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Annual Report

MTU AERO ENGINES AG

FISCAL YEAR 2021

Key facts and figures with year-on-year comparison

[T1] Selected consolidated financial information and key figures at a glance

in € million (unless stated otherwise)	2021	2020	Change against previous year in %
Revenue and earnings			
Revenue	4,188	3,977	5.3
thereof: commercial engine business[1]	1,066	1,052	1.3
thereof: military engine business[1]	482	483	-0.2
thereof: commercial maintenance business[1]	2,741	2,522	8.7
Gross profit	586	492	19.1
Earnings before interest and taxes (EBIT)	355	262	35.4
Net income	231	147	56.9
Adjusted earnings			
Adjusted earnings before interest and taxes (adjusted EBIT)	468	416	12.6
Adjusted EBIT margin (in %)	11.2	10.5	
Net income	342	294	16.0
Balance sheet			
Total assets	8,304	8,104	2.5
Equity	2,760	2,635	4.8
Equity ratio (in %)	33.2	32.5	
Net financial debt	673	781	-13.8
Cash flow			
Cash flow from operating activities	567	386	47.1
Cash flow from investing activities	-345	-245	-40.9
Free cash flow	240	105	>100
Cash flow from financing activities	-276	504	<-100
Number of employees at year end			
Commercial and military engine business	6,497	6,409	1.4
Commercial maintenance business	4,011	3,904	2.7
Total number of employees	10,508	10,313	1.9
Share indicators			
Earnings per share (in €)			
Basic earnings per share	4.17	2.63	58.5
Diluted earnings per share	4.09	2.59	57.9

[1] Before consolidation.

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To our shareholders

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Letter to our shareholders

Dear shareholders,

The coronavirus pandemic continued to have a significant impact on the aviation sector in 2021, causing repeated turbulence. As well as operating successfully in this volatile market environment, at MTU we positioned ourselves optimally for the future. The parameters for a sustained recovery of our sector are intact and we intend to secure an above-average share of the upswing.

We returned to a growth trajectory in 2021 and aim to exceed the pre-crisis level of 2019 by 2024.

All business areas at MTU should post organic growth again in 2022. We expect the strongest upward trend to come from commercial maintenance (MRO), where we are benefiting from our wide-ranging market access: We operate in the market as an independent maintenance provider, as a member of the service networks of engine systems producers (OEMs) and in partnership with airlines. In addition, we benefit from our broad portfolio, which covers all thrust and performance classes. It includes a high proportion of engines for short- and medium-haul aircraft, which are in lifecycle phases where high maintenance requirements are likely. Furthermore, our customer focus strengthens our market position: We offer our customers custom-tailored MRO solutions.

Rising demand for maintenance also has a positive impact on our spare parts business. We expect to see an increase here in 2022, especially for the V2500 for the classic A320 family and the Geared Turbofan™ for the A320neo.

Commercial series business should also grow in 2022 and beyond. Thanks to our technological edge, our crisis-resistant portfolio with stakes in leading engine programs in all segments and our broad customer base, we are well-positioned to gain an above-average share of the market growth. We anticipate that the highest growth rates will come from a strong rise in production volumes of short- and medium-haul and regional aircraft. Production rates of widebody aircraft should also pick up again. Furthermore, we are well-positioned in the business jets sector, which has proven crisis-resistant with usage rates above the pre-pandemic level.

In the military business, campaigns for the Eurofighter with the EJ200 engine and the Next European Fighter Engine for the next generation of European fighter aircraft open up attractive growth opportunities. There is also growth potential in the service and aftermarket business.

We are convinced that MTU's growth must be sustainable. MTU is a signatory of the UN Global Compact and supports the United Nations' Sustainable Development Goals. We take these goals into consideration in our business activities and pursue them as consistently as our financial targets. As an innovative engine manufacturer, MTU is aware that the Paris Agreement can only be achieved through a realistic mix of different propulsion technologies. We are working on this through our Claire (Clean Air Engine) technology agenda. Our focus here is on evolutionary engine concepts, in other words the Geared Turbofan™ programs and their ongoing development. The aim is an even greater reduction in their fuel consumption and emissions. An important step towards this is the Pratt & Whitney GTF Advantage™, which will be available from 2024. Our second area of focus is revolutionary propulsion systems, with the aim of developing completely emission-free engines. Here, we are concentrating mainly on hydrogen and flying fuel cells. Together with EASA, we are already working on the licensing requirements for fuel cell technology.

Our evolutionary and revolutionary approaches position us well to obtain stakes in engine programs for new short- and medium-haul and widebody aircraft in order to fuel the sustained growth of MTU. Moreover, we are supporting the industrial production and use of sustainable alternative fuels. Sustainability is also a key issue for us in production: Operations at our Munich site have been climate-neutral since the end of 2021. Climate protection strategies for our sites in Hanover and Ludwigsfelde will be implemented this year, followed by successive rollout to all other MTU sites.

Thanks to our crisis-resistant business model, in 2021 we paved the way for the renewed profitable and sustained upswing at MTU. In the commercial business, we have a broad customer base comprising airlines serving markets with a high proportion of domestic flights. This sector is recovering faster than international passenger traffic. Furthermore, we have many customers in the cargo sector, which is solidly above the pre-crisis level and is supporting the long-haul segment. In 2021, we aligned production rates in the commercial series business to market demand. At the same time, we prepared the company for a renewed increase in production, both organizationally and through digitalization initiatives. Capacity utilization at our maintenance shops was good in the reporting period and we were able to acquire numerous new orders. We drove forward expansion of our sites: 2021 saw the start of construction of our second Chinese site and our new repair shop in Serbia. The military business provided stability. In 2021, we achieved key milestones in the engine for the next generation of European fighter aircraft.

Our key financial indicators show how well we handled the challenges of the 2021 fiscal year: In the 2021 fiscal year, revenue was €4.2 billion. Our operating profit was €468 million and net income was €342 million, so we fully achieved our earnings targets. The figures show that we remain a reliable partner for our stakeholders even in times of crisis.

We would like to give our shareholders an appropriate share of this good performance: We are therefore proposing a dividend of €2.10 per share for 2021.

Unfortunately, our operational and financial success is not reflected in our share price performance. In 2021, MTU underperformed its competitors' shares and the shares listed in the DAX index. We cannot be satisfied with that. On the stock market, which trades in future prospects, we want to make sure our excellent perspectives make their mark.

MTU's success is based to a significant extent on the commitment, experience and competence of our employees. On behalf of the entire Executive Board, I would like to thank them most sincerely for their exceptional dedication, enormous flexibility, strong support, and discipline and responsibility in protecting against the coronavirus. The motivation and skills of our employees are key factors in our ability to look ahead to the future with confidence.

Allow me to sum up: The coronavirus pandemic has merely interrupted our profitable growth track. During 2021 already, we rebounded from the low point and intend to continue our upward course in 2022. Driven by our successful, crisis-resistant business model, the entire MTU team is working intensively to enable us to exceed the pre-crisis level by 2024.

I am delighted that you are supporting us as we head for this goal. On behalf of the entire Executive Board, I would like to thank all shareholders, customers and business partners for their support and trust during the Covid-dominated year 2021.

Sincerely yours

The Executive Board

Reiner Winkler

Chief Executive Officer (CEO), *born 1961,*
appointed until September 30, 2024

Reiner Winkler has been CEO of MTU Aero Engines AG since January 2014. His responsibilities include human resources, strategy, corporate communications and legal affairs. From May 2005 to December 2017, Winkler was MTU's Chief Financial Officer – and during the last four years of this period, he served as CFO in addition to his role as CEO. On joining MTU in 2001, Winkler, who has a degree in business administration, was placed in charge of the finance, human resources and IT departments.

Prior to that, he was managing director for finance and controlling at TEMIC Telefunken microelectronic GmbH. Further career milestones included posts with Daimler Benz AG and Siemens AG.

Peter Kameritsch

Chief Financial Officer (CFO) and Chief Information Officer (CIO)*, born 1969,*
appointed until December 31, 2025

Peter Kameritsch has been a member of the MTU Executive Board since January 2018 with responsibility for finance and IT.

He has degrees in physics and business administration. Kameritsch joined MTU in 1999 and has worked since then in management positions in finance, investor relations and corporate strategy at various MTU locations. Before his appointment to the Executive Board, he was Senior Vice President for Finance.

Lars Wagner

Chief Operating Officer (COO), *born 1975,*
appointed until December 31, 2025

Lars Wagner was appointed as MTU's Chief Operating Officer in January 2018 with responsibility for technology and development, procurement, production, assembly and quality assurance.

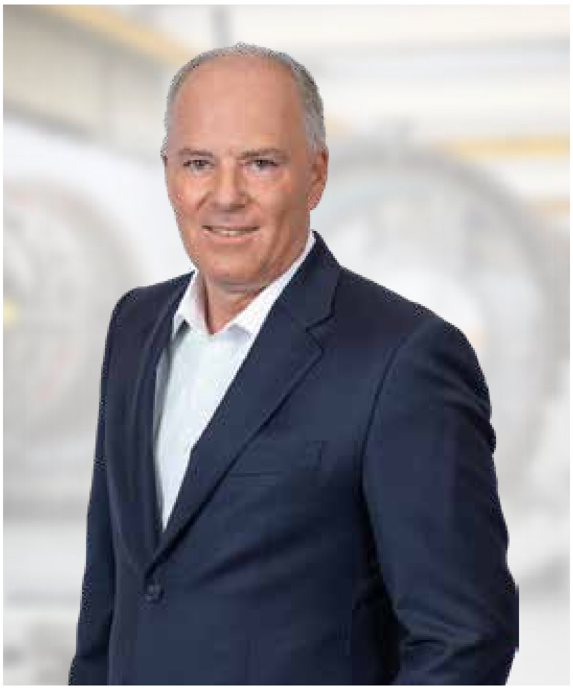
Wagner has a degree in mechanical engineering and an MBA. He joined MTU as Executive Vice President for OEM Operations in July 2015 after holding a number of management positions with Airbus, including international assignments, most recently in Hamburg.

Michael Schreyögg

Chief Program Officer (CPO), *born 1966,*
appointed until June 30, 2026

Michael Schreyögg joined the Executive Board in July 2013 with responsibility for marketing/sales and MTU's commercial and military OEM programs. In this capacity, he oversees new engine and spare parts business with OEM partners and military customers as well as aftermarket service activities for airlines. Since 2018, he has also been responsible for the MTU Maintenance sites.

Schreyögg joined MTU in 1990 with a degree in mechanical engineering. Since that time he has headed various commercial and military engine programs before assuming overall responsibility for the company's defense programs from 2008.



Report of the Supervisory Board

Klaus Eberhardt
Chairman of the Supervisory Board

Activities of the Supervisory Board

In this report, the Supervisory Board provides information in accordance with Section 171 (2) of the German Stock Corporation Act (AktG) on its activities in fiscal 2021 and the results of its review of the annual financial statements and consolidated financial statements. In 2021, which was again dominated by exceptional challenges due to the coronavirus pandemic, the Supervisory Board carried out with due care the duties of oversight and advice with which it is entrusted by law and under the terms of the company's articles of association and its own rules of procedure.

The Supervisory Board regularly advised the Executive Board on the running of the company, continually supported and monitored the management of all business activities, and assured itself that the Executive Board's dealings were proper and lawful. The Supervisory Board was informed and consulted in a direct and timely manner on all decisions of consequence for the company. The Executive Board provided the members of the Supervisory Board with regular, prompt and comprehensive information on the company's situation. The Supervisory Board received written monthly reports on the company's net assets, financial position and results of operations. New plans were explained in detail to the Supervisory Board.

The Supervisory Board discussed the strategy and all important projects with the Executive Board. After examination and careful deliberation, the Supervisory Board endorsed the company's strategic orientation with its focus on profitable organic and sustainable growth. The Supervisory Board passed resolutions on all transactions for which its approval was required in accordance with the law, the company's articles of association or the Executive Board's rules of procedure after reviewing and discussing them with the Executive Board. As needed, employee representatives or shareholder representatives meet in separate groups for discussions with members of the Executive Board as preparation for meetings of the Supervisory Board. Preparatory meetings can also take place without the Executive Board as necessary. Similarly, the Supervisory Board scheduled and held regular meetings without the Executive Board.

As in previous years, the Supervisory Board paid special attention in 2021 to the internal control mechanisms at MTU, especially the risk management system, internal auditing and legally compliant corporate governance. The Supervisory Board examined these aspects with the support of the Audit Committee and in dialogue with the Executive Board and reached the conclusion that the company has effective systems in place, in particular an effective internal control and risk management system for the accounting process.

The Supervisory Board's compliance monitoring activities are supplemented by those of the Audit Committee, which has a special responsibility in this respect. The internal auditors and the managers responsible for compliance regularly present their findings to the Audit Committee and report to it on the latest developments in the field of compliance.

In view of the new legal requirements for stock corporations, which impose an obligation to obtain the consent of the Supervisory Board for certain related party transactions, the Supervisory Board adopted an internal procedure to comply with these requirements already in 2020. In the reporting period, there were no transactions requiring consent or disclosure.

Meetings of the Supervisory Board

The Supervisory Board held five routine meetings in 2021, of which two were in-person meetings. Due to the pandemic, some of the other meetings were held exclusively as conference calls or video conferences, while some were hybrid meetings (some Supervisory Board members were present in person while others took part by video conference).

Attendance at meetings of the Supervisory Board and its committees was 100%.

[T2] Supervisory Board members' attendance at meetings of the Supervisory Board and its committees

Supervisory Board member	No. of meetings attended (incl. committee meetings)	Meetings attended in %
Klaus Eberhardt (Chairman)	12 / 12	100.0
Josef Mailer (Deputy Chairman)	14 / 14	100.0
Roberto Armellini	8 / 8	100.0
Dr. Christine Bortenlänger	9 / 9	100.0
Thomas Dautl	5 / 5	100.0
Dr.-Ing. Jürgen M. Geißinger	10 / 10	100.0
Anita Heimerl	5 / 5	100.0
Heike Madan	11 / 11	100.0
Dr. Rainer Martens	5 / 5	100.0
Dr. Joachim Rauhut	11 / 11	100.0
Prof. Dr. Marion A. Weissenberger-Eibl	5 / 5	100.0
Michael Winkelmann	5 / 5	100.0
Average attendance rate		**100.0**

Between official meetings, the chairman of the Supervisory Board was regularly briefed on the company's current situation, significant business transactions and important pending decisions. This entailed regular meetings with the Executive Board, including consulting on strategy, the status of planning, the progress of business, the company's risk situation, the risk management system and compliance.

At its meetings, the Supervisory Board and the Executive Board discussed the business performance of MTU and all its affiliated companies. Further, at its meetings the Supervisory Board discussed market conditions and the company's situation. The Supervisory Board also discussed the provisions of the German Act Implementing the Second Shareholder Rights Directive (ARUG II) and the recommendations of the German Corporate Governance Code regarding the Executive Board compensation. The new compensation system takes account of sustainability targets and provides for appropriate and motivating compensation.

At its meeting on March 9, 2021, the Supervisory Board reviewed construction progress at the location of MTU Maintenance Serbia and progress at the second location of MTU Maintenance Zhuhai. The Supervisory Board adopted the annual financial statements and the consolidated financial statements and approved the combined management report for the company and the Group for fiscal 2020. In addition, the Supervisory Board looked in detail at the allocation of the net profit for 2020 available for distribution and approved the Executive Board's profit distribution proposal. A dividend payment of €1.25 per share eligible for the dividend was therefore proposed to the Annual General Meeting on April 21, 2021. The Supervisory Board also approved the non-financial statement for the MTU Group and the company for fiscal 2020. A further question dealt with by the Supervisory Board was the appointment of an external auditor. Based on the recommendation of the Audit Committee, the Supervisory Board proposed that Ernst & Young GmbH Wirtschaftsprüfungsgesellschaft, Munich, should be appointed to audit the financial statements and consolidated financial statements and to review the half-year financial reports for 2021. Other issues examined by the Supervisory Board were the short-term incentive (STI) payable to the members of the Executive Board for 2020 and the definition of targets, bandwidths and ESG criteria for the award of STI payments to Executive Board members for 2021. The meeting also approved the assumption of a Supervisory Board mandate by a member of the Executive Board. Furthermore, the agenda of the Annual General Meeting and a resolution to hold it as a virtual event on April 21, 2021, were adopted.

At the meeting held on May 5, 2021, the Supervisory Board discussed in detail the strategic planning presented by the Executive Board. Approval was also given to the sale of the subsidiary Vericor Power Systems. Moreover, the Supervisory Board reviewed the company's cyber security measures and the information provided by the Executive Board on the use of artificial intelligence.

At the meeting held on July 27, 2021, the Executive Board gave the Supervisory Board detailed information on the status of the OEM business. It also looked ahead to the company's technology evolution and the concepts being pursued to achieve a further reduction in CO_2 emissions and other environmental impacts of aviation, for example, the use of fuel cells for emission-free flying. The members of the Supervisory Board dealt in great depth with technology issues, including the ecoRoadmap and MTU's climate strategy, which is focused on continuously reducing greenhouse gas emissions in development, production, and maintenance.

At the meeting on October 26, 2021, the Executive Board gave comprehensive information on the status and outlook of the MRO business unit. The Supervisory Board passed the resolution on adjusting Executive Board remuneration. Moreover, the members of the Supervisory Board discussed the long-term succession planning at MTU. It also examined the proposal for an adjustment of the Supervisory Board's remuneration and decided to propose a corresponding amendment of the articles of association at the Annual General Meeting 2022.

At the meeting held on December 14, 2021, the Supervisory Board deliberated in detail the operational business plans and budget for 2022. The results of the Supervisory Board's efficiency review were also discussed and compliance with the German Corporate Governance Code was verified in detail and confirmed.

Corporate governance

The Supervisory Board is convinced that the company's success is based on good corporate governance. For this reason, in 2021 the Supervisory Board once again looked in detail at the application and implementation of the German Corporate Governance Code, based on the current version of December 16, 2019. Furthermore, the Supervisory Board regularly discusses the composition of the Executive Board and Supervisory Board with a view to diversity and the appropriate inclusion of women.

The Supervisory Board's rules of procedure contain binding provisions for dealing with conflicts of interest. Such conflicts must be disclosed and, where appropriate, may result in termination of the member's term of office. There were no conflicts of interest in the reporting period. With the exception of a consulting agreement between a Supervisory Board member and a supplier of the company, there were no consulting agreements, contracts for services or similar contractual agreements between members of the Supervisory Board and MTU Aero Engines AG or any of its subsidiaries, or with customers, suppliers, lenders or other third parties in 2021. If there are any discussions or resolutions affecting this supplier in future – this was not the case during the reporting period – the Supervisory Board member concerned will not take part in them.

In addition, the Supervisory Board explicitly stated that, in the nominations it proposes to the Annual General Meeting, it takes into account the principles of avoidance of conflicts of interest and will continue to do so. When nominating candidates for election, the Supervisory Board will disclose any personal ties or business relations the candidates may have with the company, its governing bodies and/or major shareholders. There is an onboarding process for new members of the Supervisory Board. This gives them a thorough insight into MTU's product portfolio, strategy, corporate governance and how the Supervisory Board works.

The Supervisory Board also undertook a detailed examination of the recommendations of the GCGC on the independence of the members representing the shareholders. The Supervisory Board deems all of its members to be independent. This expressly applies to the employee representatives and to Dr. Rainer Martens, who ceased to be a member of MTU's Executive Board at the end of 2017. Moreover, it applies to Mr. Eberhardt and Dr. Geißinger, who have been members of the Supervisory Board for more than 12 years. The Supervisory Board has set four terms of office as the maximum for membership of the Supervisory Board and considers this to be appropriate for MTU. Consequently, all Supervisory Board committees consist exclusively of independent members. Members of the Supervisory Board undertake training on their own responsibility, with support from MTU where necessary. MTU may also defray the costs of training.
In fiscal 2021, the company supported training for the members of the Supervisory Board and its committees by arranging presentations on the German Second Act on Equal Participation of Men and Women in Management Positions (FüPoG II), the German Act on Strengthening Financial Market Integrity (FISG) and on developments in the fields of cybersecurity and artificial intelligence.

In consultation with the Executive Board, the Supervisory Board ensures long-term succession planning for appointments to the Executive Board. To this end, the Supervisory Board regularly reviews the present term of all Executive Board contracts, taking into account the age of each member, the competency profile of potential candidates and the defined diversity objective for the Executive Board.

The Supervisory Board regularly assesses how effectively the Supervisory Board as a whole and its committees perform their tasks. In 2021, the Supervisory Board conducted a self-assessment of the work in plenary session and in the Audit Committee. This took place in the form of a questionnaire, which was developed by an external law firm. The result was that the work of both the plenary session and the Audit Committee is prepared and performed efficiently. Focal areas of the self-assessment were the timeliness and scope of information provided to Supervisory Board members, the preparation and conduct of meetings of the Supervisory Board and its committees, and the composition and structure of the Supervisory Board and its committees, including the allocation of tasks between the full Supervisory Board and its committees, and the expediency of the committees that have been established, the appropriateness of the list of business activities requiring approval, the information provided to plenary sessions of the Supervisory Board by the chairpersons of the committees on the work of their committees, monitoring the cost-effectiveness of new projects, even after approval by the Supervisory Board, and examining training requirements.

Cooperation between the Supervisory Board and the Executive Board, and among the members of the Supervisory Board, was judged to be very good in 2021. No conflicts of interest arose between MTU and any member of its Executive Board or Supervisory Board.

In a joint declaration with the Executive Board dated December 14, 2021, in accordance with the requirements of Section 161 of the German Stock Corporation Act (AktG), the Supervisory Board states that MTU Aero Engines AG complies with all the recommendations of the German Corporate Governance Code in the version dated December 16, 2019. MTU's declaration of conformity is reproduced in this Annual Report in the *section of the management report headed "Corporate governance statement,"* together with a more detailed description of the company's corporate governance system. The declaration has also been posted on the MTU website.

Committee meetings

By convention, the Supervisory Board has three committees with equal numbers of employee and shareholder representatives: an Audit Committee, a Personnel Committee and – in compliance with Section 27 (3) of the German Codetermination Act (MitbestG) – a Mediation Committee. Each of these committees presents regular reports on its activities at the plenary meetings of the Supervisory Board.

A Nomination Committee, which meets on an ad hoc basis, has been set up in accordance with the recommendations of the German Corporate Governance Code. The task of the Nomination Committee is to find suitable candidates for election to the Supervisory Board. The members of this committee are Klaus Eberhardt (Chairman) and Dr. Jürgen M. Geißinger. The Nomination Committee held two meetings in 2021.

The Personnel Committee comprises Klaus Eberhardt (Chairman), Dr. Jürgen M. Geißinger and two employee representatives, Josef Mailer and Roberto Armellini. Among other things, it deals with the employment contracts of Executive Board members, including their compensation and the recommendation of candidates. The Personnel Committee convened three times in 2021 (with an attendance rate of 100%). Issues examined included the short-term incentive (STI) payable to the members of the Executive Board for 2020, the definition of targets for the award of STI payments to Executive Board members for 2021, including the targets and bandwidths for the ESG criteria, the Supervisory Board's efficiency review, and the recommendation to the Supervisory Board for the appointment and compensation of members of the Executive Board. The Supervisory Board also discussed and passed resolutions on the assumption of an external Supervisory Board mandate by a member of the Executive Board and the concept for adjusting Supervisory Board remuneration.

The Mediation Committee, whose members are identical with those of the Personnel Committee, did not have to convene in 2021.

The members of the Audit Committee are Dr. Joachim Rauhut (Chairman), Dr. Christine Bortenlänger (since April 22, 2021), Klaus Eberhardt (until April 21, 2021), Heike Madan and Josef Mailer. This committee met six times in 2021. Attendance was 100%.

The Audit Committee focused on reviewing the annual financial statements, the consolidated financial statements and the combined management report, including the non-financial statement of the MTU Group and MTU Aero Engines AG as well as the company's net assets, financial position and results of operations, and the annual and half-year reports and quarterly statements. In addition, it prepared the Supervisory Board's proposal to the Annual General Meeting on the appointment of the auditor. Further, it was responsible for engaging the auditor, Ernst & Young, the agreement with the auditor on the audit fees, and for specifying the key areas of focus for the audit of the annual financial statements and consolidated financial statements for 2021.

The Audit Committee oversaw the quality of the audit and the independence of the auditors. To this end, it obtained the auditor's statement of independence in accordance with Section 107 (3) sentence 2 of the German Stock Corporation Act (AktG).

Furthermore, the Audit Committee discussed the additional services provided by the auditor. The procedure for procuring the non-audit services provided by the auditors was reviewed and affirmed and the content and fees for such services in the reporting period were approved on a case-by-case basis.

At four of its meetings and through additional direct discussions between the Chairman of the Audit Committee and the auditor, the Audit Committee obtained reports from the auditor on its audit strategy and approach, the audit process, especially its effectiveness and progress, and the results of the audit, and asked critical questions. Moreover, it examined the qualification of the persons engaged to conduct the audit and the auditor's general quality assurance concept and its practical application. During the reporting period, the committee supplemented this with publicly available information on the quality controls performed by the auditor and its competitors. In view of the Wirecard case, during the reporting period the Audit Committee regularly discussed the role of Ernst & Young GmbH Wirtschaftsprüfungsgesellschaft, Stuttgart, as auditor of Wirecard AG. The Audit Committee questioned the auditor on this matter and evaluated its implications for the company. It did not identify any impediments to the selection of Ernst & Young GmbH Wirtschaftsprüfungsgesellschaft, Munich as auditor for the fiscal year 2022.

To assist the committee members in their tasks, they and all other members of the Supervisory Board received copies of the reports prepared by Ernst & Young concerning the audit of the annual financial statements, the consolidated financial statements and the combined management report. These documents were reviewed in detail in the presence of Ernst & Young. On this basis, the committee recommended that the Supervisory Board should adopt the financial statements and consolidated financial statements for the fiscal year 2021, and approve the combined management report and the Executive Board's profit distribution proposal.

In accordance with statutory requirements, the Audit Committee monitored the accounting process, the accounting-related internal control and risk management system and the internal auditing system, which it judged to be effective. It oversaw the company's compliance activities and received reports from the internal auditors. The Audit Committee received reports from the heads of the Corporate Audit and Compliance unit and on related party transactions. No material weaknesses were established in the internal control system for the accounting process or system for early identification of risks.

Furthermore, the committee examined the issue of aircraft funding, the company's investment policy, the reports on risk management, the outcome of the EMIR audit and, in an update, the organization of accounting at MTU.

Adoption of the annual financial statements, the approved consolidated financial statements and the management report

The annual financial statements, consolidated financial statements and combined management report of the MTU Group and MTU Aero Engines AG for 2021 were audited by Ernst & Young, Munich, whose appointment was approved by the Annual General Meeting. Ernst & Young issued an unqualified audit opinion. This was signed by Christian Baur and Gerhard Stummer, who have audited MTU since 2021 and 2020, respectively. The audit reports and documents to be reviewed were submitted in good time to all members of the Supervisory Board. The Supervisory Board conducted a thorough review of the annual financial statements, consolidated financial statements and the combined management report, including the non-financial statement of the MTU Group and MTU Aero Engines AG for 2021 and the Executive Board's proposal for the distribution of the net profit. The auditor attended the meeting of the Audit Committee of MTU Aero Engines AG on February 23, 2022, and the meeting of the Supervisory Board to discuss the financial statements on March 8, 2022, and presented the main findings of the audit. The Supervisory Board reviewed the annual financial statements, consolidated financial statements, combined management report including the non-financial statement, and the Executive Board's profit distribution proposal, and raised no objections. The company's annual financial statements and consolidated financial statements for 2021, as submitted by the Executive Board, were approved at the Supervisory

Board's meeting on March 8, 2022. The annual financial statements are therefore adopted. The Supervisory Board agreed to the Executive Board's proposal for the distribution of the net profit after giving due consideration to the interests of the company and its shareholders. A dividend payment of €2.10 per share eligible for the dividend will therefore be proposed to the Annual General Meeting.

Changes in the governing bodies, extensions of terms of office

There was one change on the Supervisory Board in 2021. There were no changes on the employees' side. On the shareholders' side, Prof. Dr. Steffens stepped down with effect from the end of December 31, 2020. Dr. Rainer Martins was appointed to the Supervisory Board by court decision as successor to Prof. Dr. Steffens effective January 26, 2021; he was elected to the Supervisory Board by the Annual General Meeting on April 21, 2021.

Klaus Eberhardt stepped down as a member of the Audit Committee with effect from the end of the Annual General Meeting on April 21, 2021. Dr. Christine Bortenlänger was elected to succeed him on the committee effective April 22, 2021.

As announced in 2020, Klaus Eberhardt will step down from the Supervisory Board at the end of the company's Annual General Meeting on May 5, 2022. At its meeting on December 14, 2021, MTU's Supervisory Board unanimously resolved to nominate Gordon Riske as a new Supervisory Board member at the company's Annual General Meeting on May 5, 2022. If the Annual General Meeting accepts this proposal, the intention is to elect Riske as Chairman of the Supervisory Board immediately after the Annual General Meeting.

The Supervisory Board would like to thank the Executive Board for its close and constructive collaboration. It would also like to thank all employees and the Works Council for their successful work and enormous commitment in 2021. Moreover, the Supervisory Board is grateful to all MTU's shareholders for the trust they place in the company.

Munich, March 8, 2022

Klaus Eberhardt
Chairman of the Supervisory Board

The Supervisory Board

Members of the Supervisory Board and the additional mandates they hold on supervisory boards or comparable oversight bodies of other business enterprises in Germany or abroad

Klaus Eberhardt

Chairman of the Supervisory Board

Independent consultant

Former CEO of
Rheinmetall AG, Düsseldorf

ElringKlinger AG

Josef Mailer

Deputy Chairman of the Supervisory Board

Chairman of the Group Works Council of
MTU Aero Engines AG, Munich

Chairman of the Works Council of
MTU Aero Engines AG, Munich

Roberto Armellini

Second authorized representative and director of
IG Metall, Munich

Dr. Christine Bortenlänger

Chief Executive of Deutsches Aktieninstitut,
Deutsches Aktieninstitut e.V., Frankfurt am Main

Covestro AG
Covestro Deutschland AG (Covestro Group)
OSRAM Licht AG, until February 23, 2021
OSRAM GmbH (OSRAM Group), until February 23, 2021
Siemens Energy AG
Siemens Energy Management GmbH
(Siemens Energy Group)
TÜV Süd AG

Thomas Dautl

Director Technical Supplier Management and Development,
MTU Aero Engines AG, Munich

Dr.-Ing. Jürgen M. Geißinger

Independent entrepreneur

Former CEO of Schaeffler AG, Herzogenaurach

Bizerba Management SE
Bizerba SE & Co. KG (Bizerba Group)
Marquardt Management SE
J. & J. Marquardt KG (Marquardt Group)

Anita Heimerl

Member of the Group Works Council of
MTU Aero Engines AG, Munich

Full-time member of the Works Council of
MTU Aero Engines AG, Munich

Heike Madan

Trade union company policy department,
Head of the union workplace representatives and company policy division, IG Metall, Frankfurt am Main

KONE GmbH

Dr. Rainer Martens, since January 26, 2021

Independent consultant

Former Chief Operating Officer of
MTU Aero Engines AG, Munich

Dr. Joachim Rauhut

Independent consultant

Former member of the Executive Board of
Wacker Chemie AG, Munich

B. Braun Melsungen AG, until March 23, 2021
creditshelf AG
J. Heinrich Kramer Holding GmbH
Stabilus S.A.

Prof. Dr. Marion A. Weissenberger-Eibl

Director of the Fraunhofer Institute for Systems and Innovation Research ISI in Karlsruhe and holder of the Chair of Innovation and Technology Management at the Karlsruhe Institute of Technology

HeidelbergCement AG
Rheinmetall AG, until May 11, 2021

Michael Winkelmann

Deputy Chairman of the Group Works Council of MTU Aero Engines AG, Munich

Chairman of the Works Council of MTU Maintenance Berlin-Brandenburg GmbH, Ludwigsfelde

MTU Maintenance Berlin-Brandenburg GmbH

Supervisory Board committees

Personnel Committee

Klaus Eberhardt, Chairman
Roberto Armellini
Dr.-Ing. Jürgen M. Geißinger
Josef Mailer

Audit Committee

Dr. Joachim Rauhut, Chairman
Dr. Christine Bortenlänger, from April 22, 2021
Klaus Eberhardt, until April 21, 2021
Heike Madan
Josef Mailer

Mediation Committee

Klaus Eberhardt, Chairman
Roberto Armellini
Dr.-Ing. Jürgen M. Geißinger
Josef Mailer

Nomination Committee

Klaus Eberhardt, Chairman
Dr.-Ing. Jürgen M. Geißinger

The MTU share

Price gains on the equity markets

Following the turbulence of 2020, the German blue-chip index, DAX, made a strong start to 2021. In the first six months, the index rose significantly with reporting on vaccines, the end of lockdowns, positive economic data and the continuation of the central banks' relaxed monetary policy driving price gains on the stock exchanges. In August, the DAX posted an all-time high of almost 16,000 points. This was followed by a correction in September.

The index subsequently rose again, reaching a high for the year of 16,251 points on November 17, 2021. The DAX closed the year at 15,885 points at the end of December 2021, a gain of 15.8% over the year.

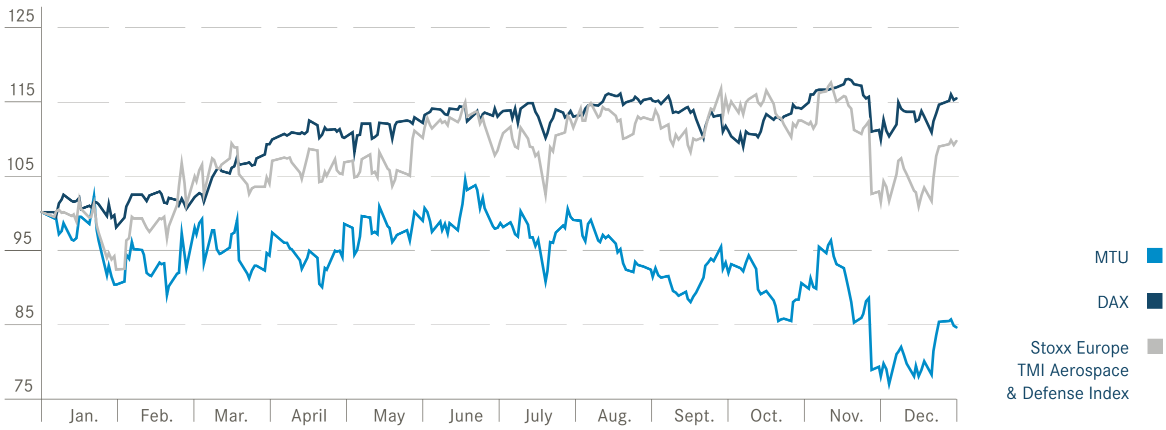
The price performance of many shares was once again highly sector-dependent in 2021. Following considerable price declines in 2020, many aviation stocks rallied at the start of 2021. Rising vaccination rates and the easing of travel restrictions in more and more countries resulted in an uptick in demand around the world. The slight upturn in aviation continued through the year. The International Air Transport Association (IATA) was cautiously optimistic in the fall, but the sector came under considerable pressure again at the end of the year due to the appearance of a new coronavirus mutation. Nevertheless, the Stoxx Europe TMI Aerospace & Defense Index, which includes shares of MTU as well as the Airbus Group, Safran, and Rolls-Royce, posted a positive trend in 2021: Over the year, it rose by 9.9%.

MTU share: setback at year's end

Following a very challenging year in 2020, MTU's share price was €211.50 at the beginning of 2021. The fallout from the coronavirus pandemic continued to affect the share price performance in 2021. The share price remained stable until mid-year, rising to a high for the year of €223.00 on June 17, 2021. On December 3, 2021, the share price dropped to €162.65, its lowest level in the year. At the end of the year, the equity markets were unsettled by the new Omicron variant, and that also affected MTU's shares, which ended the year at €179.40. MTU shares therefore fell by 15.9% during the year. The share price performance was therefore considerably weaker than the DAX and the Stoxx Europe TMI Aerospace & Defense Index.

MTU's market capitalization was around €9.6 billion at year-end 2021.

[T3] MTU share performance in 2021 compared with stock market indices (indexed; Dec. 31, 2020 = 100)



[T4] Year-on-year indicators for shares in MTU

		2021	2020
Highest price for the year[1]	€	223.00	286.70
Lowest price for the year[1]	€	162.65	106.50
Price at start of year[1]	€	211.50	258.10
Year-end price[1]	€	179.40	213.40
Performance over the year[2]	%	-16	-16
Market capitalization at year end	€ million	9,586	11,381
Average daily trading volume	€ million thousand shares	40 203	63 392
Earnings per share	€	4.17	2.63
Dividend per share	€	2.10	1.25

[1] Xetra closing price.
[2] Based on Xetra year-end share price (Dec. 31).

Dividend

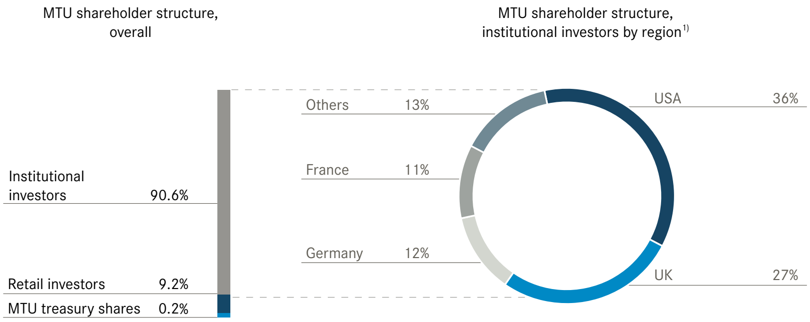
Shareholders participate in MTU's success through a dividend. The Executive Board and Supervisory Board have decided to pay a dividend for 2021. At the Annual General Meeting on May 5, 2022, they will propose payment of a dividend of €2.10 per share for the fiscal year 2021. The dividend would be paid on May 10, 2022. The payment ratio would be 33% of MTU's adjusted net income.

Trading volume

In 2021, the average number of MTU shares traded via Xetra trading was 203,000 shares per day, compared with 392,000 per day in 2020. The highest number of shares traded was 770,643 on November 26, 2021. The average daily trading volume was around €40 million (previous year: €63 million).

At the end of 2021 MTU ranked 39th in the DAX 40 index in terms of market capitalization (previous year: 31st in the DAX 30).

[T5] Shareholder structure



[1] Approximation based on top 100 shareholders.
Source: SID, December, 2021.

High proportion of institutional shareholders

There was a year-on-year rise in the number of voting rights to 53,436,048 preemptive shares. The free float was 100% on December 31, 2021. 0.15% of the shares were held by the company. Around 91% of the free float was held by institutional investors and 9% by retail investors. The majority of institutional investors are based in the USA, Germany or the UK. At the end of 2021, notifications under Section 21 (1) of the German Securities Trading Act (WpHG) had been received from the following institutional shareholders:

[T6] Institutional investors with voting rights > 3%

DGAP	Investor	Voting rights in %	No. of MTU shares
Dec. 8, 2021	BlackRock, Inc., USA	8.38%	4,480,008
Dec. 1, 2021	Kenneth C. Griffin	3.05%	1,630,560
Feb. 18, 2021	The Capital Group Companies, USA	9.94%	5,313,778
Apr. 23, 2020	Euro Pacific Growth Fund	4.84%	2,583,956
Sept. 26, 2018	Massachusetts Financial Services Company, USA	4.93%	2,561,829

* Investor share in % translated on the basis of the current voting rights of 53,436,048.

Broad coverage by analysts

In 2021, 25 analysts were reporting regularly on MTU. Buy recommendations were issued by 14 of these financial institutions, while 8 gave MTU stocks a hold rating and 3 had it on sell (previous year: 4 "buy," 15 "hold," 7 "sell"). The average price target was €213.

[T7] The following financial institutions report regularly on MTU:

Alpha Value Research	Goldman Sachs	NordLB
Barclays	Hauck & Aufhäuser	ODDO Securities Research
Berenberg	HSBC	Société Générale
BernsteinResearch	Independent Research	Stifel
BoA Merrill Lynch	JPMorgan Cazenove	UBS
Citi Global Markets Research	Kepler Cheuvreux	Vertical Research
Deutsche Bank	Landesbank Baden-Württemberg	Warburg Research
DZ Bank	Metzler	
Exane BNP Paribas	Morgan Stanley	

Intensive investor relations work

MTU again held many IR events in 2021. Due to the coronavirus situation, most one-on-one talks with investors and investors' conferences were held remotely. Overall, MTU took part in 18 international investors' conferences, including the Kepler Cheuvreux German Corporate Conference Frankfurt and the Goldman Sachs Industrials Conference.

A key platform for dialogue with shareholders was once again the MTU Annual General Meeting, which was held digitally on April 21, 2021, as a video webcast.

As in the previous year, around 72% of the share capital with voting rights was represented.

Similarly, many discussions with investors took place digitally in 2021. In all, MTU had around 1,000 contacts with investors. The annual Investor and Analyst Day took place on November 18, 2021. This virtual event brought together the MTU Executive Board and around 200 analysts and investors. The focus was on the growth-driven development of the individual business units, the technology roadmap aligned to sustainable and emission-free propulsion systems, the initial guidance for fiscal 2022 and the mid-term growth plans.

In the reporting period, accolades were awarded for the IR team's work. In the "Institutional Investor Survey 2021 All Europe Executive Team", MTU was ranked in the top 3 in the Aerospace & Defense sector in six categories. In the annual Investors' Darling Ranking by Manager Magazin, MTU was ranked 9th among the DAX companies and 16th out of the 160 public companies analyzed.

Information on IR topics can be found in the Investor Relations section of the MTU website (www.mtu.de). You are also welcome to contact the IR team by calling +49 (0)89 1489-4787.

Management compensation report

The compensation report describes the principles applied in determining the compensation for the Executive Board and Supervisory Board of MTU Aero Engines AG, and states the amount and composition of that compensation. The compensation report complies with the provisions of Section 162 of the German Stock Corporation Act (AktG).

Principles of the compensation system for members of the Executive Board

At the proposal of the Personnel Committee of MTU Aero Engines AG, the Supervisory Board decides on a system of compensation for the members of the Executive Board, including the material components of their contracts such as the amount and breakdown into non-performance-related and performance-related components. The Personnel Committee reviews the appropriateness and alignment with the market of the Executive Board compensation at regular intervals.

To take account of the requirements of the second Shareholders' Rights Directive (ARUG II) and the German Corporate Governance Code (GCGC), the Personnel Committee decided to modify the compensation system for the Executive Board with effect from the 2021 fiscal year. For this purpose, it consulted independent external compensation experts. As a result of the change in the compensation system, in addition to taking into account the achievement of the financial performance targets (adjusted EBIT and free cash flow), payment of the short-term incentive (STI) now includes the achievement of non-financial performance targets, i.e., environmental, social and governance (ESG) targets. Disbursement of the long-term performance-related component, the Restricted Stock Plan (RSP), is now based on the achievement of the performance targets adjusted EBIT and relative total shareholder return (TSR).

This ensures that corporate governance is optimally aligned with the long-term interests of the company, its investors and society. The revised compensation system for the Executive Board was introduced in the 2021 fiscal year and approved by the Annual General Meeting on April 21, 2021.

Principles of total compensation

[T8] Structure of the compensation system (total target direct compensation)

Non-performance-related components	~ 39%	Fixed compensation	Contractually agreed fixed compensation, paid in 12 equal installments
	~ 1%	Fringe benefits	- Taxable reimbursements of expenses - Cash equivalent of payments in kind - Insurance premiums
Performance-related components	~ 60%	Short-term incentive (STI) (performance-related component excluding long-term incentive)	~ 40% of variable compensation Financial performance criteria: Adjusted EBIT and free cash flow Cap 0–200% Non-financial ESG targets are taken into account via a multiplier (0.8-1.2).
		Restricted Stock Plan (RSP) (performance-related component as long-term incentive)	~ 60% of variable compensation Financial performance criteria: Adjusted EBIT and relative Total Shareholder Return Cap 0–200% Effectively granted as MTU shares (4-year holding period)

Non-performance-related components

Non-performance-related compensation (basic salary), which normally makes up around 40% of the target direct compensation, is paid on a monthly basis and consists of fixed compensation and fringe benefits. Fringe benefits comprise taxable reimbursements of expenses and the cash equivalent of payments in kind, such as the use of a company car for business and private purposes and insurance premiums, including any taxes on such benefits that have been reimbursed. In exceptional circumstances, they also include compensation for remuneration forfeited from a previous employer.

Performance-related components

Performance-related compensation makes up around 60% of the target direct compensation; it consists of a short-term incentive (STI) and the Restricted Stock Plan (RSP).

Short-term incentive (STI)

Performance-related compensation is paid in the form of a short-term incentive (STI). It normally comprises approximately 40% of the performance-related components. Its effective calculation depends on the degree of target achievement for two equally weighted key performance indicators at Group level – adjusted EBIT and free cash flow.

To ensure the comparability of the EBIT figure, it is adjusted for amounts that do not form part of the regular operating activities. These include depreciation and amortization of assets that were identified in the purchase price allocation following the carve-out in 2004 from what was then the DaimlerChrysler Group and the program assets relating to the increase in the stake in the V2500 program in 2012, which are accounted for as a reduction in revenue. In addition, adjustments are made for special items resulting from extraordinary effects (special items) resulting from impairment losses (IAS 36) and accrued restructuring expenses (IAS 37). Furthermore, an adjustment is made for the deconsolidation gain in connection with the sale of Vericor Power Systems.

MTU determines its free cash flow by combining its cash flow from operating activities with its cash flow from investing activities and eliminating components of the latter (non-recurring cash flows) that lie outside the operational management of the core business. For the reconciliation of the free cash flow, non-recurring cash outflows – comprising payments for the acquisition of shares in engine programs, payments in connection with interest-bearing loans or with financial assets held for the purpose of liquidity management, the net cash inflow in connection with the sale of Vericor and the sale of the equity investment in SMBC Aero Engines Lease B.V., and the net cash outflow for the acquisition of the remaining 20% of MTU Maintenance Lease Services B.V. – are eliminated from the cash flow from investing activities.

The targets to be achieved in the respective fiscal year to ensure payment of 100% of the STI are set annually in advance by the Supervisory Board, taking the operational business plan into account. In addition, an entry threshold is set at 80% (previous year: 70%) of the defined target level which, if achieved, corresponds to an STI payment of 50%. There is no STI entitlement below this entry threshold. Similarly, the maximum payment is limited to 200% (previous year: 180%), which is payable if the maximum target achievement of 120% (previous year: 115%) is reached. Between the entry threshold, the 100% level and maximum target achievement, the payment percentage is interpolated on a straight line in each case. The effective STI payment percentage is calculated by taking the arithmetic mean of the degree of achievement of the two performance targets.

The non-financial performance targets of relevance for the STI comprise ESG targets from the areas of environmental management, compliance, social commitment, growth & resilience, product stewardship & quality, innovation, attractiveness as an employer, employees & diversity as well as responsible procurement and digital issues. The ESG targets, their level and the target achievement ranges are defined annually by the Supervisory Board. The corresponding payment percentages are then derived from the achievement of the ESG targets and take the form of a scaled increase or reduction in the STI payment of up to 20%.

Restricted Stock Plan (RSP)/Long-term incentive (LTI)

Target achievement for the long-term incentive (LTI) component, the Restricted Stock Plan (RSP), is calculated as the arithmetic mean of the average achievement of the adjusted EBIT target used for the STI and the average total shareholder return on MTU shares relative to the STOXX Europe Total Market Aerospace & Defense (TSR) index in the fiscal year in which the LTI is granted and the two preceding years. The target range for the LTI is between 80% and 120% and the corresponding payment percentage is between 50% and 200%. The entry threshold for the TSR has been set at a relative performance versus the reference index of –10 percentage points. This corresponds to a payment of 50%. The maximum TSR target achievement is outperformance of the index by +10 percentage points, corresponding to an LTI payment level of 200%. Analogously to the STI, the TSR target achievement level is interpolated on a straight line between the entry threshold, and a relative performance of zero and maximum target achievement. The LTI is awarded as a taxable cash settlement and is contingent upon reinvestment of the full amount in MTU shares with a holding period of four years.

Further rules on compensation

For new appointments to the Executive Board, the previous defined-benefit pension entitlement will, in the future, be altered to an annual contribution to a personal pension plan.

Further, the new compensation system for the Executive Board contains penalty and claw-back rules. This enables the Supervisory Board, at its discretion, to reduce performance-related components that have not been paid out (penalty clause) or claim reimbursement of performance-related components that have already been paid (claw-back clause). The penalty and claw-back clauses take effect in cases of serious breaches of contract (Code of Conduct or compliance guidelines) and retrospective adjustment of performance-related compensation components that have been determined and/or paid on the basis of inaccurate consolidated financial statements if the amended consolidated financial statements would have resulted in a lower payment.

The share ownership guidelines require the CEO and the other members of the Executive Board to acquire shares in MTU equivalent to 300% (CEO) and 200% (other Executive Board members) respectively of their gross annual basic salary within four years (including shares acquired through the RSP). This individual obligation was complied with in the reporting period in each case. The shares are subject to a two-year lock-up period when a member leaves the Executive Board.

Termination benefits paid to a member of the Executive Board as a result of early termination of their contract, including in the event of a change of control, are limited to two years' total annual compensation (cap on termination benefits) or the compensation due for the remaining term of the contract, whichever is lower. There has not be any change to the members of the Executive Board so the rulings relating to changes on the Executive Board did not apply in the reporting period.

Under Section 87a (2) sentence 2 of the German Stock Corporation Act (AktG), in specific exceptional circumstances (e.g. in the event of a serious financial or economic crisis), the Supervisory Board may temporarily depart from the defined compensation system if this is in the long-term interests of MTU. General unfavorable market developments explicitly do not constitute specific exceptional circumstances permitting temporary departure from the compensation system. Departure from the compensation system is only possible on the basis of a corresponding resolution by the Supervisory Board, based on a proposal by the Personnel Committee, after careful examination of its necessity. Even in such cases, the compensation must still be geared to the long-term and sustainable development of MTU and reflect the success of the company and the performance of the Executive Board.

The components of the compensation system where such departures are permitted in the circumstances outlined above are the performance criteria for the STI and RSP and their weighting, the ranges for possible achievement of the targets and the methods used to determine target achievement. Similarly, the Supervisory Board can temporarily grant additional compensation components or replace individual compensation components by other compensation components if the incentive effect of the compensation of the Executive Board cannot be achieved adequately by adjusting the existing compensation components.

In accordance with Section 87a (1) sentence 2 no. 1 of the German Stock Corporation Act (AktG), the Supervisory Board has set a maximum level of compensation for each member of the Executive Board. This comprises all fixed and variable components (fixed compensation, annual performance-related compensation and the Restricted Stock Plan). The maximum compensation caps the total compensation granted for a specific fiscal year, irrespective of the time of payment. It is €5.5 million for the Chairman of the Executive Board and €3.0 million for the other Executive Board members.

Development of performance-related components

Short-term incentive (STI)

The Supervisory Board set the following performance targets for the performance period: for the short-term incentive (STI), adjusted EBIT of €400 million (actual: €468 million) and free cash flow (FCF) of €170 million (actual: €240 million). Consequently, the entry threshold for target achievement for the STI was exceeded in the reporting period and the payment percentage was therefore 200% (previous year: 0%).

As ESG targets for the reporting period, the Supervisory Board chose the areas of environmental management (criterion: CO_2 emissions relative to production hours) and attractiveness as an employer and employees & diversity (criterion: commitment & leadership). A target range of 80–120% was set for each of these criteria. Both target ranges are included in the determination of the ESG multiplier as an average.

Target achievement for the criterion "CO_2 emissions relative to production hours" is measured by the reduction compared with the reference year 2019 (28.9 kilograms per production hour). The target was an overall reduction of 6% to 27.2 kilogram per production hour, with 5 percentage points of this to be achieved by the purchase of renewable energies and 1 percentage point to be achieved through sustainable operational measures, e.g., to increase energy efficiency or energy generated by the company from renewable resources. Compared with the reference year, 2021 was overshadowed by the coronavirus pandemic. Consequently, MTU purchased green power to offset the exceptional, pandemic-related effects. By contrast, measures geared to the sustained avoidance of CO_2 emissions reduced emissions by 1.8%, so the target of 1 percentage point was exceeded. Renewables accounted for 8.6% of purchased electricity (excluding offsetting of the exceptional pandemic-related effects); therefore, the 5 percentage point target was exceeded. Total CO_2 emissions in the period December 2020 to November 2021 were 26.4 kilograms per production hour.

The target achievement range for the sustainable measures in production was defined as a target achievement contribution of 80% for a target achievement level of up to 0.7% and 120% for a target achievement level of 1.3% or above. The bandwidth for target achievement for the purchase of renewable energies was defined as a target achievement contribution of 80% for a target achievement level of up to 3.5% and a target achievement contribution of 120% for a target achievement level of 6.5% or above. Since the result was well above the levels set for both of these sub-targets, the maximum target achievement contribution of 120% was achieved for the overall criterion "CO_2 emissions relative to production hours."

Achievement of the target for the "commitment & leadership" criterion is derived from employee feedback, based on employee surveys ("pulse checks"). For this purpose, only the number of explicitly positive replies is counted. This is then expressed as a percentage of the total number of replies. The total index value calculated in this way is weighted with a target achievement level of 80% for a score of 60%, 100% for a score of 75% ,and 120% for a score of 90%. The overall index for 2021 derived from all three pulse checks was around 73% and thus slightly below the target of 75% positive assessments in the "commitment & leadership" criterion. In view of the pandemic situation in 2021, this was nevertheless a good result and led to a target achievement contribution of 97% for the "commitment & leadership" criterion.

The target achievement levels outlined above for the ESG criteria result in an ESG multiplier of 1.09.

Restricted Stock Plan (RSP)/ Long-term incentive (LTI)

The value of the Restricted Stock Plan is based on the contractually agreed RSP grant value and the realized multi-year performance level. The latter is calculated for each Executive Board member in the reporting period as the arithmetic mean of the target achievement of the adjusted EBIT and the relative total shareholder return (TSR) measured against the STOXX® Europe Total Market Aerospace and Defense in the reporting period as well as the two previous years (previous year: as an arithmetic mean of the payment percentages of the short-term incentive (STI) in the three fiscal years before the reporting period).

Achievement of the LTI performance targets developed as follows:

[T9] Achievement of LTI performance targets (in %)

	Adjusted EBIT	TSR
2021	185	
2020		175
2019	141	200
3-year target achievement adjusted EBIT	**109**	**125**

As a consequence of the change in the measurement of achievement of the LTI target, payment of the performance-related LTI components (RSP) granted for the reporting period will only be paid out in the following year (in the previous year: the LTI/RSP was granted and paid out in the same reporting period).

The following table shows the basis for determining the multi-year target achievement level for the performance-related components:

[T10] Variable compensation payment percentages

	2021	2020	2019	2018	2017
STI	218		180	161	180
RSP/LTI	117	174	165	168	158
Price of RSP shares purchased					
Purchase price per share	[1]	119	209	143	131

[1] Purchase will take place in 2022.

Compensation of individual members of the Executive Board

Compensation for the reporting period

The following table contains an individual breakdown of the compensation of each Executive Board member for the reporting period. The non-performance-related compensation is reported as compensation granted and corresponds to the amounts paid in the reporting period.

The performance-related compensation is reported as compensation granted and owed and corresponds to the expected amount of performance-related compensation based on the consolidated financial statements for the reporting period.

[T11] Total compensation granted and owed

Members of the Executive Board	**Reiner Winkler** Chief Executive Officer	**Peter Kameritsch** Chief Financial Officer and Chief Information Officer	**Michael Schreyögg** Chief Program Officer	**Lars Wagner** Chief Operating Officer	**Total**
in €	2021	2021	2021	2021	2021
Fixed compensation	924,000	525,000	525,000	525,000	2,499,000
Fringe benefits [1]	26,668	13,522	31,742	10,639	82,570
Total non-performance-related compensation	**950,668**	**538,522**	**556,742**	**535,639**	**2,581,570**
Proportion of non-performance-related compensation in %	**27%**	**30%**	**30%**	**30%**	
STI [2] [3]	1,449,700	709,590	709,590	709,590	3,578,470
RSP/LTI [2]	1,064,412	564,337	564,337	564,337	2,757,424
Total performance-related compensation	**2,514,112**	**1,273,927**	**1,273,927**	**1,273,927**	**6,335,894**
Proportion of performance-related compensation in %	**73%**	**70%**	**70%**	**70%**	
Total compensation granted and owed	**3,464,780**	**1,812,449**	**1,830,669**	**1,809,566**	**8,917,464**
Service cost (IAS 19) [4]	260,938	379,670	415,951	469,147	1,525,706
Total compensation	**3,725,718**	**2,192,119**	**2,246,620**	**2,278,713**	**10,443,170**

[1] Fringe benefits include charges to taxable income covering benefits in kind amounting to €75,573 (previous year: €78,246) and premiums for insurance policies taken out on behalf of members of the Executive Board amounting to €6,997 (previous year: €6,997).
[2] The amount reported for the variable compensation corresponds to the amount promised for 2021, to be paid out in 2022 after adoption of the annual financial statements.
[3] Non-financial ESG targets are included using a multiplier of 1.09.
[4] The service cost takes into account the effects of the adjustment of the fixed compensation adopted in the reporting period with effect from January 1, 2022.

In the reporting period, former Executive Board members received €3,650,605 of their pension entitlement (Dr. Rainer Mertens: pension of €225,811; Dr. Weingartner: lump sum of €3,424,794). Members of the Executive Board did not receive any compensation for board appointments in Group companies. The Group did not grant any loans to members of the Executive Board in the reporting period or the previous year. The compensation of the Executive Board did not have to be adjusted due to a penalty or claw-back ruling in either the reporting period or the previous year. Moreover, there was no need to temporarily depart from the defined compensation system due to specific exceptional circumstances. The agreed maximum compensation of €5.5 million for the CEO and €3.0 million for each of the other Executive Board members was not exceeded.

The individual compensation of the Executive Board and Supervisory Board members, the earnings indicators for the company and the Group and the average compensation of the workforce changed as follows:

[T12] Vertical comparison

	Change 2021 vs. 2020	Change 2020 vs. 2019	Change 2019 vs. 2018	Change 2018 vs. 2017
Compensation granted and owed to present Executive Board members				
Reiner Winkler	37%	-31%	20%	4%
Peter Kameritsch	31%	-28%	52% [1]	-
Michael Schreyögg	31%	-28%	2%	4%
Lars Wagner	32%	-28%	52% [1]	-
Compensation of former Executive Board members				
Dr. Rainer Martens	- [2]			
Dr. Stefan Weingartner	- [2]			
Compensation granted and owed to present Supervisory Board members				
Klaus Eberhardt (Chairman of the Supervisory Board, Personnel Committee and Nomination Committee)	-6%	9%	1%	0%
Josef Mailer (Deputy Chairman of the Supervisory Board)	-6%	1%	-1%	3%
Dr. Joachim Rauhut (Chairman of the Audit Committee)	-5%	-6%	1%	0%
Roberto Armellini	-4%	79%	- [3]	
Dr. Christine Bortenlänger	17%	-9%	35%	- [4]
Thomas Dautl	3%	-9%	0%	0%
Dr.-Ing. Jürgen M. Geißinger	2%	2%	-3%	4%
Anita Heimerl	0%	-7%	105%	- [5]
Heike Madan	-6%	-7%	2%	0%
Dr. Rainer Martens	- [6]			
Prof. Dr. Marion A. Weissenberger-Eibl	3%	-9%	0%	0%
Michael Winkelmann	48%	- [7]		
Earnings indicators				
Adjusted Group EBIT (IFRS)	13%	-45%	13%	11%
Net profit of MTU Aero Industries AG (German Commercial Code [HGB])[8]	50%	64%	-69%	-8%
Average compensation of the workforce				
Employees in Germany[9]	8%	-7%	1%	1%

[1] Executive Board member since January 1, 2018.
[2] First-time payment in reporting period.
[3] Supervisory Board member since June 13, 2019.
[4] Supervisory Board member since April 11, 2018.
[5] Supervisory Board member since July 17, 2018.
[6] Supervisory Board member since January 26, 2021.
[7] Supervisory Board member since May 1, 2020.
[8] Not relevant for compensation; does not provide a very meaningful insight into the economic development of MTU Group.
[9] Includes the active workforce in Germany (permanent employees, including employees on parental leave working part-time) standardized to full-time equivalents (FTEs) based on the following compensation elements: basic salary and, depending on employment group, collectively agreed one-time payments or variable compensation (profit-sharing bonus, bonuses I and II, STI and LTI).

In view of the extensive operating activities of the national companies in the MTU Group and the fact that MTU Aero Industries AG performs central tasks for the MTU Group, for example financing and its role as a tax group, the net profit of MTU Aero Engines AG for individual reporting periods is produced on a technical basis and are not a good reflection of the performance of the MTU Group. Accordingly, the suitability of the net profit as a reference base for performance-related compensation components is low. Therefore, the adjusted EBIT for the Group was included in the vertical comparison as an additional earnings indicator as it is used as the financial performance indicator for the STI and RSP. In all compensation groups evaluated, the calculation of the annual changes in compensation excludes company pension schemes.

Rules when terminating the contracts of members of the Executive Board

The active members of the Executive Board are given defined benefit commitments whose structure corresponds to that of pension commitments for members of governing bodies of peer-group companies. Executive Board members appointed from January 1, 2021, will receive a pension allowance as a contribution to a pension plan, paid out annually in cash, instead of the pension entitlements outlined above. This enables Executive Board members to take personal responsibility their pension provision. By granting this annual pension allowance, MTU no longer bears any interest rate risks and other biometric risks associated with the financing of pensions.

Retirement and survivors' pensions

The members of the Executive Board earn company pension entitlements in accordance with the "MTU Pension Capital" plan, which governs the post-employment benefits for members of the Executive Board of MTU Aero Engines AG. The benefit target is to provide a pension amounting to 60% of the basic salary after 15 years of service on the Executive Board. When the previous plan was replaced, the benefits earned up until December 31, 2009, were transferred to the new plan as the initial transfer amount. This entitlement represents the benefits payable under the old plan at the age of 60, adjusted by the ratio of actual years of service with the Group to the number of years from joining the Group until the age of 60. The initial transfer amount corresponds to the pension equivalent converted into a one-time capital amount.

Once the initial transfer amount has been determined, a pension account is opened for each member of the Executive Board, to which further capital units are credited annually. The annual capital units are determined on the basis of the individual Executive Board member's contribution and an age-related factor. The age-related factor represents an interest rate of 6% p.a. until the age of 60. The contribution period is normally limited to 15 years of service on the Executive Board and ends at the age of 60. From the age of 61, the pension account earns interest at 4% p.a. until the pension is drawn (= bonus amount). The total of accrued capital units, plus the initial transfer amount and any bonus amounts credited, make up the pension capital available to finance post-employment benefits. If benefits are payable because a member of the Executive Board becomes disabled or dies before reaching the fixed retirement age of 60, 50% of the benefits earnable up to the fixed age limit are added to the accrued balance on the pension account, taking into account the promised contribution period. The amount credited is based on the contribution paid at the time of exit.

When an insured event occurs, the pension capital is generally granted as a one-time payment. However, at the request of the Executive Board member and subject to the Group's approval, the balance accumulated on the pension account may either be drawn as capital in ten installments (with a 4% increase in the balance accumulated) or as a life annuity with annual increments of 1%. When an insured event occurs, the pension account is topped up to the level of benefit commitment under the previous plan (guaranteed capital). Pension benefits do not become payable until an insured event occurs (i.e., on reaching pensionable age, or in the event of disability or death), even if the insured party leaves the Executive Board. The pension entitlement is vested from inception.

Basic details of the above-mentioned commitments and benefits are shown in the following table:

[T13] Pension commitments

Members of the Executive Board in €	Initial transfer amount[1]	Guaranteed capital[2]	Annual contribution[3]	End of contribution period	Lump-sum payment[4]
Reiner Winkler	1,625,140 [5]	2,510,788	400,000	Aug. 1, 2021 [6]	8,537,538 [7]
Peter Kameritsch	461,573	461,573	226,027	April 1, 2029	5,096,879
Michael Schreyögg	365,627	365,627	215,478	Aug. 1, 2026	4,801,945
Lars Wagner	207,344	207,344	211,965	Jan. 1, 2033	6,939,676

1) Credit for past service up to date of changeover to new system – Reiner Winkler: December 31, 2009; Michael Schreyögg: July 1, 2013; Peter Kameritsch and Lars Wagner: January 1, 2018.
2) Level of benefits to which the insured party would have been entitled under the previous pension plan.
3) This contribution will change in 2022 in line with the adjustment to the fixed compensation adopted in the reporting period with effect from January 1, 2022.
4) All entitlements to company pension benefits (including the individual employee-funded capital account ["Pension Capital Aufbaukonto"]) taking into account the maximum contribution period.
5) Under the previous pension plan, Reiner Winkler was promised that his years of service with former Group companies would count toward his pension. In connection with the transfer of his pension entitlements to the new plan, he was promised a special transfer amount of € 575,065 in 2010
6) As part of the contract extension in 2018, the contribution period was extended to the age of 60.
7) Based on interest of 4% p.a., the one-time payment at the end of the settlement period on September 30, 2024, will amount to €9,511,228.

The differences in the annual contributions to the pension accounts result from the remaining periods of service until the end of the respective maximum contribution period, the respective age-related factors, and the individual amounts of pensionable compensation.

The following table shows the service cost for the reporting period and the previous year, and the corresponding levels of provisions, recognized in accordance with IFRS and the German Commercial Code (HGB) for members of the Executive Board:

[T14] Additions to pension provisions and total amounts

Members of the Executive Board in €	Year	Service cost (IFRS)	Service cost (German Commercial Code [HGB])	Carrying amount of pension provisions as of Dec. 31 (IFRS)[1) 2)]	Carrying amount of pension provisions as of Dec. 31 (German Commercial Code [HGB])[2]
Reiner Winkler	**2021**	**260,938**	**243,774**	**8,711,581**	**8,444,796**
	2020	255,395	234,398	8,608,974	7,905,351
Peter Kameritsch	**2021**	**379,670** [3]	**124,774**	**4,275,046**	**3,947,779**
	2020	138,191	118,398	4,051,864	3,404,331
Michael Schreyögg	**2021**	**415,951** [3]	**114,999**	**4,423,074**	**4,203,142**
	2020	124,184	110,046	4,115,516	3,649,182
Lars Wagner	**2021**	**469,147** [3]	**240,408**	**2,254,645**	**1,933,896**
	2020	299,930	223,804	1,938,897	1,435,098
Total	**2021**	**1,525,706**	**723,955**	**19,664,346**	**18,529,613**
Total	**2020**	**817,700**	**686,646**	**18,715,251**	**16,393,962**

1) The service cost and provisions take into account the effects of the adjustment to the basic salary adopted in the reporting period with effect from January 1, 2022.
2) Where appropriate, the provisions include obligations relating to claims arising from the individual employee-funded capital accounts ("Pension Capital Aufbaukonto") from previous service periods.
3) The service cost comprises past service cost in line with the adjustment to the fixed compensation adopted in the reporting period with effect from January 1, 2022.

The defined benefit obligations for former members of the Executive Board, measured in accordance with International Financial Reporting Standards (IFRSs), amount to €14,554,392 (previous year: €19,480,470).

Severance payments on premature termination of contracts of service with members of the Executive Board

If the appointment of an Executive Board member is terminated by MTU for cause and termination of the contract takes place with immediate effect, the STI will not be paid for that fiscal year. If the contract of service is terminated by MTU or the Executive Board member subject to the period of notice, the Executive Board member is entitled to a pro-rata STI payment for the remaining term of the contract.

If, before the end of the holding period for shares under the RSP, the Executive Boards contract of service ends as a result of extraordinary termination by MTU for cause pursuant to Section 626 (1) of the German Civil Code (BGB) or due to the resignation of the Executive Board member without reaching mutual agreement, or if the appointment is revoked by the Supervisory Board for cause pursuant to Section 84 (3) of the German Stock Corporation Act (AktG) before the end of the holding period, or if the Executive Board member resigns before the end of the holding period, the Executive Board member must refund the (gross) value of the RSP that has been paid out.

Severance payments on premature termination of contracts of service with members of the Executive Board in the event of a change of control or changes of shareholders of MTU Aero Engines AG

Under the contracts of service for members of the Executive Board in effect since January 1, 2021, a change of control is deemed to have occurred if a shareholder, alone or on the basis of the voting rights attributable to him or her pursuant to Section 22 of the German Securities Trading Act (WpHG), acquires the majority of the voting rights and this results in significant disadvantages for the Executive Board. Material disadvantages are, in particular, if the Executive Board member is removed, if the member's responsibilities and duties are significantly altered, or if the Executive Board member is asked to accept a reduction in employment benefits or to agree to premature termination of the respective contract of service. In such case, each member of the Executive Board shall have a special right of termination, which is to be exercised within a period of six months, with a period of notice of three months to the end of a month. If a member of the Executive Board makes use of the special right of termination, or if the Executive Board member's contract of service is terminated by mutual consent within nine months of the change of control, the Executive Board member receives a severance payment corresponding to the benefits still to be awarded up to the end of the contract term originally agreed. For the calculation of the severance payment, 100% target fulfillment is agreed for the variable compensation components. However, payments may not exceed two years' total annual compensation. If the cap on termination benefits is exceeded, the severance payment is reduced to the amount of the cap or the compensation due for the remaining term of the contract, whichever is lower.

Compensation of the Supervisory Board

The rules governing Supervisory Board compensation are laid down in the articles of association of MTU Aero Engines AG. The compensation is relative to the size of the Group and the duties and responsibilities of the Supervisory Board members.

Pursuant to Article 12 of the current articles of association of MTU Aero Engines AG, members of the Supervisory Board receive fixed annual compensation of €50,000, payable after the end of the fiscal year. The chair of the Supervisory Board receives three times and the deputy one-and-a-half times the amount of fixed compensation. In addition to this compensation, members serving on one of the Supervisory Board's committees receive an additional €10,000 for the fiscal year and a further

€20,000 for the fiscal year if they chair a committee. Furthermore, members of the Supervisory Board receive an attendance fee of €3,000 per meeting of the Supervisory Board and its committees, limited to €3,000 per day. The attendance fee is halved for meetings convened by the chair or deputy chair if they are conducted by means of telecommunication (telephone or videoconference). Expenses incurred in connection with the exercise of their office are reimbursed, as is any value-added tax payable on compensation.

The members of the Supervisory Board do not receive any share-based compensation.

The following table contains an individualized breakdown of the compensation of each Supervisory Board member in the reporting period (figures exclude value-added tax). The fixed annual payment and compensation for committee membership are disclosed as compensation owed and comprise the compensation for the reporting period paid out at the start of the following year.

The attendance fees are disclosed as compensation granted and are the amounts paid to each member in the reporting period.

[T15] Compensation granted and owed to the Supervisory Board for 2021

Supervisory Board members	Fixed annual payment		Compensation for committee membership		Attendance fees		Total compensation	
	in €	in %	in €	in %	in €	in %	in €	in %
Klaus Eberhardt (Chairman of the Supervisory Board, Personnel Committee and Nomination Committee) [3]	150,000	64%	63,083	27%	21,000	9%	234,083	100%
Josef Mailer (Deputy Chairman of the Supervisory Board) [1] [2] [6]	75,000	66%	20,000	17%	19,500	17%	114,500	100%
Dr. Joachim Rauhut (Chairman of the Audit Committee)	50,000	53%	30,000	32%	15,000	16%	95,000	100%
Roberto Armellini [1] [6]	50,000	69%	10,000	14%	12,000	17%	72,000	100%
Dr. Christine Bortenlänger [4]	50,000	73%	6,917	10%	12,000	17%	68,917	100%
Thomas Dautl	50,000	83%			10,500	17%	60,500	100%
Dr.-Ing. Jürgen M. Geißinger [1] [5]	50,000	57%	20,000	23%	18,000	20%	88,000	100%
Anita Heimerl [6]	50,000	83%			10,500	17%	60,500	100%
Heike Madan [2] [6]	50,000	67%	10,000	13%	15,000	20%	75,000	100%
Dr. Rainer Martens (since January 26, 2021)	46,528	82%			10,500	18%	57,028	100%
Prof. Dr. Marion A. Weissenberger-Eibl	50,000	83%			10,500	17%	60,500	100%
Michael Winkelmann [6]	50,000	83%			10,500	17%	60,500	100%
Total	**721,528**		**160,000**		**165,000**		**1,046,528**	

[1] Member of the Personnel Committee.
[2] Member of the Audit Committee.
[3] Member of the Audit Committee until April 21, 2021.
[4] Member of the Audit Committee since April 22, 2021.
[5] Member of the Nomination Committee.
[6] These employee representatives have declared that they will donate their Supervisory Board compensation to the Hans-Böckler-Stiftung, in accordance with the guidelines of the Confederation of German Trade Unions.

Independent auditor's report

To MTU Aero Engines AG, Munich

We have audited the attached remuneration report of MTU Aero Engines AG, Munich, prepared to comply with Sec. 162 AktG ["Aktiengesetz": German Stock Corporation Act] for the fiscal year from 1 January 2021 to 31 December 2021 and the related disclosures.

Responsibilities of the executive directors and the supervisory board

The executive directors and supervisory board of MTU Aero Engines AG, Munich, are responsible for the preparation of the remuneration report and the related disclosures in compliance with the requirements of Sec. 162 AktG. In addition, the executive directors and supervisory board are responsible for such internal control as they determine is necessary to enable the preparation of a remuneration report and the related disclosures that are free from material misstatement, whether due to fraud or error.

Auditor's responsibility

Our responsibility is to express an opinion on this remuneration report and the related disclosures based on our audit. We conducted our audit in compliance with German Generally Accepted Standards for Financial Statement Audits promulgated by the Institut der Wirtschaftsprüfer [Institute of Public Auditors in Germany] (IDW). Those standards require that we comply with ethical requirements and plan and perform the audit to obtain reasonable assurance about whether the remuneration report and the related disclosures are free from material misstatement.

An audit involves performing procedures to obtain audit evidence about the amounts in the remuneration report and the related disclosures. The procedures selected depend on the auditor's judgment, including the assessment of the risks of material misstatement of the remuneration report and the related disclosures, whether due to fraud or error. In making those risk assessments, the auditor considers internal control relevant to the preparation of the remuneration report and the related disclosures in order to plan and perform audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the entity's internal control. An audit also includes evaluating the accounting policies used and the reasonableness of accounting estimates made by the executive directors and supervisory board, as well as evaluating the overall presentation of the remuneration report and the related disclosures.

We believe that the evidence we have obtained is sufficient and appropriate to provide a basis for our opinion.

Opinion

In our opinion, on the basis of the knowledge obtained in the audit, the remuneration report for the fiscal year from 1 January 2021 to 31 December 2021 and the related disclosures comply, in all material respects, with the financial reporting provisions of Sec. 162 AktG.

Other matter – formal audit of the remuneration report

The audit of the content of the remuneration report described in this auditor's report comprises the formal audit of the remuneration report required by Sec. 162 (3) AktG and the issue of a report on this audit. As we are issuing an unqualified opinion on the audit of the content of the remuneration report, this also includes the opinion that the disclosures pursuant to Sec. 162 (1) and (2) AktG are made in the remuneration report in all material respects.

Limitation of liability

The "General Engagement Terms for Wirtschaftsprüfer and Wirtschaftsprüfungsgesellschaften [German Public Auditors and Public Audit Firms]" as issued by the IDW on 1 January 2017, which are attached to this report, are applicable to this engagement and also govern our responsibility and liability to third parties in the context of this engagement.

Munich, 8 March 2022

Ernst & Young GmbH
Wirtschaftsprüfungsgesellschaft

Baur	Stummer-Jovanovic
Wirtschaftsprüfer	Wirtschaftsprüfer
[German Public Auditor]	[German Public Auditor]

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Combined management report

The management report of MTU Aero Engines AG and the Group management report for the fiscal year 2021 have been combined in accordance with Section 315 (5) of the German Commercial Code (HGB) in conjunction with Section 298 (2) of the German Commercial Code (HGB).

The MTU Group

Business activities and markets

MTU's portfolio covers the entire lifecycle of commercial and military aircraft engines and aero-derivative industrial gas turbines. The company's activities range from development, manufacturing and marketing to maintenance.

MTU has technological expertise in low-pressure turbines, high-pressure compressors and turbine center frames, and in repair techniques and manufacturing processes. It is involved in important national and international technology programs and cooperates with the top names in the industry (GE Aviation, Pratt & Whitney and Rolls-Royce).

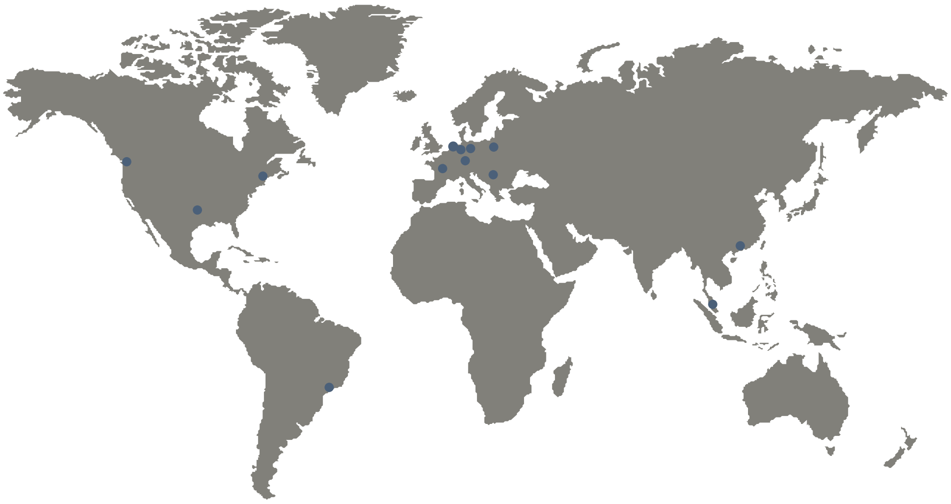
The Group also provides maintenance services for commercial aircraft engines. In the military sector, it has been the leading industrial partner to the German armed forces for decades.

MTU operates in two segments: the OEM business (Original Equipment Manufacturing) and MRO business (Maintenance, Repair and Overhaul). The OEM segment covers new commercial engines, including spare parts, and the whole of the military sector. The MRO segment comprises the commercial maintenance activities.

Group structure, locations and organization

Through its subsidiaries, joint ventures and equity investments, MTU has a presence in all key markets and regions worldwide. Further information on MTU's shareholdings is provided in the *Notes to the consolidated financial statements in Section I. "Accounting policies and principles."*

[T16] MTU Aero Engines worldwide



MTU Maintenance Canada

MTU Aero Engines North America

MTU Maintenance Dallas

MTU Maintenance do Brasil

MTU Aero Engines

MTU Maintenance Hannover

MTU Maintenance Berlin-Brandenburg

MTU Maintenance Lease Services

MTU Aero Engines Polska

MTU Maintenance Serbia

EME Aero[1)]

AES Aerospace Embedded Solutions[1)]

Pratt & Whitney Canada Customer Service Centre Europe[1)]

Ceramic Coating Center[1)]

MTU Maintenance Zhuhai[1)]

Airfoil Services[1)]

[1)] Joint ventures.

[T17] MTU's global workforce

Number of employees	Dec. 31, 2021	Dec. 31, 2020	Change against previous year: Employees	Change against previous year: in %
Locations in Germany	8,739	8,700	39	0.4
Locations outside Germany	1,769	1,613	156	9.7
Total workforce	**10,508**	**10,313**	**195**	**1.9**

Corporate strategy

MTU's corporate strategy is geared to profitable growth and customer satisfaction. The four target areas of MTU's growth strategy are:

A balanced product portfolio – Participation in rapidly growing new programs

MTU focuses on rapidly growing and high-volume military and commercial engines and works with various partners. It optimizes its risk profile and growth opportunities through continuous participation in varying thrust classes and fields of application. MTU Aero Engines is currently focusing on ramping up production of Geared Turbofan™ engines for regional and medium-haul jets, which it has developed together with partners, where the ramp-up has been delayed by the Covid crisis. At the same time, it is concentrating on the ongoing development of this engine as the Pratt & Whitney GTF Advantage™ and on developing General Electric's GE9X engine program for the Boeing 777X widebody aircraft. There will also be a cargo version of the aircraft. MTU's excellent positioning in the MRO segment is partly due to these programs, as the company has secured itself a share of the future aftermarket service business through its stakes in these engine programs.

In the commercial maintenance business, the company is driving forward the expansion of its portfolio of products and services, including digital services, to enhance customer satisfaction and continuously broaden its customer base.

In the military business, the discussions about future procurement programs have become more concrete at both national and European level. Germany, France and Spain are planning to introduce the new Future Combat Air System (FCAS) from 2040. A key element of this system is a new fighter plane. MTU aims to develop the engine for this plane jointly with Safran Aircraft Engines, Paris, France and ITP Aero, Zamudio, Spain.

Cutting-edge technologies – Maintaining and expanding technological leadership

MTU is currently extending its technological leadership by focusing on the ongoing development of gas turbines for aircraft, for example, using new materials and modern manufacturing technologies such as additive processes. In combination with optimized cyclic processes, the aim for the mid term is to raise the efficiency of MTU's core modules – the low-pressure turbine, high-pressure compressor and turbine center frame – and reduce their weight, in order to increase profitability and environmental friendliness.

The aim of reducing the climate impact of aviation set out in the Paris Agreement is far more ambitious than the previous declarations of intent by the aviation sector, for example, in Flightpath 2050. Consequently, MTU has revised its Claire (Clean Air Engine) technology agenda. The declared aim is to bring onto the market products that enable climate-neutral or emission-free flying well before 2050. In its "Technology Roadmap Towards Emission Free Flying," MTU describes specific propulsion concepts as pilot concepts. The WET engine, a revolutionary gas turbine-based propulsion system as a logical advancement of the GTF, can significantly reduce all climate-related emissions. In addition, MTU is working on an almost completely emission-free concept, the flying fuel cell, which is an electric propulsion system based on hydrogen-powered fuel cells. The aim is to demonstrate both concepts as part of the national aviation research program and, in a European context, through Clean Aviation.

In addition to alternative propulsion systems, on the road to climate-neutral aviation, sustainable aviation fuels (SAFs) play an important role. They have the potential to significantly reduce the climate impact of aviation with the engines currently used in aircraft. MTU is therefore playing a part in this field, for example, as a founding member of the association aireg (Aviation Initiative for Renewable Energy in Germany e.V.) and as a strategic partner in several projects to set up SAF production facilities.

Alongside technical improvements to products, the digitalization of products, services and value-creation processes is growing in importance. Here, MTU's activities are geared primarily to reducing lead times and expenses, for example in development by making extensive use of simulation techniques in all disciplines through to full integration in the virtual engine.

Enhanced competitiveness – Increased productivity accompanied by a reduction in capital tie-up

MTU encourages a culture of continuous improvement in order to secure its competitiveness and further increase customer satisfaction. The focus here is on optimizing structures, processes and capital tie-up in all areas of the company. Digitalization and automation technologies (Industry 4.0) play a key role here.

The goal is to continuously optimize MTU's supply chain and its production and service network in terms of delivery capability, quality and costs. Profitability and competitiveness are to be enhanced further by high investment in maintenance and repair shops in countries where wage costs are low.

A massive drive is underway to secure customer satisfaction through continuous adjustment of the product portfolio between service locations and the resulting flexibility.

Alongside measures to improve productivity and customer satisfaction, in the future MTU will be stepping up its focus on reducing CO_2 emissions in production. The ecoRoadmap initiative at the Munich site will therefore be rolled out to other production locations over time.

MTU regards responsible economic activity as an important criterion in its competitiveness, and acts in harmony with its sustainability strategy.

Innovative corporate culture – Motivated employees in a creative environment

Highly motivated, skilled workers are crucial to the successful development of the MTU Group. MTU's corporate culture places emphasis on personal development and achievement coupled with a strong sense of social responsibility.

The trend toward digitalization is set to change the work environment and tried-and-tested management methods. More scope and greater responsibility for employees as well as short decision paths are key elements of an innovative corporate culture. All employees are encouraged and empowered to contribute their own ideas and translate them into new products and services, innovative business models and improved processes.

The company promotes cultural and individual diversity, flexible working conditions and high-quality basic and further training opportunities for its workforce.

In 2021, the roadmap for the ongoing development of the corporate culture was updated and the following focal areas were defined for the coming years: greater diversity and internationality, business-mind entrepreneurial action at all levels, faster digitalization, networking and community, and a focus on tomorrow's hybrid world of work.

This roadmap is designed to drive forward MTU's cultural change and its overarching corporate vision "We shape the future of aviation."

Key performance indicators

MTU is managed on the basis of key performance indicators adopted by the Executive Board. These performance metrics are derived from the operational business plans and provide guidance for management of the company that is geared to sustainable and profitable growth. A planning and control system and a value-oriented management compensation system are used to facilitate decisions that create a suitable environment for implementing the corporate strategy.

[T18] Performance indicators

in € million	2021	2020	Change against previous year in € million	Change against previous year in %
Revenue	4,188	3,977	211	5.3
Adjusted EBIT	468	416	52	12.6
Adjusted EBIT margin (in %)	11.2	10.5		
Free cash flow	**240**	**105**	**136**	**>100**

The value-driving key performance indicators of adjusted EBIT, revenue and free cash flow define the range within which MTU operates in terms of profitability, growth and liquidity.

For a definition of adjusted EBIT, which is the most important of these KPIs, please see the *reconciliation to adjusted key performance figures in the "Results of operations" section*. Another indicator monitored by the company is the adjusted EBIT margin, which shows the relationship between adjusted EBIT and revenue.

The purpose of optimizing cash flow is to ensure that the Group maintains its financial strength. MTU determines its free cash flow by combining its cash flow from operating activities with its cash flow from investing activities and eliminating components of the latter (non-recurring cash flows) that lie outside the operational management of the core business. For the reconciliation of the free cash flow, non-recurring cash outflows – comprising payments for the acquisition of shares in engine programs, payments in connection with interest-bearing loans and financial assets held for the purpose of liquidity management – are eliminated from the cash flow from investing activities. To enhance comparability, in the reporting period, adjustments were made for special items comprising the net cash inflow in connection with the sale of Vericor Power Systems and the sale of the stake in SMBC Aero Engines Lease B.V. and net cash outflows in connection with the acquisition of the remaining 20% of MTU Maintenance Lease Services B.V.

[T19] Free cash flow

in € million	2021	2020	Change against previous year in € million	Change against previous year in %
Cash flow from operating activities	567	386	182	47.1
Cash flow from investing activities	-345	-245	-100	-40.9
Non-recurring cash flows	18	-36	54	>100
Free cash flow	**240**	**105**	**136**	**>100**

Research and development

Framework conditions and goals

The Paris Agreement initiated a paradigm shift in aviation. While previous goals such as those set out by the Advisory Council for Aviation Research and Innovation in Europe in Flightpath 2050 focused exclusively on the direct CO_2 effects on the climate, in the future, the entire climate impact of aviation will be taken into consideration. That includes non-CO_2 effects such as the climate impact of emissions of nitrogen oxides and water, as well as the impact of condensation trails, which increase cloud formation. As an intermediate step towards meeting the goal of the Paris Agreement, the European Green Deal defines a 55% reduction in greenhouse gas emissions by 2030 and the achievement of climate neutrality by 2050. In July 2021, the European Commission presented the "Fit for 55 Package" containing measures to help achieve these targets. Examples are revising the European emissions trading system and the introduction of a minimum quota for the use of sustainable aviation fuels. Alongside such measures, there is a need, above all, for innovative solutions for aircraft and engines.

MTU has established technological leadership in its core competencies of low-pressure turbines, high-pressure compressors, turbine center frames, and high-tech manufacturing processes and repair techniques. This is the basis for continued systematic development of the present gas turbine-powered engines and for revolutionary new propulsion systems.

MTU's main area of activity in the evolutionary development of gas turbine-powered engines is raising efficiency in order to minimize climate and health-related emissions. This will be achieved, on the one hand, by a further reduction in the fan pressure ratio, thereby increasing thrust efficiency. On the other hand, thermal efficiency will be increased by improving the efficiency of components and higher temperature and overall pressure ratios. Weight and dimensions also have a major influence on energy consumption. Here too, continuous improvement is the goal.

MTU's mid- and long-term targets for the development of new commercial engines are aligned to the European Green Deal as an intermediate step towards achieving the overarching goal of the Paris Agreement. The MTU technology agenda Claire (Clean Air Engine) translates these into targets at the level of drive systems and serves as the guide for technology and innovation. In view of the new objective of minimizing the overall climate impact and thus the far more ambitious targets, the Claire technology agenda was revised in the reporting period. It still comprises three stages.

Stage 1 is the Geared Turbofan™ (GTF), which was developed in partnership with Pratt & Whitney and entered series production in early 2016 for the Airbus A320neo. The GTF reduces fuel consumption and hence CO_2 emissions by around 16% (*see also "Commercial engine programs"*). The recently presented improved product, the Pratt & Whitney GTF Advantage™, reduces CO_2 emissions even further. Using sustainable aviation fuels (SAFs), the climate impact can be reduced by up to 35%. SAFs are already approved so they can now be used.

Stage 2 of Claire aims to achieve a considerable improvement in the climate impact of aviation through revolutionary gas turbine-based concepts and electric propulsion systems based on fuel cells. One of the most promising gas turbine concepts is the WET (water-enhanced turbofan) engine, a system developed by MTU that considerably reduces all climate-related emissions. A second system being developed as part of Claire stage 2 is the flying fuel cell (FFC), a fully electric system based on a hydrogen fuel cell. This system is almost entirely emission-free and could be used in an initial product for smaller aircraft within the scheduled timeframe of 2035+.

Claire stage 3 concentrates on two areas: the use of the revolutionary concepts for the widest possible range of applications and optimization of energy consumption. Although these concepts are largely climate-neutral, minimizing energy consumption is vital to reduce pressure on resources and cut costs.

In 2021, MTU launched major national multi-partner research projects for both the WET engine and the FFC. Alongside the first component and subsystem tests (WET engine), the aim is for a demonstration flight (FFC).

The WET engine and FFC have already proven successful in a European context. Both concepts received positive evaluations in the context of the "Call for Expression of Ideas" by the European Commission's Clean Aviation public-private partnership. On this basis, the Technology Roadmap for Clean Aviation was specified in more detail, so more intensive work within the Clean Aviation framework is highly likely, probably from 2023.

Technologies for engines of the future

Commercial engine programs

The most significant innovation in the area of aircraft engines in recent decades is the Geared Turbofan™ (GTF) engine developed by MTU in cooperation with Pratt & Whitney. Unlike conventional turbofans, in which the fan and low-pressure turbine run at the same speed on a single shaft, the GTF links the two components using a reduction gear. This allows the fan with its larger radius to rotate more slowly, while the low-pressure turbine rotates faster. Consequently, lower fan pressure ratios (high bypass ratios) are achieved, thereby improving thrust efficiency, increasing the efficiency of the fan and the low-pressure turbine, while cutting fuel consumption and carbon dioxide emissions by 16% each and reducing the noise level by 20 EPNdB, bringing it well below the requirement of certification. What is more, the engine is lighter because the low-pressure turbine and low-pressure compressor require fewer stages.

In the GTF project, MTU is responsible for developing and manufacturing the high-speed low-pressure turbine, the front half of the high-pressure compressor and four brush seals. In addition, MTU assembles 30% of serially produced engines for the Airbus A320neo and carries out acceptance tests for these engines. It is also a partner in the MRO network.

As of January 2022, the engines in the Geared Turbofan™ family had clocked up more than 11 million flight hours and avoided over 6 million metric tons of CO_2.

The next development stage of this product is already under way. From 2024, Pratt & Whitney and MTU will offer the Pratt & Whitney GTF Advantage™ for the A320neo, an even more efficient PW1100G-JM engine with higher thrust, which will increase range and loading capacity. The increased efficiency is attributable to improvements in the MTU components.

For the next generation of the Geared Turbofan™, the aim is to achieve a further increase in the lifecycle of components as well as a further reduction in fuel consumption. The reduction in fuel consumption should be achieved primarily by a further increase in the efficiency of the components, combined with higher overall pressure ratios. To achieve this, for example, highly complex 3D blade designs need to be implemented in a very small space. An increase in the lifecycle of components should be achieved, for example, through new coatings and optimized design concepts. Key technologies are therefore also required for production and assembly.

When it comes to engines of the highest thrust class for long-haul aircraft, MTU is participating in General Electric's GE9X for the new Boeing 777X by developing and manufacturing the extremely demanding turbine center frame. At present, the first deliveries of the 777X are scheduled for 2023.

Military engine programs

The EJ200 engine powers the Eurofighter and is in service with numerous air forces. A project to develop a new digital engine control and monitoring unit (DECMU) was introduced in the reporting period. This new development is a contribution to securing the future of this engine.

Germany, France and Spain are planning to introduce the new Future Combat Air System (FCAS) from 2040. A key component in this system is a new fighter jet, which is scheduled to come into service as from 2040. A central element in this new jet is the Next European Fighter Engine, for which MTU and Safran will be the joint lead for development, production and after-sales support. In the reporting period, a Franco-German design phase was completed by MTU, Safran, Dassault and Airbus. In addition to conventional engine systems, variable cycle engine (VCE) concepts have been investigated. Concepts of this type would extend the operational range of the engine by actively shifting geometries during flight in order to achieve the required mission flexibility. Under follow-on agreements, a more detailed examination of these promising concepts will be undertaken from 2022.

New areas of business

The WET (water enhanced turbofan) is a further development of the conventional gas turbine engine. It can reduce all climate-related emissions, thereby further reducing the overall climate impact of the Geared Turbofan™. In the reporting period, a project was initiated with funding from the German aviation research program to investigate the potential and feasibility of this revolutionary concept.

Fuel cells powered by green hydrogen have the potential to enable emission-free flying in the longer term. Propulsion systems based on flying fuel cells (FFC) that are suitable for aircraft are not yet available. All known demonstration platforms are based on solutions from the automotive sector. Unlike aircraft applications, weight and parasitic load play a secondary role in the automotive sector.

A project to develop a propulsion system based on fuel cells for the aviation sector has also commenced under the auspices of the German aviation research program. An initial trial with a fuel cell module on a model scale has already been successfully completed at an MTU test station. Initial real-scale component tests will start in 2022. An initial ground flight demonstrator is scheduled for 2024 and should take off in the middle of the decade in collaboration with the German Aerospace Center.

Digitalization

The trend toward digitalization and networked supply chains heralds the fourth industrial revolution, after the invention of the steam engine, the automated production line and the computer. People, machines, plants, logistics and products communicate and cooperate with each other, so that, for example, production is largely self-organizing. MTU is examining the entire product lifecycle and the entire value chain from development to manufacture and maintenance. The company's specific needs and requirements were defined by an interdisciplinary working group and translated into an overarching roadmap in the reporting period. The roadmaps for individual units and topics derived from this define the specific areas of work, divided into time horizons of three, five and ten years. Establishing internal structures ensures efficient management and processing of the topics. One example is the Digi Board, a central body whose role is to select the right projects from a strategic viewpoint on the basis of a cross-functional definition of requirements.

In the context of digitalization, numerous technology projects have been launched, leading ultimately to what is known as the “virtual engine.” One sub-aspect of this is the “digital twin,” a purely digital reproduction of the actual components in a real engine. The main focus here is on networking data, interdisciplinary cooperation and automated design optimization. As well as speeding up the development phase by providing more robust predictions, these modules principally aim to reduce production and maintenance costs and increase the quality of components.

In the reporting period, new design methods were developed, in particular, for revolutionary engine concepts, where conventional design methods can no longer be used. The highly interdisciplinary nature of these concepts requires a far more detailed overview of the interaction between the aircraft and engine because the key to leveraging their potential essentially lies in intelligent integration. To this end, MTU has acquired new insights and capabilities, especially in the field of system engineering.

Materials

Robust, high-temperature-resistant materials and the protective coatings required for them are a key technologies that MTU is steadily driving forward for use in the next generation of the Geared Turbofan™.

For the planned development of the Next European Fighter Engine, there is a need for lightweight materials that can withstand high stress levels throughout operation. The future focus will be on fiber-reinforced composites and powder metallurgy materials. In the light of this, MTU revised its materials strategy in the reporting period.

An initial study of the potential of fiber-reinforced composites looked at their use in the compression system. On this basis, the aim is to launch projects with universities, research institutes and industrial partners in the future.

The revolutionary WET and FFC concepts require greatly modified or completely new materials and coatings. For example, these have to be resistant to high water contents (WET) or the use of hydrogen (FFC). MTU is already working on these topics in cooperation with universities and industrial partners.

Manufacturing and maintenance technologies

Additive manufacturing processes are opening the way to new methods of production. In this area, MTU is focusing on laser powder bed fusion, where the component is built up by fusing very thin layers of a powder material. MTU uses additive manufacturing to produce the borescope eyepieces for PW1100G-JM engines, making it one of the first companies to use this technique for series production of aviation components. Preparations are under way to introduce this type of process to manufacture complex components such as bearing housings. The longer-term plan is to create new designs that would be either impossible or very costly to implement using traditional technology.

Further automation of additive manufacturing is needed to reduce costs and throughput times. Solutions for this are being explored, for example, as part of the IDEA project (Industrialization of Digital Engineering and Additive Manufacturing) with 14 institutes and industrial partners. The focus is on a holistic view of the entire process chain, including coupling hardware and software, using digital twins, and through end-to-end data formats, process simulation and process control systems. The project is supported by the German Federal Ministry of Education and Research. Ultimately, demonstration components will be manufactured on two pilot lines.

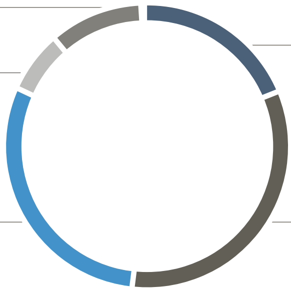
In recent years, MTU has carved out a leading position as a manufacturer of blisk rotors for compressors. For the blisks made of nickel-based alloys, which are extremely difficult to process and which are used in the aft stages of high-pressure compressors, MTU has developed a new electrochemical material-removal process (Precise Electrochemical Machining – PECM). By working with an extremely small inter-electrode gap, in the micrometer range, PECM accomplishes much greater reproduction precision. There are also plans to use this technology in fields with very complex geometries. This applies, above all, to future high-pressure compressors, which have increasingly small dimensions as the overall pressure ratios are constantly increasing.

So far, profile grooves for turbine disks have been produced by broaching. Since turbine disks are also made of materials with high heat resistance that are time-consuming to process and cause heavy wear, MTU aims to transfer PECM technology from compressor blisks to turbine disks. In the reporting period, a prototype plant for the manufacture of turbine disks using PECM technology was developed and installed at the Munich site. Series production of GTF disks using this technology is scheduled to start in 2023.

Protecting technology assets (intellectual property)

As of the end of the year, MTU's patent portfolio contained 868 patent families (2,866 individual patents). A patent family is a set of identical patents registered in various countries. As of the reporting date, this portfolio covered the following fields of technology:

[T20] Breakdown of MTU's patent portfolio by field of technology



Cooperation in science and research

For decades, cooperation with universities and research institutes has been a fixed element of the research and development work at MTU. For instance, specimen engines are made available to universities and colleges, MTU experts give lectures or supervise students writing internship reports, theses and dissertations. Furthermore, students are given support with assignments and final reports. In addition, MTU honors outstanding achievements by awarding the annual Heilmann prize to a young scientist meriting recognition for achievements in engine technology.

Strategic alliances are established with research partners in order to strengthen ties between universities and industry, and to safeguard MTU's innovative capabilities. Cooperation with leading German universities and research institutes was stepped up during the past years. In specific areas of research, cooperation with MTU competence centers is continuously being extended.

To complement MTU's technological focus, the company is supporting the construction of production facilities for sustainable aviation fuel. Two declarations of intent were signed on this in the reporting period. MTU also supports these cooperative ventures by making specialist expertise available through projects.

Based in Munich, Bauhaus Luftfahrt is a visionary think tank with an international dimension that pursues unconventional, holistic and interdisciplinary research. It brings industry and science together under one roof, focusing primarily on exploring the socioeconomic, political and ecological aspects of aviation, designing visionary aircraft and engine systems, unearthing promising technologies for the future and carrying out knowledge management.

As well as supporting projects on revolutionary propulsion systems, in the reporting period two studies were initiated on the use of hydrogen and SAF in aviation.

Investment in research and development

[T21] Research and development expenses

in € million	2021	2020	Change against previous year in € million	Change against previous year in %
Commercial engine business (OEM)	173	159	14	8.8
Military engine business (OEM)	40	19	21	>100
Commercial maintenance business (MRO)	17	8	9	>100
Total research and development expenses	**230**	**186**	**44**	**23.7**
less: externally funded expenses	70	33	37	>100
Company-funded expenses	**160**	**153**	**7**	**4.7**
Expenditure meeting recognition criteria for intangible assets				
less: commercial and military engine business (OEM)	49	56	-7	-12.8
less: commercial maintenance business (MRO)	1	2	-1	-62.1
Amortization of capitalized development costs	70	24	46	>100
Development costs recognized in EBIT	**180**	**119**	**61**	**51.5**
thereof: amounts accounted for as revenue or cost of goods sold	97	58	38	66.0
thereof: amounts accounted for in profit or loss as development costs	83	61	23	37.5

Research and development expenses amounted to 5.5% of revenue, somewhat higher than the prior-year level of 4.7%.

Externally funded development expenses principally comprise public grants for research and development for quieter and more fuel-efficient engines.

Company-funded development expenses are funded out of the Group's own resources. If the criteria for capitalization are met, the development expenses are recognized as internally generated intangible assets or as other assets if consideration is paid (acquired development work), and amortized over their useful life through revenue or the cost of goods sold. Information on capitalized company-funded expenses for internally generated intangible assets can be found in *Note 13 "Intangible assets" in the notes to the consolidated financial statements*. Further information on acquired development work can be found in *Note 17 "Acquired program assets, development work, and other assets" in the notes to the consolidated financial statements*.

Investment in intangible assets in the OEM segment (commercial and military engine business) which meets the capitalization criteria relates principally to the engine programs in the Pratt & Whitney GTF™ family of engines, the GE9X and the PW800 program.

The development of amortization of capitalized development costs in the reporting period was mainly attributable to impairment losses on capitalized development costs and acquired program assets in connection with the PW1700G engine program for the Embraer E175-E2. Further information on the special items in the impairment losses can be found in *Note 12 "Additional disclosures relating to the income statement."*

Economic report

Macroeconomic conditions

Following the sharp contraction in global economic output in 2020 as a result of the Covid-19 pandemic, an economic recovery set in 2021. According to the IMF, growth was 5.9% in 2021.

Despite sluggish vaccination drives, the emerging markets and developing countries were the growth drivers in 2021. According to the IMF, their GDP growth rate was above the global average at 6.5%. The People's Republic of China posted an above-average growth rate of 8.1%.

In the developed economies, the downturn bottomed out in 2021 and growth was 5.0%. This was supported by progress with vaccinations. The developed nations achieved a vaccination rate of over 60% of the population. The economic upswing in the USA was relatively high, with GDP increasing by 5.6%. Growth in the euro zone was 5.2%.

The global economy was again affected by a wide range of constraints in 2021, including disruption to supply chains. Some ports were closed to prevent the virus spreading, others were unable to unload ships fast enough due to labor shortages. Global supply chain problems, rising raw material prices and higher consumer savings rates pushed up inflation. According to the IMF, inflation in industrialized nations rose from 0.7% in 2020 to 3.1% in 2021.

Sector-specific conditions within the aviation industry

The aviation industry was badly hit by the Covid-19 pandemic in 2020 and passenger traffic slumped by 66%. It was hoped that 2021 would bring a significant recovery. While the first effective vaccines became available at the start of the year, production capacity for these had to be ramped up. In North America and Europe, in particular, further waves of infection resulted in far-reaching countermeasures, including restrictions on travel.
From March, a positive global trend in passenger traffic became established. This provided support for the entire sector. At the end of the year, the recovery slowed as a result of the Omicron mutation of the Covid-19 virus and the related restrictions. Nevertheless, airlines, aircraft manufacturers and service companies were able to lift revenue successively in 2021.

According to IATA, although global passenger traffic improved in 2021, it was still 53% lower than in 2019. Domestic travel (39% lower than in 2019) recovered faster than international travel (73% lower than in 2019).

The picture was similar for passenger aircraft movements, which is the most significant factor affecting demand for maintenance and spare parts. Here, aircraft movements rose by 22%. The number of passenger flights in single-aisle aircraft increased by 23% in 2021, while twin-aisle aircraft registered an increase of 15% (source: Flightradar 24).

The volume of air cargo increased and was above the pre-crisis level of 2019. According to IATA, the global air cargo volume increased by 19% compared with 2020 and 7% compared with 2019. Due to the lack of availability of cargo capacity on passenger flights, the number of cargo aircraft movements increased by 16% year-on-year (source: Flightradar 24). MTU benefited disproportionately from this positive trend because about 17% of the engine fleet of relevance to the Group operates in the cargo segment (mainly the CF6-80C and PW2000 engines). Industry-wide, cargo aircraft account for 10% of the active global fleet.

Compared with 2020, which was dominated by the crisis, airlines' revenue increased by 27% from U.S.$373 billion to U.S.$472 billion according to IATA (10/2021). In total, the airlines reported a net loss of U.S.$52 billion in 2021. Extensive state aid, especially in the USA, Europe and parts of Africa, and successful negotiations with leasing companies held back the number of insolvencies. Some airlines even reported profitable quarters. This was helped by high revenue from the cargo side.

In 2021, the average oil price was U.S.$71 per barrel Brent crude compared with U.S.$42 in 2020 (source: U.S. Energy Information Administration). The outlook was hampered by rising oil prices in the final months of 2021 because this translates into higher financial expense for airlines. Nevertheless, prices were around the historical average.

Airbus and Boeing had reduced output in 2020 in response to the crisis, the distressed state of many airlines, and the postponement of orders. In view of the prospects of a recovery from the crisis, sustained long-term growth in the industry and attractive financing terms for modern aircraft, there was an upturn in the number of aircraft ordered and taken into service in 2021. Taken together, Airbus and Boeing delivered 951 aircraft during the year, compared with just 723 in 2020. Boeing benefited from the lifting of the flight ban on the 737 MAX. Airbus increased deliveries of the A320 range of mid-haul jets from 40 per month in 2020 to 45 per month in 2021. At the end of December 2021, aircraft manufacturers had 11,332 orders on their books (source: Airbus, Boeing).

Overall assessment of the business environment

Following the peak of the Covid-19 pandemic in 2020, the business environment improved in 2021, with an emergent recovery in both the global economy and the aircraft industry. Key indicators point to a positive development.

According to the IMF, global GDP grew by 5.9% in 2021. The number of flights by cargo aircraft increased further and was higher than in previous years. Passenger traffic improved: In 2021 it was 53% below the pre-crisis level, whereas in 2020 it had been 66% below the pre-crisis level (source: IATA). Despite this recovery, the airlines reported a net loss of U.S.$52 billion (source: IATA [10/2021]). Rising raw material prices drove up inflation and increased airlines' costs.

Financial situation

The following explanatory comments and analyses are based on the audited MTU consolidated financial statements for the fiscal years ending December 31, 2021 and 2020. The consolidated financial statements were drawn up in accordance with the International Financial Reporting Standards (IFRSs) issued by the International Accounting Standards Board (IASB), to the extent that these have been adopted by the European Union.

In accordance with IFRS requirements, new and revised standards and interpretations were applied for the first time in the financial statements for 2021. Their impact on the net assets, financial position and results of operations of the Group are described in detail in the *Notes to the consolidated financial statements under "Accounting standards, interpretations, and amended standards and interpretations applied for the first time in fiscal year 2021."*

The exchange rates used for translating the MTU Group's key foreign currencies into euros are the following official rates set by the European Central Bank:

[T22] Foreign currency exchange rates

Currency	ISO code	Rate at reporting date		Average rate	
		Dec. 31, 2021 € 1 =	Dec. 31, 2020 € 1 =	**2021 € 1 =**	2020 € 1 =
U.S. dollar	USD	1.1326	1.2271	1.1827	1.1422
Canadian dollar	CAD	1.4393	1.5633	1.4826	1.5300
Chinese renminbi	CNY	7.1947	8.0225	7.6282	7.8747
Polish zloty	PLN	4.5969	4.5597	4.5652	4.4430
Serbian dinar	RSD	117.5821	117.5802	117.5733	117.5777

Results of operations

Group

[T23] Consolidated income statement

in € million	2021	2020	Change against previous year in € million	Change against previous year in %
Revenue	**4,188**	**3,977**	**211**	**5.3**
Cost of goods sold	-3,601	-3,484	-117	-3.4
Gross profit	**586**	**492**	**94**	**19.1**
Function costs	-232	-230	-1	-0.6
Earnings before interest and taxes (EBIT)	**355**	**262**	**93**	**35.4**
Net financial income/expense	-39	-67	28	41.7
Earnings before income taxes	**315**	**195**	**121**	**61.9**
Income taxes	-84	-48	-37	-77.5
Net income	**231**	**147**	**84**	**56.9**
Basic earnings per share (in €)	4.17	2.63	1.54	58.5
Diluted earnings per share (in €)	4.09	2.59	1.50	57.9
Earnings before interest and taxes, depreciation and amortization (EBITDA)	**712**	**612**	**100**	**16.3**

Revenue

The increase in revenue is mainly attributable to the development of the commercial maintenance business (MRO). Here, revenue (before consolidation) rose by €219 million from €2,522 million in the previous year to €2,741 million, driven principally by additional maintenance business attributable to the stake in the PW1100G-JM program and positive effects from remeasurement of provisions for public price auditing risks.

The commercial and military engine business (OEM) posted a slight rise in revenue (before consolidation) to €1,547 million, an increase of €13 million from the previous year's level of €1,535 million. The reasons for the increase in revenue in the OEM segment are year-on-year growth in the spare parts business and positive effects from the updated measurement of the refund liability relating to the GTF aftermarket business. The revenue increase in U.S. dollars was largely offset in euros by a weaker average U.S. dollar exchange rate than in the previous year. Further, impairment losses on capitalized program assets and acquired development work in connection with stakes in engine programs reduced revenue in the reporting period by €7 million.

Cost of goods sold and gross profit

The cost of goods sold increased as a result of the higher business volume. However, it did not rise as fast as revenue, partly because of the restructuring expenses of €33 million recognized in the previous year. The impairment losses on assets recognized in the cost of goods sold amounted to €76 million (previous year: €73 million). Combined with the increase in revenue, the development of the cost of goods sold increased the gross profit. Consequently, the gross margin, which is defined as the ratio of revenue less cost of goods sold to revenue, improved from 12.4% in the previous year to 14.0% in the reporting period. This was mainly attributable to the product mix realized in the OEM segment, organic growth in both segments, and the one-time effect of the restructuring expenses recognized in the previous year. Positive effects also came from the remeasurement of provisions for public price auditing risks. In 2021, MTU also benefited from the cost-cutting program introduced in 2020, which principally reduced the credit balances on employees' time accounts, and from the use of short-time working in the first half of the year. However, since billing in U.S. dollars is customary in the aviation sector, the development of the U.S. dollar exchange rate, which averaged U.S.$/€ 1.18 in 2021 compared with U.S.$/€ 1.14 in the previous year, adversely affected revenue and, in view of the proportion of the cost of goods sold denominated in currencies other than the U.S. dollar, the Group's gross margin. Other negative factors were the business trend in the first half of 2021, which was still affected by Covid-19, expenses, particularly in connection with the measurement of net operating liabilities denominated in U.S. dollars, reflecting the change in the exchange rate in the year under review, from U.S.$/€ 1.23 on January 1, 2021, to U.S.$/€ 1.13 as of the reporting date, and a less favorable product mix in the MRO segment.

Reconciliation to adjusted key performance figures

The reconciliation serves to factor special items out of the key earnings figures of the Group and its business segments. In this way, the success of managing operating activities is measured. The adjusted earnings figures also support comparability over time, and between MTU and other companies.

MTU utilizes the following adjusted key performance figures in its financial reports: adjusted earnings before interest and taxes (adjusted EBIT), the adjusted EBIT margin and adjusted net income. The earnings figures do not come under the provisions of the International Financial Reporting Standards (IFRSs); they are to be seen as an addition to the key financial indicators reported pursuant to IFRS.

In the interests of ensuring comparability of the EBIT figure, it is regularly adjusted for the following special items: Firstly, the contributions resulting from the “effects from purchase price allocation” and the “effects from the increase in the stake in IAE-V2500.” As of January 1, 2004, MTU passed into the ownership of Kohlberg Kravis Roberts & Co. Ltd. (KKR), following the latter's purchase of 100% of the MTU shares from the then DaimlerChrysler AG. In the context of the acquisition, assets, liabilities and contingent liabilities were identified in accordance with IFRS 3 and measured at fair value. Since then, the identified intangible assets, in particular, have resulted in substantial amortization. The latter are referred to collectively as “effects from purchase price allocation.” The contributions from the “effects from an increase in the stake in IAE-V2500” result from the increase in the stake in the V2500 program in 2012, which is capitalized as an acquired program asset and is accounted for as a reduction in revenue over its estimated economic life of 25 years. In addition, adjustments are made for special items resulting from extraordinary effects (special items) resulting from impairment losses (IAS 36) and accrued restructuring expenses (IAS 37). Furthermore, in the reporting period, an adjustment was made for the deconsolidation gain in connection with the sale of Vericor Power Systems.

Similarly, the effect of the special items outlined above is eliminated from earnings before income taxes. To establish adjusted earnings before income taxes, net interest income/expense and the interest shares in other financial income/expense connected with provisions for pensions and liabilities from pensions and plan assets are added to adjusted EBIT. All other components of financial income/expense that are influenced by the U.S. dollar exchange rate, such as the effects of exchange-rate hedging, are adjusted.

The adjusted earnings before income taxes is used to determine the adjusted net income. The normalized income taxes are calculated on the basis of the expected average tax rate for the Group (fiscal year 2021: 26%; fiscal year 2020: 29%). The profit/loss of companies accounted for using the equity method does not form part of the tax base.

[T24] Reconciliation of the consolidated income statement

in € million	2021 As reported	2021 Non-recurring items	2021 After adjustment	2020 As reported	2020 Non-recurring items	2020 After adjustment
Revenue	**4,188**		**4,188**	**3,977**		**3,977**
Cost of goods sold	-3,601		-3,601	-3,484		-3,484
thereof: special item depreciation/amortization effect of purchase price allocation		21	21		21	21
thereof: special item increase in the stake in V2500		23	23		27	27
thereof: special item impairment losses (IAS 36)		83	83		73	73
thereof: special item restructuring expenses (IAS 37)					33	33
Gross profit	**586**	**127**	**713**	**492**	**154**	**646**
Research and development expenses	-83		-83	-61		-61
Selling expenses	-124	0	-124	-146		-146
General administrative expenses	-92		-92	-79		-79
Other operating income and expenses	-16		-16	-14		-14
thereof: sale of Vericor		-13	-13			
Profit/loss of companies accounted for using the equity method	81		81	69		69
Profit/loss of equity investments	2		2	1		1
Earnings before interest and taxes (EBIT)	**355**	**114**	**468**	**262**	**154**	**416**
Net interest income/expense	-29		-29	-20		-20
Other financial income – interest included in the measurement of pensions	-6		-6	-9		-9
Other financial income/expense – miscellaneous (e.g. measurement of foreign currency holdings)	-4	4		-38	38	
Earnings before income taxes	**315**	**118**	**433**	**195**	**192**	**387**
Income taxes	-84		-84	-48		-48
Adjustment based on normalized income taxes		-7	-7		-45	-45
Net income	**231**	**111**	**342**	**147**	**147**	**294**

Earnings before interest and taxes (EBIT)

The development of EBIT compared with the previous year corresponds, in particular, with the development of the gross profit. This had a positive effect on earnings, which was strengthened by the increase in the profit/loss of companies accounted for using the equity method. The improvements outlined were only reduced to a small extent by the increase in other function costs.

As a result, there was a year-on-year improvement in both earnings before interest and taxes (EBIT) and adjusted earnings before interest and taxes (adjusted EBIT).

Net financial income/expense

Net financial income/expense improved in the reporting period, mainly as a result of foreign currency measurement effects. These positive effects were reduced to some extent by higher interest rate expense for the corporate bond issued in July 2020.

Earnings before taxes (EBT)

The positive development of EBT in the reporting period compared with the previous year corresponds to the positive development of EBIT and net financial income/expense.

Income taxes

Income tax expense amounted to €84 million in the fiscal year 2021 (previous year: €48 million). The effective Group tax rate, calculated on the basis of earnings before taxes, was 26.7% (previous year: 24.4%). Information on the reconciliation of the expected tax expense to the effective tax expense is provided in *Note 10 "Income taxes" in the Notes to the consolidated financial statements*.

Net income

Net income increased by €84 million (56.9%) to €231 million (previous year: €147 million) and, correspondingly, adjusted net income increased by €47 million (16.0%) to €342 million (previous year: €294 million).

Consolidated statement of comprehensive income

In the consolidated statement of comprehensive income, net income is reconciled with the total comprehensive income for the period of €207 million (previous year: €163 million).

The income and expense items directly recognized in other comprehensive income in the reporting period, net of deferred taxes, mainly comprised the drop of €106 million in the fair value of hedging instruments (previous year: increase in fair value of €106 million), which was offset by exchange rate gains in the translation of foreign businesses amounting to €62 million (previous year: losses of €60 million) and actuarial gains on pension obligations and plan assets totaling €26 million (previous year: actuarial losses of €32 million).

Earnings per share

Basic earnings per share amounted to €4.17 (previous year: €2.63). Taking into account the potential issue of shares resulting from convertible bonds, diluted earnings per share came to €4.09 (previous year: €2.59).

Net profit available for distribution

For an explanation of how the net profit available for distribution is determined, please refer to the *Notes to the consolidated financial statements in Section VII. "Determination of the net profit available for distribution on the basis of the annual financial statements."*

Order backlog

MTU's order backlog consists of firm customer orders that commit the Group to delivering products or providing services, plus the contractual value of service agreements. As of December 31, 2021, the order backlog (after consolidation) amounted to €22.2 billion (previous year: €18.6 billion). The increase in the order backlog related to both segments.

OEM segment

Revenue

In the OEM business, revenue (before consolidation) was slightly higher than in the previous year. This was driven by revenue in U.S. dollars, but was reduced by the development of the average U.S. dollar exchange rate. Other sales drivers in the reporting period were the effect of updating refund liabilities in connection with membership in the consortium for the GTF engine program. In the case of the PW1100G-JM, in particular, the technical improvements to engine components and modules realized in the reporting period and the previous year and retrofitting of the engine fleet currently in service improved the assessment of the profitability of the PW1100G-JM series and aftermarket business compared with previous periods. Revenue in the commercial engine business increased by €14 million (1.3%) to €1,066 million. The highest revenue generators in the reporting period were the PW1100G-JM for the A320neo and the V2500 engine for the classic A320 family.

Revenue in the military engine business was €482 million, almost unchanged from the previous year's level of €483 million (-0.2%). Here, the main sources of revenue in the reporting period were the EJ200 engine for the Eurofighter and the RB199 for the Panavia Tornado.

[T25] Revenue and adjusted EBIT (OEM)

in € million	2021	2020	Change against previous year in € million	in %
Revenue	**1,547**	**1,535**	**13**	**0.8**
Cost of goods sold	-1,197	-1,248	51	4.1
Gross profit	**351**	**286**	**64**	**22.4**
Gross margin (in %)	22.7	18.7		
Adjusted EBIT	**320**	**280**	**40**	**14.4**
Adjusted EBIT margin (in %)	20.7	18.2		

Adjusted earnings before interest and taxes (adjusted EBIT)

Adjusted EBIT benefited from higher demand for the commercial spare parts and repairs business and especially from the realized product mix and the related improvement in margins. While revenue rose, the expenses relating to the PW1100G-JM program decreased sharply. Earnings from the V2500 and GEnx programs also increased. By contrast, the weaker average U.S. dollar exchange rate in the reporting period reduced adjusted EBIT as a result of the related reduction in revenue in euros as well as the higher year-end rate for the U.S. dollar compared with the previous year, which impacted the foreign currency measurement of liabilities. Nevertheless, adjusted EBIT increased year-on-year. EBIT rose far faster than adjusted EBIT in the reporting period to €209 million compared with €137 million in the previous year. EBIT was affected by additional impairment losses on assets totaling €83 million (previous year: €73 million), while the deconsolidation gain of €13 million from the sale of Vericor Power Systems had a positive effect. In 2020, EBIT was also adversely affected by restructuring expenses of €24 million. Information on adjusted earnings is provided under Reconciliation to adjusted key performance figures in the "Results of operations" section.

Capital expenditure

Capital expenditure on intangible assets came to €54 million (previous year: €42 million) and essentially related to the capitalization of self-generated development work for the Pratt & Whitney GTF™ engines and the PW800 engine program. Capital expenditure on property, plant and equipment amounted to €148 million (previous year: €160 million) and related principally to construction in progress to expand production capacity and to other equipment, operational and office equipment. Expenditure on program assets and acquired development work was €18 million (previous year: €12 million) and mainly related to the stake in the V2500 engine program (increase in the stake in the V2500 program – IFRIC 1). Information about investments in financial assets is provided under "Financial position."

Employees

The average number of employees in the OEM segment decreased by 232 to 6,349 (previous year: 6,581). The change in headcount corresponds to the Covid-19-related business trend.

MRO segment

Revenue

In the commercial maintenance business, revenue (before consolidation) increased by €219 million year-on-year to €2,741 million (previous year: €2,522 million). After adjustment for currency effects, the increase in this segment was around 13%.

There was an increase in both revenue from the MRO segment's core business that is not tied to OEMs and revenue from orders placed by OEMs, especially relating to the GTF retrofit program and other maintenance work for the PW1100G-JM program. The ratio was roughly 60% to 40%. The most important sources of revenue in the core MRO business were the V2500 engine for the classic A320 family and the CF6-80 engine program.

[T26] Revenue and adjusted EBIT (MRO)

in € million	2021	2020	Change against previous year in € million	Change against previous year in %
Revenue	**2,741**	**2,522**	**219**	**8.7**
Cost of goods sold	-2,504	-2,317	-187	-8.1
Gross profit	**237**	**205**	**32**	**15.4**
Gross margin (in %)	8.6	8.1		
Adjusted EBIT	**149**	**136**	**12**	**9.1**
Adjusted EBIT margin (in %)	5.4	5.4		

Adjusted earnings before interest and taxes (adjusted EBIT)

The cost of goods sold did not rise as fast as revenue, due, among other things, to the one-time effect of the restructuring expenses recognized in 2020 and the remeasurement of provisions for price adjustment risks in 2021. Consequently, the gross margin improved from 8.1% in the previous year to 8.6% in the reporting period. There was a corresponding improvement in EBIT to €146 million, compared with €125 million in the previous year. The increase in adjusted EBIT and the adjusted EBIT margin was lower because in the previous year an adjustment was made for restructuring expenses. Information on adjusted earnings is provided under Reconciliation to adjusted key performance figures in the "Results of operations" section.

Capital expenditure

Capital expenditure on intangible assets and property, plant and equipment increased by €58 million to €183 million (previous year: €125 million). The main reasons for this were the construction of the plant for MTU Maintenance Serbia, investment in the expansion of MTU Maintenance Hannover, further capacity-related expansion and replacement measures, as well as licenses, which led to an increase in prepayments on intangible assets and construction in progress. Furthermore, MTU continued its investment in the growing business of short-term engine leasing. Information about investments in financial assets is provided under "Financial position."

Employees

The average number of employees in the MRO segment decreased by 6 to 3,959 (previous year: 3,965).

Financial position

MTU had increased its liquidity reserves considerably in 2020. In view of the comfortable liquidity situation, in 2021 the company redeemed a €100 million promissory note and a €30 million note purchase agreement. The option to extend the revolving credit facility by €100 million was not exercised, so the facility was reduced to the original amount of €600 million.

Principles and objectives of financial management

The main objectives of financial management are ensuring that the Group always has access to adequate liquidity, avoiding financial risks, and safeguarding financial flexibility. The Treasury department issues policies for managing interest rate, currency management and counterparty risks, financing, investing surplus liquidity and selecting suitable banks centrally for the Group.

As a rule, the cash flow from operating activities in the business segments represents the Group's main source of liquidity. Liquidity forecasts are based on the Group's operational and strategic planning, flanked by a monthly rolling (short-term) liquidity forecast. Except where there are conflicting regulatory or tax requirements, the Group is financed centrally via MTU Aero Engines AG, which provides the necessary funding for its subsidiaries. Moreover, the subsidiaries invest their surplus liquidity with MTU Aero Engines AG. This reduces the need for external borrowing and thus cash outflows for interest payments.

The limits set for counterparties are based on their long-term credit rating, their historical probability of default derived from this, and the size of the company. The limits set also support risk-based diversification of the credit default risk in connection with the investment of funds and the use of derivatives. The minimum requirement for treasury counterparties is an investment-grade rating.

Funds are invested primarily in euro-denominated sight and time deposits, money market funds and commercial paper. Foreign currency investments are only permitted up to the level of the surplus liquidity in the respective currency; speculative investment to improve the interest yield is not permitted. The term of investments is determined by liquidity planning. Apart from unavoidable negative interest rates in certain currencies, the investment policy is geared to preserving value and the liquidity of the investments. The risk of devaluation of the amounts invested is negligible due to the very short nature of such investments.

MTU's financing strategy basically aims to ensure an appropriate financial structure in order to maintain the investment-grade credit rating.

To achieve this target, MTU uses a variety of internal and external financing instruments, including occupational pension plans, bonds, credit facilities and leasing models. For information on the Group's capacity to raise funds through authorized and contingent capital, please refer to *Note 24 "Equity" in the Notes to the consolidated financial statements*.

The *Risk report* and *Note 35 "Financial risk" in the Notes to the consolidated financial statements* provide information on MTU's approach to the financial risks inherent in financing and measurement, the methods used to hedge interest rate and currency risks, and price, default and liquidity risks.

Financing instruments

[T27] Material external financing sources

Type of financing	Maturity date	Currency	Interest rate
Registered bond	June 12, 2028	€	Fixed interest rate
Corporate bond	July 1, 2025	€	Fixed interest rate
Convertible bond 2016	May 17, 2023	€	Fixed interest rate
Convertible bond 2019	March 18, 2027	€	Fixed interest rate
Revolving credit facility	Oct. 28, 2023	€	Euribor rate + margin
Lease liabilities	Various	€	Fixed interest rate

The revolving credit facility, which has not been fully drawn down, is available in full until the due date and gives MTU additional financial headroom.

The factors considered when choosing financing instruments are flexibility, credit terms, the profile of maturity dates, diversification of the investor base and borrowing costs. Material sources of financing include standard market covenants requiring the Group to ensure that its performance indicators remain within defined limits. MTU complied with the contractual obligations arising from such covenants as of December 31, 2021, and as of the end of every quarter of the reporting year. Further information on financing instruments is provided in Note 28 "Financial liabilities" in the Notes to the consolidated financial statements. Material agreements in relation to a change of control subsequent to a takeover bid are set out in the section titled "Disclosures under takeover law."

As in previous years, MTU did not engage in any off-balance-sheet financing transactions in the reporting period, such as the sale of receivables in connection with asset-backed securities or obligations toward special-purpose entities.

Net financial debt

Net financial debt serves as an indicator of the MTU Group's financial situation and is defined as the difference between gross financial debt and current financial assets. Net financial debt was lower than on December 31, 2020.

[T28] Net financial debt

in € million	Dec. 31, 2021	Dec. 31, 2020	Change against previous year in € million	in %
Bonds and notes	604	603	1	0.2
Convertible bonds	529	538	-9	-1.6
Promissory note		100	-100	-100.0
Other financial liabilities to banks		30	-30	-100.0
thereof: note purchase agreement		30	-30	-100.0
Lease liabilities	176	177	-1	-0.5
Financial liabilities arising from acquisition of stakes in programs	142	138	4	2.6
thereof: financial liabilities arising from increase in the stake in IAE-V2500	138	132	6	4.2
Gross financial debt	**1,451**	**1,586**	**-135**	**-8.5**
less:				
cash and cash equivalents	722	773	-51	-6.6
Loans to third parties	56	33	24	72.5
Financial assets	**778**	**805**	**-27**	**-3.4**
Net financial debt	**673**	**781**	**-108**	**-13.8**

Bonds and notes

Registered bond

MTU Aero Engines AG issued a registered bond on June 12, 2013, for a total nominal amount of €100 million. The registered bond matures on June 12, 2028, and is subject to interest of 3.55% p.a., payable in arrears on June 12 of each year, for the first time on June 12, 2014. The registered bond, net of transaction costs and including a discount of €3 million, is measured at amortized cost.

Corporate bond

On July 1, 2020, MTU Aero Engines AG issued an unsecured corporate bond with a nominal value of €500 million. The bond has a maturity of five years until July 1, 2025, and is available in units of €1,000. The coupon is 3.0% p.a., payable annually in arrears. The bond is listed on the regulated market on the Luxembourg Stock Exchange.

Convertible bonds

In 2016, MTU Aero Engines AG issued a senior unsecured convertible bond for a total nominal amount of €500 million. This bond is convertible into new and/or existing registered non-par-value shares in MTU. The convertible bond has an original maturity of seven years and is divided into units of €100,000. It bears a nominal interest rate of 0.125% p.a., payable annually in arrears. Bondholders have been entitled to convert their convertible bonds into common shares of MTU Aero Engines AG at any time since June 27, 2016. The initial conversion price was set at €124.7701, which represents a premium of 50% above the reference rate at the bond issue date.

Under the terms of issue of the convertible bond, MTU has the right to recall the issued bond units at their nominal value (plus accrued unpaid interest) at any time on or after June 16, 2020, subject to a period of notice of minimum 30 days and maximum 60 days, either (i) if the quoted price of the common share rises to or above 130% of the applicable conversion price over a defined period, or (ii) if no more than 20% of the nominal value of the convertible bond issue is outstanding. In the event of such cancellation by MTU, and within the above-mentioned notice period, the bondholders have the right to request that MTU convert their bonds into shares, rather than repurchase them.

On September 10, 2019, MTU Aero Engines AG bought back from its creditors a nominal amount of €275 million of the convertible bond issued in 2016, which it canceled with value date September 30, 2019. Moreover, in 2021 MTU Aero Engines AG received further conversion notices from creditors of this convertible bond with a nominal amount of €13 million (2020: €29 million; 2019: €135 million). The nominal amount outstanding was thus €48 million as of December 31, 2021 (previous year: €61 million).

In 2019, MTU Aero Engines AG issued a senior unsecured convertible bond for a total nominal amount of €500 million. This bond is convertible into registered non-par-value shares in MTU. The convertible bond has an original maturity of seven-and-a-half years and is divided into units of €100,000. It bears an interest rate of 0.05% p.a., payable annually in arrears.

Bondholders will be entitled to convert their certificates into common shares in MTU Aero Engines AG starting on September 18, 2024. The initial conversion price was set at €378.4252, which represents a premium of 55% on the reference rate.

Under the terms of issue of the convertible bond, MTU has the right to recall the issued bond units at their nominal value (plus accrued unpaid interest) at any time on or after April 8, 2025, subject to a period of notice of minimum 30 days and maximum 60 days, either (i) if the quoted price of the common share rises to or above 130% of the applicable conversion price over a defined period, or (ii) if no more than 20% of the nominal value of the convertible bond issue is outstanding. In the event of such cancellation by MTU, and within the above-mentioned notice period, the bondholders have the right to request that MTU convert their bonds into shares, rather than repurchase them.

Promissory note

The promissory note with a nominal value of €100 million was redeemed on the maturity date, June 10, 2021.

Other financial liabilities to banks

Note purchase agreement

The note purchase agreement with a nominal value of €30 million was redeemed on the maturity date, March 27, 2021.

Revolving credit facility

The company has concluded a revolving credit facility with five banks. This credit facility amounted to €600 million in 2019. On May 11, 2020, it was increased by €100 million to €700 million. This increase ran for one year and could have been extended twice by six months in each case at the company's request. The increase expired without exercise of the extension option. The original €600 million revolving credit facility still runs until October 28, 2023. €42 million of this credit facility had been drawn down in the form of guarantees as of December 31, 2021 (previous year: €35 million). The remaining available amount secures the mid-term financial flexibility of the MTU Group. The credit utilized is subject to interest at the customary market reference rate plus an additional margin.

The unused amount of the revolving credit facility is subject to a loan commitment fee.

Lease liabilities

Lease liabilities relate to liabilities under leases recognized using the effective interest rate method. For information on their accounting treatment and a summary of the corresponding capitalized lease assets, please refer *Note 36 "Leases" in the Notes to the consolidated financial statements*.

Financial liabilities arising from acquisition of stakes in programs

This item includes the deferred payment components arising from the increase in the stake in IAE-V2500 and the acquisition of shares in new engine programs. The latter are referred to in the following as financial liabilities arising from increased or new stakes in engine programs.

The financial liabilities arising from the acquisition of stakes in engine programs mainly relate to program lifetime-related payments for the acquisition of shares in commercial engine programs, in particular the Pratt & Whitney GTF™ engine family and the PW800, which are deemed to represent financing transactions in view of their long-term nature.

For more information on program liabilities, please refer to *Note 28 "Financial liabilities" in the section "Financial liabilities arising from increased or new stakes in engine programs" in the Notes to the consolidated financial statements*.

Financial liabilities arising from the increase in the stake in IAE-V2500

The purchase price agreement signed by MTU in the fiscal year 2012 in order to increase its stake in the V2500 engine program by 5 percentage points to 16 % made it necessary, among other things, to recognize a deferred financial liability contingent upon the number of flight hours performed over the next 15 years by the fleet of V2500 engines in service at the time of the stake increase.

The liability matures in 2027 and has a nominal amount of U.S.$168 million (previous year: U.S.$175 million), which translates into €148 million (previous year: €143 million) at the exchange rate prevailing at the reporting date. As of December 31, 2021, the carrying amount of the purchase price liability was €138 million (previous year: €132 million) and is included in a hedging relationship for revenue-generating transactions in U.S. dollars.

Contingent liabilities and other financial obligations

As of the reporting date, contingent liabilities amounted to €207 million (previous year: €165 million) and mainly related to the assumption of guarantees and warranties. As part of its ordinary activities, the Group furthermore incurred other financial liabilities comprising purchase commitments and future cash outflows for leases. These are additional to the liabilities reported in the consolidated balance sheet at the end of the reporting period. They relate to contractual obligations to acquire intangible assets, property, plant and equipment, and leased items. In 2019, MTU incurred income tax losses as a result of partial redemption of a convertible bond amounting to €276 million. Although MTU assumes that the losses will be confirmed in the tax audit, it should be noted that there are pending proceedings at financial courts brought by other taxpayers in comparable cases. Please refer to *Note 37 "Contingent liabilities and other financial obligations" in the Notes to the consolidated financial statements* for detailed information on contingent liabilities and other financial obligations.

Capital expenditure

[T29] Capital expenditure by class of asset

in € million	2021	2020	Change against previous year in € million	Change against previous year in %
Intangible assets	83	44	40	90.9
Property, plant and equipment	301	283	18	6.4
Financial assets	123	125	-1	-1.1
Program assets and acquired development work	18	12	5	44.6
Total capital expenditure	**525**	**463**	**62**	**13.4**

Capital expenditure on intangible assets

Capital expenditure on intangible assets in 2021 includes an amount of €51 million (previous year: €40 million) relating to self-generated development work on engine programs in which MTU holds a stake. Detailed information on capital expenditure on intangible assets is provided in *Note 14 "Intangible assets" in the Notes to the consolidated financial statements*.

Capital expenditure on property, plant and equipment

Additions in the fiscal year 2021 mainly comprised advance payments and construction in progress totaling €159 million (previous year: €90 million) and other equipment, operational and office equipment totaling €96 million (previous year: €79 million). The capital expenditures mainly relate to the expansion of production capacity, especially at the sites in Munich and Hanover (Germany) and Nova Pazova (Serbia). Further, additions to right-of-use assets for leased items amounted to €39 million in the reporting period (previous year: €88 million). For further information on capital expenditure on property, plant and equipment and the application of IFRS 16, please refer to *Note 15 "Property, plant and equipment" or Note 36 "Leases" in the Notes to the consolidated financial statements*.

Capital expenditure on financial assets

Capital expenditure on financial assets, which totaled €123 million, included €99 million (previous year: €114 million) relating to additions to companies accounted for using the equity method and capital contributions to finance EME Aero, the joint venture launched in conjunction with Lufthansa Technik. (In the previous year, this item also included investments in connection with MTU's stake in the IAE-PW1100G-JM engine leasing business.) Additional information on financial assets is included in *Note 16 "Financial assets" in the Notes to the consolidated financial statements*.

Capital expenditure on program assets and acquired development work

Capital expenditure on other assets due to acquired program assets and acquired development work relates mainly to the V2500 engine (increase in the stake in the V2500 engine program – IFRIC 1). Additional information on other assets is included in *Note 17 "Acquired program assets, development work and other assets" in the Notes to the consolidated financial statements*.

Liquidity analysis

One of MTU's key performance indicators is free cash flow. MTU determines its free cash flow by combining its cash flow from operating activities with its cash flow from investing activities and eliminating components of the latter (non-recurring cash flows) that lie outside the operational management of the core business. To arrive at the free cash flow of €240 million (previous year: €105 million), these non-recurring cash flows were therefore eliminated from the cash flow from investing activities. In the reporting period, these adjusted non-recurring cash flows comprised prepayments of €27 million net for the acquisition, in particular, of MRO program stakes (previous year: refunds for prepayments made in previous periods and additional payments made to acquire program stakes in a net amount of €-25 million), cash outflows in connection with interest-bearing aircraft and engine financing agreements in an amount of €21 million (previous year: cash inflows relating to interest-bearing aircraft and engine financing agreements in the amount of €-11 million), and net cash inflows in connection with the sale of Vericor Power Systems of €-31 million (previous year: €0 million).

[T30] Consolidated cash flow statement (abridged)

			Change against previous year	
in € million	2021	2020	in € million	in %
Cash flow from operating activities	567	386	182	47.1
Cash flow from investing activities	-345	-245	-100	-40.9
+ Adjustment for non-recurring cash flows	18	-36	54	>100
Free cash flow	**240**	**105**	**136**	**>100**
– Reverse effect of adjustment for non-recurring cash flows	-18	36	-54	<-100
Cash flow from financing activities	-276	504	-780	<-100
Translation differences	3	-11	14	>100
Change in cash and cash equivalents	**-51**	**633**	**-684**	**<-100**
Cash and cash equivalents at the beginning of the reporting period	773	139		
Cash and cash equivalents at the end of the reporting period	722	773		

Cash flow from operating activities

The cash flow from operating activities in the reporting period was higher than in the previous year. The main factors for this positive development were the profitable cash-effective business growth, supported by measures to optimize the funds tied up in working capital compared with the previous year, and profit distributions received from associates and joint ventures. The payment of refund liabilities had a counter-effect.

Cash flow from investing activities

Capital expenditure on intangible assets amounted to €82 million (previous year: €42 million) and mainly comprised capital expenditure on development assets for the Pratt & Whitney GTF™ engine family, the PW800 program and the license extension for the CF34 engine. Capital expenditure on property, plant and equipment, excluding the proceeds from asset disposals, amounted to €241 million, compared with €179 million in the previous year. The capital expenditure relates to the expansion of MTU's production capacities, especially at its sites in Germany and Serbia. The net result of cash inflows and outflows relating to financial assets mainly results, on the one hand, from cash inflows from the sale of Vericor Power Systems and the shares in SMBC Aero Engines Lease B.V. and, on the other hand, from cash outflows relating to participation in aircraft financing activities, the increase in the share in MLS from 80% to 100% and the capital increase at the joint venture EME Aero sp. z. o.o. Expenditure on program assets and acquired development work was €23 million (previous year: €19 million) and related primarily to the engine programs of the Pratt & Whitney GTF™ engine family. In addition, cash and cash equivalents were reduced by €13 million due to the deconsolidation of Vericor Power Systems (previous year: €0 million).

Cash flow from financing activities

The cash outflow in the reporting period mainly comprised €100 million for redemption of the promissory note, dividend payments of €67 million, a share buyback of €31 million, and €30 million for redemption of the note purchase agreement.

Change in cash and cash equivalents

The decrease in cash and cash equivalents results from the fact that the year-on-year increase in cash outflows for financing and investing activities more than offset the higher cash inflow from operating activities.

Net assets

Changes in balance sheet items

[T31] Consolidated balance sheet of the MTU Group

	Dec. 31, 2021		Dec. 31, 2020		Change against previous year	
in € million	in € million	in %	in € million	in %	in € million	in %
Assets						
Non-current assets						
Intangible assets and property, plant and equipment	2,379	28.7	2,296	28.3	83	3.6
Other assets	1,664	20.0	1,733	21.4	-70	-4.0
Total non-current assets	**4,043**	**48.7**	**4,030**	**49.7**	**13**	**0.3**
Current assets						
Inventories	1,380	16.6	1,278	15.8	100	7.8
Receivables/other assets	2,159	26.0	2,023	25.0	136	6.7
Cash and cash equivalents	722	8.7	773	9.5	-51	-6.6
Total current assets	**4,260**	**51.3**	**4,074**	**50.3**	**187**	**4.6**
Total assets	**8,304**	**100.0**	**8,104**	**100.0**	**200**	**2.5**
Equity and liabilities						
Equity	**2,760**	**33.2**	**2,635**	**32.5**	**125**	**4.8**
Non-current liabilities						
Provisions	968	11.7	1,047	12.9	-80	-7.6
Liabilities	1,457	17.5	1,454	17.9	3	0.2
Total non-current liabilities	**2,424**	**29.2**	**2,501**	**30.9**	**-77**	**-3.1**
Current liabilities						
Provisions/income tax liabilities	226	2.7	165	2.0	61	37.1
Liabilities	2,893	34.8	2,803	34.6	90	3.2
Total current liabilities	**3,119**	**37.6**	**2,968**	**36.6**	**151**	**5.1**
Total equity and liabilities	**8,304**	**100.0**	**8,104**	**100.0**	**200**	**2.5**

Assets

In the fiscal year 2021, intangible assets decreased by €7 million (previous year: decreased by €28 million). The main drivers here were impairment losses on capitalized development costs for the PW1700G engine program, which were offset by expenditures for the license extension in connection with maintenance of the CF34 engine.

Property, plant and equipment increased by €90 million (previous year: €61 million). This was mainly due to capital expenditure for construction in progress to increase production capacities in Germany and Serbia.

The reduction in non-current other assets mainly comprised lower fair values of hedging instruments, amortization of program assets for military and commercial engine programs and the impairment losses on program assets for the PW1700G engine program. The positive business performance of and additional capital contributions at companies included in the consolidated financial statements using the equity method had a countereffect. For more information on program assets, please refer to *Note 17 "Acquired program assets, development work and other assets" in the Notes to the consolidated financial statements*.

Inventories of raw materials and supplies rose by €71 million to €654 million in the reporting period (previous year restated: €582 million), while inventories of finished goods and work in progress were almost unchanged at €684 million (previous year restated: €683 million).

The sales to inventory ratio was 3.2 (previous year: 3.1).

Trade receivables dropped to €946 million (previous year: €969 million). Contract assets, net of the associated contract liabilities, increased to €960 million, up €90 million from December 31, 2020, mainly due to foreign currency measurement effects driven by the change in exchange rates prevailing on the reporting date. There were also receivables from tax authorities in respect of tax refunds amounting to €89 million (previous year: €42 million).

Cash and cash equivalents declined from €773 million in the previous year to €722 million. This item accounted for 8.7% (previous year: 9.5%) of total assets at the reporting date. For information on the cash flow statement, please refer to the section titled *"Financial situation – Liquidity analysis."*

Equity

[T32] Changes in equity

in € million	2021	2020
As of Jan. 1	**2,635**	**2,421**
Other comprehensive income		
Financial instruments designated as cash flow hedges	-106	106
Changes in the fair value of equity investments	-6	2
Actuarial gains/losses on pension obligations and plan assets	26	-32
Translation differences arising from the financial statements of foreign entities	62	-60
Net income	231	147
Dividend payment to shareholders of MTU Aero Engines AG/dividend payment to non-controlling interests	-80	-7
Issue of shares due to conversion of the convertible bonds	13	29
Sale of treasury shares under the Restricted Stock Plan (RSP)	2	5
Sale of treasury shares in connection with the employee stock option program (MAP)	23	23
Share buy-backPurchase of treasury shares for RSP and MAP	-31	
Changes in equity due to portfolio transactions	-9	
Total change in Group equity	**125**	**214**
As of Dec. 31	**2,760**	**2,635**

Positive changes in equity

The main factors behind the increase in equity in 2021 were the net income for the period of €231 million (previous year: €147 million), translation differences of €62 million arising from the financial statements of foreign entities, which increased equity (previous year: translation differences decreased equity by €60 million), and actuarial gains of €26 million (previous year: actuarial losses of €32 million). Other factors were the effect from the sale of treasury shares in connection with the employee stock option program and conversions of the convertible bond issued in 2016.

Negative changes in equity

Negative changes in equity resulted principally from a reduction of €106 million in the fair values of hedging instruments (previous year: increase in the fair values of €106 million), the dividend payment of €67 million to shareholders of MTU Aero Engines AG for the fiscal year 2020 (dividend payment for 2019: €2 million), and the purchase of treasury shares in the amount of €31 million (previous year: €0 million). The net reduction in equity from portfolio transactions relates to the sale of Vericor Power Systems LLC, the acquisition of the remaining 20% of MTU Maintenance Lease Services B.V., and the sale of the 10% equity investment in SMBC Aero Engine Lease B.V.

Liabilities

Within non-current liabilities, non-current pension provisions decreased by €79 million from €984 million in the previous year to €905 million due, in particular, to a higher actuarial discount rate.

Non-current liabilities mainly contain the gross financial debt of €1,338 million (previous year: €1,372 million) and other provisions of €63 million (previous year: €64 million). Non-current liabilities represented 29.2% of total equity and liabilities as of December 31, 2021, which was lower than in the previous year.

Total equity and non-current liabilities increased by €49 million in the reporting period to €5,185 million (previous year: €5,136 million). This means that 128.2% (previous year: 127.5%) of the Group's non-current assets are financed through available non-current funds.

The current provisions recognized under current liabilities are pension provisions amounting to €44 million, above the previous year's level of €26 million, income tax liabilities, which rose from €5 million to €9 million, and other provisions, which increased by €39 million to €173 million. Current liabilities also include refund liabilities to customers amounting to €1,758 million (previous year: €1,583 million), trade payables of €165 million (previous year: €169 million), contract liabilities totaling €692 million (previous year: €729 million), current financial liabilities of €226 million (previous year: €288 million), and a large number of other individual obligations.

The debt to equity ratio increased by 0.7 percentage points year-on-year to 33.2% (previous year: 32.5%).

Financial performance indicators

At MTU's Capital Market Day in November 2020, the Group provided an initial outlook on its expected business development in 2021. This was confirmed on February 18, 2021, in connection with the announcement of the annual results for 2020.

MTU forecast that annual revenue would be between €4,200 million and €4,600 million, with an adjusted EBIT margin of between 9.5% and 10.5%. Adjusted net income was expected to grow in line with adjusted EBIT. For the free cash flow, MTU forecast a cash conversion rate in the mid double-digit percentage range.

[T33] Forecast and actual results

in € million	Actual 2021	Forecast for 2021 as of Oct. 29, 2021	Forecast for 2021 as of July 30, 2021	Forecast for 2021 as of Feb. 18, 2021	Actual 2020
Revenue	4,188	Between 4,300 and 4,400	Between 4,300 and 4,500	Between 4,200 and 4,600	3,977
Adjusted EBIT margin (in %)	11.2	Approx. 10.5	Between 10 and 10.5	Between 9.5 and 10.5	10.5
Adjusted net income	342	Development in line with adjusted EBIT	Development in line with adjusted EBIT	Development in line with adjusted EBIT	294
Cash conversion rate	70%	High double-digit percentage range	Mid to high double-digit percentage range	Mid double-digit percentage range	35%

Revenue forecast

On February 18, 2021, the Executive Board forecast that revenue would rise to a range of between €4,200 million and €4,600 million in 2021 (revenue 2020: €3,977 million). When the half-year financial report was published on July 30, 2021, the revenue guidance was increased to a range of between €4,300 million and €4,500 million, and when the figures for the third quarter were reported on October 29, 2021, a more precise forecast of between €4,300 million and €4,400 million was issued. The revenue realized as of year-end 2021 was €4,188 million, which was negligibly lower than the forecast range of between €4,300 million and €4,400 million.

Earnings forecast

MTU originally forecast a reduction in the ratio of adjusted EBIT to revenue (adjusted EBIT margin) to between 9.5 and 10.5%. The guidance for the adjusted EBIT margin was revised between 10 and 10.5% after the first six months, with more precise guidance of around 10.5% issued after the third quarter. At the end of the year, the adjusted EBIT margin was 11.2% and thus above expectations.

In its initial forecast for 2021, the Executive Board anticipated that adjusted net income would grow in line with adjusted EBIT. This forecast was confirmed on July 30, 2021, and on October 29, 2021. Adjusted EBIT grew by 12.6% in the reporting period. By contrast, adjusted net income increased by 16.0% in 2021 and thus exceeded expectations.

Free cash flow

On February 18, 2021, MTU set the target of achieving a cash conversion ratio (ratio of free cash flow to adjusted net income) in the mid double-digit percentage range. When the half-year financial report was published on July 30, 2021, this was revised to the mid to high double-digit percentage range. The forecast was increased to a high double-digit percentage range when the third-quarter results were published on October 29, 2021. This target was met as of December 31, 2021, with a free cash flow of €240 million. The cash conversion rate was 70% and therefore in line with expectations (previous year: 35%).

Overall assessment of business performance in 2021

MTU's business performance in 2021 was characterized by a partial recovery, despite the ongoing coronavirus pandemic. Revenue increased to €4,188 million, a year-on-year rise of 5.3% (previous year: €3,977 million). Before intersegment consolidation, revenue in the OEM segment was virtually stable, with an increase of 0.8%, while revenue in the MRO segment increased by 8.7%.

MTU continued its investment and growth phase in 2021, which was dominated by development activities for engines in all commercial thrust classes and the expansion of production capacity at locations in Germany and other countries.

MTU's operating profit rose in both the OEM segment and the MRO segment in the reporting period; adjusted EBIT was €468 million (previous year: €416 million). The adjusted EBIT margin was 11.2% (previous year: 10.5%).

There was a corresponding increase in the free cash flow. Despite high investment in development assets, capacity expansion at sites in Germany and abroad, and significant downward pressure resulting from the continued pandemic-induced disruption of air traffic, MTU achieved a disproportionately high rise in its free cash flow to €240 million (previous year: €105 million).

Therefore, MTU essentially met, and in some cases exceeded, the forecasts published in mid-year and the more detailed guidance issued in the course of the year.

MTU AG (disclosures in accordance with the German Commercial Code [HGB])

The management report of MTU AG and the Group management report for the fiscal year 2021 have been combined in accordance with Section 315 (5) in conjunction with Section 298 (2) of the German Commercial Code (HGB). The annual financial statements of MTU AG were prepared in accordance with the provisions of the German Commercial Code (HGB) and are published together with the combined management report in the German electronic Federal Gazette (elektronischer Bundesanzeiger).

The business environment of MTU AG corresponds for the most part with that of the Group as described earlier under *"Economic report."*

Business activities

MTU AG develops and manufactures components for commercial and military aircraft engines and aero-derivative industrial gas turbines. The company also carries out maintenance of military engines.

MTU has technological expertise, in particular, in low-pressure turbines, high-pressure compressors and turbine center frames, and in repair techniques and manufacturing processes. It is involved in important national and international technology programs and cooperates with the top names in the industry (GE Aviation, Pratt & Whitney and Rolls-Royce).

Disclosures relating to results of operations

[T34] Income statement of MTU Aero Engines AG

			Change against previous year	
in € million	2021	2020	in € million	in %
Revenue	**3,695**	**3,789**	**-94**	**-2.5**
Cost of goods sold	-3,549	-3,582	33	0.9
Gross profit	**145**	**207**	**-62**	**-29.8**
Selling expenses	-94	-90	-4	-4.7
General administrative expenses	-60	-49	-11	-21.6
Net other operating income/expenses	103	-30	134	>100
Net financial income/expense	169	120	49	41.3
Earnings from ordinary operating activities	**265**	**158**	**107**	**67.6**
Tax expense	-67	-26	-41	<-100
Net profit for the year	**198**	**132**	**66**	**49.9**
Withdrawal from other retained earnings				
Allocation to other retained earnings	-86	-65	-21	-32.3
Net profit available for distribution	**112**	**67**	**45**	**67.1**

Revenue

The principal factors affecting the development of revenue were the ongoing downward pressure on the global economy as a result of the coronavirus and, in particular, the continued decline in air traffic compared with the pre-crisis level. The emergence of new mutations of the virus continues to have a major impact. This was accompanied by subdued demand from fleet operators for new aircraft. The aircraft manufacturers Airbus and Boeing responded to this in the previous year by scaling back production, which continued into the reporting period. Accordingly, the volume of engines sold in the series business remained low. Demand for maintenance and repair services was also impacted by the low level of air traffic, especially in the first six months. As a result, rising demand for spare parts in the second half of the year did not quite offset the decline in the series business. This resulted in a slight drop in deliveries and revenue in the commercial OEM business in the reporting period. Moreover, the change in the average euro/U.S. dollar exchange rate from U.S.$.1.14 per euro to U.S.$1.18 per euro in the reporting period held back revenue in the commercial OEM business as most revenue is billed in U.S. dollars.

Cost of goods sold and gross profit

In the reporting period, which was overshadowed by the pandemic, the cost of goods sold was principally influenced by write-downs of fixed assets and write-downs of current asset items relating to the PW1700G engine program for the E175-E2 regional jet whose market launch had been scheduled for the reporting period but was once again postponed for several years. The resulting negative impact on the cost of sales in the reporting period was €65 million. In the previous year, a write-down was recognized for the GWE9X and PW1200G engine programs. The impact of this on the cost of goods sold was €63 million. In addition, pandemic-related production restrictions in the first half of the year, in particular, had a negative impact on the productive use of working capacity and personnel capacities. There was an appreciable rise in the personnel expenses contained in the cost of goods sold because these expenses had been reduced by a cost-cutting program in the previous year, which principally reduced employee's time credits, the use of short-time working and the fact that there were no entitlements to various salary components. This was countered by the one-time expenses of €33 million recognized in the previous year for the cost-cutting program at the German locations. As a result of these factors, the reduction in the cost of goods sold was lower than the drop in revenue, resulting in a considerable reduction in gross profit.

Selling expenses

The change in selling expenses is attributable to higher expenditures for obligations to employees and to the ongoing coronavirus pandemic, which resulted in higher credit default risks in the aviation sector, resulting in prefinancing risks relating to the aftermarket connected with membership of consortia. Consequently, MTU recognized extensive valuation allowances for trade receivables in the reporting period. This was another factor affecting selling expenses.

Net other operating income / expense

In the reporting period, this item was mainly influenced by net income from foreign currency translation, mainly due to the euro/U.S. dollar exchange rate, which changed from U.S.$1.23 per euro to U.S.$1.13 as of the reporting date, the valuation of currency holdings and hedging transactions amounting to €34 million (previous year: €118 million) and an offsetting effect of €58 million (previous year: €74 million) from income from adjustments to accrued expenses.

Net financial income / expense

Net financial income/expense is mainly influenced by the development of investment income and dividends received. Net financial income/expense for the reporting period contains investment income of €200 million (previous year: €139 million). Of this amount, €140 million (previous year: €52 million) comprises profit transfers from MTU Maintenance Hannover GmbH, Langenhagen, Germany, MTU Maintenance Berlin-Brandenburg GmbH, Ludwigsfelde, Germany, and MTU Versicherungsvermittlungs- und Wirtschaftsdienst GmbH, Munich, Germany.

The remaining investment income of €60 million (previous year: €88 million) comprises dividend payments from subsidiaries, principally €30 million from MTU Aero Engines Polska sp. z o.o., Rzeszów, Poland, and from other equity investments, principally €28 million from MTU Maintenance Zhuhai Co. Ltd., Zhuhai, China.

Tax expense

Income tax expense amounted to €67 million in the reporting period (previous year: €26 million). The current tax expense included in this figure amounts to €61 million (previous year: €88 million), including €18 million (previous year: €32 million) relating to prior periods. This is offset by deferred taxes of €19 million (previous year €34 million) relating to prior periods.

Net profit for the year and net profit available for distribution

Subject to the approval of the Supervisory Board, the net profit for the reporting period attributable to the shareholders of MTU Aero Engines AG takes into account the allocation of €86 million of the net profit for the period to retained earnings in accordance with Section 58 (2) of the German Stock Corporation Act (AktG).

Determination of the net profit available for distribution takes account of amounts excluded from distribution: €224 million (previous year: €220 million) from the capitalization of internally generated intangible assets (Section 248 (2) of the German Commercial Code [HGB]) and €30 million (previous year: €44 million) from the measurement of pension obligations (Section 253 (2) of the German Commercial Code [HGB]), taking into account, in both cases, the related deferred taxes. These were matched in full by free reserves pursuant to Section 268 (8) of the German Commercial Code (HGB) and Section 253 (6) of the German Commercial Code (HGB) as of the reporting date.

Subject to the approval of the Supervisory Board, a proposal will be put to the Annual General Meeting that the entire net profit available for distribution be used to pay a dividend of €2.10 per share (previous year: €1.25 per share). Subject to approval by the Annual General Meeting, the dividend for 2021 will be paid on May 10, 2022, and the total dividend payment will be €112 million (previous year: €67 million).

Disclosures relating to net assets and financial position

[T35] Balance sheet of MTU Aero Engines AG

	Dec. 31, 2021		Dec. 31, 2020		Change against previous year	
in € million	in € million	in %	in € million	in %	in € million	in %
Assets						
Intangible assets and property, plant and equipment	1,740	25.7	1,777	26.9	-37	-2.1
Financial assets	1,053	15.5	1,009	15.3	44	4.4
Non-current assets	**2,793**	**41.2**	**2,786**	**42.2**	**7**	**0.3**
Inventories	708	10.4	700	10.6	8	1.1
Receivables and other assets	2,461	36.3	2,170	32.8	291	13.4
Cash and cash equivalents	627	9.2	747	11.3	-120	-16.1
Current assets	**3,796**	**55.9**	**3,618**	**54.7**	**179**	**4.9**
Prepaid expenses	**13**	**0.2**	**11**	**0.1**	**2**	**22.6**
Deferred tax assets	**183**	**2.7**	**199**	**3.0**	**-16**	**-7.9**
Total assets	**6,785**	**100.0**	**6,614**	**100.0**	**173**	**2.6**
Capital						
Subscribed capital	53	0.8	53	0.8	-0	-0.4
Capital reserves	665	9.8	644	9.7	21	3.3
Retained earnings	1,347	19.8	1,275	19.3	72	5.7
Net profit available for distribution	112	1.7	67	1.0	45	67.7
Equity	**2,176**	**32.1**	**2,038**	**30.8**	**139**	**6.8**
Pension provisions	739	10.9	702	10.6	37	5.3
Other provisions	2,066	30.4	1,863	28.2	203	10.9
Provisions	**2,805**	**41.3**	**2,565**	**38.8**	**240**	**9.3**
Liabilities						
Bonds	1,158	17.0	1,170	17.7	-12	-1.1
Liabilities to banks			130	2.0	-130	-100.0
Advance payments received	270	4.0	326	4.9	-56	-17.2
Trade payables and other liabilities	209	3.1	206	3.1	4	1.7
Liabilities	**1,637**	**24.1**	**1,832**	**27.7**	**-195**	**-10.6**
Deferred tax liabilities	**167**	**2.5**	**178**	**2.7**	**-11**	**-6.1**
Total equity and liabilities	**6,785**	**100.0**	**6,614**	**100.0**	**173**	**2.6**

In the fiscal year 2021, intangible assets in the amount of €48 million were capitalized (previous year: €55 million). €43 million (previous year: €33 million) was invested in internally generated development assets and €0 million (previous year: €19 million) was invested in acquired development work, especially for the GTF™ engine family and the GE9X and PW800 engine programs. This was partially offset by write-downs of €61 million on capitalized program assets and acquired and internally-generated development work for engine programs that have been written down permanently.

Tangible fixed assets increased, principally as a result of new and replacement purchases of machinery and tools/fixtures.

Inventories were almost stable year-on-year, registering a rise of €8 million to €708 million (previous year: €700 million).

In the second half of the year, the development of receivables and other assets benefited mainly from the recovery of the commercial maintenance business and the related spare parts and repair business. The rise in receivables from affiliated companies to €776 million (previous year: €703 million) was attributable to the business-related development of profit transfers from MRO subsidiaries and financing of foreign subsidiaries. In addition, the increase in other assets to €186 million (previous year: €91 million) was primarily due to the development of aftermarket-related compensation payments in connection with stakes in commercial engine programs. Other factors were the year-on-year increase in claims to refunds of income tax, which were due in some cases to prepayments, and input taxes. Since the commercial OEM activities are billed in U.S. dollars, the development of receivables was also attributable to the change of the U.S. dollar exchange rate prevailing on the reporting date from U.S.$/€ 1.23 to U.S.$/€ 1.13.

The change in cash and cash equivalents was mainly due to the operating performance and the dividend payment, redemption of a promissory note and a note purchase agreement, and financing of subsidiaries.

Equity comprises the capital stock less the nominal amount of treasury shares, capital reserves, retained earnings, and the net profit available for distribution.

The development of provisions for pensions mainly reflected the reduction in the discount rate, while a counter-effect came from changes in the calculation parameters, especially salary and pension trends. The miscellaneous liabilities reflect the upturn in business and the related increase in current provisions for programs. In addition, provisions were increased as a result of provisions for payroll and social security obligations for the workforce, especially for flexitime and vacations, and provisions for variable remuneration.

The drop in liabilities was mainly attributable to the redemption in the reporting period of a promissory note and a note purchase agreement amounting to €100 million and €30 million, respectively. In addition, the exercise of further conversion rights on the convertible bond issued in 2016 has to be taken into account. The reduction in prepayments received for orders in connection with stakes in commercial and military engine programs also contributed to the drop in liabilities. The other liabilities mainly contain obligations to employees in the amount of €86 million (previous year: €73 million) and liabilities arising from investments in engine programs.

Other disclosures

The opportunities, risks and future development of MTU AG essentially correspond to the opportunities, risks and future development of the MTU Group as described below under *“Forecast” and “Risk and opportunity report.”*

As the Group’s parent company, MTU AG is integrated in the Group-wide risk management system that is described in detail in the *“Risk and opportunity report.”* The description of the internal control system of MTU AG required under Section 289 (4) of the German Commercial Code (HGB) can be found under *“Internal control and risk management system for the Group accounting process.”*

For further information on the use of financial instruments, please refer to the Notes to the consolidated financial statements and to the *“Use of financial instruments” section of the Risk and opportunity report*.

Due to its dominant role within the OEM operating segment (commercial and military engine business), and in view of the profit and loss transfer agreements that exist between the parent company and its German maintenance subsidiaries in the MRO operating segment, the outlook for MTU AG is closely aligned with the expected future development of the Group as described under *“Future performance of MTU.”*

Looking ahead to the annual financial statements for MTU AG in 2022, which are prepared in accordance with the provisions of the German Commercial Code (HGB), the Executive Board anticipates revenue growth compared with the reporting period in the high single-digit to low double-digit percentage range. Assuming that the U.S. dollar exchange rate is stable and taking into account the renewed earnings impact of exceptional factors in 2021, MTU forecasts growth in earnings from ordinary operating activities in the low- to mid-double-digit percentage range in 2022.

Forecast

Macroeconomic conditions

In its new economic outlook (01/2022), the IMF predicts that the global economy will grow by 4.4% in 2022. The growth drivers will be the emerging markets and developing countries, with growth of 4.8%. In the industrialized countries, GDP is expected to rise by 3.9% in 2022. One assumption on which the IMF's growth scenario is based is that there will be a considerable reduction in the number of serious illnesses resulting from Covid-19 infections, so the economic impact of the pandemic should steadily decrease. It is expected that this will be supported by a further rise in the vaccination rate and more effective therapies.

For the USA, withdrawal from the accommodating monetary policy and a continued shortage of resources is predicted. Economic growth of 4.0% is projected for the USA. Relatively modest growth is also forecast for China as a consequence of its strict zero-Covid policy, the financing crisis in the real estate sector, and weaker domestic consumption. In the eurozone, the continued travel restrictions at the start of the year are likely to affect the economy, so growth is expected be 3.9%.

Bottlenecks in the supply of resources, rising energy prices and supply chain problems are likely to be felt globally in 2022. These factors, together with pent-up demand following the crisis, are also driving inflation. The IMF predicts that inflation will be 3.9% in the industrialized nations in 2022. Prices and inflation are not expected to stabilize at a moderate level until the following year.

The above forecasts do not include the Russia-Ukraine conflict. Far-reaching sanctions will mainly affect the Russian economy and trade with Russia. Negative effects on the global economy are to be expected, but their dimension cannot yet be estimated.

Sector-specific conditions within the aviation industry

2022 started with lower capacity and passenger figures as a result of the rapid spread of the Omicron variant of Covid-19. The essentially upward trend in the aviation sector should continue from March 2022 at the latest as Covid-related travel restrictions are eased further and the sustained economic recovery continues.

This projection is, however, affected by the outbreak of the Russia-Ukraine conflict. The sanctions imposed relate, among other things, to the export of aviation products, overflight rights and financial transactions. They affect both the Russian and the global aviation industry. In the past, the aviation sector and its long-term growth have proven resilient in crises. In 2019, Russia was the eleventh largest market in terms of air passenger traffic (source: IATA).

In its forecast of March 1, 2022, IATA predicts that air passenger traffic in 2022 will improve to 83% of the pre-pandemic level. Air cargo traffic should grow by a further 5% (source: IATA [10/2021]). However, the impact of the Russia-Ukraine conflict is not yet factored into these assessments.

The recovery in air traffic should be reflected in a significant rise in the number of passenger flights. Rising capacity will lead to the reactivation of grounded aircraft, an increase in the annual number of movements per aircraft and new aircraft deliveries. Since fleets with the most modern and economical engines were largely back in service in 2021, more older aircraft are now likely to be reactivated.

The cargo business is one ray of light in the aviation sector. Here, revenue is expected to remain strong in 2022. While only 77% of the passenger fleet was in use as of December 31, 2021, the figure for the cargo fleet was 93% (source: Cirium Fleets Analyzer). Since 17% of MTU's fleet is in the cargo segment, commercial engine programs such as the CF6-80C and the PW2000 will continue to benefit considerably from the strong demand for cargo.

According to the forecast by IATA (10/2021), global revenue in the airline sector should recover from U.S.$472 billion in 2021 to U.S.$658 billion in 2022. IATA assumes a lower net annual loss in the airline sector of around U.S.$11 billion or 8% of revenue. IATA's forecast (10/2021) is based on a sustained low oil price of U.S.$67 per barrel in 2022. However, the January forecast by the U.S. Energy Information Administration assumes U.S.$75 per barrel in 2022. An update taking into account further price rise is to be expected in light of the Russia-Ukraine conflict. This would represent an additional burden on the airlines in 2022 and put pressure on the IATA forecast.

Aircraft manufacturers Airbus and Boeing are also basing their planning on a recovery in demand and long-term growth in air traffic. Production rates for the A320 and Boeing 737 model ranges are to be increased further, from 45 to 65 A320 aircraft a month by 2023 and from 19 to 31 Boeing 737 aircraft a month in 2022. Even higher production rates are being considered, depending on supply chains, which have to stabilize in the wake of the pandemic. Given the sharper downturn in international long-haul traffic, there is greater caution about production rates in the twin-aisle segment. For example, production of the 787 type will remain at only up to five aircraft a month. Further, Boeing assumes that it will not deliver the first Boeing 777X aircraft until year-end 2023.

Future performance of MTU

In view of the impact of the Covid-19 pandemic and the large number of programs targeting different market segments, there could be delays in development or changes or postponements in series production and maintenance of engines, which could affect the principal KPIs.

Expenditure on new products and services

The ongoing Covid-19 pandemic has resulted in a continued reduction in air traffic. However, global progress in checking the pandemic is bringing a positive trend and thus a steady recovery in the aviation industry. This positive trend is countered by new restrictions on flights resulting from the Russia-Ukraine conflict, so the recovery in the aviation sector is expected to slow.

2022 should bring the start of a new ramp-up of engine production. Similarly, there should be corresponding growth in market demand for spare parts and the MRO business.

Following a sharp reduction in 2020 and initial growth in 2021, development work will pick up again, not least because of the participation in the next generation fighter aircraft, the Future Combat Air System (FCAS).

For the start of the ramp-up of engine production rates and to secure its long-term competitiveness, MTU is investing a substantial amount to expand the highly productive manufacturing and logistics capacity at its headquarters in Munich, Germany.

In addition, it is continuing to expand capacity at other sites, especially in China and at the new repair facility in Serbia.

Outlook for 2022

Target

MTU's targets for the fiscal year 2022 are as follows:

[T36] Outlook for 2022

in € million	Forecast for 2022	Actual 2021
Revenue	Between €5.2 billion and €5.4 billion	4,188
Adjusted EBIT	Growth in the mid twenty-percent range	468
Adjusted net income	Growth in line with adjusted EBIT	342
Cash conversion rate	In the mid to high double-digit percentage range	70%

The company forecasts that revenue and earnings will increase in 2022 and that the free cash flow will be positive. In view of the uncertainty regarding the economic outlook, the forecast is presented largely as ranges.

Revenue by operating segment

Within the OEM business, MTU assumes an increase in revenue from the commercial series business in the mid- to high-teens percentage range in 2022. The increase in revenue in the commercial spare parts business should be in the mid-teens percentage range.

Revenue in the military engine business is also expected to grow in the high single-digit percentage range in 2022. Revenue from development work for the FCAS also made a contribution to this.

On a U.S. dollar basis, MTU forecasts that its commercial maintenance business will grow in the mid- to high-twenties percentage range in 2022. A high revenue contribution is expected to come from the PW1100G-JM, with growth in line with the activities in the core MRO business.

In view of this, the total revenue of the MTU Group in euros is expected to be between €5.2 and €5.4 billion.

This estimate is based on an average exchange rate of the U.S. dollar to the euro of 1.15.

Operating profit

MTU expects adjusted EBIT to grow in the mid-twenties percentage range in 2022.

Adjusted net income in 2022 is expected to develop in line with adjusted EBIT.

Free cash flow

2022 will be another year of sustained high investment spending. However, MTU intends to offset these expenses through its operating business and to generate a clearly positive free cash flow. The cash conversion rate (free cash flow/adjusted net income) should be in the mid to high double-digit percentage range.

Future dividend

It is MTU's policy to pay an attractive dividend. Despite all current and future challenges and based on the overall forecast of future business developments of MTU in 2022, the company aims to further increase the dividend payout ratio. The aim is a distribution ratio of between 30% and 40%.

Employees

An increase in personnel capacity is expected in both operating segments in 2022. This will comprise a high proportion of IT personnel as well as engineering capacity for the development of the Next European Fighter Engine.

Research and development

In 2022, MTU's research and development activities will focus on engine efficiency – concentrating on the ongoing development of its key components: low-pressure turbines, high-pressure compressors and turbine center frames. In addition, the company is working on new technologies for long-term projects aimed at decarbonizing aviation. The aims are to reduce fuel consumption and emissions and extend repair cycles. Furthermore, development work in the military business is dominated by work on the Next European Fighter Engine. Detailed information on research and development activities, including the targeted medium- and long-term reductions in fuel consumption and emissions, is provided under *"Research and development."*

Overall forecast of future business performance in 2022

The Executive Board anticipates that business will develop positively: Revenue should rise significantly again and MTU should continue to post strong EBIT. Stepping up development activities and capital expenditure again in 2022 will provide a sound basis for the sustained long-term growth of MTU's business.

MTU is monitoring the possible effects of the Covid-19 pandemic and the Russia-Ukraine conflict on its present business and will revise its guidance during the year if necessary.

Risk and opportunity report

Risk report

Risks are an inherent part of any entrepreneurial activity. To enable it to take best advantage of market opportunities and to identify and manage the risks involved, MTU has an integrated opportunity and risk management system. This is linked to the Group's value-oriented performance indicators and its organizational structure. The system is based on the internationally recognized COSO II Enterprise Risk Management Framework. To assist in implementing risk management in the MTU Group, the central risk management function provides the risk owners with a variety of information and tools. These include the MTU risk guidelines and risk manual and extensive checklists, which provide guidance and operational support in the risk management process.

The systematic consideration of significant risk factors serves as a fundamental basis for value-oriented management of the MTU Group and ensures lasting business success. MTU identifies risks early on, analyzes their possible consequences and devises appropriate risk mitigation measures. The key areas of risk exposure are:

/ macroeconomic and strategic risks,
/ market and program risks,
/ development and production risks,
/ other risks arising from business operations.

Strategy and risk management system

Control environment

MTU regards a suitable control environment as being essential for a functioning risk management system. The main elements of this are:

/ management style and philosophy,
/ integrity and ethical values,
/ no-blame culture,
/ staff training and development.

The MTU Principles require a constructive approach to mistakes, and the company's leadership values include a commitment to actively driving change, creating an atmosphere of trust, and ensuring continuous improvement. This is supported by lean management in all areas of the company, which also aims to create a culture that ensures a functioning risk management system.

Risk management objectives and risk strategy

The objectives of MTU's risk management system are to create transparency with regard to all risks and opportunities, to ward off risks to MTU's status as a going concern and to safeguard the company's future business success.

The company does not limit itself to ensuring compliance with statutory requirements. Rather, it seeks to integrate its opportunity and risk management system into all processes in the company, from financial planning, control and reporting processes right through to monthly reporting to the Executive Board and the Supervisory Board. Risk management also takes place in other areas of the company; for instance, it is a key component of project management.

Identification, analysis and management of risks

MTU regards risk management as a continuous process that ensures responsible behavior when dealing with specific risks to organizational units and general risks affecting several units or the entire Group.

The Group's risk inventory, which encompasses all organizational units and all risk factors to which MTU is exposed, forms the basis for identifying risks. In accordance with the COSO II Framework, it is divided into governance and compliance, strategy and planning, operations and infrastructure, and reporting. In the interests of a more detailed assessment of risks, MTU has divided this framework into 15 risk categories covering all organizational units. MTU also examines sustainability risks inherent in its business activities that may affect third parties.

Operational risk management takes place at the level of the individual, organizationally separate units and in the subsidiaries. These are responsible for identifying, assessing, controlling and monitoring the risks in their specific areas, and documenting them in a central risk management tool. To this end, they use a general risk checklist derived from the risk inventory. Mandatory reports are submitted to the central risk management function for risks exceeding €5 million over the three-year assessment period in the form of risk maps, at dates aligned to the quarterly financial results. The risk maps are also used to document risks below the €5 million threshold. Risks occurring during the year that could threaten the company's status as a going concern are reported immediately to the central risk management function. Risks are assessed using uniform definitions of the probability of loss/damage and as possible deviations in the Group performance indicators “adjusted EBIT” and “cash flow” compared with current operational planning figures. Risk are presented gross, before taking risk mitigation measures into account. In addition to these financial risks, risk management also explicitly includes non-financial risks.

The central risk management function aggregates and consolidates the reported risks. It also provides assistance with the risk management process, prescribes uniform methods and tools, and evaluates the Group's overall risk position. Furthermore, it supports the work of the cross-organizational Risk Management Board, which performs central control and monitoring functions for the Group. At its quarterly meetings, the Risk Management Board discusses the interactions between individual risks, ensures that all risks have been reported in full, and assesses the risk exposure of the Group as a whole.

Risk reporting and risk communication

MTU's Executive Board is informed quarterly of the Group's current risk situation. The report is agreed with the Risk Management Board and is structured on the basis of the segments. This report presents the company's Top Risk Map, which covers all risks and opportunities exceeding €20 million over a three-year period. A risk assessment is then performed in this context, taking account of the amount of damage, the probability of occurrence and the identification of compensatory countermeasures.

The Supervisory Board's Audit Committee is also given an update of the MTU Group's risk position on a quarterly basis. The most important issues from the previous risk review are also presented in monthly reports to the Executive Board and the Supervisory Board.

Monitoring the risk management process

Monitoring the risk management process is crucial to ensure its proper functioning and ongoing development.

The system used for the early recognition of risks is audited by the auditor. In addition to this, the risk management system is monitored and verified by other functions and Group bodies:

- peer-group comparisons and benchmarking,
- process reviews by the Risk Management Board in the form of a self-assessment,
- regular process and effectiveness audits by Internal Audit,
- monitoring by the Audit Committee and/or Supervisory Board.

Strategy risks

Macroeconomic risks

Within the aviation industry, MTU is exposed to competition in the development, production and maintenance of engines, engine modules and engine components. In non-pandemic times, this business is cyclical and reacts sensitively to demand for passenger and cargo traffic. It is influenced by the general macroeconomic situation (GDP and trading volumes, exchange rates and raw material prices).

Demand from airlines for new aircraft and MTU's commercial engine products (new engines and spare parts) and their financing capability are heavily influenced by passenger numbers. A deterioration in the macroeconomic situation and the related demand for air traffic reduces use of the existing fleet of aircraft and demand for new aircraft. This represents a risk for MTU's business. Moreover, high competitive pressure among airlines could have a negative effect on individual airlines, which are potential direct or indirect MTU customers.

MTU is currently exposed to extraordinary risks. The outbreak and global spread of Covid-19 resulted in a pandemic and a sharp drop in air traffic.

The specific risks to the aviation industry resulting from the global spread of Covid-19 include, for example, further or extended travel restrictions, which do not simply reduce the volume of passenger and freight traffic, but also have a negative impact on demand for spare parts and aircraft maintenance services. A significant reduction in demand for air travel and air cargo could also cause MTU customers to take a more cautious stance on new orders for products and services, leading to substantial order rescheduling or even order cancellations.

Covid-19 could have a significantly negative impact on MTU's stakes in some commercial engine programs, i.e., it could result in impairment losses on the value of the related assets or increase (contingent) liabilities from such participations and MTU's obligations as a member of risk- and revenue-sharing partnerships (RRSP).

The exceptional situation in connection with the Covid-19 pandemic and the uncertainty about its continued extent and duration, including the effect of virus mutations, greatly restricts the company's ability to adequately predict and plan its business operations, especially in the short to intermediate term. Although MTU consults with government agencies, industry associations and external aviation analysts at national and international level, it is still not able to adequately forecast the impact of the Covid-19 pandemic on its business. Incorrect forecasts have a considerable negative effect on the company's business activity, cash flows, results of operations and financial position.

The Covid-19 pandemic also confronts MTU with considerable operational challenges, especially if it has to temporarily shut down production sites and research and development (R&D) locations to protect the health and safety of its employees or there is other disruption at its workplaces. Moreover, during the pandemic MTU's business operations are affected by state restrictions on the movement of people, raw materials and goods to, from and within its locations and those of its suppliers.

MTU is also indirectly affected by the effects of the Covid-19 pandemic on its suppliers. Some suppliers may have to temporarily suspend operations due to state-imposed restrictions, confronting MTU with further short- or mid-term challenges and business disruption. Therefore, MTU could be exposed to risks in respect of costs that are necessary to meet its contractual commitments as well as risks to its product supply schedules.

As a long-term effect of the Covid-19 pandemic, MTU could face more rapid changes in usage patterns or aviation regulations, which could adversely affect its business model. There is already a public debate about the social and economic implications of air travel and air cargo driven by the ongoing global climate debate. This has heightened personal and corporate awareness of travel and consumption behavior. Potential changes in usage patterns and the applicable regulations could be intensified and given new momentum by experience during the Covid-19 pandemic, e.g., online video conferencing as a substitute for business trips. If a reduction in travel and altered consumer spending patterns are regarded as socially desirable by the general public, this could have a significant negative impact on MTU's business model.

Assuming that the pandemic is successfully overcome, particularly purely economic aspects will play their customary central role for air traffic in the mid to long term, alongside the consequences of the global debate on climate policy. Successful vaccination drives are currently supporting an economic recovery from the global Covid-19 crisis. However, in its economic outlook of October 2021, the International Monetary Fund (IMF) warns that further risks are gaining ground. These have the potential to reduce future growth in air traffic and thus demand for commercial engine products. The industrialized nations are suffering supply bottlenecks and inflation as a result of a sharp hike in demand. Concern about inflation could result in a self-accelerating inflationary spiral. By contrast, the emerging markets and developing countries are still suffering enormously from the Covid-19 pandemic and are worried about the long-term consequences of the virus, according to the IMF. In general, the IMF sees a heightened risk of social unrest as a result of the pandemic. Moreover, there has been a considerable rise in state debt in most countries as a result of measures to deal with the pandemic. According to the Ifo Center, China's debt burden could have a domino effect and weaken the country's economic power – which would have a global impact. Protectionist measures introduced in some countries before the pandemic are a further risk factor. These include the trade conflict between the USA and China. Protectionist measures hold back the volume of trade and countries' economic output and therefore reduce cargo and passenger traffic.

Political crises and restrictions on air traffic following terrorist attacks or natural catastrophes are a constant risk to air traffic and to MTU's engines business. After the reporting date, Russia launched a military attack on Ukraine. As a result, the international community, especially the EU and the USA, imposed extensive economic sanctions on Russia. As a matter of course, MTU supports all sanction regulations and is in full compliance with them. The company has currently suspended all deliveries and data transfers to Russia. Payments to Russia and to Russian payment recipients have been discontinued. Furthermore, MTU has halted the signing of any new contracts with Russian involvement for an indefinite period of time. Contract negotiations that were already underway were halted with immediate effect. Generally speaking, MTU has only very limited MRO business with customers in Russia and no presence in the region. In the OEM business, MTU is involved in the PW1400G-JM engine program intended for use in a Russian mid-haul jet. In light of the current developments, this could result in impairment of capitalized development assets of up to €40 million. Regardless of this, the company is constantly monitoring the situation, including its effects on global material supplies. Potential impacts to MTU's supply chain are being assessed continually and factored into the procurement strategy. In regard to the aviation sector, there are concerns that the conflict could negatively affect the recovery in air traffic that had just recently begun.

Risks arising from corporate strategy

The main forms of strategy risk are misjudgments when taking decisions about investment in engine programs, the establishment of new sites and possible M&A activities. During the decision-making phase of a program, highly qualified specialists perform cost-benefit analyses based on set procedures that include the obligation to carry out a risk analysis on the basis of different scenarios. MTU's business model is based on long-term processes, particularly in the OEM segment. Many years of development, preproduction and volume production may lie between the decision to invest in a new commercial engine and the breakeven point. The risk is that the original economic and technological parameters might change over time, hence the need for frequent reassessments that take into account the most recent economic and technological developments. A decisive factor in this regard is, in particular, the success of the aircraft platforms on which the engines are deployed. MTU counters such strategy risks through a broad portfolio. This means that the company limits the impact of an individual program or aircraft platform by holding an interest in a wide range of products across all thrust classes.

In the longer term, a further identifiable risk, in addition to that arising from MTU's strategic decisions, is the arrival on the market of new competitors, e.g. from Russia or China. But given the high barriers to market entry, this risk is currently not regarded as critical. Changes in expectations of growth in air traffic and the aircraft industry, climate-related regulation and price increases or a reduction in the number of aircraft sold could lead to considerable negative impacts or further adjustments of the assumptions and estimates underlying the assessment of MTU's assets and liabilities and the presentation of MTU's financial position.

The engine industry is dominated by high investment both as development compensation payments to the engine OEMs and as development work by MTU at the start of a new engine program. The long product lifecycles of both aircraft and engine programs have to be taken into account when assessing the return on these investments. Empirical observation indicates that the lifecycle of successful engine programs for commercial aircraft is well over 30 years. In view of the long product lifecycle, the estimation requirements outlined above relate to long-term developments. Therefore, updated assumptions (for example, changes in the competitive situation, expectations of growth in air traffic and the aircraft industry, a deterioration in the number of aircraft sold, which could affect the creditworthiness of the Group's customers) have a considerable impact on MTU's systematic estimates and thus on its key financial indicators.

Due to the Covid-19 pandemic, in 2021 demand for air travel was still well below the pre-crisis level. MTU's commercial business was – at least temporarily – affected by a sharp drop in demand both in the sale of new engines and in the aftermarket business, as well as an acceleration of the trend to using smaller aircraft for medium-haul flights. The commercial MRO business was affected, at least temporarily, by lower demand. The impact of the Covid-19 pandemic on MTU's business makes it difficult for the company to reassess or confirm individual assumptions and estimates that were originally based on conditions and forecasts prior to the Covid-19 pandemic, because the assumptions underlying these estimates and assessments relate to currently available information and macroeconomic factors, microeconomic factors in the aviation sector and, in the case of certain suppliers and customers, expectations of how these may develop. Changes to these assumptions and estimates could have a highly negative impact on MTU's business activities, cash flow, results of operations and financial position.

Substitution risks arising from disruptive technologies

New aircraft and propulsion systems are currently being investigated in order to make a contribution to meeting the ambitious climate targets. Airbus recently presented three aircraft concepts that could facilitate emission-free commercial flights, with an increased focus on hydrogen. Modified engines should allow direct combustion of this volatile gas. According to Airbus, this technology could come into use from 2035. While combustion of hydrogen in modified engines would hardly alter MTU's present business model, electric propulsion systems are in principle a substitution risk for conventional engine technologies. However, they do not yet come anywhere near the performance required to power a large passenger or freight aircraft. Together with its research partners, MTU is conducting studies to examine all the conceivable concepts in order to factually assess the opportunities arising from alternative engine concepts and make use of them as appropriate. Among the key results from these studies are:

- Propulsion systems based on electric batteries are suitable today for applications requiring low performance and short duration of use, such as general aviation and urban mobility. With improvement in the storage capacity of batteries (5% per year), they could be used in several years on commuter aircraft and in about 30 years on regional aircraft. At the moment, there are no known battery concepts with sufficient capacity for short- and medium-haul aircraft, let alone for long-haul aircraft, which together represent an important market for MTU.
- Hybrid propulsion systems combine electric motors, generators, gas turbines and batteries. These open up new possibilities for aircraft and engine design as well as engine integration and still rely on kerosene, an energy source with high energy density. MTU is involved in a number of studies that are examining the potential of these propulsion concepts. However, as yet they have not shown any major benefits compared with conventional propulsion systems.
- Considerable progress has been made in the development of fuel cells in recent years. However, their present performance potential is not sufficient for commercial aviation. In the long term, however, in conjunction with liquid hydrogen fuel, they have far greater potential for use in aviation than batteries. MTU has therefore begun to examine the potential and feasibility of fuel cells for propulsion systems.

- CO_2 is used as the starting product for the production of synthetic fuels. This significantly improves CO_2 performance by 80% or more, depending on the production process. The big advantage of sustainable aviation fuel (SAF) is that it is a "drop-in" fuel, in other words, no technical modifications to the aircraft, engine or airport infrastructure are necessary. In initial trials, SAF has also shown considerable potential to reduce condensation trails and their climate impact. SAF is therefore the technology that could bring a direct improvement in the climate impact of the present fleet. MTU Aero Engines is involved in research into SAF through its membership of the Bauhaus Luftfahrt research institute in Munich and aireg – Aviation Initiative for Renewable Energy in Germany e.V., which is based in Berlin. This not-for-profit initiative, where MTU leads the Fuel Utilization Working Group, is promoting the availability and use of renewable energies in aviation to enable the sector to achieve its ambitious carbon reduction targets.

From today's perspective, the fields in which MTU currently operates will not be affected by actual substitution risks in the foreseeable future. Nevertheless, MTU will continue to keep a close eye on developments in the field of electric motors, batteries and, especially, fuel cells, and compile further studies so it can react and, above all, participate in a timely fashion. In parallel, MTU is permanently working to improve the efficiency of conventional engines, thus continuously raising the ecological and economical access barriers for any substitute products. In addition to the substitution risks, risks could arise from climate-related regulations in the future. At present, there are no indications of specific activity by the regulatory authorities. Nevertheless, MTU is carefully monitoring developments in its field and will examine any emerging regulatory activities to identify potential strategic risks.

MTU does not currently see any strategy risks that could jeopardize its status as a going concern.

Market and program risks

The production of engine modules and components for aircraft is characterized by intensive competition between market participants. MTU is exposed to this competition in all aspects of its two operating segments: commercial and military engine business (OEM) and commercial maintenance business (MRO).

In its OEM segment, MTU participates in programs to develop and build new engines, which its OEM partners offer to manufacturers of commercial and military aircraft, airlines and governments. Some of these programs compete with other engine programs for installation in the same aircraft type. Therefore, MTU's success depends partly on the ability of its OEM partners to secure orders from manufacturers, airlines and governments for the engine programs that MTU is involved in. In addition, through its stakes in engine programs, MTU also competes with other producers of engine modules and components (some of which are highly specialized and may offer directly competing technology) as well as with the OEMs, which may possibly decide to source development work, components and parts internally rather than from MTU.

As well as competition in the new engines business, MTU's competitive situation in the OEM segment includes the sale of engine parts and components in the aftermarket business. The aftermarket business is highly significant for MTU because the success of its participation in engine programs over the entire lifecycle depends to a large extent on this business. MTU's commercial business is cyclical and sensitive to demand for air transport as well as to the financial situation of the commercial aviation industry.

MTU's customers in the military engine business are national and international agencies. Therefore, political changes have an almost immediate effect on MTU. Given the tight national budgets that can be observed at present, especially in Europe, there is always the risk that countries may postpone or cancel orders. Due to the budget situation, it may be necessary to renegotiate the scope of contractually agreed deliveries. In the military engine business, MTU is firmly embedded in international cooperative ventures. This tends to limit risks because the partners work together to protect their common interests. Furthermore, the terms of existing contracts in the military sector are generally defined to cover a prolonged period of time, thus largely ruling out price risks.

Even though the company assumes that defense budgets are likely to rise in the future, MTU's military business is principally dependent on the sustained commitment of the German and other European governments and the U.S. administration to their military procurement programs.

MTU is also exposed to competition in its MRO segment, which comprises commercial maintenance, repairs and overhauls. MTU is an independent provider of MRO services and therefore competes with airlines' internal MRO service providers, which have links to many of their potential customers. MTU's other major competitors are OEMs' maintenance operations. OEMs can link their service contracts with airlines to the sale of engines, which initially gives them a competitive advantage over MTU in this field. Worldwide, there are also many independent engine maintenance shops that, like MTU, are endeavoring to expand their market position.

In the commercial engine maintenance business, the market is affected by different speeds of recovery from Covid-19. The narrowbody business is recovering far faster than the widebody business and large domestic markets such as China, the USA, India and Russia are leading the way in the revival of regional traffic.

Furthermore, it is evident that scheduled engine overhauls are being postponed (e.g., for engines with a remaining lifecycle) or are heavily budget-driven, e.g., to avoid expenditure by undertaking short-term optimization with lower MRO requirements.

During the Covid-19 pandemic, global cargo business performed strongly and MTU was able to further increase its MRO market position with the CF6-80, PW2000 and GE90-115 engine types.

Conditions are tough in some areas of the commercial MRO market in which MTU operates. The market conditions may remain challenging in the future as a result of factors that the company is unable to influence. The following factors could prove detrimental to the success of MTU's MRO business.

- In view of the prevailing overcapacity of MRO service providers, MTU is exposed to intensive price competition. This could have a negative impact on profit margins in this operating segment.
- Demand for MRO services depends on the capacity utilization of aircraft and could decline significantly if there is a reduction in passenger traffic.
- The client base in the MRO segment is characterized by a few large individual customers, so losing one of these customers could have a negative impact on revenue from this business.
- Some of the engine programs in the MRO business are at an advanced stage in their lifecycle, so the MRO product portfolio could be too strongly focused on aging products and technologies.
- OEMs strive, and could continue to strive, to negotiate agreements where a large proportion of maintenance work is performed by internal units, especially because some of these units have links to their potential customers. A considerable shift towards such in-house units would reduce the competitive opportunities for third-party suppliers such as MTU.
- MTU is a contracting party in "fly by the hour" and "power by the hour" agreements which obligate it to perform maintenance work on engines at flat-rate, usage-based prices. Furthermore, under these agreements, MTU effectively assumes the risk of higher maintenance and overhaul costs. MTU may incur losses in connection with these agreements because the underlying price models require a complex analysis of the performance conditions (including assumptions on future engine use and shop visit rates) when submitting offers for long-term agreements. If the assumptions made by MTU prove incorrect, its margins could be negatively affected.

MTU does not currently see any market and program risks that could jeopardize its status as a going concern.

Dependence on cooperation

MTU has long-term cooperation and collaboration agreements with various OEMs and other market participants. These can be terminated at short notice in certain circumstances, e.g., if there is a change in the company's shareholder structure. All these scenarios are beyond the company's influence. The loss of a major customer could have a severely negative impact on MTU's business activities, financial position or results of operations. For information on customer cluster risks, please refer to the *"Segment report" in the Notes to the consolidated financial statements*.

In its commercial business, MTU is involved in a number of RRSP contracts with OEMs, which relate to the development, production, sale and, in some cases, maintenance of commercial aircraft engines. The OEMs with which MTU has RRSP contracts include Pratt & Whitney, GE Aviation, IAE LLC and IAE AG. Through RRSP contracts, MTU participates in the development and production of new engine programs. In return, MTU is entitled to a share of the revenues from the sale of engines, components and spare parts.

RRSP contracts are an important business base for MTU. They enable it to build up long-term relationships with OEMs and to participate in the major engine manufacturers' sector-leading engine programs. Furthermore, MTU's RRSP contracts entail considerable risks, including a lack of control over the activities covered and losses arising from pricing of program activities or upfront financing of design and development costs, cost overruns, guarantees, warranties and penalties. The following overview highlights these risks:

- The respective OEM controls the end-customer relationship throughout the entire term of the program, including setting the price of engines and spare parts, granting concessions (including financing of engine and aircraft sales in a manner that could ultimately include recourse to MTU through the RRSP contract), granting guarantees, and defining and amending guarantee and other service guidelines for the aftermarket business
- The RRSPs give MTU only limited inspection rights. As a result, it is not in a position to fully monitor whether the OEMs fully meet their obligations or exercise their rights fairly.
- OEMs can perform repair processes on MTU components or work with second-hand spare parts, which would have a negative effect on MTU's sales of spare parts.
- MTU has to undertake considerable advance work for the design and development of the engine components, for which it has been allocated design and development responsibility. This upfront work has to be performed before a single engine has been sold. Therefore, future revenue from the engine program is not certain.
- Similarly, MTU may be required to make advance payments ("entry fees") to OEMs to enable it to participate in programs, as compensation for development or other work already undertaken by the OEMs.
- Aircraft manufacturers may require OEMs to make advance payments for participation in new aircraft programs and to cover a percentage of the manufacturer's R&D expenses. The OEMs generally pass some of the costs for such payments on to their RRSP partners.
- The value of MTU's contribution to RRSPs (in the form of work on the design, development and production of engine modules and components) is generally set on the basis of cost assumptions made when the contract is signed (with limited adjustments for changes in design or extraordinary changes in raw material costs). In the event of cost overruns in the development and production of parts for which MTU is responsible, MTU may therefore not be able to recoup such costs from its share of the program. As a result, its profits from the engine program could be reduced.

In the commercial maintenance business, MTU's interests in the Asian market include a 50:50 joint venture, MTU Maintenance Zhuhai Co. Ltd., Zhuhai, China. MTU is also involved in engine leasing, maintenance and development. In this way it can respond to the new structures in the aftermarket and offer customers a full range of services. In jointly controlled entities, where decisions have to be made collectively, there is always a risk of differences of opinion. Similarly, participation in international joint ventures often reveals cultural and political differences (for instance payment morale).

From today's standpoint, MTU believes its collaborative business model stands it in good stead to effectively manage market and program risks, in particular in respect of the challenges associated with the development, production and market introduction of new engine programs and architectures. MTU therefore does not expect these market and program risks or its dependency on cooperative agreements to have any significant impact on the Group's continued existence as a going concern.

Development and manufacturing risks

Development risks

MTU's success depends, among other things, on its R&D activities, which are performed principally in the OEM segment. MTU finances its R&D spending from its own funds, state funding and, to a limited extent, through corresponding orders. There is a risk that R&D activities may not meet customers' or market requirements cost-effectively or on schedule. Therefore, the company cannot give any assurance that the capital used for these R&D activities will lead to opportunities for commercialization or result in productivity improvements commensurate with the resources invested. Furthermore, MTU may develop specific technologies and capabilities for new programs focused on improving the overall efficiency of engines in order to reduce fuel consumption and emissions. If one of these programs should be halted or only be continued with a considerable delay, there is a possibility that MTU might not recoup the R&D costs and related investment expenditures incurred in the expectation of such programs.

Some of MTU's development activities are carried out within the scope of cooperative ventures. Each stake in such ventures and in RRSPs spreads the R&D-related risks beyond the company and therefore reduces its control over them. If one of MTU's cooperation partners has development and production risks, these could have a significant negative economic effect on MTU. In connection with RRSP and similar agreements, MTU's potential inability to deliver the necessary technology or design contribution could result in additional costs in order to fulfill its obligations, or MTU could be forced to make considerable compensation payments under the RRSP agreement instead of the technology or design contribution. In addition, MTU may be required to make penalty payments to its RRSP partners if it fails to meet delivery schedules or certain development targets.

Extensive professional project management and risk diversification between the development partners reduce the risks, so in this context MTU does not see any risks to its status as a going concern.

Manufacturing risks/shop floor risks

Highly sophisticated components and new materials are needed to meet the requirements of the airlines and OEMs with respect to engine weight, fuel consumption and noise emissions. In order to efficiently produce and process such components, MTU develops – and gains official approval for – innovative new manufacturing techniques. This can lead to delays in the start of production, a temporary increase in unit costs or a temporary reduction in delivery volumes compared to the agreed level. A further risk is that customers might impose penalties in the event that deliveries are delayed. It could also happen that the new manufacturing processes are not yet sufficiently mature to fully meet requirements when volume production is due to start. MTU counters this risk in technology projects by providing systematic support for the development and implementation process.

At present, MTU does not see any risks in this context that could jeopardize its status as a going concern.

Procurement and purchasing risks

MTU sources individual parts and components, finished products, specific services and raw materials from suppliers and third-party vendors. MTU is exposed to a risk of inadequate availability of such products. Disruption can be caused by factors such as cross-border supply chain problems, as caused most recently by Brexit and the Covid-19 pandemic, technical problems, bottlenecks in production capacity, and hikes in the price of raw materials as a result of speculation. Given the structure of the RRSP agreements with its partners, MTU has very limited exposure to situations where unexpected cost increases have to be passed on to partners and customers. Therefore, MTU takes the extensive measures outlined below to minimize the risks insofar as possible. MTU plans production requirements at regular intervals in close consultation with the supply chain to avoid unexpected procurement bottlenecks. Wherever it makes sense, products are validated and sourced from several suppliers. For many products, there are multi-year supply contracts. Regular supplier risk assessments, established purchasing and procurement processes, and close relationships with suppliers also help to minimize purchasing and procurement risks.

At present, MTU does not see any risks in this context that could jeopardize its status as a going concern.

Liability risks

Product liability claims, including defects in products produced by cooperation partners, and insurance costs could adversely affect MTU's financial position.

MTU operates in markets where it may be exposed to liability for personal injury, death or property damage. Liability could arise, in particular, due to failure of an aircraft component designed, developed, manufactured or supplied by MTU or one of its RRSP partners, including failures in connection with aftermarket business.

In the military engine business, MTU is largely exempt from product risk liability. In the commercial business, however, MTU is party to consortia and RRSP contracts. In most of these relationships, liability for third-party claims is borne by the consortium or the partners on the basis of their respective contribution to the consortium or RRSP, irrespective of the fault of the individual partner. Therefore, product liability claims could also include claims due to defects relating to products not manufactured by MTU. In these RRSP programs, the consortium lead generally has the right to settle or resolve third-party claims unilaterally on behalf of all program participants. Consequently, MTU may be exposed to substantive liability for problems unrelated to the performance of its products. Furthermore, MTU may have little or no control over such liability.

Most of MTU's RRSP contracts require it to take out insurance to cover the potential liabilities arising from such agreements and MTU makes participation in these programs contingent on such agreements. To cover the above risks, MTU has aviation product liability insurance with international aviation insurers (minimum rating of A- from Standard & Poor's or A.M. Best). Such insurance does not generally cover all liabilities that could arise in connection with RRSPs, for example, contractual penalties resulting from delays.

At present, MTU does not see any risks in this context that could jeopardize its status as a going concern.

Risks relating to financial instruments

Foreign currency risks

More than 80% of MTU's revenue is generated in U.S. dollars. A large proportion of expenses is likewise invoiced in U.S. dollars, thus providing a natural hedge. Most other expenses are incurred in euros and, to a lesser extent, in Polish zloty, Chinese renminbi and Canadian dollars. In line with the corporate policy of generating profit solely on the basis of operating activities and not through currency speculation, MTU makes use of hedging instruments exclusively for the purpose of controlling and minimizing the effect of U.S. dollar exchange rate volatility on EBIT.

The forward foreign exchange contracts concluded by MTU cover a large part of its net exposure to currency risk. The hedging horizon is up to four years and uses a model where the authorized hedging ratios decline the further in the future the net currency exposure is. Thus, only a small portion of the net U.S. dollar exposure in the present and following year is exposed to currency risks. The unhedged portion of future cash flows is translated into euros at the exchange rate prevailing on the date of settlement.

As of December 31, 2021, MTU held a hedging portfolio comprising forward foreign exchange contracts totaling U.S.$2,400 million (translated at the rate on the reporting date: €2,032 million), with maturities up to 2024.

Detailed information on the financial instruments used to hedge future cash flows is provided in *Section IV. of the Notes to the consolidated financial statements (Note 36)*.

In view of this long-term hedging strategy, MTU considers its currency risks to be manageable.

For a detailed description of MTU's financial management system, please refer to the *"Principles and objectives of financial management" section under "Financial situation."*

Non-payment risk

Airlines, which have been badly affected by the pandemic, are major direct and indirect customers of MTU. These companies may find themselves facing financial difficulties that affect the receivables of MTU and its partners.

Due to the pandemic, global airline customers have amassed considerable losses (according to IATA, U.S.$138 billion in 2020 and U.S.$52 billion in 2021). In the worst case, this could result in default on payments for engine maintenance services.

The consortium leaders in the commercial OEM business have intensive receivables management systems in place. In view of MTU's long-standing partnerships with OEMs, significant risks are considered to be low. In the MRO business, the responsible account managers monitor and manage credit risks in short cycles and proactively. A risk assessment is carried out before any relevant contract is signed, and systematic compensatory precautions are taken as needed, such as commercial credit insurance or export credit guarantees (Hermes coverage). All in all, MTU continues to consider the risks of non-payment to be manageable, especially in light of the measures taken to control them.

Other risks pertaining to business operations

Compliance risks

Compliance risks arise when managers or employees of the company fail to comply with laws and regulations or fail to observe internal guidelines. These risks can arise in all areas of the company.

MTU has implemented a number of measures with regard to its organizational structures and processes to minimize these risks and to safeguard compliance. In particular, central offices with managerial authority have been set up to monitor and enforce compliance with laws and regulations in the individual divisions (for instance, the Quality division is responsible for compliance with aviation authority regulations, while the Environmental Protection/Occupational Health and Safety division ensures that environmental protection regulations are adhered to).

Above and beyond that, measures have been put in place at the company level to minimize the risks associated with compliance issues:

- binding rules of conduct valid throughout the Group,
- establishment of a central contact for reports of misconduct,
- designation of a Compliance Officer,
- continuous security checks on employees,
- regular training.

Criminal intent can never completely be ruled out. All in all, MTU considers the compliance risks to be manageable, especially in light of the measures taken to control them.

Environmental risks and climate change

Environmental risks

Plants and installations at MTU's sites are subject to local environmental and occupational safety laws and regulations. To prevent or minimize pollution, official operating permits or licenses have to be obtained. Investment and other expenditures are aimed at ensuring compliance with these laws and regulations. Nevertheless, MTU cannot rule out violations of current and possible future environmental protection laws and regulations. Consequently, there is a risk that considerable fines or penalties could be imposed, including criminal sanctions. In addition, permits or licenses might be revoked or not extended in the future.

In some jurisdictions, owners and operators of contaminated sites may be held liable for the costs of investigation and remediation, irrespective whether or not the contamination was caused by them. Some MTU facilities have a long history of industrial operations by MTU or third parties. Newly discovered contamination at MTU's facilities or third-party sites involve a risk that costs could be incurred for remediation in the future. Moreover, the adoption of new laws or more stringent implementation of existing laws could impose additional expenditures or unexpected liabilities on MTU. Further information on occupational safety and environmental protection can be found in the *"Non-financial statement" section*. All in all, MTU considers the environmental risks to be manageable, especially in light of the measures taken to control them.

Climate change

MTU recognizes the risks and the associated urgency of climate change and is committed to the 1.5° C target set by the Paris Agreement. The main areas of activity are the transition to climate-neutral aviation and the shift to climate-neutral provision of the products and services. Alongside the relevant societal risks, there is a specific threat to MTU's business due to the loss of market access and growth opportunities, a deterioration in earnings as a result of legally-induced sanction mechanisms, a loss of attractiveness as an employer for present and future generations, and greater difficulty accessing funding, up to including legal requirements to halt production of parts or the entire business operation.

Goals and opportunities geared to sustainable commercial propulsion concepts as part of the transition to emission-free flying are defined in MTU's Clean Air Engine Technology Agenda Claire. This is being implemented as part of MTU's Leading Technology Roadmap, which focuses on two areas: First, the evolutionary development of gas turbines based on the GTF, combined with revolutionary propulsion concepts that greatly improve the cyclic process and significantly reduce all emissions. Second, complete electrification of the powerchain to maximize emission-free flying. Out of all the concepts considered, from MTU's standpoint the conversion of hydrogen into power with the aid of a fuel cell is becoming most relevant. MTU refers to this as the "flying fuel cell." Alongside these topics, MTU is actively supporting developments to increase the use of sustainable aviation fuel (SAF). Information on alternative propulsion technologies for aircraft is presented in the sections entitled *"Substitution risks arising from disruptive technologies" in the risk report and „Research and development."*

The measures designed to achieve climate-neutral provision of MTU's products and services are set out in the ecoRoadmap, which MTU has been rolling out stepwise since 2020. MTU continuously monitors greenhouse gas emissions in the production and maintenance of engines and modules at its sites using the recognized international Greenhouse Gas (GHG) Protocol. MTU aims to permanently reduce CO_2 emissions or provide high-quality compensation for those emissions are unavoidable. To make the climate impact of MTU even more transparent for stakeholders, the company takes part in the annual rating by the international non-profit organization CDP, which collects data on greenhouse gas emissions, climate risks, and climate strategies from companies once a year. All in all, MTU considers the climate change risks to be manageable, especially in light of the measures taken to control them.

IT risks

MTU constantly monitors its risk situation in the area of data processing. The two risks considered to be most critical in this field are system crashes due to technical faults and cyberattacks, resulting in the non-availability of systems, unauthorized disclosure of information, or permanent loss of data. In view of the advanced digitalization of all material business processes at MTU, high availability and integrity of our IT systems are crucial for the smooth operation of our business. MTU generates, stores and processes extensive data with special confidentiality requirements – not only, but in particular, in the military business.

MTU constantly invests considerable sums in technical and organizational measures to guarantee the availability, confidentiality and integrity of the IT systems used or operated by the company. Nevertheless, it cannot be ruled out that MTU will be confronted with system failures, unauthorized access to confidential information or the loss of data. Every data theft, unauthorized data manipulation or data loss could negatively affect MTU's relationship to present or potential customers. Incidents like this could expose MTU to liability claims by third parties. At present, MTU does not see any risks in this context that could jeopardize its status as a going concern.

Personnel risks

The quality of MTU's products and services depends to a large extent on the personnel it can recruit and retain, especially engineers and other specialists. MTU seeks to access both young talent and experienced specialists through company training programs, dual-study programs (which combine practical and academic work), attractive working conditions and marketing activities. However, for many key positions within the MTU Group there only a few sources of new staff with the necessary qualifications. The competition for such employees has increased in recent years and could intensify further in the future. Moreover, the shortage of skilled workers caused by demographic change is expected to worsen.

In addition to the risk that the MTU might not be able to recruit enough skilled workers, there is a risk of losing staff to other companies. The company is of the opinion that some MTU employees have technological know-how that makes them attractive to competitors or other employers. MTU's success depends on its ability, not simply to employ technically skilled specialists, but also to retain them over the long term.

Failure to recruit and retain qualified employees could impair MTU's ability to secure future orders.

At present, MTU does not see any risks in this context that could jeopardize its status as a going concern.

Risks arising from general, customs and tax legislation

Complex and in some cases conflicting international foreign trade and tax regulations, especially with regard to cross-border trade in goods and services in the industrial and defense sectors, mean that MTU is particularly exposed to violation of legal provisions. To compensate for relevant legal risks, processes that reinforce control are monitored and driven forward by central departments with technical and managerial authority. Identifiable risks arising from pending tax audits, customs audits, export controls and legal proceedings are managed by the central departments with the support of independent external consultants. The focus lies in particular on targeting process weaknesses and compensating for them. All in all, MTU considers the risks arising from general, customs, export control and tax legislation to be manageable, especially in light of the measures taken to control them.

Overall assessment of MTU's risk exposure

Risks in each of the key areas of exposure described above are monitored and continuously evaluated through a risk assessment for the coming fiscal year on the basis of their probability of occurrence and quantified as a deviation in adjusted EBIT relative to the currently applicable operational planning figures. In MTU's risk management process, risks are assigned to one of four probability levels. Based on the top individual earnings risks evaluated in the risk management process, for fiscal 2022, MTU derives a risk exposure based on experience of between €90 and €100 million. The OEM segment accounts for around €90 million of this and the MRO segment for the remainder. Both segments' risk exposure principally comprises market and program risks. In the OEM segment, the market and program risks relate to the structure of risk- and revenue-sharing agreements with partners and uncertainty about military export business. In the MRO segment, further demand effects in connection with the forecast market recovery have to be taken into account as further risk drivers. The estimated impact of the ongoing Covid-19 pandemic on business development in 2022 has been taken into consideration in the segment planning.

In addition to the quantified risk exposures relating to the top individual risks, MTU monitors and reports on a range of smaller risks (< €20 million) that are not included in the internal reporting of top risks and opportunities on which this report is based. As well as the earnings-related risks, the risk management process identifies, monitors and manages unplanned factors that could reduce liquidity. For 2022, this identified risk factors could reduce liquidity by approximately €121 million. These would, however, be covered by available cash and cash equivalents and by credit lines that have not been drawn down. Apart from the risks quantified above, MTU monitors and manages further risks associated with development, production, maintenance and procurement that were not quantifiable as of the reporting date.

Opportunity report

Market and program opportunities

Basic research and ongoing development of engine technologies, followed by their deployment in end products, have made MTU one of the world's leading manufacturers of engine components. MTU's new products lead the field in terms of efficiency because they save fuel and reduce emissions, noise and costs. MTU has achieved market success with the Pratt & Whitney GTF™ engine family, which it develops in partnership with Pratt & Whitney. The A320neo, Airbus A220 and Embraer E190-E2 with GTF engines are already being used in scheduled service. Since 2018, the PW800 engine family, developed in cooperation with Pratt & Whitney Canada, which is based on the same core engine as the GTF, has powered premium manufacturer Gulfstream's new generation of business jets. In order to balance out its engine portfolio in the long-haul segment, MTU has participated in the development of the GE9X, which will be the sole engine for the Boeing 777X. Thanks to this balanced portfolio, MTU will benefit in the decades ahead from the predicted growth in all market segments: the regional jet, narrowbody and widebody segments. What is more, MTU has an opportunity to raise its share of the medium-haul market because, in addition to its stake in the PW1100G-JM for the A320neo family, it also holds a stake in the V2500 for the classic A320 family. The latter program is now entering the aftermarket phase, offering future potential in the spare parts business.

Among its customers in the military sector, MTU has established a reputation as a highly qualified partner with comprehensive system know-how in product development, manufacturing and maintenance. In particular by driving forward its military-engine maintenance services with the German air force, MTU sees chances to strengthen its ties with Germany's armed forces.

What is more, ongoing export drives – especially for the Eurofighter EJ200 engine and the TP400-D6 for the A400M military transporter – present opportunities to acquire new customers in the military business. Following the signature of a contract to purchase further Eurofighters by the German defense ministry, Spain has also shown an interest in further purchases.

Driven in particular by the T408 engine, the military-program partnership with GE Aviation is doing well and could generate further opportunities to participate in transatlantic programs in the future.

The changed maintenance-related business practices in the aviation industry, in which MRO services are increasingly being offered together with engine sales contracts, open up opportunities for MTU, from the perspective of its position as a consortium partner, to develop customer loyalty in the commercial maintenance segment that will soften the impact of risks associated with the spare parts market. This integrated approach to MRO enables program partners to become members of an MRO network, giving them access to the entire volume of MRO work associated with an engine series, in accordance with their share in the program. There is a variety of models for participating. For instance, partners in the MRO network might only perform repairs on their own components, or be allocated a quota of complete shop visits corresponding to their program share. Membership in an MRO network offers more moderate margins than operating as an independent MRO provider.

The independent MRO market for engines such as the GE90 and V2500 continues to offer long-term prospects for MRO providers to participate in this steadily growing market. In particular, the increase in the number of aircraft no longer tied to the OEMs offers independent MRO providers like MTU the opportunity to gain new customers and to assume responsibility for managing the maintenance of large fleets.

Continued investment in automation and building up maintenance capacity, for instance through the establishment of MTU Maintenance Serbia d.o.o. and EME Aero Sp. Z.o.o., will enable MTU to meet the high demand in both the OEM and MRO segments in the long term.

Through MTU Maintenance Lease Services B.V., Amsterdam, Netherlands, which operates in the field of engine leasing, and the establishment of MS Engine Leasing LLC, Rocky Hill, CT, USA, for engine leasing with the partner companies in the PW1100G-JM MRO network, MTU aims to extend its activities in the lucrative leasing business and increase the scope of services provided in the aftermarket.

Opportunities associated with product development and manufacturing

The risk report describes the risks associated with development and manufacturing, but MTU's ongoing technology and development activities also open up new business opportunities. For example, ongoing product development and innovative propulsion concepts could open up the opportunity for MTU to acquire new partnership roles in future engine programs thanks to its new technologies, enabling the company to maintain a balanced product portfolio covering engines and new propulsion systems at different stages of their lifecycle.

The risk report also refers to the challenges involved in ramping up new programs; here again these challenges can be transformed into opportunities. Production processes and systems can be optimized, for example through the use of digital twins, predictive simulation (ICM2E), process data management and the forecasts derived from this, and new, cutting-edge manufacturing technologies and processes can be introduced. The risk analyses undertaken to secure the ramp-up of production, backed up by the MRL process and design or process FMEA, result in timely identification of potential problems and the related lasting process improvements. The effects of these improvements are not only felt in new programs; they can also be transposed to existing ones.That leads, for example, to further cost reductions and enhanced delivery reliability. The spread of additive manufacturing techniques (3D printing of components) opens up new possibilities for application-optimized component design and cost benefits in their production.

Through continuous improvements towards operational excellence, methods, processes and leadership behavior are constantly being developed as part of Lean Management@MTU. This results in increased transparency, a focus on value creation, support in achieving ambitious targets, and faster and more sustainable problem-solving and approaches to improvement. Improved preventive approaches, a faster response to deviations from plan and sustainable and structured solutions to problems enable the company to put in place stable processes and optimize resource deployment.

Other opportunities

As a large part of the company's revenue comes from contracts invoiced in U.S. dollars, especially in the commercial engine business and commercial MRO, a strengthening of the U.S. dollar against the euro would improve MTU's earnings. If energy prices were to stabilize or retreat to a lower level, and if commodity prices were to fall, this would have a positive effect on MTU's cost structure and hence on its business results.

See the Risk report for information on how the opportunities identified can be exploited and the associated risks avoided.

Overall assessment of opportunities

Analogously to the risk situation, as of December 31, 2021, there had not been any significant change in the opportunities compared with the previous year. It is conceivable that business could develop more favorably than is anticipated in the outlook for the 2022 fiscal year as a result of a more rapid market recovery. MTU has taken all the organizational measures necessary to recognize potential opportunities in good time and respond to them adequately. MTU applies the same methods in its assessment of specific opportunities as it does when evaluating risks. As a conservative approach is taken to the identification of risks and opportunities, the opportunities are necessarily very low compared with the risks.

Based on the opportunities identified, MTU anticipates that the OEM segment has market and program opportunities of around €50 million in connection with the GTF family. In addition, a number of unquantifiable and smaller opportunities (<€20 million) were identified, which do not form part of the internal top risk and opportunity reporting used to prepare this report. Opportunities to extend MTU's range of products and services initially lead to a financial burden. In view of the long cycles involved in the business model, these will only generate positive earnings in subsequent fiscal years. MTU does not currently foresee any fundamental changes in its opportunities.

Internal control and risk management system for the Group accounting process

The current recommendations of German Accounting Standard (GAS) 20 have been applied in this section of the combined management report concerning the main features of the accounting-related internal control and risk management system.

Objectives and components

MTU's Executive Board, Supervisory Board and Audit Committee attach the greatest importance to ensuring the regularity, accuracy and reliability of MTU's financial reporting. The accounting-related internal control and risk management system applicable for the MTU Group's financial statements helps ensure systematic compliance with these internal and external accounting requirements. The Executive Board of MTU bears overall responsibility for establishing and refining the required control and monitoring systems. The systems are tailored to the MTU Group's business model and company-specific requirements, and are an important part of the comprehensive approach to corporate governance that defines the basic framework for creating sustainable value for shareholders, customers, employees and the public.

/ The accounting-related risk management system (RMS) is an integral part of the Group's company-wide risk management system. It forms the basis for the uniform and appropriate handling of risks and for communicating them within the Group. The risks inherent in the Group's financial reporting are among the corporate risks to be monitored as a whole.
The design of the accounting-related internal control system (ICS) at MTU meets the requirements of the German Accounting Law Modernization Act (BilMoG), the definition provided by the Institute of Public Auditors in Germany (Institut der Wirtschaftsprüfer e.V. – IDW), the internationally recognized and established framework of the Committee of Sponsoring Organizations of the Treadway Commission (COSO I), and the features specific to MTU. MTU understands an ICS to be the principles, procedures and measures introduced at the company by its management that are aimed at the organizational implementation of management decisions:
   - to safeguard the effectiveness and economic efficiency of business operations – which includes protecting the company's assets,
   - to ensure the regularity and reliability of internal and external accounting, and
   - to comply with statutory regulations relevant to the company.

- The internal auditing system, which is process-independent, plays an important role in checking the effectiveness of, and improving, the accounting-related ICS and RMS. The internal audit function at MTU assesses, and helps to enhance, the controlling and monitoring systems. It is also considered to have an advisory function, contributing to improving business processes and, ultimately, the effectiveness of the internal control system. The rules of procedure of the internal audit function comply with national and international requirements as laid down by the Deutsches Institut für Interne Revision and the Institute of Internal Auditors. The internal audit function is also bound by the code of professional ethics. The administrative standards of the internal audit function are accessible to all employees on MTU's intranet.
- The Audit Committee of the Supervisory Board discusses risk management and the audits by the internal audit function. In accordance with Section 107 (3) of the German Stock Corporation Act (AktG), as amended by the German Accounting Law Modernization Act (BilMoG), the Audit Committee is also responsible for monitoring the effectiveness of the risk management system, the internal control systems, the internal auditing systems, the financial reporting process and the audit of the financial statements.

Main features

- MTU has a clearly defined management and corporate structure. Key functions spanning more than one organizational unit are managed centrally. At the same time, the subsidiaries have sufficient autonomy.
- The integrity and responsibility of all employees, also in terms of finance and financial reporting, are ensured by undertaking to observe the Group-wide Code of Conduct.
- An adequate system of guidelines has been drawn up and is updated as required.
- The departments and other organizational units involved in the accounting process are suitably equipped and regularly trained both in quantitative and qualitative terms.
- The IT systems are protected against unauthorized access by appropriate installations in the IT area. As far as possible, standard software is used in the finance systems. As part of the comprehensive IT strategy and architecture, the IT system's application controls are subject to regular internal and external reviews based on a high level of automatic (plausibility) checks. The general IT controls are checked during internal and external IT audits.
- Controls are in place for accounting-relevant processes, including dual control comprising detailed analytical checks and programmed plausibility checks on the accounting and consolidation process.
- The consolidated financial statements and all significant financial data submitted for inclusion by the Group companies are audited by an external auditor once a year. The same auditor also reviews the condensed consolidated financial statements and interim Group management report in the half-year financial report.
- In addition, accounting-relevant processes are checked by the process-independent internal audit function.
- The Group accounting department is the direct line of contact for subsidiaries in matters relating to financial reporting and annual and monthly financial statements. This information is used to prepare the consolidated financial statements in accordance with IFRSs, which are compiled in consultation with the business administration departments at the Group companies.
- The financial data communicated by the Group companies for inclusion in the consolidated financial statements are processed and validated on a decentralized basis by the respective business administration departments on the basis of the Group-wide reporting guidelines. As a supplementary control measure, (plausibility) checks on the reported data are carried out by the Group accounting department during the compilation of its monthly reports and during the consolidation process for the consolidated financial statements.
- The Group accounting department is also the central point of contact for financial reporting issues at Group level or within individual subsidiaries and joint ventures. If necessary, external consultants are called on for support.
- All subsidiaries and joint ventures are required to report their business figures to the Group in a standardized reporting format on a monthly basis, and the reported data are compared with the planning figures to ensure timely identification of discrepancies between the planned and actual figures. This allows timely identification of undesirable developments and risks so countermeasures can be taken if necessary.

Disclosures under takeover law

The following disclosures are made pursuant to Section 315a of the German Commercial Code (HGB) (takeover directive implementation). Items included in Section 315a of the German Commercial Code (HGB) that are not met at MTU Aero Engines AG are not mentioned here.

Composition of subscribed capital

The company's subscribed capital (capital stock) amounts to €53,436,048 and is divided into 53,436,048 registered non-par-value shares. The shares are registered shares. All shares have equal rights and each share entitles the holder to one vote at the Annual General Meeting.

Restrictions on voting rights and the transfer of share ownership

As of December 31, 2021, MTU held 80,088 treasury shares (previous year: 54,410). No voting rights are exercised in respect of treasury shares. The articles of association of MTU Aero Engines AG do not contain any restrictions on voting rights or the transfer of share ownership. The Executive Board has no knowledge of any agreement between shareholders that could give rise to any such restrictions.

Rules governing the appointment and dismissal of members of the Executive Board and amendments to the company's articles of association

The rules for the appointment and dismissal of members of the Executive Board are based on Sections 84 and 85 of the German Stock Corporation Act (AktG) and Section 31 of the German Codetermination Act (MitbestG) in conjunction with Article 5 of the company's articles of association.

All amendments to the articles of association require a resolution by the Annual General Meeting with a majority of at least three quarters of the voting stock attending, pursuant to Section 179 of the German Stock Corporation Act (AktG). The right to add amendments of a purely formal nature, for instance changes to the share capital as the result of utilization of the authorized capital, is devolved to the Supervisory Board under the terms of Article 13 of the articles of association.

Authorizations conferred on the Executive Board, especially concerning the issue and purchase of shares

Authorized capital

In accordance with Article 4 (5) of the articles of association, the Executive Board is authorized until April 20, 2026, to increase the company's capital stock by up to €16 million, with the prior approval of the Supervisory Board, by issuing, either in a single step or in several steps, new registered non-par-value shares in return for cash and/or contributions in kind (Authorized Capital 2021).

Conditional capital

by up to €3,867,741 through the issue of up to 3,867,741 new registered non-par-value shares. The purpose of this conditional capital increase is to issue shares to owners or creditors of convertible bonds and/or bonds with warrants in accordance with the authorization granted to the company under a resolution passed by the Annual General Meeting on April 15, 2015. Shares are issued at a conversion price or warrant exercise price determined on the basis of this authorization.

Until April 14, 2020, the Executive Board was authorized to issue, with the prior approval of the Supervisory Board, bearer and/or registered convertible bonds and/or bonds with warrants (collectively referred to as "bonds") with a total nominal value of up to €500 million. In 2016, MTU made use of this authorization to increase the company's capital stock by issuing a convertible bond with a nominal value of €500 million.

Further, in accordance with Article 4 (7) of the articles of association, the company's capital stock may be conditionally increased by up to €2,600,000 through the issue of up to 2,600,000 new registered non-par-value shares (Conditional Capital 2019). The purpose of this conditional capital increase is to issue shares to owners or creditors of convertible bonds and/or bonds with warrants in accordance with the authorization granted to the company under a resolution passed by the Annual General Meeting on April 11, 2019. Shares are issued at a conversion price or warrant exercise price determined on the basis of this authorization.

The Executive Board was authorized until April 10, 2024, to issue, in a single step or in several steps and with the prior approval of the Supervisory Board, bearer and/or registered convertible bonds and/or bonds with warrants (collectively referred to as "bonds"), with or without maturity date, with a total nominal value of up to €600 million, and to grant the owners of convertible bonds and/or bonds with warrants the right, obligation or option to convert them into registered non-par-value shares of the company representing a stake in the capital stock of up to €2,600,000 under the conditions established for the issue of convertible bonds or bonds with warrants.

In 2019, MTU made use of this authorization to increase the company's capital stock by issuing a convertible bond with a nominal value of €500 million.

For more information about this bond issue, please refer to the section of the Combined management report dealing with the financial position, and to *Note 28 to the Consolidated financial statements "Financial liabilities."*

The above authorization was canceled by a resolution passed by the Annual General Meeting on April 21, 2021, to the extent that had not been used for the €500 million convertible bond issued in 2019. The Conditional Capital 2019 in the amount of €2,600,000 in accordance with Article 4 (7) of the articles of association was also withdrawn by the same resolution and now only comprises a partial amount of €1,600,000.

Further, in accordance with Article 4 (8) of the articles of association, the company's capital stock may be conditionally increased by up to €2,600,000 through the issue of up to 2,600,000 new registered non-par-value shares (Conditional Capital 2021). The purpose of this conditional capital increase is to issue shares to owners or creditors of convertible bonds and/or bonds with warrants in accordance with the authorization granted to the company under a resolution passed by the Annual General Meeting on April 21, 2021. Shares are issued at a conversion price or warrant exercise price determined on the basis of this authorization.

The Executive Board is authorized until April 20, 2026, to issue, in a single step or in several steps and with the prior approval of the Supervisory Board, bearer and/or registered convertible bonds and/or bonds with warrants (collectively referred to as "bonds"), with or without maturity date, with a total nominal value of up to €600 million, and to grant the owners of convertible bonds and/or bonds with warrants the right, obligation or option to convert them into registered non-par-value shares of the company representing a stake in the capital stock of up to €2,600,000 under the conditions established for the issue of convertible bonds or bonds with warrants. The bonds may be issued in return for cash contributions only. They may be issued in euros or – to an equivalent value – in any other legal currency, for instance that of an OECD country. They may also be issued by an affiliated company where MTU exercises control. In such cases, and subject to the prior approval of the Supervisory Board, the Executive Board is authorized to act as guarantor for the bonds and to grant the owners of the bonds the right, obligation or option to convert them into new registered non-par-value shares in MTU.

Resolution concerning the authorization to purchase and use treasury shares pursuant to Section 71 (1) no. 8 of the German Stock Corporation Act (AktG) and to exclude subscription rights

Under the resolution adopted at the Annual General Meeting on April 11, 2019, the company received the following authorizations:

a) The company was authorized to purchase treasury shares accounting for a proportion of up to 10% of the company's capital stock, as applicable on the date of the resolution, during the period from April 11, 2019, through April 10, 2024, pursuant to Section 71 (1) no. 8 of the German Stock Corporation Act (AktG). At no point in time may the value of the acquired shares, together with other treasury shares in the company's possession or which are attributed to it pursuant to Section 71a et seq. of the German Stock Corporation Act (AktG), exceed 10% of the company's capital stock. At the discretion of the Executive Board, the shares may be purchased through the stock exchange or by means of a public offer to buy addressed to all shareholders (or – where permitted by law – through a public call to submit a sell offer).
The shares must be sold in return for proceeds that are not more than 10% above or below the quoted share price, net of any supplementary transaction charges. In the case of a sale through the stock exchange, the reference for the quoted share price as defined above is the average value of share prices in the closing auction of Xetra trading (or a comparable successor system) on the last three trading days prior to the purchase of the shares. In the case of shares purchased by means of a public offer to buy addressed to all shareholders (or a public call to submit a sell offer), the reference for the quoted share price is the average value of share prices in the closing auction of Xetra trading (or a comparable successor system) on the last three trading days prior to publication of the offer. In the event of substantial fluctuations in the share price, the Executive Board is authorized to publish a new public offer to buy or a public call to submit a sell offer based on a recalculated average value of share prices computed as outlined in the previous sentence.
The volume of the offer can be limited in the case of shares purchased by means of a public offer to buy addressed to all shareholders (or a public call to submit a sell offer). If the whole take-up of the offer (or the total number of offers) exceeds this volume, the purchase must be transacted in proportion to the number of shares offered. Preferential treatment may be given to small packages (up to 100 shares) offered for sale. Further conditions may be imposed in the offer or call to submit offers.

b) The Executive Board was authorized to sell the purchased treasury shares in a manner other than through the stock exchange or by means of a public offer addressed to all shareholders on the condition that the shares are sold in return for cash payment at a price that is not significantly below the stock market price of similarly entitled shares of the company at the time of sale. However, this authorization shall apply only on the condition that the shares sold excluding subscription rights pursuant to Section 186 (3) sentence 4 of the German Stock Corporation Act (AktG) do not exceed a total amount of 5% of the company's capital stock when this authorization becomes effective or – if such value is lower – when this authorization is exercised. This limit of 5% of the capital stock shall also include option rights and/or conversion rights on shares of the company which are issued during this authorization, i.e., since April 11, 2019, excluding subscription rights in mutatis mutandis application of Section 186 (3) sentence 4 of the German Stock Corporation Act (AktG), as well as the issue or sale of treasury shares without subscription rights pursuant to Section 186 (3) sentence 4 of the German Stock Corporation Act (AktG).

c) The Executive Board was authorized to use the purchased treasury shares in a manner other than through the stock exchange or by means of an offer addressed to all shareholders if the treasury shares are issued to program participants in conjunction with the company's stock option programs and those participants are, or were, employees or service providers of the company or one of its affiliated companies. If shares are to be used by issuing them to active or former members of the MTU Executive Board under the terms of the company's stock option programs, the Supervisory Board is authorized to transact this issue.

d) Furthermore, the Executive Board was authorized to use the purchased treasury shares as partial or complete payment in conjunction with business combinations or the acquisition, whether direct or indirect, of companies, parts of companies or holdings in companies.

e) The Executive Board was also authorized, with the consent of the Supervisory Board, to use the purchased treasury shares to exercise conversion rights or discharge conversion obligations relating to convertible bonds, bonds with warrants, profit participation certificates or income bonds (or combinations of such instruments) issued by the company or by a dependent affiliated company.

f) The Executive Board was moreover authorized, with the consent of the Supervisory Board and without any requirement for a further resolution to be passed by the Annual General Meeting, to redeem purchased treasury shares in whole or in part. They may be redeemed in a simplified procedure without any capital reduction and by adapting the arithmetic value of the outstanding portion of non-par-value shares to that of the company's stock capital. The redemption may be limited to a defined fraction of the purchased shares. The authorization to redeem shares may be used on one or more occasions. If the simplified procedure is employed, the Executive Board is authorized to amend the number of non-par-value shares stated in the articles of association.

g) The above-stated authorizations may be exercised on one or more occasions, in whole or in part, individually or in combination. They may also be exercised by Group companies as defined in Section 17 of the German Stock Corporation Act (AktG).

h) The subscription rights of existing shareholders in respect of these treasury shares are excluded insofar as the shares are utilized in the manner stated above in subsections b) to e).

i) The authorization to purchase treasury shares granted to the company on April 15, 2015, is revoked as of the effective date of this new authorization. The authorization to use the treasury shares purchased under the terms of the above-mentioned earlier resolution dated April 15, 2015, remains in force.

Material agreements relating to change of control subsequent to a takeover bid

MTU Aero Engines AG issued a registered bond in June 2013, which grants the creditor a right of early repayment in the event that a third party assumes control of over 50% of the company's share capital with voting rights and this has a negative impact on the company's credit rating.

The convertible bond issued by MTU Aero Engines AG in May 2016 contains the following provisions with regard to a change of control: In the event of a change of control, the bond terms grant bondholders the right to exercise their conversion right within a specific period of time at an adjusted conversion rate. In the event of a change of control, bondholders can redeem their bonds prematurely at the terms described in more detail in the bond conditions. A "change of control" shall be deemed to be when control is acquired or a mandatory takeover offer is published pursuant to Section 35 (2) sentence 1, Section 14 (2) sentence 1 of the German Securities Acquisition and Takeover Act (WpÜG) or, in the case of a voluntary takeover offer, if more than 30% of MTU Aero Engines AG's voting rights are legally or beneficially owned by the bidder or attributed to it pursuant to the bond conditions. If one or more persons within the meaning of Section 22 (2) of the German Securities Trading Act (WpHG) (old version) acquire(s) 50% of the voting rights of MTU Aero Engines AG, this shall represent an "acquisition of control."

The convertible bond issued by MTU Aero Engines AG in September 2019 contains the following provisions with regard to a change of control: In the event of a change of control, the bond terms grant bondholders the right to exercise their conversion right within a specific period of time at an adjusted conversion rate. In the event of a change of control, bondholders can redeem their bonds prematurely at the terms described in more detail in the bond conditions. A "change of control" comprises the acquisition of control or a mandatory offer under Section 35 (2) sentence 1 and Section 14 (2) sentence 1 of the German Securities Trading Act (WpHG). If one or more persons within the meaning of Section 29 (2) and Section 30 of the Securities Acquisition and Takeover Act (WpÜG) acquire(s) 50% of the voting rights of MTU Aero Engines AG, this shall represent an "acquisition of control."

In October 2013, MTU Aero Engines AG agreed a revolving credit facility with a banking syndicate (extended in September 2018), which provides for a right of termination for the lenders in the event that one or more persons assume(s) control of MTU Aero Engines AG or acquire(s) more than 50% of the company's issued capital.

The bond also issued in 2020 provides that, in the event of acquisition of 50% or more of the shares (by holding the shares pursuant to Section 33 of the German Securities Trading Act [WpHG] or through attribution pursuant to Section 34 WpHG), MTU Aero Engines AG will fix an optional redemption date when bondholders can redeem all or some of their bonds.

MTU Aero Engines AG has risk and revenue sharing agreements with an engine manufacturer containing clauses that allow the risk and revenue sharing agreement to be converted into a long-term supplier contract in the event that a material competitor of the contracting party acquires control of 25% or more of the company's voting rights or assets.

In addition, MTU Aero Engines AG has a cooperation agreement with another engine manufacturer. Under this agreement, that manufacturer is entitled to terminate the contract for cause in the event that one of its competitors acquires more than 50% of the company's voting rights. MTU Aero Engines AG has further cooperation agreements with the same engine manufacturer. Under these agreements, that manufacturer is entitled to terminate the contract for cause in the event that one of its competitors acquires more than 30% of the company's voting rights.

MTU Aero Engines AG also has equity investments in various joint ventures with other engine manufacturers, the purpose of which is to cooperate in the development and production of aircraft engines. According to the provisions of the corresponding agreements, MTU Aero Engines AG's share in the joint venture may be withdrawn and its participation in the accompanying cooperation agreements terminated if MTU Aero Engines AG is taken over by a competitor of the partners in these consortia.

It is standard market practice to confer contractual rights of this kind. Should an event meeting any of the above definitions of change of control take place, the exercise of rights ensuing from these agreements could have a substantial impact on MTU's net assets, financial position or results of operations.

Other agreements

Agreements on compensation in the event of a takeover bid

Pursuant to the Executive Board contracts in effect since January 1, 2021, a change of control is deemed to have occurred when a shareholder acquires a majority interest in the company and this entails material disadvantages for members of the Executive Board. Material disadvantages are, in particular, if the Executive Board member is removed, if his/her responsibilities and duties are significantly altered, or if the Executive Board member is asked to accept a reduction in employment benefits or to agree to premature termination of his/her contract of service. In such case, each member of the Executive Board shall have a special right of termination, which is to be exercised within a period of six months, with a period of notice of three months to the end of a month. If a member of the Executive Board makes use of this right, or if the executive employment contract is terminated by mutual consent within nine months after the change of control, the Executive Board member shall receive a severance payment corresponding to the benefits that would otherwise have been awarded up to the date on which the contract would normally have expired. For the calculation of the severance payment, 100% target fulfillment is agreed for the variable compensation components. The maximum amount of the severance payment is limited to two times the target annual direct compensation.

No comparable agreements have been made with regard to other employees.

Other disclosures

Non-financial statement

This non-financial statement of MTU Aero Engines in accordance with the German CSR Directive Implementation Act (CSR-RUG) provides information on material non-financial topics relating to the fiscal year 2021. This is a combined non-financial statement in accordance with Sections 289b et seq. and Sections 315b et seq. of the German Commercial Code (HGB). It contains disclosures relating to MTU Aero Engines AG as the parent company, as well as information relating to the MTU Group. The structure of the Group is described in the *Combined management report under "The MTU Group."*

In addition, in early summer, the company publishes a separate sustainability report for the previous fiscal year in accordance with the international reporting standards of the Global Reporting Initiative (GRI). Since the definition of materiality used by CSR-RUG differs from the definition used by the GRI, MTU has not used any standard as the framework for its non-financial statement.

Business model

The MTU Group and its business model are described in the Combined management report under *"The MTU Group."*

Framework

The key topics for the non-financial statement are identified by an interdisciplinary corporate responsibility (CR) team comprising the CR coordination and the CR divisional coordinators in the relevant organizational units, in consultation with the CR Board, which is the central CR decision-making body at MTU, and the Executive Board. The basis for this is MTU's Group-wide CR strategy, which sets out the topics considered to be material for the company and its stakeholders. MTU continued to develop its CR strategy in the reporting period. The topics were allocated to six fields of action defined for MTU (corporate governance, products, manufacturing & maintenance, employees, procurement practices, society) and outlined in a sustainability program, which sets targets up to 2025+. These topics are assessed in an annual materiality analysis based on the social and environmental impacts of MTU's business activities, using criteria such as legal regulations, the company's sphere of influence and the requirements of stakeholder groups. Greater consideration than in the past has been given to the positive contribution that MTU can make to each topic. The topics are also evaluated in terms of their relevance for MTU's business, for instance their impact on the Group's reputation and on its profit and loss situation.

As a result of this process, for 2021, nine topics were defined as relevant for the non-financial statement in accordance with the German CSR Directive Implementation Act (CSR-RUG), confirming the set of topics used in the previous year's reporting. CSR-RUG requires the provision of relevant non-financial information on the business performance, operating results and position of the Group. Information is also required on the impact of its business activities on the following aspects: environmental matters, employee matters, social matters, human rights, combating corruption as well as possible additional aspects. As one such additional aspect, the non-financial statement contains information on product quality and flight safety. As part of the environment aspect, MTU provides information on the climate impact of aircraft engines and CO_2 emissions at the production sites. Respecting the human rights of employees, respect for human rights in the supply chain and responsible international trade are allocated to the human rights aspect. The materiality evaluation of the topics was discussed and confirmed by the Supervisory Board's Audit Committee.

[T37] Contents of the non-financial statement

Aspect in accordance with the German CSR Directive Implementation Act (CSR-RUG)	Key topics for MTU
Additional aspect	Product quality and flight safety
Environmental matters	Climate impact of aircraft engines
	CO_2 emissions at the production sites
Combating bribery and corruption	Prevention of bribery and corruption
Employee matters	Occupational safety
	Employee development
Respect for human rights	Respecting the human rights of employees
	Respect for human rights in the supply chain
	Responsible international trade

Once again, no topics relating to the CSR-RUG aspect of social matters have been classified as relevant for inclusion in the report.

Risk identification and evaluation for the topics covered by the non-financial statement are based on MTU's established opportunity and risk management. The potential risks to the environment, society and employees resulting from MTU's business activities are compiled and evaluated quarterly by the CR coordinators and the CR Board analogously to the established opportunity and risk process, taking into account, in each case, the probability of occurrence and impact of the risk. To supplement the risk management process, MTU has established a compliance system with a separate reporting line. It is organized and managed by the Compliance Officer. In 2021, risk management of the topics covered by the non-financial statement was based on a revised risk register to assess the impact on third parties. This allows more precise identification of a risk, monitoring over a defined time period and better evaluation of its probability of occurrence.

As in the past, the risk analysis did not reveal any reportable risks with a high probability of having a severe negative impact on the identified non-financial topics.

2021 was again dominated by the global coronavirus pandemic. This also had a noticeable effect on non-financial topics. Where pandemic-related influences affected developments, measures and results, their impact on the relevant topic is outlined.

Product quality and flight safety

Quality and safety are of paramount importance in aviation and the corresponding framework conditions are strictly regulated. Legal requirements for the safe operation of flights are closely monitored by the aviation authorities. This is reflected in the high importance MTU places on product quality and flight safety. The company has to comply with the legal requirements imposed upon it as a development, manufacturing and maintenance organization in the aviation industry. MTU continuously evaluates the regulatory requirements for its business activities in order to obtain or keep the required licenses, approvals and certifications from the aviation authorities..

"Safety takes priority in what we do" is one of MTU's basic principles

A Group-wide integrated management system (IMS) ensures compliance with regulatory requirements and internal regulations as well as clear assignment of responsibilities within the company. One principle of the IMS policy is that "Safety takes priority in what we do." The basic framework is enshrined in a management manual that is binding for all employees and managers across the Group. Corporate Quality is a separate organizational unit directly subordinate to the Chief Operating Officer (COO). It reports quarterly to the Executive Board on quality aspects and flight-related incidents. In accordance with the International Civil Aviation Organization (ICAO) standard, the IMS includes a specific safety management process, which defines how to handle safety-related incidents at MTU's locations and in air traffic. Appropriate organizational structures and responsibilities, such as a Flight Safety Board and a Flight Safety Manager, have also been established. High quality standards, together with product safety and reliability, are important corporate objectives that are enshrined in the MTU Principles. MTU's Quality Vision 2025 also focuses on faultless quality, product safety in flight, and high customer satisfaction.

The strict regulatory quality and safety requirements must be complied with throughout the entire product lifecycle of an engine. MTU has therefore implemented processes designed to meet these requirements. For example, the aviation sector has strict rules governing documentation in order to verify the airworthiness of engines and their components. There must be no gaps in documentation over the entire product lifecycle. To ensure compliance with quality and safety requirements, MTU has implemented comprehensive testing and monitoring processes throughout the entire value chain. Components undergo thorough testing, based on their criticality, and are monitored in the production process.

Annual internal audits and quality audits by customers and authorities provide evidence that MTU meets uniformly high standards and is in conformance with regulatory requirements. MTU uses supplier audits to monitor suppliers' compliance with sector-specific requirements. The audits are managed on a site-specific basis. The implementation of MTU's IMS at the individual sites is validated and certified by independent and accredited external auditors. In the reporting period, part of the audits took place remotely via online communication due to the coronavirus pandemic.

Customer satisfaction and high quality are corporate objectives

MTU continuously monitors quality and, where necessary, initiates appropriate measures to achieve effective improvements. Providing customers and partners with safe and high-quality products and services helps to keep MTU's business competitive. "We increase the satisfaction of our customers" remained an overarching corporate objective for 2021, as it was in the previous year. The sub-targets explicitly specified that on-time delivery and quality should be maintained at a high level. The targets are implemented through initiatives with a long-term focus, which are realized on a continuous basis.

A defined process is in place to ensure that all customer complaints about sub-standard quality of MTU products are followed up and analyzed, and that appropriate measures are defined and implemented to permanently eliminate the root cause. The success of these measures is closely monitored. Customer complaints are evaluated at site level. At the majority of sites, the number of customer complaints in 2021 was higher than in the previous year. This resulted principally from a shift in the responsibility for components between our locations and higher capacity utilization than in 2020, which was the first year of the pandemic.

New quality activities launched

MTU is continuously developing its quality management system and regularly takes up suggestions arising, for example, from its collaboration in the international Aerospace Engine Supplier Quality (AESQ) Group and regular site-based and cross-site communication between quality managers. Continuous development focuses first and foremost on the set of rules and internal quality reporting and, especially, the digitalization of quality processes. In addition, regular site-specific training on quality aspects is organized for managers and employees. For example, new employees are required to complete a mandatory training module on the IMS. In light of the coronavirus pandemic, most training activities were organized as online seminars. In the context of the Quality Vision 2025, a "Passion for Quality" initiative was introduced at the Munich location. MTU is using this initiative to sharpen employees' awareness of quality issues at all stages in the value chain and achieve a further improvement in quality through best practices, especially by using preventive methods. Furthermore, the MRO Network Development project was introduced at the MRO (maintenance, repair, overhaul) locations to drive forward the standardization of core processes in the commercial engine maintenance business. At the locations in Munich and Poland, a project was set up to implement standardized new cross-company requirements in quality management at MTU. In this way, MTU is pressing ahead with preparations for a ramp-up following the coronavirus pandemic.

Climate impact of aircraft engines

MTU has been working for a long time on solutions to make flying more environmentally friendly. In the past, targets in the aviation sector mainly concentrated on reducing CO_2 emissions. The Paris Agreement has led to a paradigm shift, with the focus moving to the entire climate impact of air traffic. Non-CO_2 effects also account for a substantial proportion of the climate impact of aviation, for example, through condensation trails caused by particulate emissions. MTU is aware of its responsibility here and is committed to the climate target set in the Paris Agreement. As well as a further reduction in fuel consumption and thus CO_2 emissions, key topics on MTU's agenda therefore include reducing condensation trails and the related cloud formation and cutting emissions of nitrogen oxide (NOx). Another major objective for MTU is reducing the health effects of noise and exhaust emissions. The MTU Principles stress sustainable product development with fewer negative effects on the climate and health; corresponding principles are set out in the MTU Code of Conduct.

MTU is supporting the transformation of aviation as it moves towards the Paris climate target. Its Technology Roadmap Towards Emission-Free Flying focuses on both evolutionary development of gas turbine technology and revolutionary propulsion concepts. MTU's engineers favor the water-enhanced turbofan (WET engine), a concept that brings a wide-ranging reduction in fuel consumption and all emissions that impact the climate, in other words both CO_2 and NOx, as well as the formation of condensation trails. Furthermore, technology development at MTU concentrates on complete electrification of the powertrain to achieve emission-free flying. Here, MTU sees the greatest potential in converting hydrogen into power with the aid of a fuel cell (flying fuel cell, FFC).

Extensive management to drive forward sustainable innovations

MTU manages technology development for future products using a multi-level process. In the short-term, product development concentrates on specific customer requirements (specifications) based on present technologies. In the mid term (up to 15 years), advanced product designs will be generated in order to derive technology requirements. In the long term (by 2050), pilot concepts will be drafted with the aid of technology radar and development of the enabling technologies will be initiated. An Innovation Board regularly discusses all topics related to technology and innovation and initiates technology projects and studies. The Technology steering committee, which includes the Chief Operating Officer and Chief Program Officer, approves MTU's technology roadmap and is regularly updated on progress.

MTU is committed to the principle of integrated environmental protection, which takes a precautionary approach to how the company's products impact the environment, and integrates insights from this into entrepreneurial decisions. MTU's technology and innovation process incorporates the environmental and societal driving forces of aviation and derives its own targets for product development from them. The company also uses dialogue with stakeholders to identify their expectations and the impact of aviation on the environment and society. In 2021, MTU took part in discussion forums such as the 2nd National Aviation Conference 2021 in Berlin and the "Green Aircraft" consultation meeting at the Office of the Federal Chancellor, to draw the attention of politicians, the general public, research and industry to ways of making flying more environmentally friendly, including emission-free flying.

A significant role on the road to climate-neutral aviation could be played by sustainable aviation fuels (SAFs), which are suitable for use without major modifications ("drop-in" use). According to IATA, SAFs can cut cyclic CO_2 emissions by up to 80% and significantly reduce the formation of condensation trails and their climate impact. MTU is therefore playing a part in this field, for example, as a founding member of aireg (Aviation Initiative for Renewable Energy in Germany e.V), an association of airlines, manufacturers, and research institutes. MTU is also supporting several projects to set up SAF production facilities. One example is the CleanTech aviation initiative. A test flight at the German Aerospace Center (DLR) recently demonstrated the potential of SAFs, which can have a strongly positive effect by reducing particulate emissions and thus the formation of condensation trails and their impact. To leverage further potential, MTU is also involved in research and development on near drop-in fuels, in other words, fuels that can reduce the climate impact even further, but require minor modifications to engines and aircraft.

Claire technology agenda: stepping up R&D for emission-free concepts

In view of the long product cycles in the aviation sector, the goals for eco-efficient engines have a long-term perspective. They are set out in memoranda of understanding with stakeholders (airlines, the aviation industry, research, aviation authorities) such as Fightpath 2050, the European vision for the future of aviation. Since the targets for mitigating the climate impact of aviation set out in the Paris Agreement are far more ambitious than those defined in Flightpath 2050, MTU has revised its Claire (Clean Air Engine) technology agenda. The declared aim is to bring onto the market products that enable climate-neutral or emission-free flying before 2050. MTU is therefore stepping up research into future-oriented propulsion concepts, together with its partners in industry, science and research. Claire therefore defines time horizons, targets and possibilities for implementation for the three areas of aviation: short-, medium-, and long-haul flights.

Climate protection in three stages: Claire Level 1

The PW1100G-JM member of the Pratt & Whitney GTF™ engine family reduces fuel consumption and CO_2 emissions by 16% (according to data and calculations provided by the OEM Pratt & Whitney), thus exceeding the target set for the first Claire level of a 15% reduction by 2015 (reference base 2000). MTU developed the Geared Turbofan™ in cooperation with Pratt & Whitney and takes charge of some of the series production. The Geared Turbofan™ will be used for four aircraft platforms. All applications are scheduled to be transferred stepwise to series production by 2022. Drop-in SAF, which can already be used in admixture ratios of up to 50%, could reduce the climate impact of aviation by 35% according to the results of an internal study.

Milestones in the implementation of Claire Level 1 in 2021:

/ 11 million flight hours with the GTF™ engine family, avoidance of 6 million metric tons of CO_2 (as of Q4 2021, based on data from Pratt & Whitney)

Significant reduction in climate impact by 2035: Claire Level 2

Alternative fuels alone are not sufficient to bring about a significant reduction in climate impact. New engine architectures are required for that. At present no single technology has been identified with the potential to achieve climate neutrality across all applications. Consequently, MTU is working in parallel on several promising propulsion systems and different fuel options. The aim of Claire Level 2 is to reduce the climate impact of aircraft engines (CO_2, NOx and condensation trails) by between 60 and 80% by 2035 (per passenger kilometer compared with a state-of-the-art engine from 2000). One option would be full-scale use of SAFs that do not require any fossil-based kerosene (100% SAFs) and can be used with the existing infrastructure. For Claire 2, MTU is focusing principally on the improved, second-generation Geared Turbofan™ with higher overall efficiency resulting from more efficient components and lighter weight materials with improved temperature resistance. In addition, it could install WET engine technology in new aircraft. A hydrogen-driven Geared Turbofan™ would be another alternative to achieve the desired reduction in climate impact. However, the use of hydrogen requires extensive modification of the infrastructure. The flying fuel cell could achieve an even higher reduction in the climate impact on short-haul flights. In all these projects, it should be noted that the evaluation of the climate impact of aviation, especially the formation and impact of condensation trails, is still being researched. Less uncertainty is therefore an important goal: MTU is working on this intensively in collaboration with world-leading research institutes such as the German Aerospace Center (DLR).

Milestones in the implementation of Claire Level 2 in 2021:

/ Positive decision on both ideas submitted by MTU (WET and FFC) in the "Call for Expression of Ideas" by the European Commission's European Partnership for Clean Aviation

/ Start of the multi-partner DINA2030+ project on the WET engine with funding from the German aviation research program

/ Initial tests on condensation as part of DINA2030+ at the Institute for Thermodynamics at Stuttgart University

/ Official start of the nationally funded flying fuel cell project in collaboration with the German Aerospace Center (DLR)

/ First tests on a scale model of the flying fuel cell at an MTU test station

/ Approval of funding for the H2PROP project to investigate hydrogen-based propulsion concepts

Climate neutrality by 2050: Claire Level 3

In addition, MTU is already working on the next level (Claire 3 2050) in projects with industrial and research partners. These publicly funded projects center on further reducing the climate impact of aviation.

The third generation of the Geared Turbofan™ with WET engine technology should be even more efficient overall, allowing a further reduction in energy consumption. Given the limited availability of renewable energies, minimizing energy consumption is an important goal in addition to reducing climate impact. The use of hydrogen in the WET engine is feasible within this timeline. In addition to the benefits in terms of CO_2 emissions, this could potentially facilitate the integration of WET technology into the aircraft system.

Use of flying fuel cells in short- and medium-haul aircraft is an objective of Claire 3. For this purpose, the focus is on a further improvement in the weight-specific performance of the individual components. At the same time, this should reduce energy consumption.

Milestones in the implementation of Claire Level 3 in 2021:

- Start of a research project with Bauhaus Luftfahrt on integrating hydrogen into aircraft for FFC and hydrogen-based WET engines
- Start of a research project to evaluate the potential of hydrogen and SAFs to reduce climate impact, taking into account production processes, location, and logistics
- Start of a project to improve the climate assessment of revolutionary engine concepts with a focus on the formation and impact of condensation trails

CO_2 emissions at the production sites

Environmental protection in manufacturing and maintenance is important to MTU. The focus here is on climate protection. When introducing climate strategies for the operation of its sites, MTU's objectives are guided by the Paris Agreement. In the reporting period, MTU launched an ecoRoadmap for its main location in Munich. This will be rolled out to other locations from 2022.

The Executive Board bears responsibility for Group-wide environmental protection. Uniformly high standards are implemented through an environmental management system that defines processes, responsibilities and targets at site level. Environmental protection is part of MTU's integrated management system (IMS). The environmental protection criteria apply for all business units and processes and are implemented through process workflows and special company standards. The minimum standard for the operation of machines and facilities such as test stations is set by national legislation and secondary regulations. Official permits for environmentally relevant facilities supplement internal rules. Routine and ad-hoc measuring, testing and inspections are designed to ensure compliant operation of facilities.

Environmental and climate protection are an integral part of the MTU Principles, which apply to all employees worldwide. Here, the company sets out its commitment to an integrated approach, with environmental and climate protection included in business decisions. Environmental responsibility is explicitly set out in the MTU Principles in the section "Environment and society."

Environmental management is organized on a decentralized basis. All production sites have environmental departments responsible for local implementation of the relevant measures. The site management bears direct responsibility for environmental protection at each sites. They are advised and supported by the local environmental departments. The environmental departments regularly share information on innovations and best practices. The German sites are certified as complying the international environmental standard ISO 14001 and/or the EU Eco-Audit Regulation (Eco Management and Audit Scheme, EMAS).

MTU strives to continuously develop its operational environmental protection. As part of the certification process, independent external auditors and accredited environmental experts inspect the implementation and observance of the applicable environmental management requirements and make suggestions for improvements. This is supplemented by internal inspections and auditing of operations to ensure compliance with operational environmental protection requirements. The site managers use regular management reviews to monitor the implementation and effectiveness of environmental management. In this way, they influence its continuous development. In addition, through IMS reporting, the Executive Board receives a quarterly report on CO_2 emissions at the production sites in Munich, Hanover, Ludwigsfelde, Rzeszów and Vancouver.

Involving employees in environmental and climate protection

Employees are actively included in environmental protection through information campaigns and training, for example as part of the onboarding of new employees, the company suggestion plan, and campaigns to save energy and resources and cut emissions. Raising the environmental awareness of all employees in production and administration is part of the Code of Conduct. The aim of the "Zero" campaign in Munich is to reduce the consumption of resources, cut emissions, and encourage employees to act in a manner that is environmentally aware. In the reporting period, the "Zero" campaign activities were linked with the ecoRoadmap.

MTU is also engaged in dialogue with external stakeholders regarding environmental impacts. Stakeholders such as authorities and local residents can submit complaints and grievances to the company via the established reporting channels. These are investigated. The environmental officers at the German sites are the first-line contacts for questions and comments. The Munich, Hanover and

Ludwigsfelde sites provide information on their environmental impact and activities in annual environmental declarations. In addition, stakeholders can give feedback on sustainability aspects via an online survey.

MTU is a member of the UN Global Compact and is committed to the environmental protection through the ten principles of this sustainability initiative. In addition to this, the company is involved in local initiatives such as the Bavarian energy efficiency network Been-i, the climate pact of Munich-based businesses, and the Bavarian climate and environmental pact.

Introduction of a climate strategy at the Munich site

MTU aims to continuously reduce greenhouse gas emissions in development, production and maintenance activities at its facilities in order to make a contribution to global climate protection, based on the targets of the Paris Agreement. In 2021, MTU introduced an ecoRoadmap at its headquarters in Munich to reduce its carbon footprint through energy efficiency measures, captive generation of green energy and the procurement of green power. High-quality offsetting of unavoidable emissions means that the location has achieved climate neutrality at the end of 2021. The aim is to reduce CO_2 emissions by 60% by 2030. Starting in 2022, the ecoRoadmap is to be rolled out across Europe. Targets for reducing CO_2 will be set at site level.

In keeping with the ecoRoadmap, in 2021, a photovoltaic installation for captive power generation was taken into service in Munich and sourcing of green energy at this site was extended. Furthermore, initiatives were launched to involve employees in a bid to identify savings potential (company suggestion plan and Ideation Challenge). Other MTU locations are also implementing environmental programs. The Hanover site has agreed on measures for the period to 2022, principally to reduce gas and electricity consumption by machinery and in facility management. The proportion of renewable energy in power procurement mix at the sites in Hanover and Munich has increased. The site in Rzeszów, Poland, continued the “Eco Facility 2025” project to reduce environmental impacts and encourage environmentally aware behavior.

[T38] CO_2eq emissions in metric tons

	2021	2020
Scope 1		
Group	39,900	39,100
MTU AG	21,400	21,000
Scope 2		
Group	11,400	35,700
MTU AG	5,900	19,700
Total		
Group	51,300	74,800
MTU AG	27,300	40,700

The Scope 1 CO_2eq emissions result from consumption of the direct fuels kerosene, natural gas and, since this reporting period, the fuel used by company cars at the Munich location. Scope 2 CO_2eq emissions are attributable to the consumption of purchased energy (electricity and district heating). The Scope 2 emissions are calculated using the energy suppliers' emissions factors (market-based method). In the emissions data for 2020, the value recognized for biomethane in previous years was counted as natural gas, because MTU re-evaluated the certificates as a result of higher quality benchmarks for compensation in line with ecoRoadmap.

In the reporting period, CO_2eq emissions from MTU's production sites totaled 51,300 metric tons (2020: 74,800 metric tons). The MTU Group's Scope 1 emissions were 39,900 metric tons of CO_2eq and were therefore at the previous year's level. Scope 2 emissions were 11,400 metric tons of CO_2eq (2020: 35,700 metric tons). The decline in Scope 2 emissions was due to increased sourcing of green power at the Hanover, Munich and Rzeszów locations. The CO_2eq emissions at the Munich site were considerably lower than in the previous year at 27,300 metric tons (2020: 40,700 metric tons) due to the ecoRoadmap measures. This was principally attributable to the reduction in Scope 2 emissions to 5,900 metric tons. Scope 1 emissions were in line with the previous year at 21,400 metric tons. MTU undertook high-quality offsetting of the remaining Scope 1 and 2 CO_2eq emissions in Munich, so this location was climate-neutral for the first time at the end of 2021.

The high priority given to climate protection is also shown by the fact that reducing CO_2 emissions is an important environmental, social and governance (ESG) target. In the context of IMS reporting, for 2021, CO_2 emissions (Scope 1 and 2) from operation of the locations are reported relative to the number of production hours or, in the case of maintenance sites, the number of hours worked. [As an ESG-relevant KPI, CO_2 emissions relative to production hours at the Munich location affect the Executive Board's variable remuneration. Achievement of the target is measured by the reduction compared with the reference year 2019 (28.9 kilograms per production hour). The target was an overall reduction of 6%, with 5 percentage points of this to be achieved by the purchase of renewable energies and 1 percentage point through sustainable operational measures, e.g., to increase energy efficiency or energy generated by the company from renewable resources. Compared with the reference year, 2021 was affected by pandemic-related effects (e.g., lower capacity utilization and preventive measures such as energy-intensive ventilation of production facilities), which MTU offset by purchasing green power. The proportion of green energy purchased in addition to this was 8.6%, which was above the 5% target. By contrast, measures geared to the sustained avoidance of CO_2 emissions reduced emissions by 1.8%, so the 1% target was exceeded. Total CO_2 emissions in the period December 2020 to November 2021 were 26.4 kilograms per production hour. √]

Prevention of bribery and corruption

Long-term business success is based on compliance with the applicable laws and regulations and the company's own internal guidelines. MTU condemns corruption of any kind and all other forms of white-collar crime. A Group-wide Code of Conduct requires employees and management to act with responsibility and integrity and to comply with the law and in-house regulations. The MTU Principles help MTU to act in a consistent and reliable manner and make compliance with the Code of Conduct and ethical principles mandatory. Further regulations such as the MTU standard on donations, sponsorship and customer events contain further details and also help prevent corruption.

As the highest decision-making authority, the CEO bears the responsibility for the company's business ethics and anti-corruption policy. The central functions responsible for ensuring compliance are a Group-wide Compliance Officer and the Compliance Board. The Compliance Officer is responsible, in particular, for ongoing development of MTU's established compliance system to prevent corruption. He works in close consultation with the Compliance Board. The Compliance Board holds both regular and ad-hoc meetings at the invitation of the Compliance Officer. The Compliance Officer submits quarterly reports to the Executive Board and the Supervisory Board's Audit Committee, which in turn reports to the plenary meetings of the Supervisory Board. The Supervisory Board's Audit Committee oversees the Executive Board's compliance activities. In addition, the Compliance Officer has a regular direct reporting line to the CEO.

The company has established a global whistleblower system that allows employees and external stakeholders to report suspected cases of misconduct confidentially to the Compliance Officer. As well as the scope to seek personal contact, the web-based iTrust system can be used to submit reports anonymously. The Compliance Officer examines all allegations received and manages the necessary measures if they prove founded.

Zero tolerance of bribery and corruption

MTU's goal is to prevent bribery and corruption throughout the Group (principle of zero tolerance). To minimize compliance risks, among other areas, all sales-related consultancy contracts for possible corruption risks are reviewed by the Compliance Officer, where relevant with the assistance of external service providers, before they are concluded or renewed. The Corporate Audit unit examines the legal conformity of business processes and compliance with internal guidelines through regular audits. Due to the pandemic, some of these audits were performed remotely in the reporting period. New training materials are used to raise the awareness of all employees for compliance-related topics. These are based on the revision of the Code of Conduct in 2020. In addition, mandatory anti-corruption training is regularly held for managers and employees in specific functions such as sales. In the reporting period, routine corruption prevention training was organized for relevant employees at MTU's sites in North America.

No cases of corruption were identified in the reporting period.

External standards and memberships

MTU's compliance management system is based on the requirements of assurance standard IDW AsS 980 published by the Institute of Public Auditors in Germany and the Good Practice Guidance on Internal Controls, Ethics, and Compliance issued by the Organisation for Economic Co-operation and Development (OECD). It has also signed the standards issued by the Aerospace and Defence Industries Association of Europe (ASD), which aim to prevent bribery and corruption and encourage fair and equal competition. In Germany, this initiative is led by the German Aerospace Industries Association (BDLI). Moreover, these standards are a binding element of contracts with sales consultants. MTU is also a member of the following initiatives whose activities include the prevention of corruption and bribery:

- UN Global Compact
- TRACE International

Continuous development of the compliance system
MTU strives to continuously develop its compliance system. That includes raising employees' awareness of compliance-related matters. In the reporting period, the training materials on the Code of Conduct were updated. Internal media are used to remind employees to do the training module. Around 3,800 employees had taken part by year-end 2021.

Occupational safety

MTU places a great deal of importance on the safety of its employees. Employee health and safety are included in MTU's Code of Conduct as key principles of corporate social responsibility. Compliance with national laws on occupational safety is embedded in the Code of Conduct as a mandatory minimum standard for all MTU subsidiaries. In addition, MTU has an internal standard that contains generally valid parameters, rules and definitions of performance indicators. Quarterly Group-wide reporting to the Executive Board is established. Occupational safety is organized on a decentralized basis at MTU and the sites are responsible for implementing the relevant requirements. At the company's production sites, occupational safety is the responsibility of the site management and occupational safety officers are appointed at management level. The responsible local departments implement site-specific occupational safety requirements and report regularly to the site management. The company's production sites in Germany, Poland and Canada have local occupational safety committees, which include representatives of the workforce.

Occupational safety is part of MTU's integrated management system (IMS) and is regularly reviewed and driven forward. At the European production sites, workplace regulations that are mandatory for all employees contain important safety rules pertaining to accident prevention, fire protection and what to do in the event of workplace or commuting accidents.

MTU strives to minimize health and safety risks to its employees and third parties as far as possible, whilst also seeking to make continuous improvements. In view of the coronavirus pandemic, infection prevention remained a central issue in 2021. MTU fulfilled its obligation as an employer and implemented extensive technical and organizational measures at all locations to protect the health of its employees. These covered both workplaces and workflows. Mandatory guidelines for all employees based on the statutory occupational safety standards in Germany aim to prevent MTU employees catching the virus during their daily work.

Irrespective of the present, pandemic-related infection protection measures, workplaces are regularly assessed for any risks and hazards they present for employees so that appropriate measures can be implemented where necessary. To prevent accidents and achieve a lasting reduction in the number of accidents, the local occupational safety specialists record all accidents using uniform criteria and analyze them with the employees involved and their managers. Where the analysis reveals significant accident hotspots, the causes are investigated and appropriate steps taken to prevent a recurrence. In addition, near-misses are recorded and evaluated at all production sites. Group-wide safety instruction is mandatory for all employees at least once a year and trained first responders have been named. In addition, the responsible local departments undertake continuous prevention work through training sessions and information on occupational safety issues. Wherever possible, training sessions were held remotely in the reporting period. Temporary staff are included in occupational safety on the same basis as permanent employees.

The occupational safety management systems at MTU's German locations are certified externally as conforming to standard ISO 45001 Occupational health and safety management systems.

MTU sets annual tolerance thresholds for workplace accidents at its production locations (total of non-reportable category 3 accidents resulting in between one and three days absence and reportable category 4 accidents resulting in more than three days absence, excluding in each case commuting accidents). The thresholds ranged from 0 to 15 accidents per location in 2021. Three of the five locations were within the target.

[T39] Workplace accidents

	2021	2020
Category 3 (1–3 days absence)		
Group	39	28
MTU AG	10	3
Category 4 (more than 3 days absence)		
Group	31	22
MTU AG	14	7
Accident rate per 1,000 employees		
Group	3.0	2.1
MTU AG	2.6	1.3

The accident statistics (excluding commuting accidents) cover the entire workforce, including apprentices, interns, school and university students, employees on limited term contracts and temporary staff. Exception: temporary staff have only been included in the category 3 accident data since 2021.

In the reporting period, the MTU Group recorded 39 category 3 accidents (MTU AG: 10) and 31 category 4 accidents (MTU AG: 14). In both categories, the number of accidents was higher than in the previous year. The increase correlates with higher capacity utilization compared with 2020, which was the first year of the pandemic and was characterized by short-time working, production shutdowns and mobile working. Accordingly, the Group-wide accident rate for category 4 accidents increased from 2.1 per 1,000 employees in 2020 to 3.0 per 1,000 employees in 2021. MTU still has a high level of occupational safety compared with the average for the German metal-working industry, which recorded 31.4 accidents per 1,000 employees (Wood and Metal Trade Association – BG Holz- und Metall; 2020 data). As in previous years, there were no fatal accidents at MTU.

Further action to promote safe working practices

Occupational safety is implemented on a site-specific basis. Interdepartmental networking supports mutual learning and standardization within MTU. The local occupational safety officers derive proactive measures from regularly updated risk assessments, routine inspections of workplaces and audits of production and administration. The results of such analyses and workplace assessments are used as a basis for the safe and ergonomic design of new workplaces, for example, for the extension under construction in Hanover. In the reporting period, the Munich location conducted an additional survey of production employees on the occupational safety measures in place and their perception of dangers and risks.

All accidents are reported and evaluated. The analyses show that MTU's plant and machinery generally have a very high level of technical and organizational safety, so the cause of many accidents tends to be attributable to behavior rather than to the operation of plant and equipment. Therefore, measures once again focused on promoting safe working practices and enhancing the safety culture. For example, during the reporting period the Munich location organized its first special day for apprentices and employees on dual courses of study. High standards of ergonomic workplace design are also an ongoing focus. A new generation of exoskeletons to assist assembly, logistics, and maintenance personnel has been tested in Munich. In the field of risk assessment, the concept to identify mental stress was realigned in collaboration with occupational health management. An evacuation drill was held in the production facilities in Rzeszów, Poland. In Munich, a similar drill was held in cooperation with the emergency response organization at the site.

Employee development

Innovative capability and competitiveness are key success factors in the aviation industry. MTU is convinced that continuous and intensive employee development is essential for this and therefore invests in vocational and further training and in the development of talented employees. In response to these times of change, the company is extending its leadership competencies to include change leadership.

Moreover, in many of the areas in which MTU operates, training requirements are defined by the aviation authorities. One example is mandatory training on human factors (human error). In addition to industry-specific vocational training, for example, of aircraft maintenance engineers, and dual courses of study aimed at building up knowledge over the long term, MTU encourages further training of its employees. This is a key principle of corporate social responsibility defined in the company's Code of Conduct. Promoting further training and individual development perspectives for employees and managers are also enshrined in the MTU Principles and

Group-wide HR strategy. The head of human resources is responsible for training and development of employees Group-wide. The Executive Board is updated on training indicators once a year through the education and training report, and discusses specific training initiatives.

The enormous importance of vocational and further training is reflected in the extensive range of training and development offers and MTU's spending on staff training. That is based on a Group-wide works agreement in Germany, which guarantees all staff access to training and requires managers to discuss development options with their employees (training interview). In addition, at three sites in Germany, the works council is involved in further training of employees in accordance with the German Codetermination Act. It has a say in the training program. The sites in other countries also have further training regulations. At MTU Aero Engines North America, for example, all employees receive an annual Development Plan.

Employee development and lifelong learning help employees hone and develop their skills. Training requirements are established annually in a standard process either in an training interview where employees discuss training with their manager or by MTU's internal further training team on the basis of divisional/company-level interviews. Employees evaluate completed training courses in a personal meeting with their supervisor or, in some cases, via a feedback form. Completed training and development courses are documented in a training history. Training officers are available to provide advice on needs-focused training.

A multilingual online learning portal is an important basis for extending multimedia learning. Increased use of digital and hybrid formats is expected to ensure upskilling of staff at all levels in the context of mobile working and to provide flexible support. The online learning portal offers employees the opportunity to organize training for themselves, in consultation with their supervisor. A future readiness program with a focus on digitalization is an open offering available in various formats, which employees can use for networking and to obtain and share information. The aim is to continuously sharpen employees' digital mindset.

Strengthening leadership and commitment

Change leadership has become a key leadership skill in times of change. Therefore, MTU is driving forward the development of managers as "change managers" to strengthen the company's performance base for the future. The MTU Leadership Values ("We transform, We empower, We create trust") create a common set of values and principles for managers, which is especially relevant in times of change. The values provide guidance and define leadership expectations. The company therefore continued this leadership value process, for example, with training on remote leadership.

Moreover, managers have access to continuous guidance and ideas, for example, through the "Forum Leadership" blog, which is updated fortnightly, and leadership nuggets, a regular series of brief online training sessions. These offerings address current challenges such as remote leadership, virtual teamwork, resilience during periods of crisis, the role of managers as change leaders and dealing with hybrid working situations. A change management team in the HR department provides local support to help managers implement changes in their working environment.

In addition, MTU offers development opportunities and programs at all levels to identify and support talented employees in the best possible way and to support the professional development of those already appointed to management positions. One central tool is the Development Center, which uses exercises and interviews to help individuals with potential in the MTU Group draw up an individual development plan to prepare for leadership functions. The aim of the defined process at the Development Center is to undertake an objective assessment of talented employees and raise their visibility in the company. Around 60% (MTU AG: 59%) of the managers newly appointed to leadership functions in 2021 attended a Development Center. As a consequence of the coronavirus pandemic, not all planned Development Centers could be held. MTU has added a new element to its talent management: At the German sites, candidates with potential now have access to a mentoring program to foster their personal and professional development and promote cross-level and cross-functional exchange and networking.

There are also special development programs for recently appointed managers: a Leadership Exploration Program for departmental managers and a First Leadership Program for team leaders.

MTU offers both new and experienced managers opportunities to receive management transition coaching and box stop coaching, with scope for reflection and sparring. A new Executive Leadership Development Program is planned for the top management level.

Furthermore, fostering talented women and equality in management are important to the Group. In the light of this, MTU offers female staff support in their careers through a range of measures such as the FATALE University's online training and coaching program for young women in STEM professions, participation in cross-company mentoring programs, and the internal Network of Engine Women, which promotes networking, for example, on topics such as career advancement. *Further information on diversity and support for women is presented in the Corporate Governance report.*

Regular employee surveys are an important yardstick for successful teamwork and leadership. Since 2020, MTU has used a new format to conduct surveys in short cycles at its German locations. These "pulse checks" comprise a short online questionnaire to obtain a rapid snapshot of the current mood in the organization. The questions are on various topics relating to the present working situation. [The results of the pulse check are included in the environmental, social, and governance (ESG)-related KPI which influences the Executive Board's variable remuneration. The KPI is derived from employee feedback on the areas of leadership and commitment. Only answers that are explicitly positive are taken into account. The overall index for 2021 derived from all three pulse checks was around 73% and thus slightly below the target of 75%. Nevertheless, given the pandemic situation in 2021, that is a good result.√]

MTU also receives regular feedback from its location in Rzeszów, Poland, through an employee survey.

Vocational training of young people is still important

Qualified employees with a sound vocational training are also important to MTU. Despite the pandemic, MTU continued its vocational training in Germany on the usual scale and enabled around 95 young people to embark on a training course in 2021. For its new location, MTU Maintenance Serbia d.o.o., vocational training based on the German dual training system has started, with the first year apprentices attending the Aviation Academy in Belgrade. As part of the cooperation with this academy, Serbian instructors spent some time as trainees at the training workshop in Munich. To ensure that the new employees are highly qualified and to prepare them optimally for their jobs and the specific requirements of the aviation sector, most of them will be trained at MTU's three sites in Germany.

MTU continued to invest extensively in staff training in 2021, the second year of the coronavirus pandemic. Group-wide, MTU invested a total of €4.2 million in staff training (2020: €3.0 million). At MTU AG, it spent €2.7 million on staff training (2020: €1.7 million) (costs for internal and external training, excluding vocational training). The increase in staff training costs is attributable to the fact that for a while the pandemic situation allowed more face-to-face training sessions.

Respecting the human rights of employees

MTU respects the internationally proclaimed human rights set out in the United Nations' Universal Declaration of Human Rights and enforces and protects these rights within the company. Human rights are integrated into the corporate culture with the aid of various tools. In particular, MTU strives to prevent employees being exposed to any violation of their human rights (zero-tolerance principle).

MTU is committed to respecting the individuality and dignity of every individual, maintaining equality of opportunity in the workplace and preventing discrimination. The protection of human rights, the right to appropriate remuneration as well as recognition of regulations governing employee and union representation under labor and works constitution law are implemented Group-wide through the Code of Conduct. As an employer, MTU aims to create fair working conditions based on legally binding employment contracts and appropriate remuneration. This includes freedom of association and the right to adopt collective agreements. Compliance with the Code of Conduct and ethical principles is also enshrined in the MTU Principles. The MTU Principles stress that respecting human rights is an essential element in MTU's social and societal responsibility.

The commitment to respecting human rights is reinforced by MTU's status as a signatory to the UN Global Compact and by national legislation that upholds human rights. In

Germany, for example, MTU is bound by the General Act on Equal Treatment (AGG), which prohibits discrimination against employees and job applicants. In addition, there are internal guidelines on fair and cooperative conduct, which are designed to prevent bullying, sexual harassment and discrimination. These guidelines were adopted in consultation with the representatives of the workforce and include a systematic process for dealing with complaints.

Reporting processes are in place to ensure structured and effective tracking of complaints and reports of breaches of human rights. Reports can be made confidentially within the Group to the Compliance Officer or via the web-based reporting system iTrust. In addition, site-specific reporting structures have been set up. In line with the provisions of, for example, the General Act on Equal Treatment (AGG), every site in Germany has designated contacts who are appropriately trained and to whom employees can address any complaints of discrimination. There is also a female contact person that women can turn to in case of sexual harassment. At MTU Maintenance in Canada, employees can make a formal complaint to the head of Human Resources in the event of discrimination. In addition, employees have the right to submit a formal complaint externally to the BC Human Rights Tribunal. At MTU Aero Engines Polska this function is carried out by an elected employee representative. Employees can also report complaints to managers, the works council or the head of human resources. The Executive Board is informed about infringements depending on the severity of their impacts.

When they join the company, new employees are informed about the principles set out in the Code of Conduct and – in Germany – the General Act on Equal Treatment (AGG), and they undertake to comply with these requirements. In addition, MTU provides regular training on the Code of Conduct at all the company's sites and all hierarchical levels.

In 2021, there were once again no substantiated complaints under applicable anti-discrimination laws at any sites in the MTU Group.

Respect for human rights in the supply chain

As a member of the UN Global Compact, MTU respects the internationally recognized human rights enshrined in the UN Declaration of Human Rights. It extends this to its supply chain as well. The aim is to ensure the observance of human rights and fair working conditions.

A code of conduct for suppliers is in place to cover the upstream value chain. MTU's suppliers are required to give an undertaking that they will comply with this Code of Conduct for MTU Suppliers, which is based on the ten principles of the UN Global Compact and the core labor standards of the International Labour Organization (ILO). The Code of Conduct requires suppliers to respect and apply human rights, and to make sure that they are not complicit in human rights violations. In particular, it requires observance of labor standards relating to freedom of association, the right to collective bargaining, the ban on forced and child labor, equal pay regardless of gender and the equal treatment of employees. MTU also expects its suppliers to obtain a corresponding undertaking from sub-suppliers and reserves the right to terminate any contract with a supplier without notice if the supplier uses child labor in the production process for its deliveries. In addition, these principles of behavior are contained in the general business conditions and the contractual documents for suppliers.

Suppliers to the sites in Germany, Poland and Canada and the subsidiary MTU Aero Engines North America are subject to a regular risk analysis. This takes account of MTU-specific product groups and the countries where they are sourced, based on the evaluation in the Walk Free Foundation's Global Slavery Index. This risk analysis is integrated into the established risk process for suppliers. As a further step, there are plans to monitor significant suppliers' compliance with sustainability criteria. For this purpose, MTU is currently reviewing an implementation of a commercially available IT solution. In addition, at MTU Maintenance, a structured supplier evaluation is performed twice a year for suppliers to the German sites.

Various measures are used to achieve the goal of ensuring that human rights are respected in the supply chain. These apply, above all, to the procurement of tantalum, tin, gold and tungsten, which are used in some MTU components. Procurement of these minerals can be problematic because some of them come from Central African mines where the profits may be used specifically to fund armed conflicts that violate human rights. MTU strives to ensure a sustainable and transparent value chain without these "conflict minerals." The company does not procure minerals directly but they enter production and pre-production via the global, multi-step supply chain. The general conditions of business and the templates for contracts with MTU suppliers require information on the origin of minerals. This information is compiled using the EICC/GeSI Conflict Minerals Reporting Template. In accordance with the provisions of the Dodd-Frank Act, MTU makes it compulsory for relevant suppliers to provide information once a year on the origin of minerals and specifies that minerals may only be procured from certified mines and smelters (compliant smelter list) in order to ensure that the value chain does not contain conflict minerals. Based on its survey in 2021, MTU has no indication that components from its suppliers contain conflict minerals.

Moreover, in the reporting period there were no reported indications that suppliers had violated the human rights provisions of the Code of Conduct for MTU Suppliers. Furthermore, MTU did not have to terminate its relationship with any suppliers as a result of sustainability violations relating to human rights.

The German Act on Due Diligence in the Supply Chain (LkSG) will apply to MTU from 2023. In the reporting period, MTU examined the requirements and worked out a plan to ensure timely compliance with the regulatory provisions.

Responsible international trade

Trade compliance plays a vital role for MTU. One important goal here is to avoid violations of human rights. The provisions of international trade legislation apply to all business units and Group companies, including their employees. Customs and export control laws govern which products, services and technical data MTU is permitted to sell or pass on to whom, for what purpose and where. Compliance with customs legislation and international trade regulations is explicitly stipulated in MTU's Code of Conduct.

Export control law prohibits doing business with specific countries or individuals, and the supply of sensitive goods, transfer of advanced technologies, and provision of military services without explicit authorization by the respective official bodies. This is intended, in particular, to prevent the proliferation of nuclear, biological and chemical weapons, to prevent the supply of military goods or goods that can be used for military purposes to crisis regions, to prevent support for blacklisted individuals and activities that violate human rights, and to protect sovereign security interests. Under customs regulations, MTU is required to provide a precise description, detailed itemization and accurate declaration of the value of all goods intended for import or export. What is more, anti-boycott laws may prohibit individuals and entities from participating in other countries' economic boycotts and restrict the dissemination of information relating to business activities or individuals.

To ensure international trade regulations are implemented throughout the Group, MTU has set up a central international trade department (functional responsibility and supervisory authority for export control, coordination of customs regulations), which draws on the support of external consultants where necessary. To ensure compliance with international trade regulations, harmonized process standards have been introduced Group-wide. These verify conformity with export control regulations and required authorizations prior to the dispatch of documents and components. The head of the international trade department reports disciplinarily to the head of purchasing and has a direct duty to report to the Executive Board member responsible for export (Chief Operating Officer [COO]).

In the reporting period, MTU continued compulsory training of all employees affected by export control regulations, which has been on a new training concept since 2020, and drove forward the Internal Compliance Program (ICP).

Disclosures on the EU taxonomy (initial application in reporting period)

A key objective of the EU Action Plan for Financing Sustainable Growth is to reorient capital flows towards sustainable investment. In light of this, Regulation (EU) 2020/852 of the European Parliament and of the Council of 18 June 2020 on the establishment of a framework to facilitate sustainable investment, and amending Regulation (EU) 2019/2088 (subsequently referred to as the EU Taxonomy Regulation) came into effect in mid-2020. This Regulation contains a uniform and legally binding classification system defining which economic activities are deemed to be "environmentally sustainable" in the EU. The results of this classification have to be reported annually on a company-specific basis.

Article 9 of the EU Taxonomy Regulation sets out the following six environmental objectives:

a) climate change mitigation;

b) climate change adaptation;

c) the sustainable use and protection of water and marine resources;

d) the transition to a circular economy;

e) pollution prevention and control;

f) the protection and restoration of biodiversity and ecosystems.

The EU has currently published requirements for sustainable economic activities within the meaning of the EU taxonomy for two environmental objectives (climate change mitigation and climate change adaptation).

With regard to the classification of an economic activity as “environmentally sustainable” within the meaning of the EU taxonomy, a distinction has to be drawn between those activities that are taxonomy-eligible and those that are taxonomy-aligned. The first step is to examine whether an economic activity is described in the delegated act and therefore taxonomy-eligible. Only taxonomy-eligible economic activities that meet specific criteria can qualify as “environmentally sustainable.” The second step is to evaluate whether the defined technical screening criteria are met and the minimum safeguards are observed, in order to allow classification of the activity as taxonomy-aligned. Based on the current regulatory situation, in MTU’s case, for example, economic activity 3.6 “Manufacture of other low carbon technologies” is relevant.

The delegated acts published to date do not contain a separate economic activity in connection with the “manufacture of aircraft and their components.” Consequently, the treatment of the entire aviation sector has not yet been conclusively addressed. In the classification of its economic activities, MTU has therefore only taken account of the requirements already published. Appropriate reflection in the EU taxonomy remains an objective of MTU and the entire aviation sector. The Platform on Sustainable Finance is currently undertaking a more detailed evaluation of this economic activity, which is relevant for MTU, and drafting technical screening criteria. A proposal for the corresponding requirements is contained in a position paper. If the recommendations contained in the position paper are integrated into delegated acts in the future, further material parts of MTU’s economic activities could fall within the scope of the EU taxonomy. Therefore, the figures reported may be subject to substantial change in the future as a result of new EU publications.

Under an exemption granted by the EU, for the fiscal year 2021, disclosures are only required on the proportion of turnover, capital expenditures (CapEx) and operating expenditures (OpEx) associated with taxonomy-eligible and taxonomy non-eligible activities.

The amounts used to calculate the turnover, CapEx and OpEx KPIs are therefore based on the corresponding figures reported in the consolidated financial statements. In principle, all consolidated companies in the MTU Group are included in the calculation.

The basis for calculating the turnover KPI is the net revenue generated by goods and services, including intangibles, in accordance with IAS 1.82(a).

The basis for calculating capital expenditure (CapEx) comprises additions to property, plant and equipment and intangible assets in the fiscal year under review, before depreciation and amortization and before any remeasurements relating to the year concerned. Capital expenditure also includes additions to property, plant and equipment and intangible assets resulting from business combinations (application of IFRSs [IAS 16, 38, 40, 41, IFRS 16] and national accounting methods). Acquired goodwill is not taken into account.

The basis for calculating operating expenditure (OpEx) comprises direct, non-capitalized research and development expenses, renovation of buildings, short-term leases, maintenance and other direct expenditures relating to day-to-day servicing of property, plant and equipment by the company or third parties that are necessary to ensure the continued and effective use of such assets.

In view of the obligation to publish a non-financial statement, MTU is required to apply the rules set out in the Taxonomy Regulation. In accordance with Section 315e (1) HGB, the consolidated financial statements of MTU as of December 31, 2021, have been drawn up using the IFRSs.

If economic activities conducted by MTU are listed in the EU taxonomy, they are deemed to be taxonomy-eligible. Turnover, capital expenditure and operating expenditure relating to this economic activity may be classified as taxonomy-eligible.

The disclosure of taxonomy-eligible turnover (revenue) / capital expenditure (CapEx) / operating expenditure (OpEx) as a proportion of the respective total amounts for the MTU Group for the fiscal year 2021 is based on a full analysis of the Group's business activities.

The "Draft Commission notice on the interpretation of certain legal provisions of the Disclosures Delegated Act under Article 8 of EU Taxonomy Regulation on the reporting of eligible economic activities and assets" dated February 2, 2022, was applied.

Key performance indicators (KPIs)

[T40] EU Taxonomy KPIs

in %	Taxonomy-eligible proportion	Proportion not eligible for Taxonomy
Revenue	8	92
CapEx	34	66
OpEx	33	67

Turnover KPI

The turnover KPI comprises turnover (revenue) from taxonomy-eligible economic activities in a fiscal year as a proportion of total revenue in the fiscal year.

$$\text{Turnover KPI} = \frac{\text{Taxonomy-eligible net revenue}}{\text{Total net revenue}}$$

The denominator used to calculate this KPI is the total revenue of €4,188 million in 2021, as reported in the MTU Group's income statement for the fiscal year.

The revenue reported in MTU's consolidated income statement is examined across all Group subsidiaries to identify whether it was generated by taxonomy-eligible economic activities as defined in Annex I (contributes substantially to climate change mitigation) and Annex II (contributes substantially to climate change adaptation) to the Taxonomy Regulation. In the first step, MTU performs a detailed analysis of all its business activities to identify its taxonomy-eligible economic activities. A detailed analysis of the items that make up revenue is then used to allocate the respective revenue amounts to the taxonomy-eligible economic activities. The numerator is the sum of the revenue from the taxonomy-eligible economic activities, which was €350 million in the fiscal year 2021.

Based on the current status of the regulations, the economic activity 3.6 "Manufacture of other low carbon technologies" (Annex I) was identified as a material revenue-generating economic activity of the MTU Group within the meaning of the delegated act (Annex I / Annex II). On this basis, MTU classifies as taxonomy-eligible those revenues corresponding to economic activity 3.6 "Manufacture of other low carbon technologies" (Annex I) that are geared to achieving a considerable reduction in greenhouse gas emissions in other sectors of the economy.

Revenue from especially low-carbon engine technologies designed to contribute to a considerable reduction in greenhouse gas emissions in the aviation industry falls within the scope of this definition. This analysis of activities geared to a considerable reduction in greenhouse gas emissions took into account customary product life cycles for the respective model types and a comparison of alternative technologies, generally previous technologies, that are currently found on the market.

In line with market practice, a distinction was made between the following aircraft types: widebody, narrowbody and regional jets. A CO_2 reduction of 10% or more is regarded as a considerable reduction.

CapEx KPI

The CapEx KPI represents the proportion of capital expenditure (CapEx) that is associated with a taxonomy-eligible economic activity or with the purchase of products and services from a taxonomy-eligible economic activity.

$$\text{CapEx KPI} = \frac{\text{Taxonomy-eligible capital expenditure}}{\text{Total capital expenditure as defined in the EU Taxonomy Regulation}}$$

MTU's total capital expenditure as defined in the EU Taxonomy Regulation was €384 million in the reporting period.

Taxonomy eligibility was analyzed by comparing the project description of the additions of assets with Annex I (contributes substantially to climate change mitigation) and Annex II (contributes substantially to climate change adaptation) of the Taxonomy Regulation. The numerator for the CapEx KPI comprises the total additions that reflect taxonomy-eligible capital expenditure, amounting to €130 million. It comprises capital expenditures in connection with the manufacture of low-carbon engine technologies and the purchase of taxonomy-eligible products and services in the areas of information and communication technology, buildings, and fleet and energy management.

OpEx KPI

The OpEx KPI shows the proportion of operating expenditure as defined in the EU Taxonomy that is associated with taxonomy-eligible economic activities.

$$\text{OpEx KPI} = \frac{\text{Taxonomy-eligible operating expenditure}}{\text{Direct, non-capitalized costs (R\&D, renovation of buildings, leases, maintenance and servicing)}}$$

To derive the denominator, total operating expenditure containing direct, non-capitalized research and development expenses, renovation of buildings, short-term leases, and maintenance expenditures was examined by undertaking a detailed analysis by accounts and cost centers.

The numerator is that portion of the operating expenditures contained in the denominator that relates to assets or processes that are associated with taxonomy-eligible economic activities as defined in Annex I (contributes substantially to climate change mitigation) and Annex II (contributes substantially to climate change adaptation) to the Taxonomy Regulation.

A high proportion of the OpEx of €278 million comprises non-capitalized research and development expenses (in an amount of €180 million, see *"Research and development"*). Consequently, the analysis of the taxonomy eligibility of research and development expenses is of material significance for the calculation of the OpEx KPI. The research and development expenditure was calculated on the basis of the allocation to engine types, analogously to the procedure used to derive the turnover KPI. Together with the taxonomy-eligible expenditure for maintenance and repair work and the renovation of buildings, most of which were allocated to the corresponding cost-centers, taxonomy-eligible OpEx is €92 million.

In the calculation of the above KPIs, double-counting of economic activities was avoided by applying various controls, including the documentation of data generation and ensuring that the data are reconcilable with other financial information.

From fiscal 2022, taxonomy alignment also has to be reported. This will involve an even more detailed analysis of whether the identified economic activities fulfill the criteria. Alongside screening for taxonomy alignment, this includes evaluating if the taxonomy-eligible economic activities make a substantial contribution to one of the environmental objectives defined in the Taxonomy Regulation and do no significant harm to other environmental objectives. Furthermore, fulfillment of social safeguards in accordance with the OECD Guidelines for Multinational Enterprises, the UN Guiding Principles on Business and Human Rights, the ILO core labor standards and the International Bill of Human Rights must be ensured.

Corporate governance statement

The corporate governance statement forms part of the combined management report of the MTU Group and MTU Aero Engines AG. In accordance with Section 317 (2) sentence 6 of the German Commercial Code (HGB), auditing of the disclosures in accordance with Sections 289f and 315d of the German Commercial Code (HGB) is limited to determining whether the disclosures have been made.

Declaration of conformity with the German Corporate Governance Code by the Executive Board and Supervisory Board of MTU Aero Engines AG, in accordance with Section 161 of the German Stock Corporation Act (AktG)

The Executive Board and the Supervisory Board of MTU Aero Engines AG declare that the recommendations of the Government Commission on the German Corporate Governance Code, as published in the amended version of December 16, 2019, by the Federal Ministry of Justice in the official section of the Federal Gazette, have been and are being complied with in their entirety.

Munich, December 2021

On behalf of the Executive Board

Reiner Winkler
CEO

On behalf of the Supervisory Board

Klaus Eberhardt
Chairman

Responsible corporate management

Responsible corporate management is very important to MTU Aero Engines AG. The company therefore complies with all the recommendations of the German Corporate Governance Code (GCGC). The term “corporate governance” stands for the management and oversight of a company in accordance with the principles of responsibility and long-term value creation. MTU sees good corporate governance as a natural responsibility that embraces every area of the company. That comprises mutual trust and efficient collaboration between the Executive Board and the Supervisory Board, respect for the shareholders' interests and open and transparent communication with all stakeholders. As a company with global operations, MTU acts in compliance with the relevant national and international standards. In Germany, where the company has its headquarters, these standards are laid down principally in the Stock Corporation Act (AktG), the Codetermination Act (MitbestG) and the GCGC.

The Government Commission on the German Corporate Governance Code concluded a new version of the GCGC on December 16, 2019, and submitted it to the Federal Ministry of Justice and Consumer Protection for review and publication. The GCGC was published in the Federal Gazette in spring 2020 and therefore came into effect.

The Executive Board and Supervisory Board closely examined the GCCG during the past fiscal year. This report has been compiled in compliance with the applicable version of the GCGC. A full description of management practices that extend beyond statutory requirements is also provided in this section of the Annual Report.

Corporate management

Accepting responsibility – not only for its products and processes, employees, customers and partners, but in equal measure for the environment and society as a whole – forms an integral part of MTU's corporate culture. MTU is committed to sustainable development and its contribution in this area goes beyond the legal requirements. The principal focus areas of its social commitment are environmental protection, human resources policy, and community outreach projects in the neighborhoods of MTU sites. These commitments are publicly documented on the *MTU website at www.mtu.de under Company > Corporate Responsibility*.

The company has a Code of Conduct, which has to be observed by all employees. The Code of Conduct can be downloaded from the *company's website at www.mtu.de under Company > Compliance > Policies*.

MTU attaches great importance to maintaining an open, ongoing dialogue with its target groups. The company communicates with these groups via many channels, including the intranet and internet, social media, brochures, employee and customer magazines as well as at events. The aim is to generate broad public acceptance.

MTU insists on the finest quality for its products and services. Compliance with quality standards is verified by the relevant authorities and through internal and external audits. The quality standards are published on the *MTU website under Engines > Quality*.

Trust-based cooperation among governing bodies

MTU is a stock corporation organized under German law. Its governing bodies are the Executive Board, the Supervisory Board and the Annual General Meeting. The close cooperation between the Executive Board and the Supervisory Board is based on trust and on intensive, ongoing sharing of information. The Annual General Meeting, in particular, offers shareholders the opportunity to put questions to MTU executives and to exercise their voting rights.

Working procedures of the Executive Board

The goal of the Executive Board in managing MTU is to create, on its own responsibility and in the company's interest, sustainable added value, taking into account the interests of its shareholders, employees and other stakeholders. The Executive Board works as a team, with its members bearing joint responsibility. The members of the Executive Board regularly discuss important actions and events within their respective remits. Their differing qualifications and professional experience are complementary. The company's Executive Board consisted of four members in 2021.

The Supervisory Board is briefed by the Executive Board in a regular, timely and comprehensive manner on the situation of the company, especially in thematically specific meetings of the Supervisory Board and Audit Committee at intervals throughout the fiscal year. The meetings address the company's strategy, the status of planning, the achievement of targets, the company's risk situation and its risk management activities. The Executive Board coordinates decisions of a strategic nature with the Supervisory Board, ensures that such decisions are implemented and discusses the progress made. To ensure the flow of information on the company's results of operations, financial position and net assets, the Executive Board has set up a process in which the Supervisory Board receives a written report on a monthly basis. Any deviations from the planned operational performance are explained in detail to the Supervisory Board. Furthermore, the Chairman of the Supervisory Board is briefed regularly and in person on the company's current situation, significant business transactions and important pending decisions.

The Executive Board also receives regular reports on compliance, i.e., on the measures taken to comply with laws and regulations as well as with company guidelines.

Material decisions by the Executive Board, especially those concerning the budget, require the approval of the Supervisory Board. More information on these matters is provided in this Annual Report in the *Report of the Supervisory Board*. The Executive Board's rules of procedure, along with the list of transactions by MTU Aero Engines AG requiring Supervisory Board approval, can be viewed on the *company's website at www.mtu.de under Investor Relations > Corporate Governance > Articles of Association*.

In line with the recommendation of the GCGC, the Supervisory Board has set an age limit for the members of the Executive Board. Appointment or extension of the appointment to the Executive Board is only possible until age 65.

The new German Act Implementing the Second Shareholder Rights' Directive (ARUG II) came into force at the start of 2020. It contains material changes in the requirements for compensation of the Executive Board. The German Corporate Governance Code also contains new recommendations on Executive Board remuneration. The corresponding new remuneration system was adopted on October 27, 2020. All Executive Board members have agreed to it. The new remuneration system was presented to the Annual General Meeting for approval on April 21, 2021. A majority of 91.7% voted in favor. The remuneration of the Executive Board for the 2021 fiscal year can be found in the section headed *"Management compensation report."*

Working procedures of the Supervisory Board

In line with statutory requirements, the Supervisory Board comprises six shareholder representatives and six employee representatives. The Supervisory Board appoints the Executive Board and monitors and advises it in the management of the company's business. In this respect, in 2010 the Supervisory Board resolved as a matter of principle to appoint new members to the Executive Board for a term of three years. Key corporate decisions require the approval of the Supervisory Board. All Supervisory Board members are qualified for these tasks and perform their duties properly.

All members of the Supervisory Board make sure that they have sufficient time to perform their tasks. The statutory limits on the number of mandates and the upper limit of two supervisory board mandates for members of the executive board of a publicly listed company and five supervisory board mandates for other members recommended by the GCGC are taken into account.

In compliance with the GCGC, in 2021 only one former member of the Executive Board of MTU Aero Engines AG, namely Dr. Rainer Martens, had a seat on the Supervisory Board; the GCGC recommends no more than two. The Supervisory Board is responsible for regularly assessing the independence of its own members, especially the shareholder representatives. As a matter of principle, it considers the employee representatives to be independent. It considers that the Supervisory Board is independent if the majority of its members and the majority of the shareholder representatives are considered to be independent. In its present composition, this applies to all members of the Supervisory Board. It also applies to the shareholder representatives Klaus Eberhardt and Dr. Jürgen M. Geißinger who have been members of the Supervisory Board of MTU for more than 12 years. The period for which members have served on the Supervisory Board is published in their resumes on the company's website. Given the nature of MTU's business model and the lifecycle of its engines, which is 30 to 40 years om some cases, and the high initial capital expenditure involved, the Executive Board and the Supervisory Board consider long-serving members of the Supervisory Board to be an especially valuable asset to the company and do not take the view that they must necessarily be deemed insufficiently independent after a tenure of 12 to 15 years based on this fact alone. The Supervisory Board has set four terms of office as the maximum for membership of the Supervisory Board and considers this to be appropriate for MTU. Moreover, there are no other indications that the members of the Supervisory Board of MTU lack independence. In this way, independent advice and oversight of the Executive Board is ensured by both the full Supervisory Board and its committees.

The Supervisory Board's rules of procedure provide for the establishment of committees. The Supervisory Board of MTU has four committees: an Audit Committee, a Personnel Committee, a Mediation Committee and a Nomination Committee. The members of the Audit Committee are Dr. Joachim Rauhut (Chairman), Dr. Christine Bortenlänger (since April 22, 2021), Klaus Eberhardt (until April 21, 2021), Heike Madan and Josef Mailer. The members of the Personnel Committee and the Mediation Committee are Klaus Eberhardt (Chairman) and Dr. Jürgen M. Geißinger plus the employee representatives Josef Mailer and Roberto Armellini. The members of the Nomination Committee are Klaus Eberhardt (Chairman) and Dr. Jürgen M. Geißinger. Further details can be found in the section headed *"The Supervisory Board."* In addition, the resumes of the Supervisory Board are published on the *company's website at www.mtu.de under Company > Supervisory Board*.

According to the GCGC, participation in meetings by telephone or video conference should not be the rule. At MTU, meetings are held in person; participation by telephone or video conference only takes place in exceptional circumstances. In view of the special circumstances during the Covid-19 pandemic, in 2021, as in the previous year, several meetings of the Supervisory Board and its committees were held remotely or in a hybrid format (some members attended in person, others took part by video conference).

In consultation with the Executive Board, the Supervisory Board ensures long-term succession planning for appointments to the Executive Board. To this end, the Supervisory Board regularly reviews the present term of all Executive Board contracts, taking into account the age of each member, the competency profile of potential candidates and the defined diversity objective for the Executive Board.

The Supervisory Board's rules of procedure contain binding provisions for dealing with conflicts of interest. Such conflicts must be disclosed and, where appropriate, may result in termination of the member's term of office. In addition, the Supervisory Board must explicitly state such potential conflicts of interest when submitting the nominations to the Annual General Meeting. There were no conflicts of interest in the reporting period. With the exception of a consulting agreement between a Supervisory Board member and a supplier of the company, there were no consulting agreements, contracts for services or similar contractual agreements between members of the Supervisory Board and MTU Aero Engines AG or any of its subsidiaries, or with customers, suppliers, lenders or other third parties in 2021. If there are any discussions or resolutions affecting this supplier in future – this was not the case during the reporting period – the Supervisory Board member concerned will not take part in them.

The Supervisory Board has defined specific objectives for its composition and drawn up a profile of skills and expertise for the entire board, which it judges to be satisfactorily met at the present time. Importance is attached to diversity. The profile of skills and expertise forms the basis for all nominations submitted to the Annual General Meeting. It is published on MTU's website. Nominations submitted by the Supervisory Board to the Annual General Meeting take account of all objectives and also strive to comply with the profile of skills and expertise for the Supervisory Board as a whole.

In the past financial year, directors' and officers' liability insurance was in effect for the members of MTU's Executive Board and Supervisory Board. The compensation of the members of the Executive Board and Supervisory Board is based on clear and transparent criteria, which are described in the section headed *"Management compensation report."*

The Supervisory Board regularly assesses how effectively the Supervisory Board as a whole and its committees perform their tasks. In 2021, the Supervisory Board and the Audit Committee each conducted a self-assessment by evaluating feedback from a questionnaire developed by an external law firm. Focal areas of the self-assessment were the timeliness and scope of information provided to Supervisory Board members, the preparation and conduct of meetings of the Supervisory Board and its committees, and the composition and structure of the Supervisory Board and its committees, including the allocation of tasks between the full Supervisory Board and its committees, and the expediency of the committees that have been established, the appropriateness of the list of business activities requiring approval, the information provided to plenary sessions of the Supervisory Board by the chairpersons of the committees on the work of their committees, monitoring the cost-effectiveness of new projects, even after approval by the Supervisory Board, and examining training requirements. The members of the Supervisory Board and the Audit Committee considered the work of the full Supervisory Board and the Audit Committee to be conducted efficiently and adopted some specific measures to enhance organization of the Supervisory Board's work.

Diversity

The diversity of its employees plays a key role in MTU's success. Therefore, diversity is very important to MTU.

In the context of the German law on equal participation of women and men in leadership positions, MTU has set itself goals: In accordance with Section 111 (5) of the German Stock Corporation Act (AktG), the supervisory boards of companies that are listed or subject to the German Codetermination Act (MitbestG) are required to set target quotas for women on their supervisory and executive boards. In addition, under Section 76 (4) of the German Stock Corporation Act (AktG) the Executive Board is required to set a target quota for women at the two management levels directly below the Executive Board.

Diversity also plays an important role in the composition of the Supervisory Board. In compliance with both the German Stock Corporation Act (AktG) and the GCGC, the supervisory boards of listed companies subject to the German Codetermination Act (MitbestG) must comprise at least 30% women and at least 30% men. The Supervisory Board has four female members: Dr. Christine Bortenlänger, Anita Heimerl, Heike Madan and Prof. Dr. Marion A. Weissenberger-Eibl. Two are employee representatives and two are shareholder representatives. The percentage of women on the Supervisory Board is therefore unchanged at 33.3%.

In addition, the Supervisory Board has set the following goal: International focus is very important for MTU as a global corporation. At least one member of the Supervisory Board should therefore meet the criterion of "internationality." It is already the case that various members of MTU's present Supervisory Board trained or have spent a large part of their professional lives abroad. The members of the Supervisory Board should continue to contribute an international perspective.

The Supervisory Board takes the above-mentioned goals into account when submitting proposals for election by the Annual General Meeting. The same applies to the Nomination Committee, which is responsible for preparing the vote of the Supervisory Board. Since the main criterion for any proposal is still the company's interest, the Supervisory Board proposes the most suitable candidates.

The Supervisory Board's rules of procedure set an age limit for members. Their terms on the Supervisory Board automatically end at the end of the Annual General Meeting following the member's 75th birthday. Moreover, a general limit of four terms of office has been set for serving on the Supervisory Board.

The Supervisory Board also places value on fostering diversity in appointments to the Executive Board. The members of the Executive Board have diverse qualifications and work experience, which contribute to their work. In accordance with the provisions of the German Stock Corporation Act (AktG) and the German Corporate Governance Code (GCGC), in 2017 the Supervisory Board set a target quota of 25% for female members of the Executive Board, to be achieved by June 30, 2022.

At management level – which comprises tier 1 (OFK), tier 2 (FK) and tier 3 (EFK) managers – the Executive Board has set a quota of 13% for women in management positions at the MTU sites in Germany. It aims to achieve this by mid-2022. As of December 31, 2021, the percentage was 11.3%.

MTU is continuing to pursue its goal of increasing the number of women on all levels. Every area of the company is called upon to work actively toward achieving this corporate objective. The measures focus on recruiting more female potentials and providing more intensive support for female employees during their careers. To this end, MTU invests extensively in the development of its female employees and is involved in mentoring programs and a variety of initiatives. In addition, MTU has an active network for women, with Lars Wagner, Chief Operating Officer, as its advocate, and extensive measures to improve work-life balance, including flexible working hours, support services for families, and scope for teleworking.

A full description of diversity management at MTU Aero Engines AG can be found in the current *Sustainability report*.

Financial reporting

MTU prepares its consolidated financial statements and interim reports in accordance with the International Financial Reporting Standards (IFRSs). The Executive Board is responsible for this. Financial reporting comprises, in particular, the consolidated financial statements and the Group management report (including the non-financial statement). The separate financial statements of the parent company are compiled in accordance with the provisions of the German Commercial Code (HGB). An internal control system, coupled with the application of uniform accounting policies, ensures that the results of operations, financial position, net assets and cash flows of all Group companies are accurately presented. In addition, MTU has a differentiated system in place to identify and monitor business and financial risks.

Risk management and control system

The Executive Board is responsible for ensuring that an appropriate risk management and control system is in place. This system is described in the section headed *"Internal control and risk management system."* The Executive Board reports to the Supervisory Board in a regular and timely manner on existing opportunities and risks, and how they are developing. The Audit Committee of the Supervisory Board discusses risk management. In accordance with Section 107 (3) of the German Stock Corporation Act (AktG), the Audit Committee is explicitly responsible for monitoring the effectiveness of the risk management system, the internal control and auditing systems, the financial reporting process and the audit of the financial statements, and in particular, for assessing the auditors' independence.

Compliance

The corporate culture at MTU is characterized by trust and mutual respect.

The observance of legal and ethical rules and principles plays a central role in this respect. These and other aspects of compliance, such as the responsible handling of insider information, are documented in a Code of Conduct, which was revised, agreed and introduced jointly by the Executive Board and the Group Works Council in 2020. This Code of Conduct embodies MTU's corporate culture and reflects its resolve to comply strictly with the relevant laws and internal regulations. It is a Group-wide guide to ethical business relations.

Nevertheless, the risk can never be entirely ruled out that unauthorized behavior of isolated individuals might lead to contravention of the law. MTU does everything in its power to minimize this risk as far as possible, and is committed to preventing acts of misconduct, such as corruption, in the first place through corresponding rules and regular and targeted training, and to uncovering and pursuing any such acts.

Compliance is an important aspect of all management functions at MTU. For example, all managers must check that every member of their staff is familiar with the Code of Conduct and abides by its rules. Reinforcement is provided by internal training.

The central contact for all compliance-related matters in the company is the Compliance Officer, who is a member of the corporate management and reports directly to the Executive Board. The duties of the Compliance Officer focus, first and foremost, on preventing corruption and failure to comply with cartel and insider regulations. The Compliance Officer advises the Executive Board and the managing directors of the individual sites. He draws up training concepts and guidelines and makes recommendations on compliance checks. In addition, the Compliance Officer leads investigations into cases of suspected non-compliance and coordinates the measures taken.

Furthermore, he acts as ombudsman. Both employees and third parties such as customers and suppliers can report suspected non-compliance issues to the Compliance Officer confidentially. As well as contacting him personally, they have access to iTrust, a web-based whistleblower system that also allows anonymous reports.

Reports on the Compliance Officer's activities are presented to the Supervisory Board's Audit Committee. The Audit Committee then informs the plenary meetings of the Supervisory Board via a summary of its own meetings. It supervises the Executive Board's compliance activities, including monitoring the measures and training programs implemented by the Compliance Officer and proposing revisions to the compliance rules.

Extensive information, Annual General Meeting, Directors' Dealings

In keeping with the principles of good corporate governance, MTU continually provides extensive and timely information on the company's activities and any major developments in its business situation for shareholders, shareholder associations, financial analysts, the media and other interested parties. MTU strives to ensure that all stakeholders are kept informed in equal measure. Within reason, the Chairman of the Supervisory Board is also prepared to meet with investors to talk about topics specific to the Supervisory Board. The company publishes an extensive range of information on its website at *www.mtu.de*. It publishes quarterly information on its business activities. Any new developments likely to have a significant impact on the MTU share price are disclosed in the form of ad-hoc releases in accordance with statutory requirements.

Information is also posted on the MTU website whenever members of the Executive Board or Supervisory Board or related persons have purchased or sold MTU shares, debt instruments or share-based derivatives. Section 19 of the European Market Abuse Regulation stipulates that these persons must disclose such transactions if their value in a single calendar year reaches or exceeds €20,000. The total number of shares in MTU Aero Engines AG, Munich, held by members of the company's Executive Board and Supervisory Board as of December 31, 2021, was less than 1% of the company's capital stock.

In the interests of the health of shareholders and employees of MTU, the Executive Board decided, with the consent of the Supervisory Board, to hold the Annual General Meetings in 2020 and 2021 remotely, without physical attendance by shareholders or their proxies, as permitted by the German Act Concerning Measures Under the Law of Companies, Cooperative Societies, Associations, Foundations and Commonhold Property to Combat the Effects of the Covid-19 Pandemic (GesRuaCOVBekG) and the legal ordinance issued by the Federal Ministry of Justice and Consumer Protection, which came into force on October 29, 2020. At an extraordinary session on September 7, 2021, the German Bundestag resolved to further extend the Covid-19 emergency legislation. Joint stock companies are therefore permitted to hold their Annual General Meeting virtually until August 31, 2022. In view of the ongoing coronavirus pandemic and the spread of the highly infectious omicron mutation of the virus, MTU has decided that the 2022 Annual General Meeting will be held virtually. In addition, given the highly international shareholder structure, MTU considers a modern format for its Annual General Meeting to be appropriate as it enables global participation of shareholders without the need to travel or observe contact restrictions and therefore enables them to exercise their rights as shareholders and to follow the entire Annual General Meeting, including the general discussion, as a live video and audio stream. In 2021, shareholders were able to email their questions to the company at the latest one day before the Annual General Meeting.

The company supports the exercise of shareholder rights and proxy voting by its shareholders in part by providing voting representatives who exercise voting rights in accordance with instructions received from individual shareholders. Shareholders also have the option of absentee voting. Shareholders can use electronic means to authorize proxies and provide voting instructions to the company's voting representatives up to the beginning of the Annual General Meeting. MTU is not informed by its service provider of the detailed content of the voting instructions until less than 24 hours before the beginning of the Annual General Meeting.

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Consolidated income statement

[T41] Consolidated income statement

in € million	(Note)	2021	2020
Revenue	(1.)	**4,188**	**3,977**
Cost of goods sold	(2.)	-3,601	-3,484
Gross profit		**586**	**492**
Research and development expenses	(3.)	-83	-61
Selling expenses	(4.)	-124	-146
General administrative expenses	(5.)	-92	-79
Other operating income	(6.)	41	48
Other operating expenses	(6.)	-57	-62
Profit/loss of companies accounted for using the equity method	(7.)	81	69
Profit/loss of equity investments	(7.)	2	1
Earnings before interest and taxes (EBIT)		**355**	**262**
Net interest income/expense	(8.)	-29	-20
Other financial income/expense	(9.)	-10	-47
Net financial income/expense		**-39**	**-67**
Earnings before income taxes		**315**	**195**
Income taxes	(10.)	-84	-48
Net income		**231**	**147**
thereof:			
owners of MTU Aero Engines AG		222	139
non-controlling interests		9	8
Earnings per share (in €)			
Basic (EPS)	(11.)	4.17	2.63
Diluted (DEPS)	(11.)	4.09	2.59

Consolidated statement of comprehensive income

[T42] Consolidated statement of comprehensive income

in € million	(Note)	2021	2020
Net income		**231**	**147**
Translation differences arising from the financial statements of foreign entities		62	-60
Financial instruments designated as cash flow hedges		-106	106
Items that may subsequently be recycled to profit or loss		-44	46
Actuarial gains/losses on pension obligations and plan assets		26	-32
Changes in the fair value of equity investments		-6	2
Items that will not be recycled to profit or loss		20	-30
Other comprehensive income after taxes	(24.)	**-24**	**16**
Total comprehensive income		**207**	**163**
thereof:			
owners of MTU Aero Engines AG		192	162
non-controlling interests		15	1

Consolidated balance sheet – assets

[T43] Assets

in € million	(Note)	Dec. 31, 2021	Dec. 31, 2020
Non-current assets			
Intangible assets	(14.)	1,128	1,135
Property, plant and equipment	(15.)	1,251	1,161
Financial assets accounted for using the equity method	(16.)	611	556
Other financial assets	(16.)	72	137
Acquired program assets, development work and other assets	(17.)	898	973
Deferred taxes	(34.)	83	67
Total non-current assets		**4,043**	**4,030**
Current assets			
Inventories	(19.)	1,380	1,278
Trade receivables	(20.)	946	969
Contract assets	(21.)	897	870
Income tax receivables	(22.)	89	42
Other financial assets	(16.)	177	101
Other assets	(17.)	50	40
Cash and cash equivalents	(23.)	722	773
Total current assets		**4,260**	**4,074**
Total assets		**8,304**	**8,104**

Consolidated balance sheet – equity and liabilities

[T44] Total equity and liabilities

in € million	(Note)	Dec. 31, 2021	Dec. 31, 2020
Equity	(24.)		
Subscribed capital		53	53
Capital reserves		529	508
Retained earnings		2,461	2,298
Treasury shares		–17	–2
Accumulated other comprehensive income		–345	–304
Owners of MTU Aero Engines AG		**2,681**	**2,553**
Non-controlling interests		79	82
Total equity		**2,760**	**2,635**
Non-current liabilities			
Pension provisions	(25.)	905	984
Other provisions	(27.)	63	64
Refund liabilities	(31.)		9
Financial liabilities	(28.)	1,437	1,434
Contract liabilities	(30.)	7	10
Other liabilities	(32.)	9	0
Deferred taxes	(34.)	3	0
Total non-current liabilities		**2,424**	**2,501**
Current liabilities			
Pension provisions	(25.)	44	26
Income tax liabilities	(26.)	9	5
Other provisions	(27.)	173	134
Refund liabilities	(31.)	1,758	1,583
Financial liabilities	(28.)	226	288
Trade payables	(29.)	165	169
Contract liabilities	(30.)	692	729
Other liabilities	(32.)	53	34
Total current liabilities		**3,119**	**2,968**
Total equity and liabilities		**8,304**	**8,104**

Consolidated statement of changes in equity

[T45] Consolidated statement of changes in equity

in € million	Sub-scribed capital	Capital reserves	Retained earnings	Treasury shares	Accumulated other comprehensive income: Transla-tion differenc-es arising from the financial state-ments of foreign entities	Accumulated other comprehensive income: Changes in the fair value of equity invest-ments	Accumulated other comprehensive income: Actuarial gains/ losses[1]	Accumulated other comprehensive income: Financial instru-ments designat-ed as cash flow hedges	**Owners of MTU Aero Engines AG**	Non-con-trolling interests	**Total equity**
Carrying amount as of Jan. 1, 2020	**53**	**460**	**2,160**	**-11**	**22**	**11**	**-316**	**-44**	**2,335**	**86**	**2,421**
Net income			139						139	8	147
Other comprehensive income					-53	2	-32	106	23	-7	16
Total comprehensive income			**139**		**-53**	**2**	**-32**	**106**	**162**	**1**	**163**
Dividend payment			-2						-2	-5	-7
Convertible bond 2016	0	29							29		29
Restricted Stock Plan		3		2					5		5
Employee stock option program (MAP)		16		7					23		23
Carrying amount as of Dec. 31, 2020	**53**	**508**	**2,298**	**-2**	**-32**	**13**	**-348**	**62**	**2,553**	**82**	**2,635**
Net income			222						222	9	231
Other comprehensive income					55	-6	26	-106	-30	7	-24
Total comprehensive income			**222**		**55**	**-6**	**26**	**-106**	**192**	**15**	**207**
Dividend payment			-67						-67	-13	-80
Changes in equity due to portfolio transactions[2]			7		-4	-7			-4	-5	-9
Convertible bond 2016	0	12							13		13
Share buyback				-31					-31		-31
Restricted Stock Plan		2		0					2		2
Employee stock option program (MAP)		7		17					23		23
Carrying amount as of Dec. 31, 2021	**53**	**529**	**2,461**	**-17**	**19**	**0**	**-321**	**-43**	**2,681**	**79**	**2,760**

[1] Refers to pension obligations and plan assets.
[2] Relates to the sale of Vericor Power Systems LLC, the acquisition of the remaining 20% of MTU Maintenance Lease Services B.V., and the sale of the 10% equity investment in SMBC Aero Engine Lease B.V.

Consolidated cash flow statement

[T46] Consolidated cash flow statement

in € million	(Note)	2021	2020
Operating activities			
Net income		231	147
Non-cash amortization (includingof and impairment) of acquired losses on capitalized program assets and acquired development work		92	119
Amortization, depreciation, write-ups and impairment of other non-current assets		265	233
Profit/loss of companies accounted for using the equity method	(7.)	-81	-69
Profit/loss of equity investments	(7.)	-2	-1
Gains/losses on the disposal of assets		-14	1
Change in pension provisions	(25.)	-22	-14
Change in other provisions	(27.)	40	-18
Change in refund liabilities (not included in working capital)	(31.)	-96	-80
Change in working capital		50	-25
Other non-cash items		42	6
Net interest income/expense	(8.)	29	20
Interest paid		-29	-14
Interest received		1	3
Dividends received		85	52
Income taxes	(10.)	84	48
Income taxes paid		-107	-21
Cash flow from operating activities		**567**	**386**
Investing activities			
Capital expenditure on:			
Intangible assets	(14.)	-82	-42
Property, plant and equipment	(15.)	-262	-195
Financial assets	(16.)	-42	-44
Acquired program assets and development work		-23	-19
Proceeds from disposal of:			
intangible assets/property, plant and equipment	(14.) / (15.)	21	41
consolidated subsidiaries		32	
other financial assets	(16.)	10	13
Cash flow from investing activities		**-345**	**-245**
Financing activities			
Cash inflow from other bonds and notes	(28.)		594
Cash outflow from other bonds and notes	(28.)	-100	
Settlement of lease liabilities	(28.)	-34	-41
Settlement of purchase price liabilities for stakes in programs		-25	-56
Repayment of financial liabilities	(28.)	-30	-10
Dividend paid to shareholders of MTU AG/ to non-controlling interests		-80	-7
Sale of treasury shares in connection with the employee stock option program (MAP) / Restricted Stock Plan (RSP)	(28.)	23	23
Share buyback		-31	0
Cash flow from financing activities		**-276**	**504**
Net change in cash and cash equivalents during the reporting period		**-54**	**644**
Effect of translation differences on cash and cash equivalents		3	-11
Cash and cash equivalents at beginning of period (Jan. 1)		773	139
Cash and cash equivalents as of Dec. 31		**722**	**773**

Consolidated segment report

[T47] Consolidated segment report

in € million	Commercial and military engine business (OEM) 2021	Commercial and military engine business (OEM) 2020	Commercial maintenance business (MRO) 2021	Commercial maintenance business (MRO) 2020	Total reportable segments 2021	Total reportable segments 2020	Consolidation/ reconciliation 2021	Consolidation/ reconciliation 2020	MTU Group 2021	MTU Group 2020
External revenue	1,494	1,497	2,693	2,480	4,188	3,977			4,188	3,977
Revenue from intersegment sales	53	38	48	42	101	80	-101	-80		
Total revenue	**1,547**	**1,535**	**2,741**	**2,522**	**4,289**	**4,057**	**-101**	**-80**	**4,188**	**3,977**
Gross profit	**351**	**286**	**237**	**205**	**588**	**492**	**-1**	**1**	**586**	**492**
Amortization	41	39	7	7	47	46			47	46
Non-cash amortization of capitalized program assets and acquired development work	46	51			46	51			46	51
Depreciation	115	102	66	73	181	176			181	176
Impairment losses	83	71		6	83	78			83	78
Amortization/value adjustments/ depreciation/impairment losses	**285**	**264**	**72**	**86**	**357**	**350**			**357**	**350**
Earnings before interest and taxes (EBIT)	**209**	**137**	**146**	**125**	**355**	**262**	**-0**	**-0**	**355**	**262**
thereof: special item depreciation/ amortization effect of purchase price allocation	18	18	2	2	21	21			21	21
thereof: special items from increase in the stake in IAE-V2500	23	27			23	27			23	27
thereof: special item portfolio transactions	-13				-13				-13	
thereof: special item restructuring expenses		24		9		33				33
thereof: special item impairment losses on program assets	83	73			83	73			83	73
Adjusted earnings before interest and taxes (adjusted EBIT)	**320**	**280**	**149**	**136**	**468**	**416**	**-0**	**-0**	**468**	**416**
Profit/loss of companies accounted for using the equity method	44	35	37	34	81	69			81	69
Carrying amount of companies accounted for using the equity method	339	323	272	233	611	556			611	556
Assets	**7,189**	**6,996**	**2,515**	**2,344**	**9,704**	**9,340**	**-1,400**	**-1,237**	**8,304**	**8,104**
Liabilities	**4,729**	**4,698**	**1,877**	**1,667**	**6,606**	**6,365**	**-1,063**	**-896**	**5,543**	**5,469**
Material non-cash items	**36**	**-11**	**5**	**17**	**42**	**6**			**42**	**6**
Capital expenditure:										
Intangible assets	54	42	29	2	83	44			83	44
Property, plant and equipment	148	160	153	123	301	283			301	283
Capitalized program assets and acquired development work	18	12			18	12			18	12
Total capital expenditure	**219**	**214**	**183**	**125**	**402**	**339**			**402**	**339**
Key segment data:										
EBIT (in % of revenue)	13.5	9.0	5.3	4.9	8.3	6.5			8.5	6.6
Adjusted EBIT (in % of revenue)	20.7	18.2	5.4	5.4	10.9	10.2			11.2	10.5

The key indicator used by management to measure the operating performance of each segment is adjusted earnings before interest and taxes (adjusted EBIT). The contribution of companies accounted for using the equity method to adjusted EBIT amounted to €81 million in fiscal year 2021 (previous year: €69 million).

Intersegment sales are transacted at arm's length at standard market terms and invoiced in the same way as transactions with external third parties. The material non-cash items in the reporting period included gains arising from foreign currency translation. In the reporting period, two major customers each accounted for more than 10% of total Group revenue. Business with the largest customer generated revenue of €1,227 million (previous year: €933 million) and with the second-largest customer €482 million (previous year: €636 million). In each case, the revenue stemmed from both segments.

MTU Maintenance Serbia d.o.o. has been consolidated under the commercial maintenance business (MRO segment) since April 2021, while Vericor Power Systems was deconsolidated from the MRO segment in August 2021 as a result of its sale to CSL Capital Management. For more information on segment reporting, please see *Section V. "Segment information."*

I. Accounting principles and policies

Principles and methods

The business activities of MTU Aero Engines AG, Munich, Germany, and its consolidated companies (subsequently referred to as the Group, Group companies or MTU) extend over the entire lifecycle of an engine program – from development, structural design, testing and manufacturing of new commercial and military engines and spare parts through to the maintenance, repair and overhaul of commercial and military engines. MTU divides its activities into two operating segments: the commercial and military engine business (OEM) and the commercial maintenance business (MRO).

MTU's commercial and military engine business (OEM business) covers the development and manufacturing of modules, components and spare parts for engine programs, and in some cases final assembly. The military engine business additionally includes the provision of maintenance services. The MRO segment consists of the commercial maintenance business (MRO business), which covers all activities relating to the maintenance, repair and overhaul of commercial engines as well as associated services.

The parent company, MTU Aero Engines AG, with registered office at Dachauer Strasse 665, 80995 Munich, Germany, is registered under reference HRB 157 206 in the commercial registry of the district court of Munich.

The consolidated financial statements were approved for publication by the Executive Board of MTU Aero Engines AG, Munich, on March 7, 2022.

MTU's consolidated financial statements were prepared in accordance with International Financial Reporting Standards (IFRSs) as applicable in the European Union (EU), and the supplementary requirements of Section 315e (1) of the German Commercial Code (HGB). All IFRSs issued by the International Accounting Standards Board (IASB) that were in effect at the time these consolidated financial statements were prepared and were applied by MTU were endorsed by the European Commission for use in the EU.

The consolidated financial statements have been prepared on a going concern basis. The management assessment is based on structured multi-year business planning, continuing positive earnings power in 2021 despite the continuing crisis in the aviation sector, an order backlog covering several years, and sound financing as a result of high levels of liquidity.

The consolidated financial statements for the period ended December 31, 2021, and the combined management report for fiscal year 2021 were prepared in accordance with Section 315e (1) of the German Commercial Code (HGB) and published in the Federal Gazette (Bundesanzeiger).

The fiscal year is identical to the calendar year. Comparative figures for the previous year are included in the consolidated financial statements.

In the presentation of the balance sheet, a distinction is made between non-current and current assets and liabilities. A more detailed maturity analysis of certain items is provided in the Notes to the consolidated financial statements. An asset or liability is classified as current if:

- it is held primarily for trading purposes,
- it is expected to be realized or repaid respectively within 12 months of the reporting date,
- it is cash or a cash equivalent, unless the exchange or utilization of the asset for the purpose of fulfilling an obligation is restricted for a period of at least 12 months after the reporting date, or
- it is a net contract asset or liability that will be realized during MTU's normal business cycle, even if the period for realization may exceed 12 months.

The income statement is prepared using the cost-of-sales method in which revenue is balanced against the expenses incurred to generate it, and expenses are classified by function: production, research and development, distribution, and general administration. The consolidated financial statements are denominated in euros. All amounts are stated in millions of euros (€ million), unless otherwise specified. Due to rounding, some of the rounded figures presented in these consolidated financial statements may not correspond exactly to the sum of the individual figures, and it may not be possible to calculate some of the individual percentages from the rounded absolute figures presented. "0" represents amounts of between zero and half a million euros, while "–0" represents amounts between zero and minus half a million euros. Amounts of exactly €0.00 are shown by an empty field in tables.

Accounting standards, interpretations, and amended standards and interpretations applied for the first time in fiscal year 2021

The following new and amended accounting standards and interpretations were applied for the first time in these consolidated financial statements:

[T48] New and amended standards and interpretations

Standard	Title
IFRS 9, IAS 39, IFRS 7, IFRS 4 and IFRS 16	Amendments: Interest Rate Benchmark Reform – Phase 2
IFRS 4	Amendments: Extension of the Temporary Exemption from Applying IFRS 9

Application of these standards did not result in any significant changes to the MTU Group's financial reporting.

Accounting standards, interpretations, and amended standards and interpretations issued but not yet applied

The following new and amended standards and interpretations have been issued by the IASB but were not yet effective for annual periods beginning on or after January 1, 2021:

[T49] Accounting standards and interpretations not yet applied

Standard	Title
IFRS 16	Amendments: Covid-19-Related Rent Concessions beyond 30 June 2021[1]
IFRS 17	Amendments: Application of IFRS 17 and IFRS 9 – Comparative Information[3] [4]
IFRS 3	Amendments: Reference to the Conceptual Framework[2]
IFRS 17	Insurance Contracts[3]
IAS 1	Amendments: Classification of Liabilities as Current or Non-Current[3] [4]
IAS 1	Amendments: Disclosure of Accounting Policies[3] [4]
IAS 8	Amendments: Definition of Accounting Estimates[3] [4]
IAS 12	Amendments: Deferred Tax related to Assets and Liabilities arising from a Single Transaction[3] [4]
IAS 16	Amendments: Proceeds Before Intended Use[2]
IAS 37	Amendments: Onerous Contracts – Cost of Fulfilling a Contract[2]
Annual Improvements to IFRS Standards 2018–2020 Cycle	Amendments: to IFRS 1, IFRS 9, IFRS 16 undand IAS 41[2]

[1] Effective for annual periods beginning on or after April 1, 2021.
[2] Effective for annual periods beginning on or after January 1, 2022.
[3] Effective for annual periods beginning on or after January 1, 2023.
[4] Still awaiting EU endorsement.

MTU does not apply standards, interpretations and amendments before the effective date.

In view of the MTU Group's current business model, the aforementioned standards are not expected to have a material impact on MTU's financial reporting in future reporting periods.

Application of Section 264 (3) of the German Commercial Code (HGB)

MTU Maintenance Hannover GmbH, Langenhagen, Germany, MTU Maintenance Berlin-Brandenburg GmbH, Ludwigsfelde, Germany, and MTU Maintenance Coating Services GmbH, Ludwigsfelde, Germany, are consolidated affiliated companies of MTU Aero Engines AG, Munich. These companies apply the exemption in Section 264 (3) of the German Commercial Code (HGB).

Consolidated group

As of December 31, 2021, the Group including MTU Aero Engines AG, Munich, comprised 34 companies. These are presented in detail in the list of major shareholdings in *Note 38 "Related party disclosures."*

Changes in the consolidated group

In the reporting period, the number of Group companies and equity investments in associates and joint ventures included in the consolidated financial statements changed as follows:

[T50] Consolidated group

	Germany	International	Total
Shareholdings as of Dec. 31, 2019	**12**	**22**	**34**
Additions 2020			
Disposals 2020			
Shareholdings as of Dec. 31, 2020	**12**	**22**	**34**
Additions 2021		2	2
Disposals 2021		-2	-2
Shareholdings as of Dec. 31, 2021	**12**	**22**	**34**

The additions relate to an interest of 50% in EUMET GmbH, Munich, and an interest of 100% in MTU Maintenance Singapore Pte. Ltd., Singapore.

EUMET GmbH is a joint venture with Safran Aircraft Engines S.A.S., Paris, France, a military program company working on the development of the engines for a new European fighter jet.

MTU Maintenance Singapore Pte. Ltd., Singapore, serves as a representative office in the Asian region.

The disposals relate to the sale of Vericor Power Systems LLC, Alpharetta, GA, USA, for a sales price of U.S.$71 million and the 10% share in Sumisho Aero Engine Lease B.V., Amsterdam, Netherlands.

Subsidiaries

The consolidated financial statements of MTU Aero Engines AG, Munich, include all material companies in which MTU Aero Engines AG, Munich, has a controlling interest as defined by IFRS 10, in other words entities in which MTU, as the investor, is exposed, or has rights, to variable returns from its involvement with the investee and has the ability to affect those returns through its power over the investee. There were no changes in the classification of these controlling interests during the reporting period.

Associates

Associated companies are companies over which MTU exercises significant influence in accordance with IAS 28 and which are neither subsidiaries nor joint ventures. The equity investments in these entities, over whose financial and operating policies MTU directly or indirectly exercises significant influence, are accounted for using the equity method, or at fair value if the effects of their consolidation under the equity method would be immaterial to the presentation of MTU's net assets, financial position and results of operations. There were no changes in the classification of these equity investments during the reporting period. MTU holds an 18% share in the voting rights of IAE International Aero Engines LLC, East Hartford, CT, USA, and of PW1100G-JM Engine Leasing LLC, East Hartford, CT, USA. The underlying agreements grant MTU significant influence over the management of these investees, as well as information and consultation rights, thus justifying their classification as associates from MTU's perspective.

Joint ventures

Joint ventures are companies over which MTU exercises joint control together with one or more other entities in accordance with IFRS 11. MTU's joint ventures, namely

- AES Aerospace Embedded Solutions GmbH, Munich, Germany;
- Airfoil Services Sdn. Bhd., Kota Damansara, Malaysia;
- Ceramic Coating Center S.A.S., Paris, France;
- Engine Maintenance Europe Aero sp. z o.o., Jasionka, Poland,
- MTU Maintenance Zhuhai Co. Ltd., Zhuhai, China, and
- Pratt & Whitney Canada Customer Service Centre Europe GmbH, Ludwigsfelde, Germany

are included in the consolidated financial statements using the equity method of accounting based on their materiality for the presentation of the Group's net assets, financial position and results of operations.

Non-material investments

Non-material investments are shares in companies and stakes in engine programs whose overall impact on the Group's net assets, financial position and results of operations is currently and foreseeably insignificant. These investments are measured at fair value and recognized in other comprehensive income in the consolidated financial statements in compliance with the requirements of IFRS 9.

Restrictions

In certain cases, MTU or its subsidiaries may be subject to restrictions on their ability to transfer liquid funds or other assets to other Group companies. Such restrictions may stem from regulatory requirements or from contractual agreements.

Consolidation principles

All business combinations are accounted for using the acquisition method in accordance with IFRS 3. Under the acquisition method, the acquirer accounts for the business combination by measuring and recognizing the identifiable assets acquired and the liabilities and contingent liabilities assumed. The identifiable assets, liabilities, and contingent liabilities are measured at fair value. Any excess of the purchase price over the net fair value of the acquired assets is recognized as goodwill in accordance with IAS 36 and tested for impairment at least annually, or at shorter intervals if there is an indication that the asset might be impaired. If the Group's interest in the net fair value of the acquired identifiable net assets exceeds the cost of the business combination, that excess (negative goodwill) is recognized in the income statement after remeasurement as required by IFRS 3.36.

The effects of intragroup transactions are eliminated. Receivables and liabilities as well as expenses and income between the consolidated companies are offset against each other. Internal sales are transacted on the basis of normal market transfer prices and intragroup profits and losses are eliminated.

Currency translation

Transactions in foreign currencies are translated to the functional currency using the exchange rate prevailing on the date of the transaction. At the reporting date, monetary items are translated using the exchange rate prevailing at that date, whereas non-monetary items are translated using the exchange rate prevailing on the actual transaction date. Translation differences are generally recognized in the income statement. The assets and liabilities of Group companies whose functional currency is not the euro are translated from the corresponding local currency to the euro using the closing exchange rate at the reporting date. In the income statements of foreign Group companies whose functional currency is not the euro, income and expense items are translated each month using the exchange rate applicable at the end of the month; the average exchange rate for the year can be derived from these end-of-month exchange rates. The translation differences arising in this way are recognized in other comprehensive income and do not have any impact on the net profit/loss for the year.

Accounting policies

The consolidated financial statements of MTU Aero Engines AG, Munich, and its subsidiaries are prepared using uniform accounting policies based on the International Financial Reporting Standards (IFRSs).

Revenue

IFRS 15 states that revenue from contracts with customers should be recognized as an amount that reflects the consideration to which the entity expects to be entitled in exchange for the promised goods or services as part of its contractual performance obligation. A five-step model framework is used to identify and measure this revenue:

1. Identify the contract(s) with the customer,
2. Identify each party's performance obligations in the contract,
3. Determination of the transaction price,
4. Allocate the transaction price to the performance obligations in the contract,
5. Recognize revenue when (or as) the entity satisfies a performance obligation.

Identification of the contract(s) with the customer

Contracts may be entered into in writing, orally or implicitly in the ordinary course of business. In each case, the contracts must be enforceable and have commercial substance. A contract with a customer will be within the scope of IFRS 15 if these conditions are met and as soon as it is "probable" that MTU will collect the consideration to which it is entitled for the performance of the contractually agreed work and services. When the probability that the consideration will be collected is assessed, the customer's ability and intention to deliver the consideration by the due date are taken into account. MTU considers contracts to be within the scope of IFRS 15 if:

- all parties are in agreement with the terms of the contract,
- each party's rights in relation to the goods or services to be transferred can be identified,
- the payment terms for the goods or services to be transferred can be identified,
- the contract has commercial substance, and
- it is probable that the consideration to which MTU is entitled in exchange for the goods or services will be collected.

If, at the reporting date, a contract with a customer does not yet meet all of the above criteria, the company will continue to re-assess the contract at regular intervals until such time as the criteria are met. From this point onward, IFRS 15 will be applied to the contract.

In the commercial OEM segment, MTU identifies the respective consortium leaders (OEMs), which exercise control over the consortium, as customers within the meaning of IFRS 15 in the case of the existing risk- and revenue-sharing partnerships in the commercial engine business. In the case of risk- and revenue-sharing partnerships with joint consortium leadership (as is the standard for the military engine business), by contrast, the customer served by the consortium (e.g., an air force) is identified as the customer within the meaning of IFRS 15. In the commercial maintenance business (MRO segment), MTU identifies customers within the meaning of IFRS 15 on the basis of the regular direct customer (e.g., aircraft operator, leasing company).

Contract modification

Long-term service agreements in particular are often modified to take changes in the terms and conditions into account. The renewal of existing contracts is also regarded as a contract modification. A contract modification in accordance with IFRS 15 exists if the changes either create new rights and obligations or modify existing enforceable rights and obligations, thus altering the scope of the contract and/or the agreed price. Such changes must be accounted for either by modifying the existing contract or by establishing a separate, new contract. In the commercial maintenance business (MRO segment) in particular, maintenance for engine fleets can be arranged by way of long-term service agreements. The renewal of such long-term service agreements is usually accounted for as the termination of the old contract and the simultaneous establishment of a new contract.

Identification of performance obligations

Once a contract has been identified as being within the scope of IFRS 15, its terms and conditions and the company's general terms of business are assessed in order to identify the promised goods or services (or bundle of goods and services) to be treated as distinct performance obligations and subsequently recognized. A good or service is distinct if the customer can benefit from the good or services on its own or in conjunction with other readily available resources, and if the promise to transfer the good or services to the customer is separately identifiable from other promises in the contract.

MTU's material performance obligations are as follows:

- manufacturing/delivery of aircraft engine components (sometimes including their assembly into modules)
- development/provision of engine technology
- other technical services, in particular, with regard to the development and repair of engines and the maintenance and overhaul of engines and Industrial gas turbines

Determination of the transaction price

The transaction price is the amount of consideration to which a company expects to be entitled in exchange for the transfer of goods or delivery of services to a customer. Where a contract contains elements of variable consideration, the company will estimate the amount of variable consideration to which it is entitled under the terms of the contract.

Variable consideration included in the transaction price is only recognized as revenue to the extent that MTU considers a subsequent revenue reversal highly improbable.

The agreed transaction price is reduced in the case of qualified payments to customers. MTU defines such payments to customers as payments that are not made in exchange for identifiable goods and services that are independent of MTU's performance obligations toward its customer. Such payments to customers, especially in the commercial engine business (OEM segment), are customary in the sector in connection with compensation for engine development and certification, measures to gain market access and retain customers, and joint liability for warranty risks and contractual penalties.

Allocation of transaction price to performance obligations

Where a contract comprises multiple performance obligations, the transaction price is allocated to the performance obligations by reference to their standalone selling prices. Standalone selling prices are based whenever possible on observable data. Certain variable consideration components are allocated in full to a performance obligation by reference to their economic substance. Factors taken into account here are that the performance obligation is substantially satisfied by MTU and the allocation is in line with the contractual objectives for the allocation of the transaction price. If no standalone selling price is directly observable, MTU as a general rule estimates the applicable transaction price on the basis of the expected costs plus an appropriate margin by assessing relevant information that can be obtained without undue effort.

In the case of contracts in the commercial and military engine business (OEM segment) in which MTU's role is effectively that of a supplier or service provider to the consortium leader (OEM), without the responsibility to provide development assets or engine technology, the transaction prices are fixed in the consortium agreement, including variable elements. These transaction prices must be allocated in full to the goods delivered or services provided (e.g., engine assembly).

For commercial consortium agreements in which MTU assumes responsibility for providing development/engine technology to the consortium or consortium leader (OEM) in addition to supplying parts or performing assembly, engine maintenance and other maintenance services, MTU initially allocates the contractually agreed, market-driven transaction prices (relative standalone selling prices) to the corresponding delivery and performance obligations. The additional contractually agreed variable consideration (share in the net profits of the engine program) is allocated to the obligation to provide the development/engine technology.

In the commercial maintenance business (MRO segment), transaction prices fixed in the consortium agreement, including variable elements, are allocated with reference to the relative standalone selling prices to the identified components of the respective maintenance contracts.

Recognition of revenue when performance obligations are satisfied

Revenue is recognized, either over a specific period of time or at a point in time, when control of a good or service is transferred.

Revenue from the delivery of engine modules and components is recognized at a point in time and calculated with respect to the effective transfer of control to the customer and the associated beneficial risks and opportunities. Revenue from customer-specific services – such as development projects and especially engine maintenance – is recognized over time if they meet the necessary criteria.

When such revenue is recognized over time, the amount of completed work is determined as the ratio of contract costs incurred up to the reporting date to total contract costs.

In the reporting period and the previous year, all substantial claims to consideration identified or to be identified in the future in connection with the provision of goods and services for which orders had been placed as of the reporting date are classified as contracts with customers pursuant to IFRS 15.

Contracts with subcontractors

MTU sometimes works with subcontractors to fulfill its performance obligations. When MTU subcontracts the repair of engine components to a third party, MTU remains responsible for the quality of these repairs vis-à-vis the customer. Moreover, MTU is responsible for obtaining certificates of airworthiness for all new parts and components it delivers to customers. The subcontractors invoice MTU for their services in accordance with their contractual agreement with the Group. They have no influence over the prices charged by MTU to its customers.

MTU is thus the principal contractor and reports its revenue as a gross amount. In other words, the full amount of sales from the customer is reported as revenue, while the amount invoiced by the subcontractor is recognized under cost of goods sold.

Activity as agent for the sale of non-MTU parts

As a member of certain engine consortia in the military sector, MTU participates in the sale of parts made by other partners, in addition to its development and production activities. The specific tasks performed by MTU consist in particular of organizing the sales process for the non-MTU parts, and contract negotiations. The percentage commission on the sale is not recognized as revenue until no uncertainty exists as to the amount of revenue arising from the sale, which is then recognized at a point in time.

Since MTU is merely the agent in this transaction, it recognizes the net amount of the consideration to which it is entitled for its activity as an agent.

Cost of goods sold

The cost of goods sold comprises the production cost of goods and services sold, including customer-funded development work, and the cost of products purchased for resale. In addition to direct material and production costs, it also comprises allocated production overheads, including amortization of production-related intangible assets and depreciation of production facilities, write-downs on inventories and an appropriate portion of production-related administrative overheads.

Research and development expenses

Research costs are expensed in the period in which they are incurred.

In the case of development costs, a distinction is drawn between customer-funded development work and company-funded development work. Services provided as part of customer-funded development projects (e.g., government-funded technology programs) are reported in cost of goods sold, in light of the fact that the incurred costs are reimbursed by a contracting entity.

Development costs generated in the context of company-funded development projects are capitalized in accordance with the requirements of IAS 38 or recognized as an expense in the period in which they are incurred. The capitalized development costs comprise all costs directly attributable to the development process and are amortized over the asset's respective useful life from the start of marketing of the engine program by MTU. The amortization expense is recognized in cost of goods sold.

Intangible assets

Externally acquired and self-generated intangible assets are recognized in accordance with IAS 38 if it is probable that a future economic benefit is associated with the asset and the cost of the asset can be measured reliably.

Intangible assets with a finite useful life are carried at their purchase or production cost and amortized on a straight-line basis over their useful lives.

Amortization is based on the following regular useful lives:

[T51] Useful lives of assets (in years)

Program assets arising from the purchase price allocation and self-generated development assets	Maximum 30
Customer relationships	4–26
Other assets	3–5

The useful lives and amortization methods pertaining to intangible assets are regularly assessed for appropriateness, and adjustments are made where necessary to the estimates used when the financial statements are being prepared.

Goodwill is tested for impairment regularly or as necessary in accordance with IAS 36. Each of the two operating segments, OEM (commercial and military engine business) and MRO (commercial maintenance business), is tested separately.

Property, plant and equipment

Property, plant and equipment are subject to wear and tear and are carried at their purchase or production cost less cumulative depreciation charges and impairment losses. The cost of items of self-constructed plant and equipment comprises all directly attributable costs and an appropriate proportion of production-related overheads. These assets are assigned to an appropriate category once they have been completed or are operational. The revaluation model is not applied. Depreciation on property, plant and equipment is calculated using the straight-line method in accordance with the useful life of the asset.

Depreciation is based on the following regular useful lives:

[T52] Useful lives of assets (in years)

Buildings	20–50
Lightweight structures	10–14
Property facilities	10–20
Technical equipment, plant and machinery	5–25
Operational and office equipment	3–14

The useful lives of machines used in multi-shift operation are reduced accordingly to take account of additional usage.

Public sector grants and assistance

In accordance with IAS 20, public sector grants and assistance are not recognized until there is reasonable assurance that the conditions attached to them will be complied with and that the grants will be received. Grants are recognized as other operating income in the periods in which the related expenses arise. This item also includes the reimbursement of personnel expenses under relevant government assistance programs. MTU passes payments made by the Federal Employment Agency for short-time working on to its employees and therefore treats such payments as transitory items.

In the case of capital expenditure on property, plant and equipment and on intangible assets, the amount of the public sector grant awarded for this purpose is deducted from the purchase or production costs of the asset. The grants are then recognized in the income statement using reduced depreciation/amortization amounts over the lifetime of the asset. Public sector grants and assistance for assets with indefinite useful lives are generally recognized as other operating income in the periods in which expenses arising from fulfillment of obligations related to the grants are incurred.

Borrowing costs

Borrowing costs directly related to the acquisition, construction or production of qualifying assets are added to the purchase or production costs of those assets in accordance with IAS 23 until such time as the assets have been made ready for sale or for their intended use. Qualifying assets are those that require a substantial period of time to be made ready for sale or for their intended use.

Borrowing costs are capitalized only insofar as they relate to the purchase and preparation of qualifying assets for their intended use or sale, and only include activities that commenced on or after January 1, 2009.

Leases

A contract is accounted for as a lease if it grants the following rights:

- right to control the use of an identified asset in return for compensation
- right to obtain substantially all the economic benefits from that use

At the start of the lease, a lease liability and a right-of-use asset are recognized. Right-of-use assets are recognized at cost less all cumulative depreciation charges and all cumulative impairment losses. The Group recognizes lease liabilities at the present value of the lease payments to be made over the term of the lease. Lease payments are both fixed and variable.

The Group calculates the present value of lease payments by applying its incremental borrowing rate at the delivery date, because the interest rate underlying the each lease cannot be determined reliably on an individual basis. After the delivery date, interest is added to the lease liabilities, and they are reduced by lease payments made. In addition, the carrying amount of the lease liabilities is remeasured when there is any modification of the lease, lease term, or lease payments (e.g., changes in future lease payments due to a change in the index or interest rate used to determine those payments), or a change in the assessment of an option to buy the underlying.

Lease payments are reported in the cash flow statement, with the amount of the lease liabilities paid recognized in cash flow from financing activities and the interest component paid recognized in cash flow from operating activities.

For accounting purposes, certain future developments are only taken into account if their occurrence is deemed to be sufficiently certain. Assets and liabilities are not recognized in the case of short-term leases or leases for low-value assets. Payments for short-term lease or low-value asset leases as well as variable lease payments are recognized as an expense in function costs in the income statement in the period in which they occur.

If the Group acts as lessor, all leases at the start of their term are classified as either finance leases or operating leases.

Classifying a lease requires the Group to make an overall assessment as to whether the lease transfers all significant risks and opportunities associated with ownership of the underlying asset. If this is the case, the lease is classified as a finance lease; if not, it is classified as an operating lease. In making this assessment, the Group takes into account certain indicators, such as whether the lease covers most of the useful life of the asset.

On the delivery date of the leased assets, assets held in a finance lease are recognized as a receivable in the amount of the net investment in the lease. The interest rate underlying the lease is used to measure the net investment in the lease.

Acquired program assets and acquired development work

MTU refers to program assets and acquired development as deferred compensation payments to the consortium leader (OEM or customer) in favor of inclusion in or compensation for development services for the respective engine program. Since there is not specific consideration, MTU classifies these as revenue-reducing payments to customers in accordance with IFRS 15. The above payments always refer to the lifetime of the program and are therefore systematically incurred at the start of the respective engine program. Consequently, they are accrued and recognized as non-current assets. They are capitalized at the nominal amount of the payments. These assets are amortized against revenue over the lifetime of the program in question, which generally means a period of up to 30 years.

If the above payments contain significant deferred conditional components, these are accounted for analogously to IFRIC 1. Changes resulting from reassessment of the condition components are recognized outside of profit or loss by adjusting the related assets.

Impairment of intangible assets, property, plant and equipment, acquired program assets and acquired development work

At each reporting date, an analysis is carried out to reveal any indication that the value of intangible assets, or property, plant and equipment, or acquired program or development work might be impaired. If impairment is indicated, the value of the asset in question is assessed on the basis of its recoverable amount.

Assets with an indefinite useful life, intangible assets that are not yet ready for use, and goodwill acquired in connection with a business combination are not subject to amortization, but are instead reviewed for impairment at least once each year, regardless of the circumstances. Annual impairment testing takes place at the level of the cash generating units, corresponding to the two operating segments commercial and military engine business (OEM) and commercial maintenance business (MRO).

The impairment loss on intangible assets, property, plant and equipment and acquired program or acquired development work is determined by comparing the carrying amount with the recoverable amount. The recoverable amount is either the fair value of the asset (or of the cash-generating unit) less costs to sell, or the value in use, whichever is higher. The recoverable amount is usually determined using a discounted cash flow (DCF) method.

When applying the discounted cash flow (DCF) method, the weighted average cost of capital (WACC) before tax is determined iteratively on the basis of a corresponding after-tax discount rate. This is derived from the cost of equity after tax, which is based on a risk-free base interest rate and a risk premium (market risk premium multiplied by the beta coefficient calculated on the basis of a peer group analysis). The cost of debt of the peer group companies is also factored into the calculation. Cost of equity and cost of debt are weighted according to the average capital structure of the peer group companies when determining WACC after tax.

If it is not possible to attribute separate future cash flows to discrete assets that have been generated independently of other assets, then an impairment test must be carried out on the basis of the cash-generating unit to which the asset (group) ultimately belongs. For this purpose, the cash flows that can be generated by the asset or cash-generating unit are forecast. The discount rate takes account of the risks associated with the asset or cash-generating unit.

If the reasons for impairment losses recognized in a prior period no longer exist, the impairment loss on these Assets is reversed, except in the case of goodwill.

Non-current financial assets

Investments in joint ventures and associates that have a material impact on the Group's net assets, financial position and results of operations are accounted for using the equity method. The Group's share in the profit or loss of these entities is therefore allocated on a pro rata basis to profit/loss and to the corresponding carrying amount of the investment. This profit/loss is reported as a separate line item under "profit/loss of companies accounted for using the equity method."

Investments in subsidiaries that are not consolidated, and other equity investments and loans, are recognized at fair value. Here, MTU makes use of the option of recognizing such assets in other comprehensive income. Dividend payments received from these equity investments are included in the profit/loss of equity investments.

Inventories

Raw materials and supplies are measured at average purchase cost or net realizable value, whichever is lower. Transaction price reductions such as rebates, bonuses or cash discounts are taken into account when determining acquisition cost. Purchase cost comprises all direct costs of purchase and other costs incurred in bringing the inventories to their present location and condition.

Finished products and work in progress are recognized at purchase/production cost or net realizable value, whichever is lower. The purchase/production cost comprises all purchase costs and production-related expenses based on normal capacity utilization. In addition to direct costs, these include an appropriate and necessary portion of the cost of material and production overheads, including production-related depreciation. Administrative expenses are also included to the extent that they can be attributed to production operations.

Net realizable value is the estimated selling price generated in the ordinary course of business for the finished goods in question, less estimated costs necessary to make the sale (costs to complete and selling expenses). In the commercial engine business, the net realizable value from the marketing of inventories in the series business at the consortium level is regularly below the corresponding purchase/production cost. In the commercial maintenance business, the marketing of engine parts is affected, in particular, by the availability of used parts and by demand resulting from current usage of the engine fleet. Valuation allowances are recognized for the impairment risk of inventories.

The development of the net realizable value and thus the valuation allowances in the reporting period was affected to a large extent by the coronavirus pandemic, which impacted on short- and mid-term business performance in the commercial engine business and the commercial maintenance business.

Lower utilization of existing capacities, e.g., as a result of a pandemic, is not reflected in the production cost recognized in the balance sheet. The costs that were not covered are included as a negative reconciliation difference directly in the profit or loss of the affected fiscal year.

Contract assets

A contract asset represents the Group's right to consideration for goods or services it has transferred to a customer. A contract asset is recognized when the Group has satisfied its performance obligations and when its right to consideration is conditional on something other than the passage of time. If the right to consideration is unconditional except for the passage of time, it is recognized as a trade receivable and accounted for in accordance with the accounting principles for financial instruments. The contract assets are presented on the basis of contracts with customers, taking into account any upfront payments.

Financial instruments

A financial instrument is a contract that simultaneously gives rise to a financial asset in one company and to a financial liability or equity instrument in another company.

Financial assets

Financial assets include, in particular, cash and cash equivalents, trade receivables, loans to third parties, other receivables, and derivative financial assets.

At initial recognition, financial assets are measured at their fair value. The measurement of a financial asset subsequent to initial recognition depends on its classification. Financial assets are measured at amortized cost if the purpose is to hold the financial assets in order to collect contractual cash flows and the contractual terms of the financial asset give rise on specified dates to cash flows.

Financial assets are measured at fair value through other comprehensive income if the purpose is to hold the financial assets in order to collect contractual cash flows and the contractual terms of the financial asset give rise on specified dates to cash flows and, additionally, these assets are to be sold at maturity. A distinction is made between debt instruments for which the accumulated gains and losses are reclassified on derecognition and equity instruments for which this is not the case. MTU has elected to use the option offered by IFRS 9 of recognizing equity instruments at fair value through other comprehensive income.

All other financial assets are measured at fair value through profit or loss.

Arm's length acquisitions and disposals of financial assets are recognized as of the fulfillment date.

Impairment loss on financial assets

The impairment model in IFRS 9 is based on the premise of providing for expected losses.

In the case of trade receivables and contract assets, expected losses are recognized for the entire remaining duration of the contract (full lifetime loss allowance). For all other financial instruments, expected credit losses are measured at an amount equal to the 12-month expected credit losses, unless there has been a significant increase in the credit risk. Otherwise, expected losses are also recognized for these financial assets over their remaining term to maturity.

To determine whether there has been a significant increase in the credit risk of a financial asset, the probability of default is assessed at least once a quarter using both external rating information and internal information on the credit quality of the financial asset. In the case of debt instruments, a significant increase in the credit risk is determined principally on the basis of past-due information or probability of default.

When calculating the expected credit losses, an amount is factored in for the possible impairment of Groups of financial assets with a comparable credit rating. The loss allowance is based on credit spreads covering good, average and poor credit ratings. The classifications used by international rating agencies are applied when making these measurements.

The credit rating of financial assets is considered to be impaired in the following cases: significant financial difficulties of the debtor or a high probability that the debtor will enter bankruptcy or financial reorganization; the closure of an active market; significant changes in technological, economic, legal or market conditions affecting the issuer; or a significant or persistent decline in the fair value of the financial asset below its amortized cost. Impairment losses are initially entered in a separate valuation allowance account and only recognized as such after it has been established that the value of the asset is unrecoverabl

Financial liabilities

Financial liabilities often oblige the holder to return the instrument to the issuer in return for cash or another financial asset. Financial liabilities include, in particular, bonds and other liabilities evidenced by certificates, trade payables, finance lease liabilities, promissory notes, derivative financial liabilities and other liabilities to banks.

Financial liabilities are measured at their fair value at the time of acquisition, which is normally equivalent to the fair value of the settlement amount. Transaction costs directly attributable to the acquisition are deducted from the amount of all financial liabilities. If a financial liability is interest-free or bears interest at below the market rate, it is recognized at an amount that is consistently lower than the settlement price or nominal value. The financial liability initially recognized at fair value is amortized subsequent to initial recognition using the effective interest rate method.

Cash and cash equivalents

The salient features of cash and cash equivalents, which include demand deposits, money market funds and short-term bank deposits, are that they have a maturity of three months or less from the date of acquisition and are measured at their nominal value.

Derivative financial instruments

MTU uses derivative financial instruments as a hedge against currency and price risks arising from its operating activities and financing transactions.

At initial recognition and when measured subsequently, derivative financial instruments are measured at their fair value. This value is determined using quoted market prices in an active market and is represented by the amount that MTU would receive or would have to pay at the reporting date if the financial instrument were terminated. If no quoted market prices in an active market are available, the fair value is calculated using recognized financial mathematical models (DCF method) on the basis of the relevant exchange rates, interest rates and credit standing of the contractual partners at the reporting date.

Hedge accounting (hedging relationships)

MTU satisfies the requirements of IFRS 9 concerning instruments used to hedge future cash flows. When a hedge is undertaken, the relationship between the financial instrument designated as the hedging instrument and the underlying transaction is documented, as are the risk management objective and strategy for undertaking the hedge. This includes assessing the effectiveness of the hedging instrument used. Existing cash flow hedges are checked for effectiveness on a regular basis.

MTU uses cash flow hedges to hedge the exposure of future payment cash flows transacted in U.S. dollars (underlying transactions) to fluctuations in foreign currency exchange rates. At remeasurement subsequent to initial recognition, the effective portion of the hedging instrument is recognized in equity under other comprehensive income, together with attributable deferred taxes, until such time as the underlying hedged transaction is realized.

The amounts recognized in other comprehensive income at remeasurement are recycled to the income statement as soon as the underlying hedged transaction is recognized. The cost of effective hedging instruments used to hedge cash flows from revenue-generating transactions (cash flow hedges) are recognized in other operating income.

Current and deferred taxes

Current and deferred taxes are recognized in the consolidated financial statements in the manner prescribed in the relevant tax jurisdictions. Current and deferred taxes are recognized in equity if they relate to business transactions that directly lead to a decrease or increase in equity.

The MTU Group assesses whether it is probable that a tax authority will accept a specific tax treatment. If MTU concludes that it is probable that the tax authority will accept the tax treatment, it determines the taxable profit, tax bases, unused tax losses, unused tax credits or tax rates consistently with the tax treatment that it uses or plans to use in its income tax filings.

If MTU concludes that it is probable that the tax authority will not accept a tax treatment, it reflects the effect of this uncertainty when determining the related taxable profit, tax bases, unused tax losses, unused tax credits or tax rates through a best estimate (e.g., the amount/expected amount) or the most likely outcome.

If this tax treatment affects both current tax and deferred taxes (for example, if it affects both taxable profit used to determine current tax and tax bases used to determine deferred tax), the MTU Group makes consistent judgments and estimates for both current and deferred taxes.

Interest on back taxes and tax refunds arising from tax audits are recognized in interest expense in the income statement.

Deferred tax assets and liabilities are established for temporary differences between the tax bases of assets and liabilities and their carrying amount in the consolidated balance sheet. Tax assets are established on tax credits available for carry-forward at such time as the conditions attached to the award of the tax credit have been fulfilled. Similarly, deferred tax assets are established on tax losses available for carry-forward. Deferred tax assets are recognized to the extent of the probability that taxable income will be available against which the deductible temporary difference can be applied together with losses as well as tax credits that are permitted to be carried forward. Deferred tax assets and liabilities are measured using the tax rates applicable on the date when the temporary differences are reversed. Deferred tax assets and liabilities are offset insofar as this meets the requirements of IAS 12.74.

Pension obligations

Provisions for pension obligations are accounted for using the projected unit credit method in accordance with IAS 19. This method takes into account not only pension and other vested benefits known at the reporting date, but also expected increases in pensions and salaries, applying a conservative assessment of the relevant parameters.

In the case of defined contribution plans, the company has no obligations beyond the payment of contributions to the plan. In the case of defined benefit plans, the company has an obligation to fulfill commitments to current and former employees.

In some cases, it is difficult to differentiate between defined contribution and defined benefit plans. In Germany, for example, a minimum level of benefits is guaranteed for defined contribution plans, such that, even when the plan is provided through an external fund or insurance company, the employer remains liable. This "ultimate employer liability" is governed by Section 1 (1) sentence 3 of the German Occupational Pensions Act (BetrAVG). For financial reporting purposes, the term "defined benefit plan" is interpreted on the basis of the underlying economic substance of the arrangement. Insofar as the MTU Group has no material obligations beyond its "ultimate liability" once the contributions have been paid to state and private pension funds, these plans are classified as defined contribution plans. Current contributions are recognized as expenses in the period in which they are paid.

Actuarial gains and losses – from the measurement of the defined benefit obligation (DBO) and the plan assets – may arise either from changes in the actuarial assumptions used or when the actual development diverges from those assumptions. They are recognized in other comprehensive income in the period in which they arise and are recognized separately in the statement of comprehensive income. Past service cost is recognized directly in profit and loss. Where reinsurance claims exist and the criteria given in IAS 19 are met, these claims are treated as plan assets and netted against the pension obligations. The interest expense resulting from the reversal of the discount on the net liability, comprising pension obligations less the corresponding plan assets, is recognized under other financial income/expense. Service cost is recognized in the income statement as personnel expenses allocated to the relevant function costs.

Other provisions

In accordance with IAS 37, other provisions are recognized to cover legal or constructive obligations resulting from past events if settlement is expected to result in an outflow of resources. Such obligations regularly arise in connection with claims on warranties and the risk from pending losses on onerous contracts, the recognition of losses arising from the settlement of accounts and subsequent costs, outstanding invoices, personnel costs, various taxes (especially consumer taxes), and other costs such as the risk of legal action and lawsuits, for instance in connection with government investigations.

If a planned and controlled restructuring program has been presented by the management, provisions are recognized for the expenditures arising directly from the restructuring. Restructuring provisions are recognized only if there is a constructive restructuring obligation and if the related expenditures are both necessarily incurred as a result of the restructuring and not associated with the company's ongoing operating activities.

Non-current provisions for liabilities with an identifiable maturity of more than one year beyond the reporting date are measured at the present value of expected future cash flows. The company measures provisions for pending losses on onerous contracts at the lower of the expected costs on settlement of the contract and the expected costs on premature termination of the contract.

Provisions for personnel obligations are recognized in accordance with IAS 19 or IAS 37. Obligations relating to pre-retirement part-time working arrangements and long-service awards are measured on the basis of actuarial reports.

Contingent liabilities

Contingent liabilities are potential obligations arising from past events whose existence depends on the occurrence or non-occurrence of one or more uncertain future events that are not wholly within the control of MTU. Contingent liabilities are not recognized as liabilities in the balance sheet because at the reporting date it is considered that there is unlikely to be an outflow of economic resources, or, as an exception, the amount of the obligation cannot be reliably estimated.

Contract liabilities

When a customer pays the consideration for a performance obligation, or if the company has an enforceable right to receive a specified consideration prior to the transfer of a good or service to the customer, the company presents such contracts with customers as contract liabilities, recognizable on the due date or on the date of settlement in accordance with IFRS 15. Recognition of a contract liability signifies that MTU has entered into an agreement with a customer in which it promises to transfer goods or services to that customer in exchange for consideration. In the commercial OEM business, MTU is, in individual cases, a partner in consortia for engine programs and, at the same time, participates directly in the contract liabilities of the associated program companies as a partner in such companies. MTU releases amounts from the balance of such liabilities to revenue taking into account refund liabilities that are established reflect the participation in program profits associated with the program company's contract liabilities. The contract liabilities are presented on the basis of contracts with customers, taking into account any corresponding contract assets realized as of reporting date.

Refund liabilities

In accordance with IFRS 15, a refund liability is recognized if the company receives consideration from a customer and expects to refund some or all of that consideration to the customer. Refund liabilities represent the amount of consideration to which the company does not expect to be entitled at the reporting date. In the commercial OEM business, MTU may participate in program profits through the provision of development work/technology. Such participation regularly involves retrospective price corrections. These are attributable to rebates on invoiced list prices in the programs' series and spare parts business, which are common practice in the sector. MTU takes this invoicing practice into account in revenue recognition, especially with a view to its participation in the program profits, through provisions for refund liabilities, which affect revenue.

Dividend payment and profit distribution

The claims of shareholders to dividend payments and profit distribution relating to a specific reporting period (fiscal year) are recognized as a liability in the period in which the corresponding resolution is passed. Disclosures relating to the Executive Board's or Supervisory Board's proposal to the Annual General Meeting concerning the dividend payment are provided in *Section VII. "Determination of the net profit available for distribution on the basis of the annual financial statements."*

Discretionary scope, measurement uncertainties and sensitivity

Preparation of the consolidated financial statements in accordance with IFRSs requires that assumptions and estimations be made that have an impact not only on the amounts of the assets and liabilities as well as contingent liabilities, but also on how these items are recognized. These assumptions and estimations conform with the circumstances prevailing at the reporting date and, to that extent, also influence the amount of income and expenses recognized in the fiscal years presented. The assumptions and estimations relate primarily to the Group's own determination of the useful lives of intangible assets and property, plant and equipment or the basis for measuring acquired program assets and development work, inventories, the calculation of the fair value of financial instruments, the determination of the effective date of planned transactions that form part of a hedging relationship, the measurement and recognition of provisions and other liabilities, especially refund liabilities and contract liabilities, and tax assets, especially in connection with temporary differences, tax losses available for carry-forward and tax credits. Furthermore, assumptions and estimations are the elementary basis for planning calculations at company, segment, program, and customer contract level. Such planning calculations form the material basis for impairment testing in accordance with IAS 36, including in connection with program assets and assets relating to historical purchase price allocations, and in connection with revenue realization in some areas, particularly in regard to variable remuneration components as defined by IFRS 15.

In individual cases, the actual values may differ from the assumptions and estimations made, so it may be necessary to adjust the measurement of assets and liabilities recognized in the financial statements. Changes are made to estimations when more reliable information becomes available in accordance with IAS 8 and these may have an impact on the figures in the period in which the changes are made and, where applicable, on subsequent periods.

/ In principle, the measurement of intangible assets, other assets, property, plant and equipment, and financial assets involves the use of estimations. Judgments by management form the basis for determining the fair value of assets and liabilities and the useful life of assets. If the actual results deviate from these estimations, or if these estimations have to be adjusted in a future period, this may have an impact on the presentation of the Group's net assets, financial position and results of operations.

/ In the process of determining impairment losses, estimations are made concerning such parameters as the source, timing and amount of the impairment loss. Many different factors can give rise to an impairment loss, e.g., changes in the competitive situation, expectations concerning the growth of air travel and the aircraft industry, changes in the cost of capital, changes in the future availability of financing funds, aging and obsolescence of technologies, replacement costs, or purchase prices paid in comparable transactions. If the actual results deviate from these estimations, or if these estimations have to be adjusted in a future period, this may have an impact on the presentation of the Group's net assets, financial position and results of operations. Reference is made to *Note 14 "Intangible assets"* for the sensitivity analysis of the goodwill of the two operating segments and to *Note 17 "Acquired program assets, development work and other assets"* for the goodwill of program assets.

/ Given the long-term nature of engine programs, changes in the cost of capital as a result of changes in interest rates, risk premiums or beta factors and in forecast cash flows from revenue-generating transactions, especially in connection with forecast volume, price and cost structures, the time period for the provision of the work and services and the corresponding consideration within the program can have a significant impact on the assessment of the value of the program-related assets, which are also material for revenue and the cost of goods sold. The principal components of program-related assets, alongside the acquired program assets, are the capitalized development costs, inventories and contract assets. Furthermore, the recognition and especially the amortization of intangible and other program-related assets is also affected by the estimated materialization and dynamic of the volume, price and cost structures for the respective engine program. If the actual results deviate from these estimations, or if these estimations have to be adjusted in a future period, this may have an impact on the presentation of the Group's net assets, financial position and results of operations.

- The interpretation of a sensitivity analysis of the extent of possible consequences of changes to measurement parameters, in particular those relating to claims on warranties, price and quantity structure, the risk from pending transactions, the risk of losses arising from the settlement of accounts, and the measurement of risks arising from legal action and lawsuits, does not allow the consequences of individual events to be assessed, due to the multitude of sensitivity scenarios presenting high degrees of uncertainty.
- In view of the sector's customary spread of expected margins in the series and spare parts business, the assumed "marketing mix" in the commercial OEM programs has a considerable influence on the determination of the fair values of relevant program assets such as inventories and contract assets, and liabilities such as refund and contract liabilities. If the actual results deviate from these estimations, or if these estimations have to be adjusted in a future period, this may have an impact on the presentation of the Group's net assets, financial position and results of operations.
- The management recognizes valuation allowances for expected credit losses from receivables and contract assets. Valuation of the expected credit loss and the hedging instruments used to offset this requires the use of estimations based on assumptions. If the actual results deviate from these estimations, or if these estimations have to be adjusted in a future period, this may have an impact on the presentation of the Group's net assets, financial position and results of operations.
- In certain cases, financial liabilities may be linked to deferred, conditional purchase price components. Determination of the fair value of such liabilities requires predictions about the future development of the parameters affecting their development. These comprise, on the one hand, publicly available market data (interest rate, U.S. dollar exchange rate) and, on the other, input parameters that are not publicly available – specifically, in this case, the number of flight hours on which payments are based for part of the V2500 engine fleet in the period up to 2027. To predict the future number of flight hours, MTU makes use of an in-house forecasting model that is based on internally as well as externally available information concerning the in-service V2500 fleet. The sensitivity analysis takes into account both the absolute number of flight hours on which payments are based and the time period within which these hours arise. If the actual results deviate from these estimations, or if these estimations have to be adjusted in a future period, this may have an impact on the presentation of the Group's net assets, financial position and results of operations. Further information on the financial liability relating to the increase in the stake in the V2500 can be found in *Note 28 "Financial liabilities."*
- When revenue is recognized at a point in time, estimates are necessary because, as a partner in engine consortia, MTU receives a fixed and a variable revenue component. The variable revenue component, which is mainly made up of a net profit share and revenue-reducing effects such as losses arising from the settlement of accounts and rebates, is determined on the basis of empirical data and parameters specified in customer contracts, which necessarily implies management judgments or forecasts. Estimations are required, in particular, with regard to refund liabilities and, in individual cases, the subsequent measurement of contract assets and liabilities. If the actual results deviate from these estimations, or if these estimations have to be adjusted in a future period, this may have an impact on the presentation of the Group's net assets, financial position and results of operations.
- Revenue recognized over time is accounted for according to progress, if it is sufficiently probable that future economic benefits associated with the business will flow to MTU. Because in some cases it may not be possible to reliably estimate the outcome, revenue calculated according to progress is recognized on the basis of the contract costs incurred up to the reporting date, to the extent that it is probable that these costs can be recovered. The measurement uncertainty is consistent with the complexity and long-term nature of the respective customer contract. Management regularly reviews its estimations made in connection with these customer contracts, making adjustments to the accounting where necessary. If the actual results deviate from these estimations, or if these estimations have to be adjusted in a future period, this may have an impact on the presentation of the Group's net assets, financial position and results of operations.
- Income taxes must be determined for each tax jurisdiction in which the Group operates. Estimates are required when measuring actual and deferred taxes. The utilization of deferred tax assets depends on the possibility of generating sufficient taxable income in a particular tax category and tax jurisdiction. A variety of factors are used to assess the probability that it will be possible to utilize deferred tax assets, e.g., past operating results, operating business plans and the periods over which losses can be carried forward. If the actual results deviate from these estimations, or if these estimations have to be adjusted in a future

period, this may have an impact on the presentation of the Group's net assets, financial position and results of operations.

- The total value of provisions for pensions and similar obligations, and therefore the expenses in connection with employees' retirement benefits, are determined using actuarial methods based on assumptions concerning interest rates, choice of optional payment modalities, wage, salary and pension trends, and life expectancy. If it should become necessary to modify these assumptions, this could have a significant effect on the future amount of pension provisions or the future expenses for pensions and thus on the Group's net assets, financial position and results of operations. Further information on pension provisions can be found in *Note 25 "Pension provisions."*
- The measurement and recognition of other provisions, accrued liabilities (as defined in IAS 37), refund liabilities and contingent liabilities involve substantial estimations by MTU. These concern contractual penalties, the implications of forward-looking information from program partners and customers, the cost of developing suitable engineering solutions, changes in the requirements imposed by flight safety organizations and aviation authorities, and the cost of meeting warranty obligations. Similarly, when accounting for committed aircraft financing agreements, estimations are required concerning the probability that the loans will be realized, the consistency of the terms with market conditions, and the change in the value of the pledged security. If the actual results deviate from these estimations, or if these estimations have to be adjusted in a future period, this may have an impact on the presentation of the Group's net assets, financial position and results of operations.
- In connection with the recognition of leases in accordance with IFRS 16, the assessment whether extension and termination options will be exercised is based on probability. The specific circumstances of each lease are used for this. These circumstances relate, in particular, to the operational need to continue to use the leased asset, the options and limitations of other means of financing and the terms for continued leasing of the asset. If the actual results deviate from these estimations, or if these estimations have to be adjusted in a future period, this may have an impact on the presentation of the Group's net assets, financial position and results of operations.

All assumptions and estimates are based on the prevailing conditions and judgments made at the reporting date. Any subsequent changes occurring before the financial statements are prepared are taken into account in the amounts recognized. Estimations of future business developments also take into account the economic environment of the industry and the regions in which MTU is active, such as are deemed realistic at that time.

In order to obtain new information, MTU also relies on the services of external consultants such as analysts, actuaries, appraisers, and tax and legal advisors.

Covid-19 pandemic

In 2021, as for other companies, the Covid-19 pandemic still had a significant impact on the business operations of MTU and the assumptions and estimates used in the preparation of the consolidated financial statements. In the aviation sector, this comprised, in particular, the uncertainty about mid- and long-term business development, which also affect the reliability of corporate planning. In light of the continuing spread of the virus and its mutations, it is still difficult to predict the scope and duration of the resulting effects on the business performance of MTU, including the implications regarding the development of the fair values of assets and liabilities, and the company's results of operations and liquidity situation. The assumptions and estimations made in preparing the consolidated financial statements as of December 31, 2021, were based on the best information and knowledge available to the management at that time.

The scenario used for corporate planning is based on the following principal key assumptions:

For the commercial OEM and MRO business, it was assumed that global passenger traffic will be back at the 2019 level in 2023 (basis: IATA and Tourism Economics, April 2021). The market for regional and mid-haul aircraft is driven by domestic traffic, which IATA expects to recover in 2022. The negative effects of the crisis had a bigger impact on the market for long-haul aircraft than on the market for regional and mid-haul aircraft; therefore, long-haul aircraft are not expected to return to the 2019 level until later. In view of the reduction in cargo capacity in passenger aircraft, capacity utilization of cargo aircraft is expected to remain very high. Programs with a high proportion of cargo aircraft such as the CF6-80C and PW2000 will benefit from this. In the MRO segment, MTU expects to benefit from the high proportion of engines for regional and mid-haul aircraft (especially CF34, V2500 and CFM56), which are less affected by the crisis. This segment is recovering quickly in the USA and China, for example. The drop in demand as a consequence of Covid-19 should continue to be offset by the strong cargo business and new customer acquisition. Further information on revenue from the commercial engine business can be found in *Note 1 "Revenue."*

The military business is not affected by the crisis; new programs such as Future Combat Air System (FCAS) and, in this context the Next European Fighter Engine (NEFE) form a solid basis for the future. Further information on revenue from the military engine business can be found in *Note 1 "Revenue."*

Therefore, MTU assumes that the impact of the Covid-19 pandemic on global air traffic and thus on the business development of MTU and its consolidated financial statements will be temporary. In particular, it affects estimations used to derive the fair value of intangible assets, program assets, inventories, contract assets and receivables. Further information on valuation allowances for receivables see *Note 4 "Selling expenses."*

Climate change

The effects of climate change were taken into account in the preparation of the consolidated financial statements. MTU currently assumes that climate change is not expected to have a material impact on the Group's going concern basis until February 2023 or on the Group's profitability in the next ten years. The effects of climate change were analyzed on the assumption that the main risk for MTU arising from climate change consists in the substitution of MTU engine technology with engine technologies from other market participants with significantly lower emissions. Engine technologies with significantly lower emissions than the engine technologies used at MTU have at present not reached market-ready status, and this means that there is no substitution risk with a significant impact on the net assets, financial position and results of operations at least in the next ten years. Details on substitution risks are presented in the section entitled *"Substitution risks arising from disruptive technologies"* in the risk report of the management report.

This assessment is flanked by proactive measures to ensure a seamless transition to the climate-neutral provision of MTU products and services. Details are presented in the section entitled *"Climate change"* in the risk report of the management report.

In light of the impairment risks related to climate change and Covid-19, additional sensitivity analyses were undertaken on goodwill and acquired program assets (*Note 14 "Intangible assets"* and *Note 17 "Acquired program assets, development work"*). The suitability of sensitivities for an assessment of the above estimation uncertainties in connection with climate change and the Covid-19 pandemic is only very limited due to the large number of scenarios underlying interpretation of the individual factors. Assumptions and estimated forecasts used to measure liabilities, especially program and refund liabilities, are also affected.

II. Notes to the consolidated income statement

1. Revenue

Revenue developed in the reporting period as follows:

[T53] Revenue

in € million	Revenue recognized at a point in time	Revenue recognized over time	Jan. 1 to Dec. 31, 2021	Revenue recognized at a point in time	Revenue recognized over time	Jan. 1 to Dec. 31, 2020
Commercial engine business	1,066		1,066	1,052		1,052
Military engine business	315	167	482	306	177	483
Commercial and military engine business (OEM)	**1,381**	**167**	**1,547**	**1,358**	**177**	**1,535**
Commercial maintenance business (MRO)	**104**	**2,637**	**2,741**	**94**	**2,428**	**2,522**
Consolidation	-53	-48	-101	-38	-42	-80
Total revenue	**1,432**	**2,756**	**4,188**	**1,415**	**2,562**	**3,977**

Revenue included €398 million (previous year: €583 million) carried as contract liabilities at the beginning of the fiscal year.

Furthermore, revenue of €17 million recognized in the reporting period (previous year: €17 million) related to performance obligations satisfied in prior periods.

The Group generates its revenue in the following geographical areas:

[T54] Revenue according to customer's country of domicile

in € million	2021	2020
Germany	616	586
Europe (excluding Germany)	266	281
North America	3,015	2,744
Asia	166	231
Other regions	124	136
Total revenue	**4,188**	**3,977**

In the reporting period, approximately 72% (previous year: 69%) of MTU's revenue was generated from business with customers in North America, with the US market accounting for a share of 68% (previous year: 65%).

Contracted performance obligations which were not yet satisfied as of December 31, 2021, including variable components which could be estimated (i.e., the order backlog), amounted to a cumulative transaction price of €22.2 billion (previous year: €18.6 billion). Of this cumulative transaction price, €3.3 billion will be realized in revenue within one year, €10.5 billion will be realized in revenue within two to five years, and €8.4 billion is expected to be realized in revenue after five and within 25 years.

A more detailed presentation of revenue, broken down by external and intersegment revenue and their attribution to major customers, is provided under *"Consolidated segment report."* Additional information can be found in the *disclosures relating to operating results in the Combined management report*.

2. Cost of goods sold

[T55] Cost of goods sold

in € million	2021	2020
Cost of materials	-2,688	-2,576
Personnel expenses	-701	-625
Depreciation and amortization (incl. impairment losses)	-295	-285
Other cost of goods sold	33	-55
Cost of goods sold	**-3,650**	**-3,541**
Capitalized development costs	49	56
Total cost of goods sold	**-3,601**	**-3,484**

Cost of goods sold increased as a result of the higher business volume. Combined with the increase in revenue, this increased the gross profit. Consequently, the gross margin, which is defined as the ratio of revenue less cost of goods sold to revenue, improved from 12.4 % in the previous year to 13.9 % in the reporting period. This was mainly attributable to the product mix realized in the OEM segment, organic growth in both segments, and the one-time effect of the restructuring expenses recognized in the previous year. MTU also benefited in 2021 from the development of the estimated profitability of the GTF program, which impacted the amortization of refund liabilities as well as from the cost-cutting program initiated in 2020, under which in particular the credit balances on employees' time accounts were reduced, and by utilizing short-time working as a tool in the first half of the year.

However, since billing in U.S. dollars is customary in the aviation sector, the development of the U.S. dollar exchange rate, which averaged U.S.$/€ 1.18 in 2021 compared with U.S.$/€ 1.14 in the previous year, adversely affected revenue and, in view of the proportion of the cost of goods sold denominated in currencies other than the U.S. dollar, the Group's gross margin. Other negative factors were the business trend in the first half of 2021, which was still affected by Covid-19, expenses in connection with the measurement of net operating liabilities denominated in U.S. dollars at the exchange rate on the reporting date – given the change in the exchange rate from U.S.$/€ 1.23 on January 1, 2021, to U.S.$/€ 1.13 as of the reporting date – and a less favorable product mix in the MRO segment. Furthermore, the need to recognize impairment losses of €76 million for the PW1700G program negatively impacted the cost of sales. Impairment losses of €7 million for the F414 program were also recognized in revenue.

The development of the other components of the cost of goods sold in the reporting period corresponded to the change inventories and the establishment and amortization of provisions for components such as inventories and contract assets, and provisions and contract liabilities.

3. Research and development expenses

Company-funded research and development expenses developed as follows:

[T56] Research and development expenses

in € million	2021	2020
Cost of materials	-52	-35
Personnel expenses	-29	-24
Depreciation and amortization	-2	-2
Other development costs	-1	-1
Research and development expenditure	**-84**	**-62**
Capitalized development costs	1	1
Research and development expenses recognized in profit or loss	**-83**	**-61**

More information is given in the *"Research and development" section of the Combined management report*.

4. Selling expenses

[T57] Selling expenses

in € million	2021	2020
Cost of materials	-22	-20
Personnel expenses	-73	-70
Depreciation and amortization	-2	-2
Other selling expenses	-28	-53
Total selling expenses	**-124**	**-146**

Selling expenses comprise expenses for marketing and advertising, media relations expenses, as well as impairment allowances and impairments of receivables from customers and contract assets. In the reporting period, the impairment losses applied to operations in both the OEM segment and the MRO segment. The decrease in other selling expenses is related to valuation allowances for contract assets and outstanding receivables, particularly in the MRO business in regard to credit default risks, which were established and increased in the previous year. Further information on valuation allowances can be found in *Note 20 "Trade receivables"* and *Note 21 "Contract assets."*

5. General administrative expenses

[T58] General administrative expenses

in € million	2021	2020
Cost of materials	-9	-8
Personnel expenses	-64	-56
Depreciation and amortization	-3	-4
Other administrative expenses	-15	-13
Total general administrative expenses	**-92**	**-79**

General administrative expenses are expenses incurred in connection with administrative activities that cannot be directly allocated to development, production or sales activities.

6. Other operating income and expenses

[T59] Other operating income and expenses

in € million	2021	2020
Income		
Gains from the disposal of intangible assets and property, plant and equipment	1	0
Reimbursement of insurance claims	1	9
Hedge income	2	7
Rental income from		
property owned by MTU	2	2
sublet property owned by third parties	0	1
Income from public sector grants and assistance	7	20
Deconsolidation gain	13	
Miscellaneous other operating income	14	10
Total other operating income	**41**	**48**
Expenses		
Hedging costs	-51	-52
Losses from the disposal of intangible assets and property, plant and equipment	-1	-1
Expenses associated with insurance claims	-2	-6
Rental payments for sublet property	-1	-1
Sundry other operating expenses	-3	-2
Total other operating expenses	**-57**	**-62**
Net other operating income/expenses	**-16**	**-14**

Deconsolidation gains of €13 million (previous year: €0 million) were generated from the sale of Vericor Power Systems LLC in August 2021.

The use of short-time working in Germany as a result of the necessary reduction in operations in connection with the pandemic led to claims for the reimbursement of social security contributions totaling €2 million (previous year: €12 million). These are recognized in other operating income.

7. Profit/loss of companies accounted for using the equity method and of equity investments

[T60] Profit/loss of companies accounted for using the equity method and of equity investments

in € million	2021	2020
Profit/loss of companies accounted for using the equity method		
Associates	43	35
Joint ventures	38	34
Total profit/loss of companies accounted for using the equity method	**81**	**69**
Profit/loss of equity investments		
Program management and coordination companies	1	-1
Other related companies	2	2
Total profit/loss of equity investments	**2**	**1**

The principal drivers of the profit/loss of companies accounted for using the equity method are the business performances of the joint venture MTU Maintenance Zhuhai Co. Ltd., Zhuhai, China, and the associated company PW1100G-JM Engine Leasing LLC, East Hartford, CT, USA.

Information on companies accounted for using the equity method is provided in *Note 16 "Financial assets."*

8. Net interest income/expense

[T61] Net interest income/expense

in € million	2021	2020
Interest income	**1**	**3**
Interest expense		
Bonds and notes	-20	-12
Convertible bonds	-4	-4
Liabilities to banks	-1	-1
Lease liabilities	-4	-5
Other interest expense	-5	-4
Capitalized borrowing costs for qualifying assets	4	4
Interest expense	**-30**	**-22**
Net interest income/expense	**-29**	**-20**

The year-on-year decrease in interest income is mainly attributable to the timing structure, in terms of repayment date, and the timing of loans extended for aircraft and engine financing activities required by MTU's stake in commercial engine programs. The rise in interest expense in the reporting period corresponds, in particular, with the corporate bond issued in the third quarter of 2020. Further information can be found in *Note 28 "Financial liabilities."*

The borrowing costs capitalized in the reporting period relate to qualifying assets acquired or constructed mainly in connection with the Group's stake in the Pratt & Whitney GTF™ engine family and PW800. The capitalized amount was determined using a cost of debt capital of 2.3% (previous year: 2.3%).

9. Other financial income/expense

[T62] Other financial income/expense

in € million	2021	2020
Effects of currency translation: exchange rate gains/losses on		
currency holdings	9	-35
financing transactions	1	-4
lease liabilities	-6	7
Fair value gains/losses on derivatives		
Currency derivatives	-1	6
Commodity forwards	2	1
Interest included in measurement of assets and liabilities		
Pension obligations and plan assets	-6	-9
Receivables, other provisions and liabilities	-12	-13
Miscellaneous other financial income/expense	3	-0
Other financial income/expense	**-10**	**-47**

The effects from measurement of foreign currency holdings mainly relate to the change in the U.S. dollar exchange rate prevailing on the reporting date from U.S.$/€ 1.23 to U.S.$/€ 1.13 to the euro in the reporting period. For information on the impact of pensions and plan assets, please refer to *Note 25 "Pension provisions."*

10. Income taxes

Recognized income taxes comprise current income taxes paid or payable in the countries in which the Group operates, and deferred tax income or expense.

[T63] Analysis of current and deferred income taxes

in € million	2021	2020
Tax expense incurred in current period	-52	-62
Tax expense (-)/tax income incurred in prior periods	-13	-32
Current income taxes	**-64**	**-94**
Deferred tax expense (-)/tax income resulting from temporary differences	-21	50
Deferred tax expense (-)/tax income resulting from tax credits	2	-4
Deferred tax expense (-)/tax income resulting from tax losses carried forward	-1	0
Deferred income taxes	**-20**	**46**
Income tax expense	**-84**	**-48**

Tax reconciliation

As a basic principle, deferred tax assets and liabilities are measured using the applicable tax rate for the period when the asset is realized or the liability is settled, based on current tax legislation in the countries concerned.

In the reporting period, as in the previous year, the deferred taxes of the German Group companies were measured using a regular income tax rate of 32.2%. The income tax rate for the domestic tax group of MTU Aero Engines AG is still comprised of the uniform corporation tax rate of 15.0% plus a solidarity surcharge of 5.5% on the calculated corporation tax expense and takes into account an average municipal trade tax rate of 16.4%.

The deferred taxes of companies outside Germany were measured using the relevant tax rates for the countries in question, which range between 15% and 27%.

Information on changes in deferred tax assets and liabilities is provided in *Note 34 "Deferred taxes."*

The following table shows the reconciliation of expected tax expense to recognized tax expense:

[T64] Tax reconciliation

in € million	2021	2020
Earnings before income taxes	315	195
Income tax rate	32.2%	32.2%
Expected tax expense	**-102**	**-63**
Impact of		
Recognition and measurement adjustments and write-downs on deferred tax assets	-1	-5
Non-tax-deductible operating expenses and tax-exempt income	-2	-0
Lower tax rates for companies outside Germany	10	5
Investments accounted for using the equity method	5	14
Tax audit and prior periods	6	2
Tax credits available for carry-forward	2	2
Withholding tax charge and other foreign taxes	-1	-3
Other impacts	-2	-0
Income tax expense	**-84**	**-48**
Effective tax rate	**26.7%**	**24.4%**

11. Earnings per share

To determine diluted earnings per share, the number of common shares that could potentially be issued through the granting of equity instruments is added to the weighted average number of outstanding shares.

The net income available for distribution to shareholders of MTU Aero Engines AG amounted to €222 million (previous year: €139 million).

In the reporting period, the weighted average number of outstanding shares was 53,325,298 (previous year: 52,985,567 shares). Based on these parameters, basic earnings per share amounted to €4.17 (previous year: €2.63).

Diluting effects arose from 1,739,437 shares (previous year: 2,030,805 shares) that could potentially be issued through the convertible bonds issued by MTU, which meant that diluted earnings per share amounted to €4.09 (previous year: €2.59).

12. Additional disclosures relating to the income statement

After adjustments to eliminate the depreciation and amortization effect of the purchase price allocation (PPA), the increase in the stake in the IAE-V2500 program, the sale of Vericor Power Systems in 2021 (restructuring expenses in 2020) and the impairment losses recognized for the PW1700G engine program for Embraer E175-E2 jets and the F414 (in 2020: PW1200G engine program for the Mitsubishi SpaceJet and the GE9X engine program for the Boeing 777X), the following reconciliation gives the performance indicator “Adjusted earnings before interest and tax (adjusted EBIT)”:

[T65] Reconciliation of EBIT to adjusted EBIT, depreciation/ amortization expense and non-recurring items

in € million	2021	2020
Earnings before interest and taxes (EBIT)	**355**	**262**
thereof: special item depreciation/ amortization effect of purchase price allocation	21	21
thereof: special item increase in the stake in V2500	23	27
thereof: special item sale of Vericor	-13	
thereof: special item restructuring expenses		33
thereof: special item impairment losses on program assets	83	73
Adjusted earnings before interest and taxes (adjusted EBIT)	**468**	**416**

Costs by function include the following personnel expenses items:

[T66] Personnel expenses

in € million	2021	2020
Wages and salaries	722	625
Social security, pension and other benefit expenses	134	143
Total personnel expenses	**856**	**768**

Personnel expenses include pension benefits of €13 million (previous year: €22 million). Other social security expenses amounted to €121 million (previous year: €122 million). The decrease of expenses for pensions benefits is mainly attributable to lower contributions for service cost. The increase in wages and salaries is due to the lapse of most effects of cost-cutting programs in the previous year, for example, reducing employees time credits and the reduction in variable compensation payments. In addition, the German locations benefited in the previous year from salary compensation payments in connection with short-time working due to operating restrictions.

The average number of persons employed during the fiscal year breaks down as follows:

[T67] Disclosures on the average number of employees

Number	2021	2020
Industrial staff	4,236	4,330
Administrative staff	4,789	4,792
Temporary employees	725	941
Employees in vocational training	314	297
Interns	244	186
Total average number of employees	**10,308**	**10,546**

The fees charged by the Group auditor Ernst & Young GmbH Wirtschaftsprüfungsgesellschaft in 2021 in accordance with Section 314 (1) no. 9 of the German Commercial Code (HGB) amounted to a total of €1,677 thousand (previous year: €1,134 thousand).

[T68] Group auditor compensation

in € thousand	2021	2020
Financial statement auditing services	1,513	915
Other assurance services	142	163
Other services	22	56
Total Group auditor compensation	**1,677**	**1,134**

The fee for financial statement auditing services primarily related to the audit of the consolidated financial statements and the separate financial statements of MTU Aero Engines AG and its subsidiaries and reviews of the interim financial statements. Other assurance services mainly included the limited assurance engagement on the non-financial statement and the compensation report as well as the EMIR audit.

III. Notes to the consolidated balance sheet

13. Changes in intangible assets and property, plant and equipment

[T69] Changes in non-financial assets – purchase and production costs 2021

in € million	As of Jan. 1, 2021	Currency translation differences	Changes in the consolidated group[1]	Additions	Transfers	Disposals	As of Dec. 31, 2021
Program assets arising from the purchase price allocation	670			0			670
Program-independent technologies	125						125
Customer relationships	57						57
Rights and licenses	158	1	-11	7	2	-1	156
Goodwill	391	0	-5			-1	386
Development assets	527	0	-7	51			572
Prepayments on intangible assets	21	-0		26			47
Intangible assets	**1,950**	**1**	**-22**	**83**	**2**	**-1**	**2,013**
Land, leasehold rights and buildings, including buildings on third-party land	616	4	4	21	16	-7	655
Technical equipment, plant and machinery	821	2		25	53	-13	887
Other equipment, operational and office equipment	878	1	-6	96	10	-105	875
Advance payments and construction in progress	154	0	4	159	-81	-0	236
Property, plant and equipment	**2,470**	**8**	**1**	**301**	**-2**	**-125**	**2,653**
Total	**4,419**	**9**	**-21**	**384**		**-126**	**4,665**

[1] Additions relate to the initial consolidation of MTU Maintenance Serbia, disposals relate to the deconsolidation of Vericor Power Systems.

[T70] Changes in non-financial assets – depreciation/amortization and carrying amount 2021

in € million	As of Jan. 1, 2021	Currency translation differences	Changes in the consolidated group[1]	Additions	Transfers	Disposals	As of Dec. 31, 2021	Carrying amount as of Dec. 31, 2021
Program assets arising from the purchase price allocation	449			18			467	203
Program-independent technologies	125						125	
Customer relationships	51			2			53	3
Rights and licenses	132	1	-11	10	0	-1	131	25
Goodwill								386
Development assets	58			49			108	464
Prepayments on intangible assets								47
Intangible assets	**815**	**1**	**-11**	**80**	**0**	**-1**	**885**	**1,128**
Land, leasehold rights and buildings, including buildings on third-party land	193	1	-1	26	-0	-6	214	441
Technical equipment, plant and machinery	585	1		58	-1	-12	632	256
Other equipment, operational and office equipment	530	1	-4	100	0	-71	556	319
Advance payments and construction in progress								236
Property, plant and equipment	**1,308**	**3**	**-4**	**185**	**-0**	**-90**	**1,401**	**1,251**
Total	**2,123**	**4**	**-15**	**265**		**-90**	**2,286**	**2,379**

[1] Additions relate to the initial consolidation of MTU Maintenance Serbia, disposals relate to the deconsolidation of Vericor Power Systems.

[T71] Changes in non-financial assets – purchase and production costs 2020

in € million	As of Jan. 1, 2020	Currency translation differences	Additions	Transfers	Disposals	As of Dec. 31, 2020
Program assets arising from the purchase price allocation	670					670
Program-independent technologies	125					125
Customer relationships	57					57
Rights and licenses	153	-2	3	3	-0	158
Goodwill	392	-0				391
Development assets	487	-0	40			527
Prepayments on intangible assets	48	-1			-26	21
Intangible assets	**1,932**	**-4**	**44**	**3**	**-26**	**1,950**
Land, leasehold rights and buildings, including buildings on third-party land	497	-5	79	45	-0	616
Technical equipment, plant and machinery	749	-7	35	54	-11	821
Other equipment, operational and office equipment	843	-3	79	27	-68	878
Advance payments and construction in progress	201	-2	90	-129	-6	154
Property, plant and equipment	**2,291**	**-16**	**283**	**-3**	**-84**	**2,470**
Total	**4,223**	**-20**	**327**	**-0**	**-110**	**4,419**

[T72] Changes in non-financial assets – depreciation/amortization and carrying amount 2020

in € million	As of Jan. 1, 2020	Currency translation differences	Additions	Transfers	Disposals	As of Dec. 31, 2020	Carrying amount as of Dec. 31, 2020
Program assets arising from the purchase price allocation	431		18			449	221
Program-independent technologies	125					125	
Customer relationships	48		2			51	6
Rights and licenses	123	-2	10	0	-0	132	26
Goodwill							391
Development assets	43		15			58	469
Prepayments on intangible assets							21
Intangible assets	**770**	**-2**	**46**	**0**		**815**	**1,135**
Land, leasehold rights and buildings, including buildings on third-party land	174	-1	21	-0	-0	193	423
Technical equipment, plant and machinery	546	-3	52	-0	-10	585	235
Other equipment, operational and office equipment	471	-2	112	0	-51	530	348
Advance payments and construction in progress							154
Property, plant and equipment	**1,190**	**-6**	**185**	**-0**	**-61**	**1,308**	**1,161**
Total	**1,960**	**-7**	**231**		**-61**	**2,123**	**2,296**

14. Intangible assets

Intangible assets comprise program assets and program-independent technologies which were capitalized as part of the purchase price allocation in connection with the acquisition by Kohlberg Kravis Roberts & Co. Ltd. (KKR) on January 1, 2004, of the shareholding in MTU previously held by DaimlerChrysler AG, and acquired goodwill. This item also includes capitalized, self-created development assets and software (the latter mostly for engineering applications).

In the reporting period, intangible assets totaling €83 million (previous year: €44 million) were recognized, of which €51 million (previous year: €40 million) were internally generated, mainly in connection with the Pratt & Whitney GTF™ engines and the PW800 engine program. In addition, €26 million of this amount were attributable to license payments related to the maintenance and repair business for the GE CF34 engine program. €79 million (previous year: €45 million) of the amortization expense for intangible assets was recognized in the cost of goods sold; this amount includes impairment losses on development assets (IAS 36) of €33 million (previous year: €0 million) related to the PW1700G engine program.

Goodwill reported under intangible assets is allocated to the operating segments as follows:

[T73] Goodwill of operating segments

in € million	2021	2020
Commercial and military engine business (OEM)	304	304
Commercial maintenance business (MRO)	82	87
Total goodwill	**386**	**391**

Goodwill was tested for impairment in the reporting period as in previous years. For information on the basic approach, please refer to the section entitled "Impairment of intangible assets, property, plant and equipment, acquired program assets and acquired development work" in Section I. "Accounting principles and policies."

For the regular impairment testing, the value in use of the operating segments was calculated in order to determine their respective recoverable amounts, based on the operational business plans for the second half of the period under review.

The calculations of the recoverable amounts are based on the following assumptions: The first step involves the use of models to predict future changes in the engine fleet and the corresponding market shares of engines for which MTU holds or expects to hold supply responsibility or that are or will be of significance to its service business, especially in the MRO segment. MTU applies these forecasts systematically as a basis for its revenue and corresponding capacity planning, from which the planned EBIT and cash flows for each of the two operating segments are derived. The outcome of this process is therefore necessarily based on expectations as regards future market shares and growth in the individual markets, the profitability of products as well as macroeconomic developments such as trends in exchange rates, interest rates and commodity prices against a backdrop of decisions related to climate policy. The values in use, and the corresponding carrying amounts, are determined without reference to financing activities. More information can be found in *Section I. "Accounting policies and principles."*

In the OEM segment, the calculation of cash flow used to determine the value in use is based on revenue growth in the low teens percentage range in the relevant planning period. The EBIT margin is expected to grow at rates in the mid-teens percentage range. The weighted cost of capital before taxes (discount rate) applied here was 12.1% (previous year: 11.0%). Since the detailed planning period in the OEM segment depends on the pricing typical for the industry for the new engine and spare parts businesses within the multi-year program business cycles as well as on the effects of the Covid-19 pandemic, the perpetuity is derived from the strategic long-term planning (2027 to 2036) as in previous years. This makes it possible to consider both the low-margin phase for program launches as well as the stronger margin phase of the spare parts business in mature programs. Consequently, the revenue assumption for the perpetuity is derived from revenue in 2026 plus a compound annual growth rate of 0.5% and an annuity. The previously mentioned annuity takes into account the extent to which revenue in the strategic long-term planning exceeds the revenue in the final year of the planning period (plus a growth rate of 0.5%). The operating earnings margin used for the perpetuity is based on a conservative valuation. Moreover, in view of the positive development in the planning period, it is assumed that the margin will only be slightly above the level of the last planning year.

For the MRO segment, the detailed planning horizon reflects revenue growth in the high single-digit percentage range and EBIT margin growth in the mid single-digit percentage range, while the cost of capital before taxes (discount rate) is expected to be 12.0% (previous year: 11.2%). Analogous to the method used in the previous year, the perpetuity for the MRO segment, given the shorter business cycles of the MRO business, was derived from revenue and the EBIT margin of the final year of the detailed planning period (2026) plus a growth rate of 0.5% as in the previous year.

Impairment testing in both operating segments did not result in the need to recognize impairment losses.

In addition, various sensitivity analyses were also carried out. These indicated that even less favorable assumptions than those applied during the original planning phase for key determining factors would not result in the need to recognize impairment losses. In particular, this means that no need to recognize an impairment loss for the operating segments would be implied by either the increase in weighted cost of capital before taxes to 14.0% or the failure to meet the planned EBIT by 20%, each under otherwise identical conditions. Based on the current business plan, considering otherwise identical conditions, only if the revenue taken into consideration for calculating the perpetual annuity in the OEM segment fell by more than 42% or the revenue in the MRO segment by more than 54%, this would indicate the need to recognize an impairment loss.

15. Property, plant and equipment

Through its capital expenditure on property, plant and equipment, MTU aims to expand its production capacity and modernize equipment and machinery to state-of-the-art standards.

In the reporting period, the Group's total capital expenditure on property, plant and equipment amounted to €301 million (previous year: €283 million). Additions to this item also include the recognition of right-of-use assets under leases. Further information is provided in *Note 36 "Leases."*

The depreciation expense on property, plant and equipment is included in the presentation of the following line items: cost of sales €178 million (previous year: €179 million), research and development expenses €2 million (previous year: €2 million), selling expenses 2 million (previous year: €1 million), and general administrative expenses €3 million (previous year: €3 million).

Additions to land, leasehold rights and buildings, including buildings on third-party land, amounted to €21 million in the reporting period (previous year: €79 million) and relate mainly to new buildings and building extensions and to right-of-use assets for real estate leases.

Capital expenditure on technical equipment, plant and machinery totaling €25 million (previous year: €35 million) relates mainly to the purchase of plant and machinery for the capacity expansion in connection with the ramp-up of production of the Pratt & Whitney GTF™ engine family and the GE9X and PW800 engine programs.

The capital expenditure on other equipment and operational and office equipment in the amount of €96 million (previous year: €79 million) and additions to advance payments and construction in progress in the reporting period in the amount of €159 million (previous year: €90 million) relates principally to the expansion of production capacities, mainly in Munich and Hanover, Germany, and in Nova Pazova, Serbia, and the recognition of right-of-use assets for leased office space.

16. Financial assets

Financial assets accounted for using the equity method

Financial assets accounted for using the equity method in the consolidated financial statements amounted to €611 million at the reporting date (previous year: €556 million).

Associates

PW1100G-JM Engine Leasing LLC, East Hartford, CT, USA, leases out spare engines of the PW1100G-JM series and is the only material investment in an associate included in MTU's consolidated financial statements.

MTU holds an 18% interest in the company, which is accounted for using the equity method in the consolidated financial statements.

The table below provides a summary of the financial data of PW1100G-JM Engine Leasing LLC, East Hartford, CT, USA for the reporting period:

[T74] Summary of financial data of PW1100G-JM Engine Leasing LLC

in € million	2021	2020
Balance sheet as of Dec. 31		
Current assets	141	259
Non-current assets	1,462	1,507
Current liabilities	48	84
Non-current liabilities	40	28
Equity	1,514	1,653
Share of equity	273	298
Reconciliation to carrying amount	29	-8
Carrying amount of company accounted for using the equity method	301	290
Income statement		
Revenue	482	445
Net income	229	188
Total comprehensive income	**229**	**188**
Group's share in the income	42	33
Dividend received from the company	**53**	**19**

The following table presents the aggregated, unaudited financial information of the associates that are not material when considered separately (further details of shareholdings are presented in Note 38 "Related party disclosures"):

[T75] Aggregated financial information on the non-material associates

in € million	2021	2020
Carrying amount of companies accounted for using the equity method	33	28
Net income	11	11
Total comprehensive income	**11**	**11**
Group's share in the income	2	2

Joint ventures

MTU's material joint ventures are MTU Maintenance Zhuhai Co. Ltd., Zhuhai, China, and EME Aero sp. z o.o., Jasionka, Poland. MTU holds a 50% interest in each of these companies. The material joint ventures are accounted for using the equity method in the consolidated financial statements.

MTU Maintenance Zhuhai Co. Ltd. specializes, in the maintenance, repair and overhaul of the V2500, CFM56, LEAP and PW1100G-JM engines and serves the China and Southeast Asia regions.

EME Aero sp. z o.o. focuses on providing maintenance services for the Pratt & Whitney GTF™ engine family, which powers the Airbus A320neo family and other aircraft.

The table below provides a summary of the unaudited financial data of the material joint ventures in the MTU Group for the reporting period and the previous year:

[T76] Income statement, statement of comprehensive income and balance sheet information of the material joint ventures

	2021		2020	
in € million	Engine Maintenance Europe Aero sp. z o.o.	MTU Maintenance Zhuhai Co. Ltd.	Engine Maintenance Europe Aero sp. z o.o.	MTU Maintenance Zhuhai Co. Ltd.
Income statement data disclosures				
Revenue	321	967	95	860
Depreciation/amortization and write-downs	-15	-9	-11	-6
Interest income		0		0
Interest expense	-5	-3	-5	-6
Income tax credits	1		3	
Income tax expense		-16		-13
Other income and expenses	-321	-856	-107	-755
Net income	**-19**	**83**	**-24**	**82**
Other comprehensive income		7		10
Total comprehensive income	**-19**	**90**	**-24**	**92**
Group's share in the income	-10	45	-12	41
Balance sheet disclosures				
Non-current assets	182	159	170	106
Cash and cash equivalents	11	43	4	25
Other current assets	125	820	58	683
Total assets	**318**	**1,023**	**231**	**814**
Equity	51	456	50	384
Non-current financial liabilities		104		73
Other non-current liabilities	11		12	
Current financial liabilities	253	246	164	242
Other current liabilities	3	216	6	115
Total equity and liabilities	**318**	**1,023**	**231**	**814**
Reconciliation to carrying amount				
Share of equity	25	228	25	192
Reconciliation to carrying amount	0		0	
Carrying amount of companies accounted for using the equity method	**26**	**228**	**25**	**192**
Dividend received from joint ventures		**28**		**31**

The following table presents the aggregated, unaudited financial information of the joint ventures that are not material when considered separately (further details of shareholdings are presented in Note 38 "Related party disclosures"):

[T77] Aggregated financial information on the non-material joint ventures

in € million	2021	2020
Carrying amount of companies accounted for using the equity method	24	21
Net income	4	3
Other comprehensive income	0	-1
Total comprehensive income	**4**	**2**
Group's share in the income	3	5

Other financial assets

The carrying amounts of other financial assets included in the consolidated financial statements are presented below:

[T78] Breakdown of other financial assets

	Total		Non-current		Current	
in € million	Dec. 31, 2021	Dec. 31, 2020	Dec. 31, 2021	Dec. 31, 2020	Dec. 31, 2021	Dec. 31, 2020
Financial assets measured at purchase cost	**234**	**101**	**60**	**39**	**174**	**62**
Loans to third parties[1]	56	33	56	33		
Receivables from employees	1	1			1	1
Receivables from suppliers	11	23			11	23
Miscellaneous other financial assets	166	44	3	6	163	38
Financial assets at fair value through other comprehensive income	**7**	**27**	**7**	**27**		
Other interests in related companies	7	27	7	27		
Derivatives without hedging relationship	**2**	**1**	**0**	**0**	**1**	**1**
Derivatives with hedging relationship	**6**	**109**	**5**	**71**	**1**	**38**
Total other financial assets	**250**	**238**	**72**	**137**	**177**	**101**

[1] Included in net financial debt.

The additions to loans to third parties are primarily attributable to the share in financing granted for aircraft and engines as part of commercial OEM programs.

The receivables from suppliers primarily include short-term credit notes which were received for returned goods, amendments to invoices and trade discounts.

Miscellaneous other financial assets amounting to €166 million (previous year: €44 million) relate to numerous individual items. The increase reflects mainly predpaid compensation payment components to the consortium leader (OEM) recognized on the balance sheet for the maintenance and repair business for stakes in commercial OEM engine programs, higher receivables from fly-by-hour contracts and the partial payment of the purchase price for Vericor Power Systems LLC, which is not due until 2022.

Other interests in related companies include the carrying amounts of MTU's investments in companies that are neither fully consolidated nor accounted for using the equity method (for further details of shareholdings see Note 38 "Related party disclosures"). The shares in SMBC Aero Engine Lease B.V., Amsterdam, Netherlands, included in 2020 were sold to Sumitomo in October 2021. MTU applied the option granted by IFRS 9 to recognize the investment in SMBC at fair value outside of profit and loss.

The changes in the fair value of the equity investment in SMBC Aero Engine Lease B.V. previously recognized in accumulated other comprehensive income were reclassified to retained earnings upon disposal. The sales price amounted to €9 million. In addition, further investments totaling €1 million were added.

At the reporting date, derivative financial assets comprised the following instruments:

[T79] Derivative financial instruments

in € million	Total		Non-current		Current	
	Dec. 31, 2021	Dec. 31, 2020	Dec. 31, 2021	Dec. 31, 2020	Dec. 31, 2021	Dec. 31, 2020
Forward foreign exchange contracts/ currency options	6	109	5	71	1	38
Nickel forward contracts	2	1	0	0	1	1
Total derivative financial instruments	**8**	**110**	**5**	**71**	**3**	**39**

17. Acquired program assets, development work and other assets

In the reporting period, compensation payments for development work in an amount of €1 million (previous year: €11 million) paid to consortium leaders (OEMs) were capitalized. The total amount of accrued payments for acquired development assets offset against revenue in the reporting period was €8 million (previous year: €8 million). Further, impairment losses of €12 million (previous year: €0 million) were recognized on acquired development assets related to the PW1700G engine program as a result of impairment testing due to indications of impairment, as rescribed by IAS 36.

In the reporting period, MTU spent €16 million (previous year: €2 million) on the acquisition of program assets. The total amount of acquired program assets recognized in profit or loss in the reporting period was €38 million (previous year: €42 million). Further, impairment losses of €34 million (previous year: €68 million for GE9X and PW1200G engine programs) were recognized on program assets relating to the PW1700G and F414 engine programs as a result of impairment testing due to indications of impairment, as prescribed by IAS 36.

The above impairment losses were established for the OEM engine program stakes (cash-generating unit) by comparing the value in use of the engine programs in question, established by a DCF analysis, with the corresponding net program assets, comprising capitalized development work, program assets, acquired development work and the attributable property, plant and equipment, inventories, contract assets and receivables. Relevant program obligations, especially refund liabilities, were reflected as reductions in this context.

As a result of the postponement of the PW1700G engine program, which is being developed as the exclusive propulsion system for the Embraer E175-E2, and the reduction of the value in use of the F414 engine, which is utilized in various fighter jets, MTU recognized impairment losses through profit or loss totaling €83 million in 2021 (previous year: €73 million for the GE9X and PW1200G engine programs). Of this amount, €46 million (previous year: €68 million) relate to the acquired program assets, development work and other assets item.

Determining the value in use within the scope of impairment tests requires forecasts, particularly in respect to the respective program sales volume and the associated program gross margin. The weighted average cost of capital used in determining value in use is 8.2% after taxes.

In view of the estimation uncertainties resulting from Covid-19 and those related to climate-related effects, sensitivity analyses are presented below. These assume that all other parameters remain unchanged and therefore do not take into account the interdependency of the parameters and, above all, any countermeasures. Accordingly, the values should be regarded as a theoretical gross risk.

If, assuming the other parameters remain unchanged, revenue from the engine programs that were impaired as of the reporting date was reduced by 10%, the associated value in use would decrease by €14 million. By contrast, if, assuming the other parameters remain unchanged, the annual gross profit was reduced by 5%, the value in use would decrease by €17 million. Finally a 10% increase in WACC after taxes, without any change in the other assumptions, implies that the value in use would decrease by €32 million. The reduction of the value in use of those programs implies a corresponding impact on earnings as a result of the need to recognize additional impairment losses.

Update effects of the IAE-V2500 stake increase result in an addition of €15 million in the program assets (previous year: a reduction of €106 million due to the pandemic-related need to reassess the corresponding deferred conditional purchase price liability). The program asset in question is recognized analogously to IFRIC 1. More information can be found in *Section I. "Accounting policies and principles"* under *"Acquired program assets and acquired development work."*

Other assets include claims for tax refunds amounting to €27 million (previous year: €12 million) in respect of transactional taxes and prepaid maintenance charges, insurance premiums and rents.

18. Deferred tax assets

Deferred tax assets increased by €16 million to €83 million (previous year: €67 million) in the reporting period. Further details are provided in *Note 34 "Deferred taxes."*

19. Inventories

The carrying amount of inventories, taking into account valuation allowances, comprises the following components:

[T80] Inventories

in € million	Change in write-downs	Dec. 31, 2021 Gross amount	Dec. 31, 2021 Write-down	Dec. 31, 2021 Carrying amount	Dec. 31, 2020 adjusted Gross amount	Dec. 31, 2020 adjusted Write-down	Dec. 31, 2020 adjusted Carrying amount
Raw materials and supplies	19	737	-83	654	684	-102	582
Work in progress	5	497	-19	479	489	-24	465
Finished goods	14	263	-58	205	289	-71	218
Advance payments		42		42	13		13
Total inventories	**38**	**1,540**	**-160**	**1,380**	**1,476**	**-198**	**1,278**

Corresponding to their substance, third parties (commission companies) for further processing of raw materials provided are reported as part of unfinished goods in the reporting period (December 31, 2021: €38 million). To ensure comparability, the previous year's figures reported have been adjusted accordingly by €36 million.

Of the total volume of inventories, an amount of €385 million (previous year: €494 million) was considered to be impaired at the reporting date. The decrease in the valuation allowances compared with the previous year relates to the identification of additional impairment risks in the previous year related to inventories of engine parts, especially in the MRO segment, as a result of the pandemic-related restrictions on air travel. Further information can be found in *Section I. "Accounting policies and principles – Inventories" and "– Discretionary scope, measurement uncertainties and sensitivity."*

20. Trade receivables

[T81] Trade receivables

in € million	Dec. 31, 2021	Dec. 31, 2020
Third parties	466	465
Related companies	480	505
Total trade receivables	**946**	**969**

Transactions with related companies are presented in more detail in *Note 38 "Related party disclosures."* The carrying amount of trade receivables includes valuation allowances in the amount of €54 million (previous year: €46 million). Further details on valuation allowances are provided in the following section.

21. Contract assets

The contract assets result from performance obligations that have been satisfied, where receipt of the agreed consideration depends on acceptance of the performance obligation by the customer and the amounts becoming due for payment. Changes in the reporting period were due to the change in the U.S. dollar exchange rate from U.S.$/€ 1.23 in the previous year to U.S.$/€ 1.13 at year-end 2021, and were partly offset by the development of business, which was affected by the coronavirus pandemic.

Valuation allowances on trade receivables and contract assets changed as follows in the fiscal year:

[T82] Valuation allowances

in € million	2021	2020
As of Jan. 1	**47**	**20**
Translation differences		
Transferred		
Additions	34	29
Utilized	–17	
Reversed	–6	–3
As of Dec. 31	**58**	**47**

Contract assets account for €4 million (previous year: €0 million) of the reported valuation allowances. The additions to this item in the reporting period are consistent with changes in the credit standing of specific customers (non-payment risk) and country risk classifications (market risk) in the commercial engine business, including the impact of the pandemic, and are predominantly recognized on a case-by-case basis. The expenses resulting from the derecognition of trade receivables are offset against the corresponding revenue, resulting in net income of €19 million (previous year: €7 million). Higher expenses are attributable to deteriorated customer creditworthiness.

As in prior years, all expense and income amounts arising from valuation allowances and the derecognition of trade receivables are recognized as selling expenses.

In order to minimize the non-payment risk, an active receivables management system is operated both in the OEM segment, supported in particular by the engine consortium leader, and in the MRO segment.

22. Income tax receivables

At the reporting date, income tax receivables amounted to €89 million (previous year: €42 million). €70 million of this amount (previous year: €37 million) comprises income tax receivables in Germany.

23. Cash and cash equivalents

The cash and cash equivalents amounting to €722 million (previous year: €773 million) comprise cash in hand and bank deposits. This item also includes foreign-currency holdings with an equivalent value of €98 million (previous year: €32 million). The increase in foreign-currency holdings is attributable to higher business volumes in foreign currency due to the lower air traffic restrictions during the reporting period. For information on the investment policy, please refer to the section entitled *"Financial situation – Principles and objectives of financial management."*

24. Equity

Changes in Group equity are presented in the consolidated statement of changes in equity.

Subscribed capital

The company's subscribed capital (capital stock) is €53 million and is divided into 53 million non-par-value registered shares. The increase in the reporting period was due to the exercise of conversion options from the convertible bond issued in 2016.

Authorized capital

In accordance with Article 4 (5) of the articles of association, the Executive Board is authorized until April 20, 2026, to increase the company's capital stock by up to €16.0 million, with the prior approval of the Supervisory Board, by issuing, either in a single step or in several steps, new registered non-par-value shares in return for cash and/or contributions in kind (Authorized Capital 2021). Authorized Capital 2021 was adopted in the Annual General Meeting on April 21, 2021; the same resolution annulled the Authorized Capital 2019.

Conditional capital

In accordance with Article 4 (6) of the articles of association, the company's capital stock may be conditionally increased by up to €3,763,952 through the issue of up to 3,763,952 new registered non-par-value shares. The purpose of this conditional capital increase is to issue shares to owners or creditors of convertible bonds and/or bonds with warrants in accordance with the authorization granted to the company under a resolution passed by the Annual General Meeting on April 15, 2015. Shares are issued at a conversion price or warrant exercise price determined on the basis of this authorization.

Until April 14, 2020, the Executive Board was authorized to issue, with the prior approval of the Supervisory Board, bearer and/or registered convertible bonds and/or bonds with warrants (collectively referred to as "bonds") with a total nominal value of up to €500 million. In 2016, MTU made use of this authorization to increase the company's capital stock by issuing a convertible bond with a nominal value of €500 million.

Further, Article 4 (7) of the articles of association stated that the company's capital stock may be conditionally increased by up to €2,600,000 through the issue of up to 2,600,000 new registered non-par-value shares (Conditional Capital 2019). The purpose of this conditional capital increase was to issue shares to owners or creditors of convertible bonds and/or bonds with warrants in accordance with the authorization granted to the company under a resolution passed by the Annual General Meeting on April 11, 2019. Shares were issued at a conversion price or warrant exercise price determined on the basis of this authorization.

The Executive Board was authorized until April 10, 2024, to issue, in a single step or in several steps and with the prior approval of the Supervisory Board, bearer and/or registered convertible bonds and/or bonds with warrants (collectively referred to as "bonds"), with or without maturity date, with a total nominal value of up to €600 million, and to grant the owners of convertible bonds and/or bonds with warrants the right, obligation or option to convert them into registered non-par-value shares of the company representing a stake in the capital stock of up to €2,600,000 under the conditions established for the issue of convertible bonds or bonds with warrants. The bonds could only be issued in return for cash contributions. They could be issued in euros or – to an equivalent value – in any other legal currency, for instance that of an OECD country. They could also be issued by an affiliated company where MTU exercises control. In such cases, and subject to the prior approval of the Supervisory Board, the Executive Board was authorized to act as guarantor for the bonds and to grant the owners of the bonds the right, obligation or option to convert them into new registered non-par-value shares in MTU.

In 2019, MTU made partial use of this authorization to increase the company's capital stock by issuing a convertible bond with a nominal value of €500 million. More details are provided in *Note 28 "Financial liabilities."*

The authorization described above for the Executive Board to issue bonds with a total nominal value of up to €600 million was canceled at the Annual General Meeting on April 21, 2021, to the extent that had not been used for the €500 million convertible bond issued in 2019. The Conditional Capital 2019 in the amount of €2,600,000 in accordance with Article 4 (7) of the articles of association was also withdrawn and now only comprises a partial amount of €1,600,000.

Further, in accordance with Article 4 (8) of the articles of association, the company's capital stock may be conditionally increased by up to €2,600,000 through the issue of up to 2,600,000 new registered non-par-value shares (Conditional Capital 2021). The purpose of this conditional capital increase is to issue shares to owners or creditors of convertible bonds and/or bonds with warrants in accordance with the authorization granted to the company under a resolution passed by the Annual General Meeting on April 21, 2021. Shares are issued at a conversion price or warrant exercise price determined on the basis of this authorization.

The Executive Board is authorized until April 20, 2026, to issue, in a single step or in several steps and with the prior approval of the Supervisory Board, bearer and/or registered convertible bonds and/or bonds with warrants (collectively referred to as "bonds"), with or without maturity date, with a total nominal value of up to €600 million, and to grant the owners of convertible bonds and/or bonds with warrants the right, obligation or option to convert them into registered non-par-value shares of the company representing a stake in the capital stock of up to €2,600,000 under the conditions established for the issue of convertible bonds or bonds with warrants. The bonds may be issued in return for cash contributions only. They may be issued in euros or – to an equivalent value – in any other legal currency, for instance that of an OECD country. They could also be issued by an affiliated company where MTU exercises control. In such cases, and subject to the prior approval of the Supervisory Board, the Executive Board is authorized to act as guarantor for the bonds and to grant the owners of the bonds the right, obligation or option to convert them into registered non-par-value shares in MTU.

Capital reserves

Capital reserves contain premiums from the issue of shares and the equity component (net of proportional transaction costs) of convertible bonds that have been redeemed or are still outstanding.

The issue of new shares as a result of the exercise of options to convert the convertible bond 2016 increased the capital reserves by €12 million in the reporting period (previous year: €29 million).

Capital reserves also include premiums for the issue of own shares in connection with the Restricted Stock Plan (RSP) or the employee stock option program (MAP) or the Stock Matching Plan (SMP) and, previously, the Matching Stock Plan (MSP).

Retained earnings

Retained earnings mainly comprise the net profit generated in the past by consolidated Group companies that has not been distributed.

Treasury shares

Purchase of treasury shares in accordance with the authorization granted by the Annual General Meeting on April 11, 2019

The Executive Board of MTU Aero Engines AG, Munich, Germany, is thus authorized by the resolution of the Annual General Meeting of April 11, 2019, to purchase treasury shares with an aggregate nominal value not exceeding 10% of the company's issued capital stock, as applicable on the date of the resolution, during the period to April 10, 2024, pursuant to Section 71 (1) no. 8 of the German Stock Corporation Act (AktG). At no point in time may the value of the acquired shares, together with other treasury shares in the company's possession or which are attributed to it pursuant to Section 71a et seq. of the German Stock Corporation Act (AktG), exceed 10% of the company's capital stock. These shares may be purchased on the stock market or by means of a public offering addressed to all shareholders. The consideration paid for these shares must not be more than 10% above or below the quoted share price, not taking into account any ancillary transaction costs.

Purchase and holdings of treasury shares

In fiscal year 2021, 150,000 shares (previous year: 0 shares) were purchased for a total price of €31 million. The average purchase price amounted to €207.97 per share. The shares purchased by MTU in the reporting year and in previous years still serve the purpose of granting shares in connection with the employee stock option program (MAP) and under the Restricted Stock Plan (RSP). In the reporting period, 0 shares (previous year: 17,573 shares) were sold to Executive Board members under the Restricted Stock Plan (RSP) and a further 10,437 shares (previous year: 26,069 shares) were sold to senior managers. A total of 113,885 shares (previous year: 145,018 shares) were sold to Group employees in the fiscal year under the employee stock program (MAP), of which 11,114 shares (previous year: 12,645 shares) were sold to eligible senior managers.

Reconciliation of weighted average number of outstanding shares

In fiscal year 2021, the weighted average number of outstanding shares totaled 53,325,298 (previous year: 52,985,567). A total of 53,355,960 shares in MTU Aero Engines AG, Munich, were in circulation as of December 31, 2021 (previous year: 53,277,849 shares). The company held 80,088 treasury shares as of December 31, 2021 (previous year: 54,410 shares).

Accumulated other comprehensive income

Accumulated other comprehensive income decreased by €41 million to €-345 million (previous year: €-304 million) in fiscal year 2021. This was principally due to the decrease in the fair values of cash flow hedges used in the hedging of foreign currencies due to the valuation at closing date, and was partially offset by the gains arising from the translation of the financial statements of foreign entities and actuarial gains on the measurement of pension provisions.

The table below shows the income and expenses recognized in other comprehensive income, including the associated deferred taxes:

[T83] Items recognized in other comprehensive income

in € million	2021 Before	2021 income taxes	2021 After	2020 Before	2020 income taxes	2020 After
Translation differences arising from the financial statements of foreign entities accounted for using the equity method	28		28	-10		-10
Translation differences arising from the financial statements of other consolidated foreign entities	34		34	-51		-51
Translation differences arising from the financial statements of foreign entities	**62**		**62**	**-60**		**-60**
Actuarial gains/losses on pension obligations and plan assets	39	-12	26	-47	15	-32
Financial instruments designated as cash flow hedges for companies not accounted for using the equity method	-150	48	-102	148	-47	101
Financial instruments designated as cash flow hedges for companies accounted for using the equity method	-3		-3	5		5
Changes in the fair value of equity investments	-6		-6	2		2
Income and expense recognized in other comprehensive income	**-59**	**35**	**-24**	**48**	**-32**	**16**

Disclosures relating to capital management

MTU strives to maintain a strong financial profile in the interests of assuring the company's continuation as a going concern and its financial flexibility, as well as ensuring confidence on the part of its shareholders and lenders. As part of its capital management, the company observes the statutory requirements on capital maintenance. There are no further statutory capital requirements. In general, the dividend policy is based on distributing between 30% and 40% of the adjusted annual net income to shareholders if the financial situation permits and the corporate bodies approve. The Group's capital management activities are focused on optimizing the balance between equity and net financial debt. A description of the financial indicators MTU is obliged to meet in the context of its liabilities to banks can be found in *Note 28 "Financial liabilities."*

25. Pension provisions

Defined benefit plans and defined contribution plans are in place for MTU employees. For Group companies in Germany, these benefits are financed primarily by provisions recognized in the financial statements, which are covered only to a small extent by plan assets. In contrast, MTU Maintenance Canada Ltd., Richmond, Canada, has a funded retirement benefit plan.

Defined contribution plans

Since January 1, 2007, no direct pension commitments have been granted to new employees in Germany other than senior managers. Instead, MTU paid contributions in the amount of €3 million in the reporting period (previous year: €3 million) to an external pension fund for employees who joined the company after that date. In addition, MTU provides direct insurance contracts funded by employee contributions.

Employer's contributions to the state pension scheme in fiscal year 2021 totaled €52 million (previous year: €52 million).

Defined benefit plans

The pension obligations of MTU are measured using the projected unit credit method in accordance with IAS 19, taking account of future salary and pension increases and other adjustments expected to be made to benefits and pension plans. The provision for defined benefit plans recognized in the balance sheet corresponds to the present value of the benefits payable for current and past service (the defined benefit obligation) of beneficiaries less the fair value of plan assets at the reporting date. An extensive actuarial analysis is carried out annually for each pension plan by independent actuaries.

Actuarial gains or losses may arise in connection with increases or decreases either in the present value of the defined benefit obligation or in the fair value of plan assets. Causes of actuarial gains or losses include the effect of changes in measurement parameters, changes in the assessment of risks on pension obligations, and differences between the actual return on plan assets and the proportional share of interest on the net liability.

In order to calculate the funding status and the pension obligation recognized, the present value of unfunded and funded obligations is offset against the fair value of the plan assets. In Germany, there are no legal or regulatory minimum funding requirements.

The present value and funding status of the defined benefit obligation is as follows:

[T84] Present value of defined benefit obligation (DBO)

in € million	Dec. 31, 2021	Dec. 31, 2020
Present value of unfunded pension obligations	948	1,009
Fair value of plan assets	-0	-0
Total Germany	**948**	**1,009**
Present value of funded pension obligations	28	27
Fair value of plan assets	-28	-28
Total other countries (negative value = plan asset surplus)	**-0**	**-1**
Recognized pension obligations (net)	**948**	**1,009**

The following parameters were applied to measure the pension obligations as of December 31 of the respective year and to measure the pension plan expense in the respective reporting period:

[T85] Actuarial assumptions: Germany

in %	Dec. 31, 2021	Dec. 31, 2020
Interest rate for accounting purposes	0.86	0.39
Salary trend	2.50	2.50
Pension trend	1.80	1.50

[T86] Actuarial assumptions: other countries

in %	Dec. 31, 2021	Dec. 31, 2020
Interest rate for accounting purposes	3.25	2.50
Salary trend	3.00	3.00
Pension trend	2.50	2.50

The market yields on high-quality, fixed-interest corporate bonds with similar maturities in Germany increased compared with the previous year. In view of the duration of the obligations, which currently stands at 10 years, pension obligations were discounted as of December 31, 2021, applying a discount rate of 0.86%. The mortality tables issued by Prof. Dr. Heubeck (RT 2018G) were used to measure the pension plan obligations in Germany. For Group companies in other countries, up-to-date mortality assumptions for each country were applied. The expected salary trend refers to the expected rate of increase in salaries and other compensation, which is estimated based on inflation, the length of service of employees within the Group, as well as other factors. Like the development of the discount rate, the salary and pension trends still take account of the expected macroeconomic impact in connection with the Covid-19 pandemic. Employee turnover, mortality rates and disability risk were estimated on the basis of statistical data.

The present value of pension obligations changed as follows in the fiscal year:

[T87] Present value of pension obligations

in € million	2021	2020
Defined benefit obligation as of Jan. 1	**1,037**	**1,004**
Current service cost	13	17
Past service cost	2	1
Pension plan subscriber contributions	4	5
Interest expense	5	8
Translation differences	2	-2
Actuarial gains (-)/losses (+)		
Financial assumptions	-50	47
Assumptions based on experience	9	0
Plan settlements/transfers	-20	-24
Pension benefit and capital payments	-25	-21
Defined benefit obligation as of Dec. 31	**976**	**1,037**

The actuarial losses arising from updated assumptions based on experience relate in particular to the empirical behavior of beneficiaries of the company pension scheme when choosing the mode of payment.

The obligations resulting from plan settlements/transfers are attributable to the conversion of pension benefits into fixed-sum payments and the Group's employee turnover rate.

Plan assets changed as follows in the fiscal year:

[T88] Fair value of plan assets

in € million	2021	2020
Fair value as of Jan. 1	**28**	**30**
Interest income on plan assets	1	1
Actuarial gains/losses (-)	-2	1
Translation differences/transfers	2	-2
Employer contributions	0	0
Pension benefit payments	-2	-2
Fair value as of Dec. 31	**28**	**28**

[T89] Breakdown of plan assets

in %	2021	2020
Acquired pension benefits	68.8	70.2
Fixed-interest securities	25.0	23.9
Shares	6.2	5.9
Total plan assets	**100.0**	**100.0**

The structure of the plan assets is reviewed annually to optimize the risk and return of the assets invested and adjusted if necessary. The pension fund's statement of principles defines restrictions to be observed when choosing investments; the investment policy was unchanged from previous years.

The expense from defined benefit pension plans and similar obligations recognized in the income statement for the reporting period comprises the following items:

[T90] Expense from defined benefit pension plans and similar obligations

in € million	2021	2020
Current service cost	13	17
Past service cost	2	1
Service cost	**14**	**18**
Interest cost on pension provisions	5	8
Interest income on plan assets	-1	-1
Net interest cost	**4**	**7**
Interest cost on liabilities from pension capital	**2**	**2**
Total expense	**21**	**27**

Current and past service costs are recognized under personnel expenses. The other components of the pension expense recognized in the income statement are included in other financial income/expense. The measurement effects related to actuarial gains and losses are recognized in total comprehensive income as part of other comprehensive income.

Expected future pension benefit payments

In the coming years, the Group expects to settle its pension provisions and liabilities through the following series of payments:

[T91] Expected yearly amount of pension benefit payments

in € million	2022	2023	2024	2025
Expected yearly amount of pension benefit payments	28	31	35	39

The disclosures on the expected payment of pension benefits take into account the method of payment agreed as of the reporting date or, alternatively, the standard contractual terms; in the case of Executive Board members this is normally a lump sum and for other employees payment in installments.

The main actuarial assumptions used to calculate the defined benefit obligation (DBO), apart from the mode of payment, are the discount rate, salary and pension trends, and assumed life expectancy. The following sensitivity analysis shows how the DBO would have been influenced by potential changes in the underlying assumptions:

[T92] Sensitivity analysis of the defined benefit obligation

in € million	2021	2020
Discount rate 50 basis points higher	–56	–63
Discount rate 25 basis points lower	30	33
Pension trend 50 basis points higher	11	11
Assumed life expectancy year longer	13	13

There are interdependencies between certain actuarial assumptions, especially between changes in the discount rate and the expected pension and salary trends. The sensitivity analysis does not take these interdependencies into account.

26. Income tax liabilities

The income tax liabilities comprise German corporation and municipal trade tax plus income taxes for Group companies outside Germany.

[T93] Income tax liabilities

in € million	2021	2020
As of Jan. 1	**5**	**5**
Utilized	–5	–5
Allocated	9	5
As of Dec. 31	**9**	**5**

Income tax liabilities are due within one year.

27. Other provisions

[T94] Other provisions

in € million	Total		Non-current		Current	
	Dec. 31, 2021	Dec. 31, 2020	Dec. 31, 2021	Dec. 31, 2020	Dec. 31, 2021	Dec. 31, 2020
Warranty obligations and risks from pending losses on onerous contracts	24	28			24	28
Personnel obligations	85	33	14	14	71	19
Obligations relating to restructuring measures	7	27	0	5	7	22
Outstanding invoices	107	103	49	45	58	58
Other liabilities	12	8			12	8
Total other provisions	**236**	**198**	**63**	**64**	**173**	**134**

Non-current other provisions developed as follows:

[T95] Non-current other provisions 2021

in € million	As of Jan. 1, 2021	Transferred	Utilized	Reversed	Allocated	Discount reversed	As of Dec. 31, 2021
Personnel obligations	14	-3	-1		5	-0	14
Obligations relating to restructuring measures	5	-5	-0		1		0
Outstanding invoices	45			-11	14		49
Total non-current other provisions	**64**	**-8**	**-2**	**-11**	**20**	**-0**	**63**

The following cash outflows are expected from the carrying amounts of non-current other provisions:

[T96] Expected cash outflow from non-current other provisions

in € million	Carrying amount as of Dec. 31, 2021	Expected cash outflow 2023
Personnel obligations	14	4
Obligations relating to restructuring measures	0	
Outstanding invoices	49	6
Total expected cash outflow from non-current other provisions	**63**	**10**

[T97] Expected cash outflow from non-current other provisions

in € million	Carrying amount as of Dec. 31, 2020	Expected cash outflow 2022
Personnel obligations	14	5
Obligations relating to restructuring measures	5	5
Outstanding invoices	45	43
Total expected cash outflow from non-current other provisions	**64**	**53**

MTU expects that the above obligations will become due for payment within the next five years.

Current other provisions developed as follows:

[T98] Current other provisions 2021

in € million	As of Jan. 1, 2021	Transferred	Utilized	Reversed	Allocated	Currency translation differences	As of Dec. 31, 2021
Warranty obligations and risks from pending losses on onerous contracts	28		-17	-4	17	0	24
Personnel obligations	19	3	-14	-1	64	0	71
Obligations relating to restructuring measures	22	-6	-9		0		7
Outstanding invoices	58		-11	-6	17		58
Other liabilities	8		-6	-2	12	0	12
Total current other provisions	**134**	**-4**	**-56**	**-13**	**110**	**1**	**173**

The cash outflows relating to current other provisions are expected to be realized in the calendar year following the reporting period.

Warranty obligations and risks from pending losses on onerous contracts

The main component of this item of provisions is an amount of €24 million (previous year: €28 million) for liabilities associated with warranty obligations in connection with the delivery of goods and services.

MTU has identified a small amount of onerous contracts in its commercial maintenance business (MRO) in which the unavoidable costs of fulfilling contractual obligations are higher than the expected inflow of economic benefits from these contracts. A provision of €3 million (previous year: €3 million) was recognized to cover the difference.

Obligations relating to restructuring measures

Obligations relating to restructuring measures result from the restructuring program initiated in 2020. The obligations principally comprise benefits granted to employees to realize pre-retirement part-time working and early retirement arrangements and other agreements on the termination of employment contracts.

Personnel obligations

The provisions for personnel expenses include provisions for long-service awards amounting to €3 million (previous year: €4 million) and provisions for pre-retirement part-time working arrangements based on the collective agreement on phased retirement and related works agreements. On the basis of these agreements, obligations amounting to €13 million (previous year: €12 million) were recognized at the end of the reporting period. The obligation takes account of relevant plan assets amounting to €11 million (previous year: €11 million). The item also includes provisions for profit-sharing bonuses, which amounted to €63 million (previous year: €12 million). They relate to short-term incentive (STI) awards to the Executive Board and senior managers as well as to the bonus for staff not covered by the collective wage agreement and the profit-sharing bonus for employees covered by the collective wage agreement.

The Executive Board members and senior managers receive target direct compensation comprising non-performance-related components (fixed compensation and fringe benefits) and performance-related components. The performance-related components are divided into the STI, as a performance-related component with no long-term incentive effect, and the Restricted Stock Plan, as a performance-related component with a long-term incentive effect.

The STI is based on the extent to which the Group's KPI targets are met, adjusted EBIT and free cash flow, and, in the case of the Executive Board, a discretionary factor based on achieving ESG targets.

The Restricted Stock Plan entails a cash payment, which must be immediately re-invested in MTU shares. These shares are subject to a specific vesting period, defined according to the beneficiary's rank in the management hierarchy. The target compensation granted for the purchase of shares essentially depends on the proportionate target direct compensation weighted by the average STI payment calculated over a period of several years and, in the case of the Executive Board, also from the relative total shareholder return performance of the MTU share calculated over a period of several years.

Detailed explanatory notes on the compensation system for members of the Executive Board are provided in the *Management compensation report in the section headed "The MTU share."*

Outstanding invoices

Outstanding invoices include, in particular, accruals for cost of sales components in the form of outstanding invoices arising in particular from contracts with suppliers and service providers.

In the case of leases where MTU is obligated to meet specific maintenance conditions before returning the aircraft engine, the performance obligations on the reporting date are recognized as a liability. This is measured at the nominal value of the expected future maintenance costs to satisfy the return conditions set out in the lease. These provisions are at times of a long-term nature.

Other liabilities

This item includes a multitude of accrued liabilities which, considered individually, are judged to be of immaterial importance.

28. Financial liabilities

[T99] Financial liabilities

in € million	Total		Non-current		Current	
	Dec. 31, 2021	Dec. 31, 2020	Dec. 31, 2021	Dec. 31, 2020	Dec. 31, 2021	Dec. 31, 2020
Bonds and notes	604	603	595	593	9	9
Convertible bonds	529	538	529	538	0	0
Promissory note		100				100
Financial liabilities arising from increased or new stakes in engine programs	142	138	107	109	35	29
Financial liabilities to banks						
Note purchase agreement		30				30
Financial liabilities to related companies	0	0			0	0
lease liabilities	176	177	108	132	68	45
Total gross financial debt	**1,451**	**1,586**	**1,338**	**1,372**	**113**	**214**
Derivatives without hedging relationship		0				0
Derivatives with hedging relationship	58	0	30		28	0
Personnel-related financial liabilities	111	91	69	62	41	30
Miscellaneous other financial liabilities	44	44		0	44	44
Total other financial liabilities	**212**	**135**	**99**	**62**	**113**	**74**
Total financial liabilities	**1,663**	**1,722**	**1,437**	**1,434**	**226**	**288**

Gross financial debt

Bonds and notes

Registered bond

MTU Aero Engines AG issued a registered bond on June 12, 2013, for a total nominal amount of €100 million. The registered bond is repayable on June 12, 2028, and is subject to interest of 3.55% p.a. Interest is payable in arrears on June 12 of each year, for the first time on June 12, 2014. The registered bond, net of transaction costs and including a discount of €3 million, is measured at amortized cost.

Corporate bond

On July 1, 2020, MTU Aero Engines AG issued an unsecured corporate bond with a nominal value of €500 million. The bond matures in five years on July 1, 2025, and is available in units of €1,000. The coupon is 3.0% p.a., payable annually in arrears. The bond is rated by Moody's (Baa3) and Fitch (BBB) and is listed on the regulated market on the Luxembourg Stock Exchange.

Convertible bonds

In 2016, MTU Aero Engines AG issued a senior unsecured convertible bond for a total nominal amount of €500 million. This bond is convertible into registered non-par-value shares in MTU.

The convertible bond has an original maturity of seven years and is divided into units of €100,000. It bears a nominal interest rate of 0.125% p.a., payable annually in arrears.

Bondholders have been entitled to convert their convertible bonds into common shares of MTU Aero Engines AG at any time since June 27, 2016. The initial conversion price was set at €124.7701, which represents a premium of 50% on the reference rate.

Under the terms of issue of the convertible bond, MTU has the right to recall the issued bond units at their nominal value (plus accrued unpaid interest) at any time on or after June 16, 2020, subject to a period of notice of minimum 30 days and maximum 60 days, either (i) if the quoted price of the common share rises to or above 130% of the applicable conversion price over a defined period, or (ii) if no more than 20% of the nominal value of the convertible bond issue is outstanding. In the event of such cancellation by MTU, and within the above-mentioned notice period, the bondholders have the right to request that MTU convert their bonds into shares, rather than repurchase them.

On September 10, 2019, MTU Aero Engines AG bought back from its creditors a nominal amount of €275 million of the convertible bond issued in 2016, which it canceled with value date September 30, 2019. Moreover, in 2021 MTU Aero Engines AG received further conversion notices from creditors of this convertible bond with a nominal amount of €13 million (2020: €29 million; 2019: €135 million). The nominal amount outstanding was thus €48 million as of December 31, 2021 (previous year: €61 million).

In 2019, MTU Aero Engines AG issued a senior unsecured convertible bond for a total nominal amount of €500 million at an issue price of 103%. This bond is convertible into registered non-par-value shares in MTU.

The convertible bond has an original maturity of 7.5 years and is divided into units of €100,000. It bears an interest rate of 0.05% p.a., payable annually in arrears.

Bondholders have been entitled to convert their bonds into common shares of MTU Aero Engines AG at any time from September 18, 2024, onward. The initial conversion price was set at €378.4252, which represents a premium of 55% on the reference rate.

Under the terms of issue of the convertible bond, MTU has the right to recall the issued bond units at their nominal value (plus accrued unpaid interest) at any time on or after April 8, 2025, subject to a period of notice of minimum 30 days and maximum 60 days, either (i) if the quoted price of the common share rises to or above 130% of the applicable conversion price over a defined period, or (ii) if no more than 20% of the nominal value of the convertible bond issue is outstanding. In the event of such cancellation by MTU, and within the above-mentioned notice period of minimum 30 and maximum 60 days, the bondholders have the right to request that MTU convert their bonds into shares, rather than repurchase them.

For information on the effect of transactions with the convertible bonds on the company's subscribed capital and capital reserves, see Note 24 "Equity."

Promissory note

The promissory note issued in 2020 with a nominal value of €100 million was repaid at maturity on June 10, 2021.

Financial liabilities arising from increased or new stakes in programs

These items include the deferred payment components arising from the increase in the stake in IAE-V2500 and the acquisition of shares in new engine programs. The latter are referred to in the following as financial liabilities arising from increased or new stakes in engine programs. Please refer to Note 17 "Acquired program assets, development work and other assets" in regard to the corresponding program assets.

Financial liabilities arising from the increase in the stake in IAE-V2500

The agreement signed by MTU in fiscal year 2012 in order to increase its stake in the IAE-V2500 engine program by five percentage points to 16% included a deferred payment component contingent upon the number of flight hours performed over the next 15 years by the V2500 engine fleet in service at the time of the stake increase.

Other financial liabilities arising from the acquisition of stakes in programs

The other financial liabilities arising from the acquisition of stakes in programs mainly relate to program lifetime-related payments for the acquisition of shares in commercial engine programs, which are deemed to represent financing transactions in view of their long-term nature.

Financial liabilities to banks

Note purchase agreement

The note purchase agreement with a nominal value of €30 million was repaid at maturity on March 27, 2021.

Revolving credit facility

The company has concluded a revolving credit facility with five banks. This credit facility amounted to €600 million in 2019. On May 11, 2020, it was increased by €100 million to €700 million. This increase ran for one year and could have been extended twice by six months in each case at the company's request. The increase expired without exercise of the extension option. The original €600 million revolving credit facility still runs until October 28, 2023. €42 million of this credit facility had been drawn down in the form of guarantees as of December 31, 2021 (previous year: €35 million). The remaining available amount of €558 million (previous year: €665 million) ensures the Group's financial flexibility in the medium term.

MTU has undertaken to ensure that certain financial indicators remain within defined covenants throughout the term of the revolving credit facility as follows: MTU's gearing (consolidated net financial debt in relation to adjusted EBITDA) at the end of each quarter shall not exceed 3.0; the times interest earned ratio (adjusted EBITDA in relation to the consolidated net interest expense) at the end of each quarter shall not fall below 4.0.

Lease liabilities

The lease liabilities, which are recognized using the effective interest method, correspond to the accrual of right-of-use assets for procurement leases. More information can be found in *Note 36 "Leases"* and in *Section I. "Accounting policies and principles" under "IFRS 16 Leases."*

Changes in gross financial debt are shown in the following tables:

[T100] Changes in gross financial debt

			Non-cash items				
in € million	As of Jan. 1, 2021	Deposits and withdrawals	Addition	Interest	Transfer/ other	Currency translation differences	As of Dec. 31, 2021
Bonds and notes	603	-19		20			604
Convertible bond 2016	60	-0		0	-13		47
Convertible bond 2019	478	-0		4			482
Promissory note	100	-100					0
Financial liabilities arising from increased or new stakes in engine programs	138	-25	21	4	0	4	142
Financial liabilities to banks							
Note purchase agreement	30	-30		0			0
Financial liabilities to related companies	0		0				0
lLease liabilities	177	-34	42		-19	9	176
Total gross financial debt	**1,586**	**-207**	**63**	**28**	**-31**	**13**	**1,451**

[T101] Changes in gross financial debt

				Non-cash items				
in € million	As of Jan. 1, 2020	Deposits and withdrawals	Addition	Interest	Transfers	Currency translation differences	Effect of measurement at fair value	As of Dec. 31, 2020
Bonds and notes	100	494		8				603
Convertible bond 2016	88			1	–29			60
Convertible bond 2019	475			4				478
Promissory note		100						100
Financial liabilities arising from increased or new stakes in engine programs	300	–56		9	8	–11	–112	138
Financial liabilities to banks								
Note purchase agreement	30			0				30
Other liabilities to banks	10	–10		–0		–0		
lLease liabilities	147	–41	88		–8	–9		177
Total gross financial debt	**1,150**	**487**	**88**	**22**	**–29**	**–19**	**–112**	**1,586**

Other financial liabilities

Liabilities from derivatives

The increase in financial liabilities from derivatives to €58 million (previous year: €0 million) is mainly attributable to a decrease in the fair value of forward foreign exchange contracts due to the development of the U.S. dollar exchange rate relative to the agreed hedging rates.

Personnel-related financial liabilities

Personnel-related financial liabilities of €111 million (previous year: €91 million) result primarily from pension capital claims of €78 million (previous year: €70 million) arising from direct pension commitments under the company pension scheme.

In addition, obligations under the employee stock option program (MAP) of €12 million (previous year: €11 million), which the Executive Board of MTU Aero Engines AG, Munich, offered again in fiscal year 2021, are also reported here. Under the employee stock option program (MAP), MTU offers all eligible employees within and outside of the collective wage agreement and members of senior management the opportunity to invest in MTU shares. At the end of a two-year vesting period, employees within and outside of the collective wage agreement receive a taxable "matching" payment corresponding to 50% of the amount invested by the employee in MTU shares at the beginning of the program. Members of senior management receive a taxable "matching" payment at the end of the two-year vesting period corresponding to one-third of the amount individually invested.

The number of shares sold to Group employees under the terms of the employee stock option program (MAP) in fiscal years 2021 and 2020 was as follows:

[T102] Employee stock option program (MAP)

Issue date	Number of shares sold	Average purchase cost (in € million)	Total proceeds of sale (in € million)	Selling price per share (in €)
June 2021	113,885	17	23	205.30
June 2020	145,018	7	23	161.00

The total expense for the "matching" payment in connection with the employee stock option program (MAP) in fiscal year 2021 amounted to €10 million (previous year: €9 million).

The shares transferred to the employees, measured at the average acquisition cost, were removed from the equity item "treasury shares." The difference of €7 million (previous year: €16 million) between the proceeds of the sale and the original acquisition cost was allocated to the capital reserves.

Miscellaneous other financial liabilities

This item is used to present numerous liabilities that are immaterial when viewed separately such as customer credit balances.

29. Trade payables

[T103] Trade payables

in € million	Dec. 31, 2021	Dec. 31, 2020
Accounts payable to:		
Third parties	162	166
Related companies	3	3
Total trade payables	**165**	**169**

Trade payables include open purchase invoices and accruals for purchased goods and services.

The total amount of trade payables is due in less than one year.

30. Contract liabilities

The contract liabilities contain advance payments by customers for the delivery of engine modules and components and for maintenance services. Changes in the reporting period were due to lower advance payments received in the military OEM business and to the change in the U.S. dollar exchange rate from U.S.$/€ 1.23 in the previous year to U.S.$/€ 1.13 at the end of the 2021 fiscal year.

31. Refund liabilities

[T104] Refund liabilities

	Total		Non-current		Current	
in € million	Dec. 31, 2021	Dec. 31, 2020	Dec. 31, 2021	Dec. 31, 2020	Dec. 31, 2021	Dec. 31, 2020
Warranty and liability risks	269	462	0	0	269	462
Invoice corrections / subsequent costs	1,489	1,130	0	9	1,489	1,121
Total refund liabilities	**1,758**	**1,593**	**0**	**9**	**1,758**	**1,583**

Refund liabilities for warranty and liability risks correspond to compensation obligations arising in connection with MTU's stakes in commercial engine programs (OEM) as a consortium member.

Refund liabilities arise in particular from the multi-step invoicing system for commercial engine programs (OEM). Sales typically occur under commercial engine programs, particularly:

/ delivery of new engines to aircraft manufacturers
/ delivery of spare parts to MRO service providers, and
/ provision of repair and maintenance services to airlines and leasing companies,

with reference to the catalog list price. Regular supplementary agreements of the consortium leader (OEM) with its customers serve to regularly grant effective discounts as the program's supplies and services are utilized.

New parts business: Series engines are sold to the aircraft manufacturer at the catalog list price which sells the total aircraft – aircraft including engine – to an airline for a total price. The engine program in turn regularly grants the procuring airline a corresponding credit (fleet introductory allowance) for selecting the respective engines for its aircraft. As a consortium partner, MTU participates in this invoicing sequence initially through its share in the sale to the aircraft manufacturer and the subsequent credit to the airline. In regard to revenue realization, the previously mentioned transactions are settled in profit or loss by accruing a refund liability.

Spare parts business: In this case, spare parts are sold at the catalog list price to the MRO service provider who combines the spare parts with repair and assembly services in the course of performing engine maintenance and repair services and markets this bundled service (shopvisit) to an engine owner or operator (e.g., airline, leasing company). The engine program in turn regularly grants the engine owner or operator procuring maintenance and repair services a corresponding credit (warranty or goodwill) based on the existence of pre-existing damage to or remaining lifecycles of engine parts, etc. As a consortium partner, MTU participates in this invoicing sequence initially through its share in the sale of spare parts to the MRO service provider and the subsequent credit to the aircraft owner or operator. In regard to revenue realization, the previously mentioned transactions are settled in profit or loss by accruing a refund liability.

To this extent, the changes in the balances of the refund liabilities correspond to the growth of stakes in commercial engine programs and their revenue structure – share of new engine and spare parts business and their respective profitability. Invoicing in connection with commercial engine programs continues to be in U.S. dollar. Consequently, changes in the exchange rate at the reporting date are a key driver of the measurement of liability balances due to their monetary character.

They fell mainly in relation to the consortium stake in GTF engine programs. In the case of the PW1100G-JM, in particular, the technical improvements to engine components and modules realized in the reporting period and the previous year and retrofitting of the engine fleet currently in service improved the assessment of the profitability of the PW1100G-JM series and aftermarket business compared with previous periods.

The refund liabilities for invoice corrections/subsequent costs relate primarily to retroactive adjustments to the prices in contracts with customers, for which retroactive price corrections are carried out regularly in keeping with the invoicing practices for commercial engine program shares. Settlement of these price corrections was still outstanding as of the reporting date. Another significant portion of these liabilities comprises marketing expenses for commercial engine programs for which a final invoice has not yet been issued by the consortium leader (OEM) but which already have economic substance. The increase in the reporting period corresponds to the sharp increase in operating business as of the reporting date and the stronger U.S. dollar exchange rate.

In line with invoicing practice for commercial engine programs (OEM), retrospective adjustments in the shares of variable program profits allocated by the OEM as of the reporting date are systematically expected; consequently the management is required to make the corresponding estimates. These estimates have to take account of the influence of the Covid-19 pandemic, the climate debate and effects in connection with geopolitical risks, particularly those arising from Russia's military attack on Ukraine on commercial air traffic and thus on the development of conditions for commercial program investments, especially in respect to the spare parts or aftermarket business. Given the complexity of these parameters, equally reliable and meaningful sensitivity data does not have to be mapped correctly either for individual engine programs or at company level. For more information, see *Section I. "Accounting policies and principles – Refund liabilities" and "Accounting policies and principles – Discretionary scope, measurement uncertainties and sensitivity."*

32. Other liabilities

[T105] Other liabilities

in € million	Total		Non-current		Current	
	Dec. 31, 2021	Dec. 31, 2020	Dec. 31, 2021	Dec. 31, 2020	Dec. 31, 2021	Dec. 31, 2020
Personnel-related liabilities						
Social security	1	1			1	1
Other personnel-related liabilities	23	17			23	17
Other tax liabilities	24	14			24	14
Other liabilities	14	2	9	0	4	1
Total other liabilities	**62**	**34**	**9**	**0**	**53**	**34**

Personnel-related liabilities

Other personnel-related liabilities in particular concern vacation entitlements and flex-time credits. The changes in the reporting period correspond in particular with the phase-out of cost-cutting measures initiated in the previous year to offset the burden of the Covid-19 pandemic.

Other tax liabilities

The tax liabilities relate to payable wage and church taxes, solidarity surcharges, and transactional taxes.

Other liabilities

Other liabilities concern deferred income.

33. Additional disclosures relating to financial instruments

Carrying amounts, measurement/recognition methods and fair value by measurement category
In the following overview, the carrying amounts of financial instruments are aggregated by measurement category. The information presented also includes separate amounts for each measurement category as a function of the measurement/recognition method applied.

Finally, the carrying amounts of the measurement categories are set opposite the fair values for comparison.

The financial instruments presented in the table that are not within the scope of either IFRS 7 or IFRS 9 relate to personnel-related liabilities and the corresponding plan assets accounted for in accordance with IAS 19.

[T106] Disclosures relating to financial instruments
Carrying amounts, measurement/recognition methods and fair values as of Dec. 31, 2021

in € million	Carrying amount as of Dec. 31, 2021	Amount carried in balance sheet			Amount carried in balance sheet IFRS 16	Financial instruments not within the scope of IFRS 9 or IFRS 7	Total	Fair value as of Dec. 31, 2021
		Measured at amortized cost	Fair value through other comprehensive income	Fair value through profit or loss				
ASSETS								
Financial assets								
Loans and receivables	234	231				3	234	234
Other interests in related companies	7		7				7	7
Trade receivables	946	946					946	946
Derivative financial assets								
Derivatives without hedging relationship	2			2			2	2
Derivatives with hedging relationship	6		6				6	6
Cash and cash equivalents	722	722					722	722
EQUITY AND LIABILITIES								
Refund liabilities	1,758	1,758					1,758	1,758
Trade payables	165	165					165	165
Financial liabilities								
Bonds and notes	604	604					604	659
Convertible bonds (2016 and 2019)	529	529					529	543
Financial liabilities arising from increased or new stakes in engine programs	142	142					142	147
Financial liabilities to related companies	0							
Lease liabilities	176				176		0	0
Derivative financial liabilities								
Derivatives with hedging relationship	58		58				58	58
Other financial liabilities	154	44				111	154	154

[T107] Disclosures relating to financial instruments
Carrying amounts, measurement/recognition methods and fair values as of Dec. 31, 2020

in € million	Carrying amount as of Dec. 31, 2020	Amount carried in balance sheet			Amount carried in balance sheet IFRS 16	Financial instruments not within the scope of IFRS 9 or IFRS 7	Total	Fair value as of Dec. 31, 2020
		Measured at amortized cost	Fair value through other comprehen-sive income	Fair value through profit or loss				
ASSETS								
Financial assets								
Loans and receivables	101	94				7	101	101
Other interests in related companies	27		27				27	27
Trade receivables	969	969					969	969
Derivative financial assets								
Derivatives without hedging relationship	1			1			1	1
Derivatives with hedging relationship	109		109				109	109
Cash and cash equivalents	773	773					773	773
EQUITY AND LIABILITIES								
Refund liabilities	1,593	1,593					1,593	1,593
Trade payables	169	169					169	169
Financial liabilities								
Bonds and notes	603	603					603	666
Convertible bonds (2016 and 2019)	538	538					538	614
Promissory note	100	100					100	100
Financial liabilities arising from increased or new stakes in engine programs	138	138					138	146
Financial liabilities to banks	30	30					30	30
Lease liabilities	177				177		177	177
Derivative financial liabilities								
Derivatives with hedging relationship	0		0				0	0
Other financial liabilities	135	44				91	135	135

The financial assets and liabilities carried at amortized cost contain cash and cash equivalents, trade receivables, other receivables, trade payables and other liabilities which are generally due within a relatively short time. The carrying amounts of these assets and liabilities therefore correspond approximately to their fair value at the reporting date.

The fair value of the financial assets and liabilities measured at fair value was derived from stock market prices or, alternatively, using a discounted cash flow method.

Classification of fair value measurements of financial assets and liabilities according to the fair value hierarchy

To take account of the relevance of the estimated parameters used in the measurement of financial assets and liabilities measured at fair value, MTU's financial assets and liabilities are allocated to three levels.

The three levels of the fair-value hierarchy are described below, together with their utilization when measuring financial assets and liabilities:

Level 1 Quoted prices in active markets for identical assets or liabilities (unadjusted input);

Level 2 Prices of assets or liabilities that can be observed directly or indirectly (derived);

Level 3 Unobservable inputs used to measure prices of assets or liabilities.

The convertible bonds (2016 and 2019), which are traded on the stock exchange are carried at amortized cost and the corporate bond were assigned to Level 1, the equity investments carried at fair value through other comprehensive income were assigned to Level 3, and all other qualifying financial instruments were assigned to Level 2.

The following tables show the allocation of financial assets and liabilities measured at fair value to the three levels of the fair value hierarchy for 2021 and 2020:

[T108] Classification within the fair-value hierarchy for the 2021 fiscal year

in € million	Level 1	Level 2	Level 3	Total
Financial assets measured at fair value				
Derivative financial instruments		8		8
Other interests in related companies			7	7
Total financial assets		**8**	**7**	**15**
Financial liabilities measured at fair value				
Derivative financial instruments		58		58
Total financial liabilities		**58**		**58**

[T109] Classification within the fair-value hierarchy for the 2020 fiscal year

in € million	Level 1	Level 2	Level 3	Total
Financial assets measured at fair value				
Derivative financial instruments		110		110
Other interests in related companies			27	27
Total financial assets		**110**	**27**	**137**
Financial liabilities measured at fair value				
Derivative financial instruments		0		0
Total financial liabilities		**0**		**0**

The fair value of the derivative financial instruments assigned to Level 2 and the equity investments assigned to Level 3 is measured using a discounted cash flow (DCF) method. In the case of equity investments, internal planning calculations and market data were used to derive the discount rate.

Payment cash flows for financial liabilities

The following tables list the contractually agreed interest and principal payments for the financial liabilities.

[T110] Payment cash flows for financial liabilities 2021

		Cash flow 2022			Cash flow 2023			Cash flow 2024			Cash flow 2025 and subsequent years		
in € million	**Carrying amount as of Dec. 31, 2021**	Fixed interest	Variable interest	Principal	Fixed interest	Variable interest	Principal	Fixed interest	Variable interest	Principal	Fixed interest	Variable interest	Principal
Refund liabilities	1,758			1,751									8
Trade payables	165			165									
Bonds and notes	604	19			19			19			29		600
Convertible bonds	529	0			0			0		48	1		500
Promissory note													
Financial liabilities arising from increased or new stakes in engine programs	142			35			37			33			37
Financial liabilities to banks	0												
lease liabilities	176	1		69	5		21	5		18	32		33
Derivative financial liabilities													
Derivatives with hedging relationship	58			28			21			9			
Other financial liabilities	154			86			16			13			51

[T111] Payment cash flows for financial liabilities 2020

		Cash flow 2021			Cash flow 2022			Cash flow 2023			Cash flow 2024 and subsequent years		
in € million	Carrying amount as of Dec. 31, 2020	Fixed inter-est	Vari-able inter-est	Princi-pal	Fixed inter-est	Vari-able inter-est	Princi-pal	Fixed inter-est	Vari-able inter-est	Princi-pal	Fixed inter-est	Vari-able inter-est	Princi-pal
Refund liabilities	1,593			1,583			10						
Trade payables	169			169									
Bonds and notes	603	19			19			19			48		600
Convertible bonds	538	0			0			0		90	1		500
Promissory note	100	1		100									
Financial liabilities arising from increased or new stakes in engine programs	138			29			35			35			39
Financial liabilities to banks	30		0	30									
Loans from third parties													
lease liabilities	177	1		46	1		54	1		16	5		62
Derivative financial liabilities													
Derivatives without hedging relationship	0												
Derivatives with hedging relationship	0												
Other financial liabilities	135			75			15			12			45

These include all instruments in the portfolio at the reporting date for which payment terms had been contractually agreed. Amounts reported for derivatives represent net outflows. Amounts denominated in a foreign currency are translated at the exchange rate at the respective reporting date. The variable-rate interest payments on the financial instruments are based on the most recent interest rate fixed prior to the reporting date. Financial liabilities with no fixed repayment date are always assigned to cash flows on the basis of the earliest likely repayment dates.

Within the scope of its partnerships in engine programs, MTU is a party to aircraft financing agreements for the purpose of promoting sales. Such commitments are always made collectively and in favor of the consortium leader (OEM). They are provided in two basic forms: predelivery payments (PDP) and backstop commitments. In both cases, any funds made available to the aircraft purchaser are always transferred directly to the aircraft manufacturer solely by the consortium leader (OEM).

MTU classifies loan commitments granted up to the reporting date totaling a nominal amount, translated into euros, of €746 million (previous year: €733 million) as part of its gross liquidity risk in accordance with the requirements of IFRS 7. However, based on experience, it is considered to be very unlikely that all these nominal loan amounts will actually be utilized to their full extent. This is because the financing terms offered take account of the creditworthiness of the purchaser of the aircraft, based on market practice, through clauses in the credit agreement. The terms for backstop commitments are deliberately prohibitive. In the case of predelivery payments (PDP), the consortium has collateral rights to the aircraft while it is still in production and thus in the possession of the aircraft manufacturer. In the case of backstop commitments, the aircraft is collateral under substantive law. It is to be expected that third parties arrange relevant portions of the financing commitments directly with the purchaser of the aircraft, not least due to the financing conditions.

In addition, as of the reporting date, there were unutilized financing commitments for equity investments in the form of capital contributions or shareholder loans totaling €36 million (previous year: €160 million).

With respect to the notional impact on MTU's liquidity of the financing offers, the company ensures that its credit lines (see *Note 28 "Financial liabilities"*) provide adequate liquidity reserves, even in the unlikely event of all financing offers being taken up at the same time, and considers the possibility of extending these credit lines to back up future financing offers. In the event that loan commitments are utilized, MTU considers the associated liquidity and credit risks to be manageable.

Explanatory comments relating to net gain/loss on financial instruments by measurement category

The tables below show the gains/losses arising from transactions involving financial instruments, aggregated by measurement category, for the reporting period and the previous year. Interest income and expense in connection with financial assets and liabilities that are measured at fair value through profit or loss are not included:

[T112] Net gain/loss on financial assets and liabilities 2021

in € million	from interest	from investments	from remeasurement	Currency translation	Write-down	Net gain / loss 2021
Financial assets measured at cost	2			155	-19	137
Financial assets measured at fair value through other comprehensive income		3				3
Financial assets measured at fair value through profit or loss			3			3
Financial liabilities measured at cost	-25		-9	-211		-245
Financial liabilities measured at fair value through profit or loss			-3			-3
Financial instruments not within the scope of IFRS 7 or IFRS 9	-4	82		3		80
Total	**-28**	**85**	**-8**	**-54**	**-19**	**-24**

[T113] Net gain/loss on financial assets and liabilities 2020

in € million	from interest	from investments	from remeasurement	Currency translation	Write-down	Net gain / loss 2020
Financial assets measured at cost	5			-93	-37	-126
Financial assets measured at fair value through other comprehensive income		2				2
Financial assets measured at fair value through profit or loss			13			13
Financial liabilities measured at cost	-19		-11	175		144
Financial liabilities measured at fair value through profit or loss			-7			-7
Financial instruments not within the scope of IFRS 7 or IFRS 9	-5	69		-28		37
Total	**-19**	**71**	**-5**	**54**	**-37**	**64**

The gain/loss from remeasurement in connection with valuation allowances for financial assets (particularly trade receivables and contract assets) are recognized in selling expenses. Currency translation effects are recognized in revenue or the costs of goods sold depending on the operational nature of the associated financial assets and liabilities. Further information on the impact on profit/loss can be found in *Section II. "Notes to the consolidated income statement."*

Explanatory comments relating to net interest income/expense
The net interest income/expense on financial assets and liabilities includes interest income from long-term loans and interest expenses arising from the corporate bond, the convertible bonds, loan agreements with banks and lease liabilities. The interest relating to financial instruments that are not within the scope of either IFRS 7 or IFRS 9 is recognized in other financial income/expense.

Explanatory comments on net gain/loss from equity investments
The profit contributions from equity investments comprise profit transfers from MTU Versicherungsvermittlungs- und Wirtschaftsdienst GmbH, Munich, Germany, and the military program companies, and the dividends from SMBC Aero Engine Lease B.V., Amsterdam, Netherlands.

Explanatory comments on net gain/loss from remeasurement
The net gain/loss on financial instruments measured at fair value through profit or loss mainly comprises exchange rate gains and losses on derivatives not designated in a hedging relationship and is recognized in other financial income/expense. The amount stated for "financial liabilities measured at amortized cost" mainly results from reversing the discount on this category of financial instruments and is recognized in other financial income/expense.

Explanatory comments on net gain/loss from currency translation
The amounts recognized for currency translation of financial assets and liabilities, measured at cost, result principally from foreign currency measurement of trade receivables, trade payables, and refund liabilities. The amounts relating to receivables are recognized in revenue while the amounts relating to liabilities are recognized in the cost of goods sold.

Explanatory comments on net gain/loss from valuation allowances
Along with additions and disposals to allowance accounts, valuation allowances recognized in profit or loss also include write-downs of receivables for which no valuation allowance has been recognized.

Offsetting financial assets and financial liabilities

The following financial assets and financial liabilities subject to offsetting agreements existed at the reporting date:

[T114] Offset amounts of financial assets and financial liabilities as of Dec. 31, 2021

	(a)	(b)	(c)	(d)	(e) = (c) − (d)
in € million	Gross amounts of recognized financial assets / liabilities	Gross amounts of recognized financial assets / liabilities offset in the balance sheet	Net financial assets / liabilities recognized in the balance sheet	Related amounts not offset in the balance sheet	Net amount
Other assets					
Loans and receivables	234		234		234
Other interests in related companies	7		7		7
Trade receivables	1,324	378	946		946
Derivative financial assets					
Derivatives without hedging relationship	2		2	2	0
Derivatives with hedging relationship	6		6	6	0
Cash and cash equivalents	722		722		722
Refund liabilities	1,758		1,758		1,758
Trade payables	543	378	165		165
Financial liabilities					
Bonds and notes	604		604		604
Convertible bonds	529		529		529
Promissory note	0		0		0
Financial liabilities arising from increased or new stakes in engine programs	142		142		142
Financial liabilities to banks	**0**		**0**		**0**
lease liabilities	176		176		176
Derivative financial liabilities					
Derivatives with hedging relationship	58		58	8	50
Other financial liabilities	154		154		154

[T115] Offset amounts of financial assets and financial liabilities as of Dec. 31, 2020

	(a)	(b)	(c)	(d)	(e) = (c) − (d)
in € million	Gross amounts of recognized financial assets / liabilities	Gross amounts of recognized financial assets / liabilities offset in the balance sheet	Net financial assets / liabilities recognized in the balance sheet	Related amounts not offset in the balance sheet	Net amount
Other assets					
Loans and receivables	144	43	101		101
Other interests in related companies	27		27		27
Trade receivables	1,505	536	969		969
Derivative financial assets					
Derivatives without hedging relationship	1		1		1
Derivatives with hedging relationship	109		109		109
Cash and cash equivalents	773	0	773		773
Refund liabilities	1,653	60	1,593		1,593
Trade payables	687	518	169		169
Financial liabilities					
Bonds and notes	603		603		603
Convertible bond	538		538		538
Promissory note	100		100		100
Financial liabilities arising from increased or new stakes in engine programs	138		138		138
Financial liabilities to banks	30	0	30		30
Finance lease liabilities	177		177		177
Derivative financial liabilities					
Derivatives with hedging relationship	0		0		0
Other financial liabilities	136	0	135		135

The “Related amounts not offset in the balance sheet” presented in the table refer to financial assets and liabilities arising from derivatives that can be offset against debt if the issuer becomes insolvent.

34. Deferred taxes

Deferred tax assets and liabilities arise on temporary differences between the tax bases of assets and liabilities of the individual Group companies and the corresponding carrying amounts in the consolidated balance sheet. Deferred tax assets were also recognized for tax credits and losses available for carry-forward.

Deferred tax assets and liabilities were recognized in OCI in connection with the subsequent measurement of pension obligations and the corresponding plan assets and in connection with the fair value measurement of derivative financial instruments which were part of an effective hedging relationship, and in respect of the difference between the fair value and initial carrying amounts of the equity components of the convertible bonds.

[T116] Changes in deferred tax assets and liabilities

in € million	Dec. 31, 2021 Deferred tax assets in equity	Dec. 31, 2021 Deferred tax liabilities in equity	Dec. 31, 2020 Deferred tax assets in equity	Dec. 31, 2020 Deferred tax liabilities in equity	2021 Tax income / expense (-) in the income statement	2021 Recognized in equity / OCI
Assets						
Intangible assets		216		224	8	-0
Property, plant and equipment	11	92	9	94	4	-0
Financial assets		5	-0	0	-3	-2
Inventories	61		60		1	0
Receivables and other assets[1]	75	51	88	50	-14	-0
Total assets	**146**	**364**	**157**	**368**	**-4**	**-2**
Equity						
Gains and losses from the measurement of derivatives with hedging relationship	18		3	33		48
Equity portion of convertible bond		12		12		
Actuarial gains/losses on pension obligations and plan assets	152		164			-12
Total equity	**170**	**12**	**167**	**45**		**35**
Liabilities						
Pension provisions		20		12	-8	
Other provisions	6	0	4	0	2	0
Liabilities	141		150	0	-9	0
Total liabilities	**148**	**20**	**153**	**12**	**-14**	**0**
Deferred taxes on assets and liabilities	**464**	**397**	**478**	**425**	**-19**	**33**
Tax credits and tax losses available for carry-forward						
Tax credits available for carry-forward	36		34		2	-0
Tax losses available for carry-forward	2		4		-2	0
Valuation allowances and unrecognized recoverable tax payments						
Valuation allowances on tax credits carried forward	-11		-11		-0	0
Valuation allowances on tax losses carried forward		1	-2		1	-0
Temporary differences for which no deferred tax assets were recognized	-13		-11		-2	0
Total tax credits and losses carried forward	**14**	**1**	**14**		**-1**	**-0**
Deferred tax assets/liabilities before offset	**478**	**398**	**492**	**425**	**-20**	**33**
Offset	-395	-395	-425	-425		
Net deferred tax assets/liabilities	**83**	**3**	**67**	**0**	**-20**	**33**

[1] Contains also acquired program assets and development work as well as contract assets.

Please refer to *Note 10 "Income taxes"* for further information relating to current and deferred income tax assets and liabilities resulting from the balance sheet items listed above and to the tax reconciliation between the expected and recognized tax expense.

Tax assets and liabilities are offset against one another only if they relate to the same type of tax levied by the same tax jurisdiction and are due within the same period.

Deferred tax assets were recognized for deferred tax losses/credits available for carry-forward in the case of the following Group companies:

[T117] Deferred tax assets recognized for tax losses/credits available for carry-forward as of Dec. 31

in € million	USA 2021	Poland 2021	Total 2021	Total 2020
Tax credits available for carry-forward	1	35	36	34
Tax losses available for carry-forward	2		2	4
Potential tax impact of tax losses/credits available for carry-forward	**3**	**35**	**38**	**37**
Valuation allowances on tax credits carried forward		-11	-11	-11
Valuation allowances on tax losses carried forward	-1		-1	-2
Deferred tax assets recognized for tax losses/credits available for carry-forward	**2**	**23**	**25**	**25**

USA

As a result of the sale of Vericor Power Systems LLC, Alpharetta, GA, USA, in August 2021, the tax entity in place with MTU Aero Engines North America Inc. (AENA), Rocky Hill, CT, USA, since July 1, 2016, was dissolved. Tax losses available for carry-forward as of December 31, 2021, relate exclusively to state tax, which after the application of valuation allowances amounted to the equivalent of €7 million (previous year: €7 million).

Furthermore, recoverable tax credits are recognized for the tax types that mainly result from development activities. For these recoverable tax credits, deferred tax assets were similarly recognized.

Poland

MTU Aero Engines Polska sp. z o.o. receives government support through Poland's economic development program by virtue of its location in a special economic zone. Because its business investments help to create jobs, the company has been awarded tax credits in respect of the profits it expects to achieve through its production activities, with separate amounts being accorded each year through to 2026. Deferred tax assets amounting to €23 million (previous year: €22 million) were recognized on the basis of the business investments realized up to the reporting date, taking into account the currently expected earnings from the activities for which tax credits were awarded.

In addition to the activities for which tax advantages are granted, the company also provides services that are subject to normal taxation. In fiscal years 2012 through 2016, this area of business resulted in tax losses, while in 2017 through 2019 taxable profit was generated. In 2020, tax losses were incurred again. Taxable profits were once again generated in 2021. The tax losses available for carry-forward as of December 31, 2020, were fully utilized in 2021. In this respect, no deferred taxes were recognized in this regard (previous year: €2 million).

At the reporting date, there were temporary differences amounting to €66 million (previous year: €57 million) for which no deferred tax assets were recognized, in view of the relevant income expectations for the next five years. The resulting potential tax impact of €13 million (previous year: €11 million) was therefore not taken into account in the calculation of the income tax expense.

Deferred tax liabilities for taxable differences arising from investments in subsidiaries and joint ventures

In accordance with IAS 12, no deferred tax liabilities were recognized for temporary differences amounting to €308 million (previous year: €308 million) that arose in connection with investments in subsidiaries and joint ventures. If these differences were to lead to the creation of deferred tax liabilities, they would result in a tax liability amounting to €13 million (previous year: €13 million), based on the current tax legislation.

IV. Other disclosures

35. Financial risk

In the ordinary course of business, MTU is exposed to credit risks, liquidity risks and market risks. The objective of financial risk management is to minimize the risks arising from operating activities and the resulting financing requirements through the use of selected derivative and non-derivative hedging instruments.

Risks in connection with the procurement, financing and sale of MTU's products and services are described in detail in the management report. In order to counter financial risks, MTU has put in place an integrated risk management system, which is monitored by the Supervisory Board. The principles of this system aim at promptly identifying, analyzing, and communicating risks and taking countermeasures. Market risks, particularly the net exposure from currency risks and commodity price risks are analyzed in respect of their potential impact on earnings before interest and taxes (EBIT) and on net financial income or expense, and reduced through the targeted use of derivative financial instruments.

Credit risks

MTU is exposed to credit risks arising from its operating activities in both the OEM and MRO segments. The risk situation deteriorated in the reporting period due to the impact of the pandemic on the aviation industry. MTU has a systematic, structured credit risk management.

In view of the importance of managing credit risks, engine and aircraft financing arrangements to which MTU is a party as a result of its engine program and MRO alliances are managed by the central treasury department. Further details on engine and aircraft financing arrangements are provided in *Note 33 "Additional disclosures relating to financial instruments"* and in the *"Risk and opportunity report," which forms part of the Combined management report.*

Financing transactions in connection with liquidity management, e.g., time deposits or forward foreign exchange contracts, also expose the Group to a certain degree of credit risk. MTU's internal guidelines therefore stipulate that such transactions may only be entered into centrally by the central Treasury department, and only with contracting parties with a credit rating of at least investment grade. Counterparty limits are assigned and monitored on the basis of credit rating and company size. For information on the investment policy, please refer to the *section entitled "Financial situation – Principles and objectives of financial management."*

The maximum credit risk is represented by the carrying amounts of the financial assets recognized in the balance sheet, plus the amount of financial guarantees and loan commitments. The increase in carrying amounts is attributable to lower potential for netting against corresponding liabilities and collateral under substantive law. The unsecured portions of financial assets were included in the calculation of the expected credit losses using an impairment matrix. For this purpose, the assets were allocated to groups with credit standings A, B and C, for which the respective credit loss rate was determined using published information and/or credit ratings from international agencies:

[T118] Expected credit losses as of Dec. 31, 2021

in € million	Credit standing A	Credit standing B	Credit standing C	Total
Expected credit loss rate	0.06%	1.26%	3.82%	
Gross amount	2,351	108	211	2,671
Expected credit losses	1	1	8	11

[T119] Expected credit losses as of Dec. 31, 2020

in € million	Credit standing A	Credit standing B	Credit standing C	Total
Expected credit loss rate	0.06%	1.26%	3.64%	
Gross amount	1,180	27	51	1,258
Expected credit losses	1	0	2	3

Other than collateralization rights for engine and aircraft financing loans issued, there were no material agreements at the reporting date that could reduce the maximum credit risk. Nonetheless, MTU is exposed to other, proportionate liability risks and therefore potential additional credit risks as a result of its membership in engine consortia. Further details can be found in *Note 37 "Contingent liabilities and other financial obligations."*

Market risks

Currency risks

More than 80% of MTU's revenue is generated in U.S. dollars. At least half of this currency risk is naturally hedged by costs settled in U.S. dollars. Most other costs are incurred in euros, and to a lesser extent in Canadian dollars and Polish zloty. Translation differences for the unhedged portion of the portfolio have a direct impact on net income and cash flow.

Hedging strategy

MTU uses a defined hedging model to hedge a defined portions of its expected net foreign currency surplus. The purpose is to minimize the impact of the volatility of the U.S. dollar exchange rate on net income and the cash flow. The forward foreign exchange contracts and currency options used for this purpose are designated as financial instruments to hedge cash flows from expected sales realized in U.S. dollars. The hedge ratio decreases the longer the hedging horizon is.

An economic hedging relationship exists between the hedged item and the hedging instrument, since the terms of the forward foreign exchange contracts and currency options correspond to the terms of the highly probable forecast transactions (this is true for the nominal amount and the expected payment date). MTU uses the hypothetical derivative method to measure the effectiveness of the hedge and prospectively compares the changes in fair value of the hedging instrument with the changes in fair value of the hedged items that are attributable to the hedged risk.

Hedge ineffectiveness can arise for a number of reasons:

/ when the timing of the cash flows from the hedged item and the hedging instruments differs or the expected amount of cash flows from the hedged item and the hedging instrument changes.
MTU considers it unlikely that an effective risk could arise from such an event since only the net foreign currency surplus is hedged and sufficient gross foreign currency payments are available to service the hedging instruments.

/ different effects of the counterparty credit risk on the changes in fair value of the hedged item and the hedging instrument.
MTU believes that this poses a low effective risk because all banks with which MTU enters into hedging transactions and MTU itself must have an investment grade rating. The priced credit risk between MTU and the commercial banks is therefore very low at present and thus immaterial.

Translation differences arising from the translation of financial statements of international subsidiaries into the Group's functional currency and effects from measurement at the closing rate (translations risks) are not included when deriving the hedging volume.

Forward foreign exchange contracts

As of December 31, 2021, MTU held open forward foreign exchange contracts with maturities up to December 2024 in a nominal amount of U.S.$2,400 million. At the exchange rate prevailing on the reporting date, that translates into €2,032 million. The fair values of the open forward foreign exchange contracts maturing in and after 2022 decreased by €123 million in the reporting period (previous year: increase by €124 million for maturities in and after 2021). Changes in the value of the hedged item correspond to those of the hedging instrument, so that the hedging instruments were effective. As of December 31 of the previous year, MTU had hedged cash flows for fiscal years 2021 through 2024 amounting to U.S.$2,280 million (which translates into €1,858 million at the exchange rate prevailing on December 31, 2020).

Currency option transactions

The options give MTU the right (long options) or obligation (short options) to sell a defined quantity of U.S. dollars for euros at agreed euro exchange rates at a specific time. The risk of financial loss from a long option is limited to the premiums that have already been paid. In the case of short options MTU collects a premium. Losses can be incurred if the exchange rate at maturity, compared with that agreed when the option was sold, falls by more than the amount of premiums received for these options. As of December 31, 2021, MTU held neither long options (previous year: U.S.$20 million) nor short options (previous year: U.S.$20 million).

The forward foreign exchange contracts and currency options open at the reporting date had the following maturities:

[T120] Cash flow hedges

	Dec. 31, 2021			
	Due in less than 1 year	Due in more than 1 year and ess than 2 years	Due in more than 2 years	Total
Forward foreign exchange contracts				
Nominal amounts (in U.S. $ million)	1,060	900	440	2,400
Average forward rate (€/U.S. $)	1.17	1.18	1.20	1.18
thereof recognized as				
financial assets				
nominal amounts (in U.S. $ million)				300
carrying amounts (in € million)				6
financial liabilities				
nominal amounts (in € million)				2,100
carrying amounts (in € million)				58
Currency option transactions				
Nominal amounts (in U.S. $ million)				
Average forward rate (€/U.S. $)				
thereof recognized as				
financial assets				
nominal amounts (in U.S. $ million) [1]				
carrying amounts (in € million)				
financial liabilities				
nominal amounts (in U.S. $ million) [1]				
carrying amounts (in € million)				

[1] Combination of call and put options that partially offset each other.

[T121] Cash flow hedges

	Dec. 31, 2020			
	Due in less than 1 year	Due in more than 1 year and less than 2 years	Due in more than 2 years	Total
Forward foreign exchange contracts				
Nominal amounts (in U.S. $ million)	1,040	1,200	40	2,280
Average forward rate (€/U.S. $)	1.18	1.17	1.13	1.17
thereof recognized as				
financial assets				
nominal amounts (in U.S. $ million)				2,280
carrying amounts (in € million)				109
financial liabilities				
nominal amounts (in € million)				
carrying amounts (in € million)				
Currency option transactions				
Nominal amounts (in U.S. $ million)	20			20
Average forward rate (€/U.S. $)	1.19			1.19
thereof recognized as				
financial assets				
nominal amounts (in U.S. $ million) [1]				20
carrying amounts (in € million)				1
financial liabilities				
nominal amounts (in U.S. $ million) [1]				20
carrying amounts (in € million)				0

[1] Combination of call and put options that partially offset each other..

Hedging instruments designated as cash flow hedges

The liability arising from the deferred purchase price component in connection with the increase in MTU's program share in the IAE-V2500 engine program, which has to be serviced in U.S. dollars, serves as an instrument for hedging cash flows arising from revenue generated in U.S. dollars. This liability matures in 2027 and has a nominal amount of U.S.$168 million (previous year: U.S.$175 million), which translates into €148 million (previous year: €143 million) at the exchange rate prevailing at the reporting date. As of December 31, 2021, the carrying amount of the purchase price liability was €138 million (previous year: €132 million) and is recognized under financial liabilities as part of the net debt.

As of the reporting date at the end of fiscal year 2021, the following amounts arising from the fair value measurement of forward foreign exchange contracts and other hedging instruments were recognized in equity:

[T122] Impact of hedging relationships on equity

in € million	Hedge reserves	Hedging costs reserves	Currency translation reserves	Total
Carrying amount as of Jan. 1, 2020	**4**	**–33**	**–14**	**–44**
Changes in fair value of forward foreign currency sales and options	161	24		185
Amounts recycled to profit or loss	17	–57	5	–35
Impacts from currency translation			3	3
Deferred taxes	–57	11	–1	–47
Carrying amount as of Jan. 1, 2021	**125**	**–56**	**–6**	**62**
Changes in fair value of forward foreign currency sales and options	–233	98		–135
Amounts recycled to profit or loss	50	–59	3	–6
Impacts from currency translation			–12	–12
Deferred taxes	59	–13	1	48
Carrying amount as of Dec. 31, 2021	**0**	**–30**	**–14**	**–43**

No transactions were hedged in prior periods that are no longer expected to occur.

As a further element of its hedging strategy, MTU employs derivative financial instruments to which hedge accounting under IFRS 9 is not applied:

Currency swaps

In the course of the reporting period, U.S. dollars were sold at the daily rate and repurchased after a short time using a swap. As the selling and buying rates differ only marginally, these swaps are immaterial in terms of risk. The purpose of these transactions was to optimize liquidity in U.S. dollars. As of December 31, 2021, currency swaps expiring in the period up to January 3, 2022, with a notional value of U.S.$55 million were concluded (previous year: U.S.$93 million).

Exchange rate sensitivity analysis

The sensitivity analysis showing the effects of hypothetical changes in exchange rates on net income and equity relates to the foreign currency positions included in the respective balance sheet items at the reporting date. In this context, it is assumed that the volume at the reporting date is representative of the full year.

A significant proportion of trade receivables and payables, refund liabilities and finance lease liabilities is invoiced in U.S. dollars and is thus exposed to exchange rate fluctuations. All other non-derivative financial instruments to which hedge accounting is not applied are already denominated in the Group's functional currency (the euro), and are therefore not included in the exchange rate sensitivity analysis. The equity instruments held by the Group are not of a monetary nature and therefore do not present a currency risk as defined by IFRS 7.

If the exchange rate of the euro to the U.S. dollar at December 31, 2021, or at the prior-year reporting date had been 10% higher or lower, this would have produced the following hypothetical effects on net income and equity, particularly due to the effects of measurement of foreign currency receivables and liabilities on the reporting date:

[T123] Exchange rate sensitivity analysis

	2021		2020	
in € million	-10%	+10%	-10%	+10%
Exchange rate sensitivity (€/U.S. $)				
Closing exchange rate Dec. 31, 2021: 1.1326 (Dec. 31, 2020: 1.2271)	1.02	1.25	1.10	1.35
Net income	**–98**	**80**	**–80**	**65**
Equity [1]	**–147**	**128**	**–136**	**113**

[1] After tax.

Interest rate risks

MTU is exposed to interest rate risk principally in the eurozone, and to a lesser extent in Canada, China, Poland and the USA. MTU's interest rate risks are mainly related to pension obligations and financial liabilities.

Interest rate sensitivity analysis

Interest rate risk is presented in accordance with IFRS 7 using sensitivity analysis, which shows the effects of changes in market interest rates on interest payments, interest income and expense, other income statement items, net income and equity. The interest rate sensitivity analysis is based on the following assumptions:

Changes in the market interest rate of non-derivative financial instruments bearing fixed market interest rates have an effect on net income and equity only if these financial instruments are measured at fair value through profit or loss or were classified as such at initial recognition. Consequently, all fixed-interest financial instruments measured at amortized cost have no interest-rate-induced effects on net income and equity that must be accounted for, apart from future amounts to be charged to net interest income/expense.

In fiscal year 2021, floating-rate financial instruments and financial instruments measured at fair value held at the reporting date were not exposed to any significant interest rate risks.

Price risks

There is a general risk of price increases for commodities. This risk is mitigated mainly by procuring goods with appropriate price agreements and only to a small extent by entering into derivative financial instruments for nickel forward contracts.

As of December 31, 2021, MTU had entered into nickel forward contracts with credit institutions for a volume of 700 metric tons of nickel (previous year: 400 metric tons) for the years 2022 through 2023 and contracted fixed prices for nickel of between U.S.$13.7 thousand and U.S.$18.7 thousand per metric ton (previous year: between U.S.$12.5 thousand and U.S.$16.2 thousand per metric ton).

If the market price for nickel on the respective maturity date exceeds the agreed fixed price, MTU will receive a payment for the difference from the bank. In the opposite case, MTU is obligated to make a payment to the bank. No hedge accounting was applied to these transactions within the meaning of IFRS 9. The fair value loss of €2 million (previous year: €1 million) arising from these forward commodity purchases is recognized in other financial income/expense (see Note 9).

If the market prices in nickel forward contracts had been 10% higher or lower, net income would have been €1 million higher or lower (previous year: €0 million).

Liquidity risks

MTU's liquidity risk relates to its inability to meet payment obligations due including meeting potential obligations related to sales financing measures because of insufficient cash or cash equivalents being available. In order to ensure the solvency and financial flexibility of MTU at all times, long-term credit lines and liquid funds are held available based on multi-year financial planning and rolling monthly liquidity planning.

Liquidity is invested mainly in demand deposits, money market funds and other short-term money market papers. The maturity profile of invested amounts is based on liquidity planning and considers the availability of a suitable amount of reserves at all times. In addition, MTU has access to a long-term, syndicated credit facility in the amount of €600 million. Even in view of the Covid-19 pandemic and its impact on the international macroeconomic environment and on the aircraft industry in particular, the liquidity reserves available from credit facilities that have not been drawn down and from cash and cash equivalents can be considered sufficient for the years to come. For further information, see the Notes 28 "Financial liabilities" and 33 "Additional disclosures relating to financial instruments."

36. Leases

Group as lessee

The Group has entered into leases for land and buildings, technical equipment and machinery, and operational and office equipment. The terms of leases for land and buildings range from two to 33 years. Lease terms for technical equipment, plant and machinery and for motor vehicles and operational and office equipment are typically between two and five years. A number of leases have renewal and termination options as well as variable lease payments, which are explained in detail below.

The Group primarily acts as lessee in the following cases:

- Real estate leases for production, logistics and office capacities (land and buildings). Some of the underlying contracts include price escalation clauses linked to the consumer price index. The lease terms are between two and 17 years; some leases have renewal options.
- Leasing of vehicles and industrial trucks (operational and office equipment). The underlying leases regularly take into account variable components of the lease rates. The lease terms are between two and five years; some leases have renewal options.
- Engine leasing (operational and office equipment): The underlying leases may take into account variable components of the lease rates. The lease terms are between one and ten years; some leases have renewal options. Engines are provided to MRO customers on the basis of sub-leases.

The tables below show the changes in carrying amounts and depreciation expenses of the right-of-use assets recognized in the balance sheet:

[T124] Right-of-use assets 2021

in € million	As of Jan. 1, 2021	Currency translation differences	Additions	Transfers	Disposals	As of Dec. 31, 2021
Purchase cost						
Land, leasehold rights and buildings, including buildings on third-party land	94	1	16	1	-2	110
Technical equipment, plant and machinery	2					2
Other equipment, operational and office equipment	145	-0	23		-35	133
Total purchase cost	**241**	**1**	**39**	**1**	**-37**	**245**
Depreciation						
Land, leasehold rights and buildings, including buildings on third-party land	-11	-0	-12		3	-21
Technical equipment, plant and machinery	-2					-2
Other equipment, operational and office equipment	-56	0	-25		20	-61
Total depreciation	**-70**	**-0**	**-37**		**23**	**-84**
Carrying amount	**172**	**0**	**2**	**1**	**-15**	**161**

[T125] Right-of-use assets 2020

in € million	As of Jan. 1, 2020	Currency translation differences	Additions	Transfers	Disposals	As of Dec. 31, 2020
Purchase cost						
Land, leasehold rights and buildings, including buildings on third-party land	22	-1	72	1		94
Technical equipment, plant and machinery	2					2
Other equipment, operational and office equipment	150	-0	15		-21	145
Total purchase cost	**175**	**-1**	**87**	**1**	**-21**	**241**
Depreciation						
Land, leasehold rights and buildings, including buildings on third-party land	-4	0	-8			-11
Technical equipment, plant and machinery	-2		-0			-2
Other equipment, operational and office equipment	-30	0	-39		13	-56
Total depreciation	**-36**	**0**	**-47**		**13**	**-70**
Carrying amount	**139**	**-1**	**41**	**1**	**-8**	**172**

In the reporting period, an administrative office building was leased on a long-term basis at the Hanover site. The maturity analysis for lease liabilities is presented in *Note 33 "Additional disclosures relating to financial instruments."*

The following amounts for leases were recognized in profit or loss:

[T126] Amounts recognized in profit or loss for leases

in € million	2021	2020
Income		
Income from subleasing right-of-use-assets	20	30
Gains arising from sale and leaseback transactions	3	0
Lease income	**23**	**30**
Expenses		
Depreciation of right-of-use assets	37	42
Impairment losses on right-of-use assets		5
Interest expense for lease liabilities	4	5
Short-term lease expense	5	4
Low-value asset lease expense	2	1
Variable lease payment expense not included in the measurement of lease liabilities	3	5
Lease expense	**51**	**62**

In the reporting period, the Group's cash outflows for leases amounted to €47 million (previous year: €57 million). Future cash outflows for leases not recognized on the balance sheet are presented below in *Note 37 "Contingent liabilities and other financial liabilities."*

Group as lessor

MTU leases out engines that are owned by the Group as well as engines that are in turn leased by MTU. The leases generally have terms of between one and three years. In this context, tailored engine leases are offered by the Group to its customers, especially airlines and companies that offer engine maintenance services. The engines are primarily leased out under operating leases. Renewal and premature termination options are granted on a case-by-case basis.

The maturity analyses of lease receivables are as follows:

[T127] Maturity analysis of finance lease receivables

in € million	Dec. 31, 2021	Dec. 31, 2020
Finance lease receivables		
Less than 1 year	0	1
1 to 2 years	0	0
2 to 3 years		
3 to 4 years		
4 to 5 years		
More than 5 years		
Undiscounted finance lease receivables	**0**	**1**
Unearned finance income	–0	–0
Unguaranteed residual value	–0	
Net investment in finance leases	**0**	**1**

[T128] Maturity analysis of operating lease payments

in € million	Dec. 31, 2021	Dec. 31, 2020
Operating lease receivables		
Less than 1 year	11	6
1 to 2 years	4	2
2 to 3 years	1	1
3 to 4 years	0	1
4 to 5 years		
More than 5 years		
Total	**16**	**9**

Lease revenue of €44 million was earned from operating leases in the reporting period (previous year: €57 million). Divestment gains of €0 million (previous year: €0 million) were recorded in connection with finance leases in 2021.

37. Contingent liabilities and other financial obligations

Contingent liabilities

The following table contains an overview of the contingent liabilities of the MTU Group on the reporting date for 2021 and the previous year.

[T129] Contingent liabilities

in € million	Dec. 31, 2021	Dec. 31, 2020
Contingent liabilities arising from risk- and revenue-sharing agreements	6	8
thereof IAE International Aero Engines AG	3	4
Bank guarantees	57	56
Guarantees and other contingent liabilities	143	102
Total contingent liabilities	**207**	**165**

The contingent liabilities from risk- and revenue-sharing agreements result from MTU's membership in the consortium formed to manage the V2500 engine program, which is structured as a risk- and revenue-sharing partnership, and hence also include liabilities arising from MTU's indirect interest in this program via Pratt & Whitney Aero Engines International GmbH, Lucerne, Switzerland (PWAEI).

Analogously to previous years, bank guarantees and guarantees and other contingent liabilities principally comprise contract fulfillment and customs bonds of a customary amount and guarantees assumed for credit facilities and investment subsidies.

Founded in 2019 and consolidated for the first time in 2021, MTU Maintenance Serbia d.o.o. received public sector grants related to the site's establishment and construction. MTU also receives a small amount of public sector grants and assistance to subsidize new production buildings and research and development expenses. The risk of repayment obligations exists until such time as the relevant project has been completed and all the conditions associated with it have been met. At the reporting date, the probability that risks of this kind could materialize was deemed to be very low.

In fiscal year 2019, MTU incurred income tax losses due to the partial repayment of a convertible bond in the amount of €276 million. Even though MTU assumes that the losses will be confirmed by the tax audit, reference is made to other taxpayers with proceedings pending before tax courts in comparable matters.

In addition, as of the reporting date, there were unutilized financing commitments for equity investments in the form of capital contributions or shareholder loans totaling €136 million (previous year: €160 million) and further commitments to OEM customers relating to shares in sales financing commitments in respect of commercial engine programs. As of the reporting date, the unutilized nominal amount of such financing commitments was €746 million (previous year: €733 million). MTU treats these commitments as a component of its gross liquidity risk within the meaning of IFRS 7. Further details can be found in *Note 33 "Additional disclosures relating to financial instruments."*

Other financial obligations

Obligations arising from leases

The breakdown by maturity of future cash outflows for leases for which lease liabilities have not yet been recognized is as follows:

[T130] Future cash outflows from leases

in € million	Dec. 31, 2021	Dec. 31, 2020
Variable lease payments		
Due in less than 1 year		
Due in more than 1 year and less than 5 years		
Due in more than 5 years		
Extension and termination options		
Due in less than 1 year		1
Due in more than 1 year and less than 5 years		0
Due in more than 5 years		
Leases that have not yet commenced		
Due in less than 1 year	0	1
Due in more than 1 year and less than 5 years	0	15
Due in more than 5 years	0	35
Total future cash outflows from leases	**1**	**52**

Purchase commitments for financial obligations

As of December 31, 2021, purchase commitments amounted to €8 million (previous year: €10 million) for the purchase of intangible assets and to €117 million (previous year: €75 million) for the purchase of property, plant and equipment and were therefore in the normal range for the business.

38. Related party disclosures

Related companies

Transactions between Group companies and joint ventures or associates were, without exception, entered into in the normal course of business and on an arm's length basis.

Transactions between consolidated companies were eliminated in the consolidated financial statements and are therefore not disclosed separately in this Note.

Business with related companies

In the reporting period, intragroup transactions involving the supply of goods and services were conducted by Group companies as part of their normal operating activities (e.g., development, repairs, assembly, IT support). In the reporting period and the previous year, the following transactions resulting in current receivables and liabilities were entered into with related companies that are not consolidated:

[T131] Trade receivables from and trade payables to related companies

in € million	Trade receivables Dec. 31, 2021	Trade receivables Dec. 31, 2020	Trade payables Dec. 31, 2021	Trade payables Dec. 31, 2020
Associates	323	402		
Joint ventures	155	98	0	2
Subsidiaries accounted for at fair value	1	1	3	1
Other related companies		4		
Total	**480**	**505**	**3**	**3**

[T132] Income/expense from trade receivables from related companies

in € million	Income Dec. 31, 2021	Income Dec. 31, 2020 (adjusted)	Expenses Dec. 31, 2021	Expenses Dec. 31, 2020
Associates	1,654	1,574	–1,041	–937
Joint ventures	403	420	–160	–68
Subsidiaries accounted for at fair value	8	3	–26	–23
Other related companies		5		–5
Total	**2,064**	**2,002**	**–1,226**	**–1,033**

In connection with MTU's membership in the consortium for the V2500 engine program, which is structured as a risk- and revenue-sharing partnership, there are contingent liabilities of €2 million to the related party IAE International Aero Engines AG. Furthermore, there is a guarantee of €143 million for credit lines of EME Aero sp. z o.o., which is recognized as a contingent liability (guarantees and other contingent liabilities).

In addition, there are unutilized financing commitments for equity investments in the form of capital contributions or shareholder loans totaling €136 million.

Major shareholdings

The list of major shareholdings shows the equity investments of MTU Aero Engines AG, Munich, and the equity of each company as of December 31, 2021:

[T133] Major shareholdings

Name and registered office of entity	Consolidation method[2]	Shareholding (in %) Dec. 31, 2021
I. Investments in subsidiaries		
MS Engine Leasing LLC., Rocky Hill, CT, USA[1]	Full	75.23
MTU Aero Engines Finance Netherlands B.V., Amsterdam, Netherlands	Fair value	100.00
MTU Aero Engines North America Inc., Rocky Hill, CT, USA	Full	100.00
MTU Aero Engines Polska sp. z o.o., Rzeszów, Poland	Full	100.00
MTU Aero Engines Shanghai Ltd., Shanghai, China	Fair value	100.00
MTU Maintenance Berlin-Brandenburg GmbH, Ludwigsfelde, Germany	Full	100.00
MTU Maintenance Canada Ltd., Richmond, Canada	Full	100.00
MTU Maintenance Coating Services GmbH, Ludwigsfelde, Germany	Full	100.00
MTU Maintenance Dallas Inc., Grapevine, TX, USA	Fair value	100.00
MTU Maintenance Hannover GmbH, Langenhagen, Germany	Full	100.00
MTU Maintenance IGT Service do Brasil Ltda., São Paulo, Brazil	Fair value	100.00
MTU Maintenance Lease Services B.V., Amsterdam, Netherlands	Full	100.00
MTU Maintenance Serbia d.o.o., Belgrad, Serbia	Full	100.00
MTU Maintenance Service Centre Australia Pty. Ltd., Perth, Australia	Fair value	100.00
MTU Maintenance Service Centre Ayutthaya Ltd., Ayutthaya, Thailand	Fair value	100.00
MTU Maintenance Singapore Pte. Ltd., Singapore	Fair value	100.00
MTU Versicherungsvermittlungs- und Wirtschaftsdienst GmbH, Munich, Germany	Fair value	100.00
II. Investments in associates		
IAE International Aero Engines AG, Zurich, Switzerland	At equity	25.25
IAE International Aero Engines LLC., East Hartford, CT, USA	At equity	18.00
PW1100G-JM Engine Leasing LLC., East Hartford, CT, USA	At equity	18.00
III. Equity investments in joint ventures		
AES Aerospace Embedded Solutions GmbH, Munich, Germany	At equity	50.00
Airfoil Services Sdn. Bhd., Kota Damansara, Malaysia	At equity	50.00
Ceramic Coating Center S.A.S., Paris, France	At equity	50.00
EME Aero sp. z.o.o., Jasionka, Poland	At equity	50.00
EPI Europrop International GmbH, Munich, Germany	Fair value	28.00
EUMET GmbH, Munich, Germany	Fair value	50.00
EUROJET Turbo GmbH, Hallbergmoos, Germany	Fair value	33.00
MTU Maintenance Hong Kong Ltd., Hong Kong, China [1]	Fair value	50.00
MTU Maintenance Zhuhai Co. Ltd., Zhuhai, China	At equity	50.00
MTU Turbomeca Rolls-Royce GmbH, Hallbergmoos, Germany	Fair value	33.33
MTU Turbomeca Rolls-Royce ITP GmbH, Hallbergmoos	Fair value	25.00
Pratt & Whitney Canada Customer Service Centre Europe GmbH, Ludwigsfelde, Germany [1]	At equity	50.00
Turbo Union GmbH, Hallbergmoos, Germany	Fair value	39.98

[1] Indirect shareholding.
[2] - Full = fully consolidated.
- Fair value = measured at fair value.
- At equity = carrying amount of investment increased or decreased in proportion to Group's interest in equity.

Related persons

Other than the transactions specified in *"Other related party transactions,"* no Group companies entered into any transactions subject to disclosure requirements with members of the Group's Executive Board or Supervisory Board or with any other individuals in key management positions, or with companies of whose governing or supervisory bodies these individuals are members. The same applies to close members of the families of those individuals.

Members of the Executive Board

As of December 31, 2021, the Executive Board of MTU Aero Engines AG, Munich, had the following members:

[T134] Members of the Executive Board

Reiner Winkler Chief Executive Officer
Peter Kameritsch Chief Financial Officer and Chief Information Officer
Lars Wagner Chief Operating Officer
Michael Schreyögg Chief Program Officer

Executive Board compensation

The members of the Executive Board received total compensation amounting to €10 million (previous year: €8 million) for their work as board members in fiscal year 2021. Total compensation breaks down into the following components:

[T135] Compensation of the Executive Board

	2021		2020	
	in € million	in %	in € million	in %
Short-term employee benefits				
Non-performance-related components	3		3	
Performance-related components without long-term incentive effect[1]	4			
Performance-related components with long-term incentive effect[1]	3		4	
Total	**9**	**85**	**7**	**88**
Post-employment benefits				
Service cost / past service cost	2		1	
Total	**2**	**15**	**1**	**13**
Total compensation	**10**	**100**	**8**	**100**

[1] Performance-related compensation for the reporting period paid in the subsequent year; the 2020 performance-related component with a long-term incentive effect was paid out in the same period in accordance with contractual arrangements applicable at the time.

Members of the Executive Board did not receive any compensation for board appointments in Group companies.

In the reporting period, as in the previous year, no loans or advances were granted to members of the Executive Board. Similarly, as in the previous year, no contingent liabilities were assumed by the company in favor of members of the Executive Board.

Provisions for pensions and entitlements of former Executive Board members were €14 million as of December 31, 2021 (previous year: €19 million).

Details of the compensation awarded to individual members of the Executive Board, and other related information, are presented in the Management compensation report in the section headed *"The MTU share."*

Compensation of the Supervisory Board members

Detailed information on the compensation system for MTU's Supervisory Board members is provided in the *Management compensation report in the section headed "The MTU share."*

As in the previous year, members of the Supervisory Board did not receive any additional compensation for board appointments over and above that received for their appointment to the Supervisory Board of MTU Aero Engines AG, Munich. The compensation amounted to €1 million (previous year: €1 million).

In fiscal year 2021, MTU employees appointed as employee representatives to the Supervisory Board of MTU Aero Engines AG received salaries under their normal employment contracts (excluding Supervisory Board compensation) totaling €1 million (previous year: €1 million). The total amount represents the sum of their respective gross salaries.

In the reporting period, as in the previous year, no loans or advances were granted to members of the Supervisory Board. Similarly, as in the previous year, no contingent liabilities were assumed by the company in favor of members of the Supervisory Board.

Details of the compensation awarded to individual members of the Supervisory Board, and other related information, are presented in the *Management compensation report in the section headed "The MTU share."*

Other related party transactions

MTU shares and options bought or sold by members of the Executive Board and the Supervisory Board in fiscal year 2021 were bought or sold on an arm's length basis.

The transactions were published in the register of companies and on MTU's website at *www.mtu.de > Investor Relations > Corporate Governance > Directors' Dealings.*

Shareholders

Pursuant to Section 160 (1) no. 8 of the German Stock Corporation Act (AktG), disclosure is required of shareholdings of which the company has been notified pursuant to Section 21 (1) or (1a) of the German Securities Trading Act (WpHG). Detailed information can be found under *"The MTU share."*

V. Segment information

39. Segment reporting

MTU reports on two operating segments: the OEM segment (commercial and military engine business) and the MRO segment (commercial maintenance business). Segmentation is based on the internal organizational structure and the corresponding reporting system, which takes into account the different risks and return structures for both segments. A detailed description of the operating segments is provided in the Consolidated segment report.

Commercial and military engine business (OEM)

In the commercial and military engine business, the Group develops, manufactures, assembles and delivers commercial and military engines and components. The maintenance, repair and overhaul of military engines is also included in this segment.

Commercial maintenance business (MRO)

In the commercial maintenance business, the Group maintains, repairs and overhauls aircraft engines and industrial gas turbines. In addition to complete engine maintenance, the services provided include engine module and parts repairs as well as related services.

Profit/loss of companies accounted for using the equity method

The carrying amount and the share in profit/loss of consolidated Group companies accounted for using the equity method are included in the consolidated financial statements if these companies can be directly allocated to an operating segment.

Segment assets and segment liabilities

Segment assets comprise all assets that can be directly allocated to specific operating activities and whose positive or negative operating results have an impact on earnings before interest and tax (EBIT/adjusted EBIT). Assets and liabilities are allocated to the operating segment in which they are used to generate business. The consolidation/reconciliation amount in the segment assets line relates to the consolidation of the carrying amount of subsidiaries and of accounts receivable from intersegment sales of €1,400 million (previous year: €1,237 million) and to segment liabilities of €1,063 million (previous year: €896 million).

The cash and cash equivalents of the German Group companies are managed centrally by the parent company in a cash pooling system. The parent company's operating activities are allocated to the OEM segment, which is why the associated interest income and expense arise mainly in that segment.

Segment capital expenditures

Segment capital expenditures relate to additions to tangible and intangible fixed assets, acquired program assets and acquired development assets.

[T136] Capital expenditure on intangible assets, property, plant and equipment, acquired program assets and acquired development work

in € million	2021	2020
Germany	291	264
Europe (excluding Germany)	102	26
North America	10	49
Total capital expenditure	**402**	**339**

Approximately 72% (previous year: approximately 78%) of capital expenditure on intangible assets, property, plant and equipment, acquired program assets and acquired development work relates to Group companies in Germany.

Consolidation/reconciliation column

The amounts in the "consolidation/reconciliation" column for earnings before interest and tax (EBIT/adjusted EBIT) are used to eliminate the effect of intersegment sales.

Segment information by region

External revenues, capital expenditure on tangible and intangible fixed assets, and non-current assets are divided into the following regions: Germany, Europe (excluding Germany), North America, Asia and other regions. Revenue from business with third parties is allocated according to the country where the customer is domiciled. Further details relating to the breakdown of revenue by region are presented in *Note 1 "Revenue."*

The regional allocation of capital expenditure and non-current assets is based on the location of the respective asset or where it is mainly used.

[T137] Non-current assets

in € million	2021	2020
Germany	3,004	3,003
Europe (excluding Germany)	654	635
North America	385	391
Total non-current assets	**4,043**	**4,030**

VI. Events after the reporting date

After the reporting date, Russia launched a military attack on Ukraine. As a result, the international community, especially the EU and the USA, imposed extensive economic sanctions on Russia. As a matter of course, MTU supports all sanction regulations and is in full compliance with them. The company has currently suspended all deliveries and data transfers to Russia. Payments to Russia and to Russian payment recipients have been discontinued. Furthermore, MTU has halted the signing of any new contracts with Russian involvement for an indefinite period of time. Contract negotiations that were already underway were halted with immediate effect. Generally speaking, MTU has only very limited MRO business with customers in Russia and no presence in the region. In the OEM business, MTU is involved in the PW1400G-JM engine program intended for use in a Russian mid-haul jet. In light of the current developments, this could result in impairment of capitalized development assets of up to €40 million.Regardless of this, the company is constantly monitoring the situation, including its effects on global material supplies. Potential impacts to MTU's supply chain are being assessed continually and factored into the procurement strategy. In regard to the aviation sector, there are concerns that the conflict could negatively affect the recovery in air traffic that had just recently begun.

Beyond this, MTU is not aware of any events of material importance that occurred after the reporting date that could have a significant impact on the net assets, financial position and results of operations of the MTU Group as presented in this report.

VII. Determination of the net profit available for distribution on the basis of the annual financial statements

Unlike the consolidated financial statements, which are based on the IFRSs issued by the IASB and endorsed by the EU, the annual financial statements of MTU Aero Engines AG, Munich, are prepared in accordance with the requirements of the German Commercial Code (HGB) and German Stock Corporation Act (AktG).

[T138] Income statement of MTU Aero Engines AG

			Change against previous year	
in € million	2021	2020	in € million	in %
Revenue	**3,695**	**3,789**	**-94**	**-2.5**
Cost of goods sold	-3,549	-3,582	33	0.9
Gross profit	**145**	**207**	**-62**	**-29.8**
Selling expenses	-94	-90	-4	-4.7
General administrative expenses	-60	-49	-11	-21.6
Net other operating income/expenses	103	-30	134	>100
Net financial income/expense	169	120	49	41.3
Earnings from ordinary operating activities	**265**	**158**	**107**	**67.6**
Tax expense	-67	-26	-41	<-100
Net profit for the year	**198**	**132**	**66**	**49.9**
Withdrawal from other retained earnings				
Allocation to other retained earnings	-86	-65	-21	-32.3
Net profit available for distribution	**112**	**67**	**45**	**67.1**

Proposed profit distribution

Subject to the approval of the Supervisory Board, a proposal will be put to the Annual General Meeting that a dividend of €2.10 per share should be paid for the reporting period (previous year: €1.25) and that the remainder of the net profit be allocated to retained earnings. In the light of the global coronavirus pandemic and the resulting risks to the short- and mid-term development of the net assets, financial position and results of operations, in the previous year the majority of the net profit was carried forward.

Federal Gazette (Bundesanzeiger)

The annual financial statements, consolidated financial statements and combined management report of MTU Aero Engines AG, Munich, are published in the Electronic Federal Gazette (elektronischer Bundesanzeiger). Print copies can be obtained on request from MTU Aero Engines AG, 80995 Munich, Germany.

Declaration of conformity with the German Corporate Governance Code

The declaration of conformity by the Executive Board and Supervisory Board of MTU Aero Engines AG, Munich, pursuant to Section 161 of the German Stock Corporation Act (AktG) is published in the MTU Annual Report 2021 and also permanently available to shareholders on the MTU website at www.mtu.de.

Munich, March 7, 2022

signed
Reiner Winkler
Chief Executive Officer

signed
Peter Kameritsch
Chief Financial Officer and Chief Information Officer

signed
Michael Schreyögg
Chief Program Officer

signed
Lars Wagner
Chief Operating Officer

Responsibility statement and independent auditor’s report

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Responsibility statement

We hereby affirm that, to the best of our knowledge, the consolidated financial statements of the MTU Group and the separate annual financial statements of MTU Aero Engines AG present a true and fair view of their respective net assets, financial position and results of operations in accordance with the applicable financial reporting standards, and that the combined management report provides a faithful and accurate review of the business performance of the MTU Group and of MTU Aero Engines AG, including business performance and position, and outlines the significant opportunities and risks of the MTU Group's and MTU Aero Engines AG's likely future development.

Munich, March 7, 2022

signed
Reiner Winkler
Chief Executive Officer

signed
Peter Kameritsch
Chief Financial Officer and
Chief Information Officer

signed
Michael Schreyögg
Chief Program Officer

signed
Lars Wagner
Chief Operating Officer

Translation of the German independent auditor's report concerning the audit of the consolidated financial statements and group management report prepared in German

Independent auditor's report

To MTU Aero Engines AG

Report on the audit of the consolidated financial statements and of the combined management report

Opinions

We have audited the consolidated financial statements of MTU Aero Engines AG, Munich, and its subsidiaries (the "Group"), which comprise the consolidated income statement and consolidated statement of comprehensive income for the fiscal year from 1 January 2021 to 31 December 2021, the consolidated statement of financial position as of 31 December 2021, the consolidated statement of changes in equity and the consolidated cash flow statement for the fiscal year from 1 January 2021 to 31 December 2021, and the notes to the consolidated financial statements, including the recognition and measurement principles presented therein. In addition, we have audited the group management report, which is combined with the management report of MTU Aero Engines AG, Munich ("combined management report"), for the fiscal year from 1 January 2021 to 31 December 2021. In accordance with the German legal requirements, we have not audited the content of the non-financial statement and the corporate governance statement contained in the "Other disclosures" section of the combined management report.

In our opinion, on the basis of the knowledge obtained in the audit,

- the accompanying consolidated financial statements comply, in all material respects, with the International Financial Reporting Standards (IFRSs) as adopted by the EU and the supplementary provisions of German law pursuant to Sec. 315e (1) HGB ["Handelsgesetzbuch": German Commercial Code] and give a true and fair view of the assets, liabilities and financial position of the Group as of 31 December 2021 and of its financial performance for the fiscal year from 1 January 2021 to 31 December 2021 in accordance with German legally required accounting principles, and
- the accompanying combined management report as a whole provides an appropriate view of the Group's position. In all material respects, this combined management report is consistent with the consolidated financial statements, complies with German legal requirements and appropriately presents the opportunities and risks of future development. Our opinion on the combined management report does not cover the content of the non-financial statement and the content of the corporate governance statement referred to above.

Pursuant to Sec. 322 (3) Sentence 1 HGB, we declare that our audit has not led to any reservations relating to the legal compliance of the consolidated financial statements and of the combined management report.

Basis for the opinions

We conducted our audit of the consolidated financial statements and of the combined management report in accordance with Sec. 317 HGB and the EU Audit Regulation (No 537/2014, referred to subsequently as "EU Audit Regulation") and in compliance with German Generally Accepted Standards for Financial Statement Audits promulgated by the Institut der Wirtschaftsprüfer [Institute of Public Auditors in Germany] (IDW). Our responsibilities under those requirements and principles are further described in the "Auditor's responsibilities for the audit of the consolidated financial statements and of the combined management report" section of our auditor's report. We are independent of the group entities in accordance with the requirements of European law and German commercial and professional law, and we have fulfilled our other German professional responsibilities in accordance with these requirements.

In addition, in accordance with Art. 10 (2) f) of the EU Audit Regulation, we declare that we have not provided non-audit services prohibited under Art. 5 (1) of the EU Audit Regulation. We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our opinions on the consolidated financial statements and on the combined management report.

Key audit matters in the audit of the consolidated financial statements

Key audit matters are those matters that, in our professional judgment, were of most significance in our audit of the consolidated financial statements for the fiscal year from 1 January 2021 to 31 December 2021. These matters were addressed in the context of our audit of the consolidated financial statements as a whole, and in forming our opinion thereon; we do not provide a separate opinion on these matters.

Below, we describe what we consider to be the key audit matters:

1. Recognition of revenue from risk- and revenue-sharing partnerships

Reasons why the matter was determined to be a key audit matter
The MTU Group primarily generates its revenue in the commercial and military engine business (OEM segment (Original Equipment Manufacturing)) from risk- and revenue-sharing partnerships with other engine manufacturers. In the civilian OEM segment, the respective syndicate leaders (OEM) are identified as customers; in the military engine business these are the syndicate's end customers. The significant performance obligations are manufacturing and delivering engine parts along with developing and providing technology.

Revenue from delivering engine modules and parts is recognized when MTU fulfills the performance obligation identified in the contract by delivering the goods. Revenue is therefore recognized when the customer has gained control of the asset pursuant to IFRS 15.31. For engine programs in which the syndicate leader is provided with the right to use the engine modules and parts for marketing by having them delivered to their warehouse, this is the time at which delivery is made to the syndicate leader. The basis for the amount of revenue is the expected contractually agreed purchase price for the assets. Reports on risk- and revenue-sharing partnerships, the volumes sold and the final purchase prices are only available at a later point in time, generally after the engine modules and parts have been delivered by the OEM to the end customers.

Furthermore, risk- and revenue-sharing partnerships mean that MTU is obliged to provide other partners with licenses to its technology. MTU receives variable remuneration for these licenses. Pursuant to IFRS 15.58, this variable remuneration is recorded based on reports from the risk- and revenue-sharing partnerships, because this is when there is no longer any uncertainty surrounding the amount. If this reporting is delayed, revenue from the provision of this license is allocated as of the reporting date based on qualified estimates that take the contractual arrangements into account.

Revenue, which has not been recognized based on reports on risk- and revenue-sharing partnerships, is recognized in the statement of financial position under trade receivables or contract assets. Billing risks are recorded as refund liabilities.

There is a risk of error when recognizing revenue and a risk of fraud on account of incentives to achieve certain performance targets and forecasts if the recognition is not based on a partner report. The materiality of revenue for the consolidated financial statements, the discretionary scope involved in the required estimates and the fact that revenue and adjusted EBIT are financial performance indicators for the Group in terms of corporate management and forecasts meant that revenue at the time of delivery to the warehouse of the syndicate leader and the revenue from the provision of the license as of the reporting date constituted a key audit matter.

Auditor's response
We used a substantive audit approach to assess the appropriateness of revenue recognition from risk- and revenue-sharing partnerships. We assessed the design of the underlying business processes and tested selected controls of the internal accounting control system.

For intraperiod transactions, we performed data analyses on any existing anomalies. In this context, our procedures included correlation analyses and time series analyses. We verified the development of contract assets resulting from the recognition of revenue upon delivery to the warehouse of the syndicate leader on a sample basis by inspecting the delivery notes (upon delivery) or the reports on risk- and revenue-sharing partnerships (upon removal).

In addition, we compared the contractually agreed purchase prices with the price lists on a sample basis. In respect of the estimation of billing risks, we assessed the underlying valuation methods and key valuation parameters, and verified the computational accuracy of the calculation.

To assess the amount of variable revenue from license fees estimated for the month of December 2021, we reconciled the estimated values with the reporting of the risk- and revenue-sharing partnerships from January 2022 on a sample basis.

In addition, we also reconciled recorded revenue against payments received and analyzed credits granted in January in respect of their allocation to the correct period. We reconciled non-standard transactions, journal entries and closing entries to the underlying documents on a sample basis. Our audit procedures did not lead to any reservations relating to the recognition of revenue from risk- and revenue-sharing partnerships.

Reference to related disclosures
The disclosures in the notes to the consolidated financial statements on the principles of recognizing revenue are contained in section I. "Accounting principles and policies" in the subsections on "Revenue", "Contract assets", "Contract liabilities", "Refund liabilities" and "Discretionary scope, measurement uncertainties and sensitivity". The significance of revenue in connection with corporate management as well as with regard to the business development and forecast is also presented in the "Key performance indicators" and "Financial performance indicators" sections of the combined management report.

2. Measurement of liabilities from warranty obligations as well as risks from pending transactions

Reasons why the matter was determined to be a key audit matter
In the consolidated financial statements of MTU Aero Engines AG, liabilities from warranty obligations and risks from pending transactions are reported as "Refund liabilities" and "Other provisions" under non-current and current liabilities in the statement of financial position. They relate to statutory and agreement-specific obligations and comprise estimates made on both a case-by-case and general basis. During the audit, we determined the measurement of liabilities from warranty obligations as well as risks from pending transactions relating to specific individual matters and subject to high levels of estimation uncertainty a key audit matter because the measurement of these items, the amounts of which are significant, is based to a large extent on the executive directors' estimates and assumptions, in particular with regard to the technical risks as well as the amount of the anticipated costs.

Auditor's response
To assess the measurement of liabilities from warranty obligations as well as risks from pending transactions, we examined the design of the underlying business processes, in particular the process of preparing the financial statements and tested selected controls of the internal accounting control system. We questioned the representatives of MTU Aero Engines AG and inspected contracts, written correspondence and documentation. In particular, we assessed the underlying measurement methods and key valuation parameters and checked the calculations for arithmetical accuracy. We also obtained and evaluated confirmations from lawyers and interviewed representatives from the legal department to assess the measurement.

Our audit procedures did not lead to any reservations relating to the measurement of liabilities from warranty obligations as well as risks from pending transactions.

Reference to related disclosures
The disclosures in the notes to the consolidated financial statements on refund obligations and other provisions are contained in section I. "Accounting principles and policies" in the subsections on "Other provisions", "Refund liabilities" as well as "Discretionary scope, measurement uncertainties and sensitivity" and in section III. "Notes to the consolidated balance sheet" in the subsections "27. Other provisions" and "31. Refund liabilities".

3. Recoverability of payments to customers based on the program term and capitalized development costs from risk- and revenue-sharing partnerships

Reasons why the matter was determined to be a key audit matter
The MTU Group participates in risk- and revenue-sharing partnerships with other engine manufacturers. Payments are made and proportionate costs are assumed in order to enter into these partnerships in the civilian OEM segment. These payments to customers based on the program term are recognized as "Acquired program values, development and other assets" under non-current assets in the consolidated financial statements. Furthermore, internally-funded development services are rendered, which are capitalized as development costs. The management board of MTU Aero Engines AG analyzes these assets for impairment at each reporting date. In this regard, in addition to the effects of the COVID-19 pandemic, in fiscal year 2021 the management board also included potential climate-related policy decisions in its deliberations. The basis for this is the planning of the individual engine programs over the remaining program term. If the analysis reveals indications of a possible impairment, the asset's or overarching cash-generating unit's discounted cash flows are compared to the corresponding carrying amount. The Company determines the discount rate (WACC) using external valuation experts. The assessment of whether the assets are impaired is based to a large extent on estimates by the Company's executive directors. The resulting discretionary scope

gives rise to a generally higher risk for accounting misstatements. Against this background, in particular given the increased risk in the aviation industry due to the COVID-19 pandemic, the assessment of whether the payments to customers based on the program term and capitalized development costs from risk- and revenue-sharing partnerships were impaired was a key audit matter.

Auditor's response
We examined the planning process of MTU Aero Engines AG in order to assess the impairment of payments to customers based on the program term and capitalized development costs. We also requested evidence to show to what extent external sources are included in the planning process. Building on this, for selected programs we used variance analyses to compare the program planning with the prior-year planning and assessed the planning assumptions based on interviews with the responsible program officers. In doing so, we took into account the possible impact of the COVID-19 pandemic on the aircraft industry when assessing the planning assumptions used. We also took into account management's assessment regarding the consequences of possible decisions relating to climate policy on MTU's product portfolio and the economic development of individual engine programs. We assessed the competence, capabilities and objectivity of the expert engaged by the Company to derive the WACC, gained an understanding of the expert's work and assessed the suitability of that work as audit evidence for the relevant assertion. In addition, we assessed the derivation of the WACC by consulting internal valuation specialists, in particular by comparing the peer group with comparable companies from an external database, reconciled market data and checked for arithmetical accuracy. We checked the completeness of the net assets' carrying amount. We examined the underlying valuation models to test impairment both in terms of clerical accuracy and the methods used. We checked the results of the impairment testing performed by the executive directors using sensitivity analyses for plausibility and compared these with the sensitivities determined by the Company on a sample basis.

Our audit procedures did not lead to any reservations relating to whether the payments to customers based on the program term and capitalized development costs from risk- and revenue-sharing partnerships were impaired.

Reference to related disclosures
The disclosures in the notes to the consolidated financial statements on program values and capitalized development costs are contained in section I. " Accounting principles and policies" in the subsections on "Research and development expenses", "Intangible assets", "Acquired program assets and acquired development work", "Impairment of intangible assets, property, plant and equipment, acquired program assets and acquired development work" as well as "Discretionary scope, measurement uncertainties and sensitivity". There are also disclosures in the notes to the consolidated financial statements in section II. "Notes to the consolidated income statement" in the subsection "3. Research and development expenses" as well as in section III. "Notes to the consolidated balance sheet" in the subsections "13. Changes in intangible assets and property, plant and equipment", "14. Intangible assets" and "17. Acquired program assets, development work and other assets". Further disclosures on capitalized research and development costs are presented in the "The MTU Group / Research and development" as well as "Economic report / Financial situation" sections of the combined management report.

Other information
The Supervisory Board is responsible for the Report of the Supervisory Board in the "To our shareholders" section of the annual report 2021. The executive directors and the Supervisory Board are responsible for the declaration pursuant to Sec. 161 AktG ["Aktiengesetz": German Stock Corporation Act] on the German Corporate Governance Code, which is part of the statement on corporate governance. In all other respects, the executive directors are responsible for the other information. The other information, of which we received a version prior to issuing this auditor's report, includes:

/ The non-financial statement and corporate governance statement on the section "Other disclosures" of the combined management report;
/ The sections "Key facts and figures with year-on-year comparison", "Responsibility statement" and the sections in the annual report 2021 " To our shareholders" and "Additional information".

Our opinions on the consolidated financial statements and combined management report do not cover the other information, and we therefore do not provide an opinion or any other form of audit conclusion on these matters.

In connection with our audit, our responsibility is to read the other information and to assess whether the other information

- is inconsistent in any material respect with the consolidated financial statements, the combined management report or our knowledge obtained in the audit, or
- otherwise appears to be materially misstated.

If, based on the work we have performed, we conclude that there is a material misstatement of this other information, we are required to report that fact. We have nothing to report in this regard.

Responsibilities of the executive directors and the Supervisory Board for the consolidated financial statements and the combined management report

The executive directors are responsible for the preparation of the consolidated financial statements that comply, in all material respects, with IFRSs as adopted by the EU and the additional requirements of German commercial law pursuant to Sec. 315e (1) HGB, and that the consolidated financial statements, in compliance with these requirements, give a true and fair view of the assets, liabilities, financial position and financial performance of the Group. In addition, the executive directors are responsible for such internal control as they have determined necessary to enable the preparation of consolidated financial statements that are free from material misstatement, whether due to fraud or error.

In preparing the consolidated financial statements, the executive directors are responsible for assessing the Group's ability to continue as a going concern. They also have the responsibility for disclosing, as applicable, matters related to going concern. In addition, they are responsible for financial reporting based on the going concern basis of accounting unless there is an intention to liquidate the Group or to cease operations, or there is no realistic alternative but to do so.

Furthermore, the executive directors are responsible for the preparation of the combined management report that, as a whole, provides an appropriate view of the Group's position and is, in all material respects, consistent with the consolidated financial statements, complies with German legal requirements and appropriately presents the opportunities and risks of future development. In addition, the executive directors are responsible for such arrangements and measures (systems) as they have considered necessary to enable the preparation of a combined management report that is in accordance with the applicable German legal requirements, and to be able to provide sufficient appropriate evidence for the assertions in the combined management report.

The Supervisory Board is responsible for overseeing the Group's financial reporting process for the preparation of the consolidated financial statements and of the combined management report.

Auditor's responsibilities for the audit of the consolidated financial statements and of the combined management report

Our objectives are to obtain reasonable assurance about whether the consolidated financial statements as a whole are free from material misstatement, whether due to fraud or error, and whether the combined management report as a whole provides an appropriate view of the Group's position and, in all material respects, is consistent with the consolidated financial statements and the knowledge obtained in the audit, complies with the German legal requirements and appropriately presents the opportunities and risks of future development, as well as to issue an auditor's report that includes our opinions on the consolidated financial statements and on the combined management report.

Reasonable assurance is a high level of assurance, but is not a guarantee that an audit conducted in accordance with Sec. 317 HGB and the EU Audit Regulation and in compliance with German Generally Accepted Standards for Financial Statement Audits promulgated by the Institut der Wirtschaftsprüfer (IDW) will always detect a material misstatement. Misstatements can arise from fraud or error and are considered material if, individually or in the aggregate, they could reasonably be expected to influence the economic decisions of users taken on the basis of these consolidated financial statements and this combined management report.

We exercise professional judgment and maintain professional skepticism throughout the audit. We also:

- Identify and assess the risks of material misstatement of the consolidated financial statements and of the combined management report, whether due to fraud or error, design and perform audit procedures responsive to those risks, and obtain audit evidence that is sufficient and appropriate to provide a basis for our opinions. The risk of not detecting a material misstatement resulting from fraud is higher than for one resulting from error, as fraud may involve collusion, forgery, intentional omissions, misrepresentations, or the override of internal control.

- Obtain an understanding of internal control relevant to the audit of the consolidated financial statements and of arrangements and measures (systems) relevant to the audit of the combined management report in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of these systems.
- Evaluate the appropriateness of accounting policies used by the executive directors and the reasonableness of estimates made by the executive directors and related disclosures.
- Conclude on the appropriateness of the executive directors' use of the going concern basis of accounting and, based on the audit evidence obtained, whether a material uncertainty exists related to events or conditions that may cast significant doubt on the Group's ability to continue as a going concern. If we conclude that a material uncertainty exists, we are required to draw attention in the auditor's report to the related disclosures in the consolidated financial statements and in the combined management report or, if such disclosures are inadequate, to modify our respective opinions. Our conclusions are based on the audit evidence obtained up to the date of our auditor's report. However, future events or conditions may cause the Group to cease to be able to continue as a going concern.
- Evaluate the overall presentation, structure and content of the consolidated financial statements, including the disclosures, and whether the consolidated financial statements present the underlying transactions and events in a manner that the consolidated financial statements that comply with IFRSs as adopted in the EU and the additional requirements of German commercial law pursuant to Sec. 315e (1) HGB give a true and fair view of the assets, liabilities, financial position and financial performance of the Group.
- Obtain sufficient appropriate audit evidence regarding the financial information of the businesses or business activities within the Group to express opinions on the consolidated financial statements and on the combined management report. We are responsible for the direction, supervision and performance of the group audit. We remain solely responsible for our audit opinions.
- Evaluate the consistency of the combined management report with the consolidated financial statements, its conformity with [German] law and the view of the Group's position it provides.
- Perform audit procedures for the forward-looking disclosures made by the executive directors in the combined management report. On the basis of sufficient appropriate audit evidence we evaluate, in particular, the significant assumptions used by the executive directors as a basis for the prospective information, and evaluate the proper derivation of the prospective information from these assumptions. We do not express a separate opinion on the prospective information and on the assumptions used as a basis. There is a substantial unavoidable risk that future events will differ materially from the prospective information.

We communicate with those charged with governance regarding, among other matters, the planned scope and timing of the audit and significant audit findings, including any significant deficiencies in internal control that we identify during our audit.

We also provide those charged with governance with a statement that we have complied with the relevant independence requirements, and communicate with them all relationships and other matters that may reasonably be thought to bear on our independence and where applicable, related safeguards.

From the matters communicated with those charged with governance, we determine those matters that were of most significance in the audit of the consolidated financial statements of the current period and are therefore the key audit matters. We describe these matters in our auditor's report unless law or regulation precludes public disclosure about the matter.

Other legal and regulatory requirements

Report on the assurance on the electronic rendering of the consolidated financial statements and the combined management report prepared for publication purposes in accordance with Sec. 317 (3a) HGB

Opinion

We have performed assurance work in accordance with Sec. 317 (3a) HGB to obtain reasonable assurance about whether the rendering of the consolidated financial statements and the combined management report (hereinafter the "ESEF documents") contained in the attached file MTU_KA+KLB_ESEF_2021-12-31.zip (SHA-256-Prüfsumme: 517ac1915197ccaea027353bf7510554f6b76dcaa0abd62be60e681fbf8f7284) and prepared for publication purposes complies in all material respects with the requirements of Sec. 328 (1) HGB for the electronic reporting format ("ESEF format"). In accordance with German legal requirements, this assurance extends only to the conversion of the information contained in the consolidated financial statements and the combined management report into the ESEF format and therefore relates neither to the information contained within these renderings nor to any other information contained in the file identified above.

In our opinion, the rendering of the consolidated financial statements and the combined management report contained in the file identified above and prepared for publication purposes complies in all material respects with the requirements of Sec. 328 (1) HGB for the electronic reporting format. Beyond this assurance opinion and our audit opinions on the accompanying consolidated financial statements and the accompanying group management report for the fiscal year from 1 January 2021 to 31 December 2021 contained in the "Report on the audit of the consolidated financial statements and of the combined management report" above, we do not express any assurance opinion on the information contained within these renderings or on the other information contained in the file identified above.

Basis for the opinion

We conducted our assurance work on the rendering of the consolidated financial statements and the combined management report contained in the file identified above in accordance with Sec. 317 (3a) HGB and the IDW Assurance Standard: Assurance on the Electronic Rendering of Financial Statements and Management Reports Prepared for Publication Purposes in Accordance with Sec. 317 (3a) HGB (IDW AsS 410) (10.2021). Our responsibility in accordance therewith is further described in the "Auditor's responsibilities for the assurance work on the ESEF documents" section. Our audit firm applies the IDW Standard on Quality Management 1: Requirements for Quality Management in the Audit Firm (IDW QS 1).

Responsibilities of the executive directors and the supervisory board for the ESEF documents

The executive directors of the Company are responsible for the preparation of the ESEF documents including the electronic rendering of the consolidated financial statements and the combined management report in accordance with Sec. 328 (1) Sentence 4 No. 1 HGB and for the tagging of the consolidated financial statements in accordance with Sec. 328 (1) Sentence 4 No. 2 HGB.

In addition, the executive directors of the Company are responsible for such internal control as they have considered necessary to enable the preparation of ESEF documents that are free from material non-compliance with the requirements of Sec. 328 Abs. 1 HGB for the electronic reporting format, whether due to fraud or error.

The supervisory board is responsible for overseeing the process for preparing the ESEF documents as part of the financial reporting process.

Auditor's responsibilities for the assurance work on the ESEF documents

Our objective is to obtain reasonable assurance about whether the ESEF documents are free from material intentional or unintentional non-compliance with the requirements of Sec. 328 (1) HGB. We exercise professional judgment and maintain professional skepticism throughout the assurance work. We also:

/ Identify and assess the risks of material intentional or unintentional non-compliance with the requirements of Sec. 328 (1) HGB, design and perform assurance procedures responsive to those risks, and obtain assurance evidence that is sufficient and appropriate to provide a basis for our assurance opinion.

- Obtain an understanding of internal control relevant to the assurance on the ESEF documents in order to design assurance procedures that are appropriate in the circumstances, but not for the purpose of expressing an assurance opinion on the effectiveness of these controls.
- Evaluate the technical validity of the ESEF documents, i.e., whether the file containing the ESEF documents meets the requirements of Commission Delegated Regulation (EU) 2019/815, in the version in force at the date of the financial statements, on the technical specification for this file.
- Evaluate whether the ESEF documents enable an XHTML rendering with content equivalent to the audited consolidated financial statements and to the audited combined management report.
- Evaluate whether the tagging of the ESEF documents with Inline XBRL technology (iXBRL) in accordance with the requirements of Arts. 4 and 6 of Commission Delegated Regulation (EU) 2019/815, in the version in force at the date of the financial statements, enables an appropriate and complete machine-readable XBRL copy of the XHTML rendering.

Further information pursuant to Art. 10 of the EU Audit Regulation

We were elected as group auditor by the Annual General Meeting on 21 April 2021. We were engaged by the Supervisory Board on 21 May 2021/9 June 2021. We have been the auditor of MTU Aero Engines AG for an uninterrupted period since the audit of the consolidated financial statements for fiscal year 2014.

We declare that the opinions expressed in this auditor's report are consistent with the additional report to the audit committee pursuant to Art. 11 of the EU Audit Regulation (long-form audit report).

In addition to the financial statement audit, we have provided to the Company or entities controlled by it the following services that are not disclosed in the consolidated financial statements or in the combined management report:

In addition to the statutory audit of the annual financial statements and consolidated financial statements of MTU Aero Engines AG, we also performed audits of the financial statements of subsidiaries and carried out reviews, which were integrated into the audit, of interim financial statements and compliance certificates for loan agreements.

Audit-related services largely included assurance services in respect of the non-financial statement and the remuneration report in accordance with the AktG ["Aktiengesetz": German Stock Corporation Act].

Other services were performed for the intraperiod inspection of documents that are not directly related to the current financial statement audit.

Other matter – use of the auditor's report

Our auditor's report must always be read together with the audited consolidated financial statements and the audited combined management report as well as the assured ESEF documents. The consolidated financial statements and the combined management report converted to the ESEF format – including the versions to be published in the Bundesanzeiger [German Federal Gazette] – are merely electronic renderings of the audited consolidated financial statements and the audited combined management report and do not take their place. In particular, the ESEF report and our assurance opinion contained therein are to be used solely together with the assured ESEF documents made available in electronic form.

German Public Auditor responsible for the engagement

The German Public Auditor responsible for the engagement is Christian Baur.

Munich, 8 March 2022

Ernst & Young GmbH
Wirtschaftsprüfungsgesellschaft

sgd.	sgn.
Baur	Stummer-Jovanovic
Wirtschaftsprüfer	Wirtschaftsprüfer
[German Public Auditor]	[German Public Auditor]

The assurance engagement performed by Ernst & Young (EY) relates exclusively to the German version of the non-financial statement 2021 of MTU Aero Engines AG. The following text is a translation of the original German independent assurance report.

Independent auditor's report on limited and reasonable assurance engagement

To MTU Aero Engines AG, Munich

We have performed an assurance engagement on the non-financial statement of MTU Aero Engines AG according to § 289b HGB ("Handelsgesetzbuch": German Commercial Code), which is combined with the non-financial statement of the group according to § 315b HGB, consisting of the chapter "Non-financial statement" in the group management report as well as the section "The MTU Group" in the group management report being incorporated by reference, for the reporting period from for the period from 1 January 2021 to 31 December 2021.

Our engagement refers to

/ the disclosures in the non-financial statement marked with the symbol "[√]" on the KPIs "CO_2 emissions by production hours (Munich site)" as well as the "Total index value PulsCheck" (in the following "selected ESG KPIs") with reasonable assurance and
/ the other disclosures in the non-financial statement (in the following "other non-financial disclosures") with limited assurance.

Not subject to our assurance engagement are other references to disclosures made outside the non-financial statement as well as prior-year disclosures.

Responsibilities of the executive directors

The executive directors of the Company are responsible for the preparation of the non-financial statement in accordance with Sec. 315c in conjunction with Secs. 289c to 289e HGB ["Handelsgesetzbuch": German Commercial Code] and Art. 8 of Regulation (EU) 2020/852 of the European Parliament and of the Council of 18 June 2020 on the establishment of a framework to facilitate sustainable investment and amending Regulation (EU) 2019/2088 (hereinafter the "EU Taxonomy Regulation") and the Delegated Acts adopted thereunder as well as in accordance with their own interpretation of the wording and terms contained in the EU Taxonomy Regulation and the Delegated Acts adopted thereunder as set out in the section "Disclosures on the EU taxonomy" of the non-financial statement.

These responsibilities of the Company's executive directors include the selection and application of appropriate non-financial reporting methods and making assumptions and estimates about individual non-financial disclosures that are reasonable in the circumstances. Furthermore, the executive directors are responsible for such internal control as the executive directors consider necessary to enable the preparation of a non-financial statement that is free from material misstatement, whether due to fraud (manipulation of the non-financial statement) or error.

The EU Taxonomy Regulation and the Delegated Acts adopted thereunder contain wording and terms that are still subject to considerable interpretation uncertainties and for which clarifications have not yet been published in every case. Therefore, the executive directors have disclosed their interpretation of the EU Taxonomy Regulation and the Delegated Acts adopted thereunder in the section "Disclosures on the EU taxonomy" of the non-financial statement. They are responsible for the defensibility of this interpretation. Due to the immanent risk that undefined legal terms may be interpreted differently, the legal conformity of the interpretation is subject to uncertainties.

Independence and quality assurance of the auditor's firm

We have complied with the German professional requirements on independence as well as other professional conduct requirements.

Our audit firm applies the national legal requirements and professional pronouncements - in particular the BS WP/vBP ["Berufssatzung für Wirtschaftsprüfer/vereidigte Buchprüfer": Professional Charter for German Public Accountants/German Sworn Auditors] in the exercise of their Profession and the IDW Standard on Quality Management issued by the Institute of Public Auditors in Germany (IDW): Requirements for Quality Management in the Audit Firm (IDW QS 1) and accordingly maintains a comprehensive quality management system that includes documented policies and procedures with regard to compliance with professional ethical requirements, professional standards as well as relevant statutory and other legal requirements.

Responsibilities of the auditor

Based on our assurance engagement, our responsibility is to express a reasonable assurance opinion on selected ESG KPIs as well as a limited assurance opinion on the other non-financial disclosures in the non-financial statement.

We conducted our assurance engagement in accordance with International Standard on Assurance Engagements (ISAE) 3000 (Revised): "Assurance Engagements other than Audits or Reviews of Historical Financial Information" issued by the IAASB.

Responsibilities of the auditor for the assurance of selected ESG KPIs with reasonable assurance

ISAE 3000 (Revised) requires that we plan and perform the assurance engagement to obtain reasonable assurance about whether the Company's non-financial statement is prepared, in all material respects, in accordance with Sec. 315c in conjunction with Secs. 289c to 289e HGB.

The assurance engagement on the non-financial statement includes performing procedures and obtaining evidence for the quantitative and qualitative disclosures in the non-financial statement that is sufficient and appropriate to provide a basis for our opinion.

We exercise professional judgment and maintain professional skepticism throughout the assurance engagement. Our procedures also include:

- Identifying and assessing the risks of material misstatement of the selected ESG KPIs, whether due to fraud or error, designing and performing procedures responsive to those risks, and obtaining evidence that is sufficient and appropriate to provide a basis for our opinion. The risk of not detecting a material misstatement resulting from fraud is higher than for one resulting from error, as fraud may involve collusion, forgery, intentional omissions, misrepresentations, or the override of internal control.
- Obtaining an understanding of internal control relevant to the assurance engagement on the selected ESG KPIs in order to design procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of these systems.
- Evaluating the appropriateness of methods used by the executive directors and the reasonableness of estimates made by the executive directors and related disclosures.
- Evaluating the presentation of disclosures in the non-financial statement.

We believe that the evidence we have obtained is sufficient and appropriate to provide a basis for our opinion.

Responsibilities of the auditor for the assurance of other non-financial disclosures with limited assurance

ISAE 3000 (Revised) requires that we plan and perform the assurance engagement to obtain limited assurance about whether any matters have come to our attention that cause us to believe that the Company's non-financial statement is not prepared, in all material respects, in accordance with Sec. 315c in conjunction with Secs. 289c to 289e HGB and the EU Taxonomy Regulation and the Delegated Acts adopted thereunder as well as the interpretation by the executive directors disclosed in the section "Disclosures on the EU taxonomy" of the non-financial statement. Not subject to our assurance engagement are other references to disclosures made outside the non-financial statement, prior-year disclosures as well as the external sources of documentation or expert opinions mentioned in the non-financial statement, which are marked as unassured.

In a limited assurance engagement, the procedures performed are less extensive than in a reasonable assurance engagement, and accordingly, a substantially lower level of assurance is obtained. The selection of the assurance procedures is subject to the professional judgment of the auditor.

In the course of our assurance engagement we have, among other things, performed the following assurance procedures and other activities:

- Inquiries of the employees regarding the selection of topics for the non-financial statement, the risk assessment, and the policies of MTU for the topics identified as material
- Inquiries of employees responsible for data capture and consolidation as well as the preparation of the other non-financial disclosures in the non-financial statement, to evaluate the reporting system, the data capture and compilation methods as well as internal controls to the extent relevant for the assurance of the other disclosures in the non-financial statement
- Identification of likely risks of material misstatement
- Inspection of relevant documentation of the systems and processes for compiling, aggregating and validating data in the relevant areas, e.g. compliance and human resources in the reporting period and testing such documentation on a sample basis,
- Analytical procedures on other disclosures in the non-financial statement at the level of the Company and the Group

- Inquiries and inspection of documents on a sample basis relating to the collection and reporting of selected data
- Evaluation of the presentation of the non-financial statement
- Evaluation of the process to identify the taxonomy-eligible economic activities and the corresponding disclosures in the non-financial statement.

In determining the disclosures in accordance with Art. 8 of the EU Taxonomy Regulation, the executive directors are required to interpret undefined legal terms. Due to the immanent risk that undefined legal terms may be interpreted differently, the legal conformity of their interpretation and, accordingly, our assurance engagement thereon are subject to uncertainties.

Assurance conclusion

In our opinion, on the basis of the knowledge obtained in the assurance engagement, the selected ESG KPIs in the non-financial statement of the MTU Aero Engines AG for the period from 1 January to 31 December 2021 have been prepared, in all material respects, in accordance with Sec. 315c in conjunction with Secs. 289c to 289e HGB.

Based on the assurance procedures performed and the evidence obtained, nothing has come to our attention that causes us to believe that the other non-financial disclosures of the Company for the period from 1 January to 31 December 2021 have not been prepared, in all material respects, in accordance with Sec. 315c in conjunction with Secs. 289c to 289e HGB and the EU Taxonomy Regulation and the Delegated Acts adopted thereunder as well as the interpretation by the executive directors as disclosed in the section "Disclosures on the EU taxonomy" of the non-financial statement.

Restriction of use

We draw attention to the fact that the assurance engagement was conducted for the Company's purposes and that the report is intended solely to inform the Company about the result of the assurance engagement. As a result, it may not be suitable for another purpose than the aforementioned. Accordingly, the report is not intended to be used by third parties for making (financial) decisions based on it. Our responsibility is to the Company alone. We do not accept any responsibility to third parties. Our assurance opinion is not modified in this respect.

General Engagement Terms and Liability

The "General Engagement Terms for Wirtschaftsprüfer and Wirtschaftsprüfungsgesellschaften [German Public Auditors and Public Audit Firms]" dated 1 January 2017 are applicable to this engagement and also govern our relations with third parties in the context of this engagement (www.de.ey.com/general-engagement-terms). In addition, please refer to the liability provisions contained there in no. 9 and to the exclusion of liability towards third parties. We accept no responsibility, liability or other obligations towards third parties unless we have concluded a written agreement to the contrary with the respective third party or liability cannot effectively be precluded.

We make express reference to the fact that we will not update the report to reflect events or circumstances arising after it was issued, unless required to do so by law. It is the sole responsibility of anyone taking note of the summarized result of our work contained in this report to decide whether and in what way this information is useful or suitable for their purposes and to supplement, verify or update it by means of their own review procedures.

Munich, 8 March 2022

Ernst & Young GmbH
Wirtschaftsprüfungsgesellschaft

sgd. Nicole Richter Wirtschaftsprüferin	sgd. ppa. Dr. Patrick Albrecht

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Glossary of engine terms

Compressor
The task of the compressor is to ingest air and compress it before it is fed into the combustor. Compressors consist of bladed disks (rotors) that rotate at very high speed between stationary guide vanes (stators). In order to achieve a compression ratio of over 40:1, which is standard in all modern two-shaft engines, it is necessary to use multi-stage low-pressure and high-pressure compressors rotating at different speeds on dual concentric shafts. These are driven by the corresponding turbines.

Fan
The first rotor of the low-pressure compressor is called the fan. It accelerates the bypass stream flowing aftward and provides the engine's main thrust. It is driven by the low-pressure turbine via the low-pressure shaft.

Geared Turbofan™
What sets the Geared Turbofan™ propulsion system apart is that it features a reduction gearbox between the fan and low-pressure shaft on which the low-pressure compressor and low-pressure turbine that drives the fan are seated. The gearbox allows the fan with its large diameter to rotate more slowly and, at the same time, the low-pressure compressor and turbine to rotate much faster. This enables lower fan pressure ratios and therefore higher bypass ratios to be achieved so the individual components can operate at their respective optimum speeds. As a result, the efficiency of the Geared Turbofan™ is greatly boosted. Therefore, fuel consumption as well as carbon dioxide and noise emissions are significantly reduced. The propulsion system is moreover lighter than a conventional engine owing to the reduced compressor and turbine stage count. In addition, the maintenance costs are lower.

Industrial gas turbines
The operating principle of an industrial gas turbine is essentially the same as that of an aero engine. However, instead of the customary low-pressure turbine used in aircraft, industrial gas turbines have a power turbine. This turbine delivers the power, either directly or via a gear unit, to an additional attached power unit such as a pump or generator. Nearly all industrial gas turbines of the lower and intermediate power classes are aero-engine derivatives.

MRO business
MRO stands for maintenance, repair and overhaul. At MTU, the term "MRO business" is also used more specifically to designate one of the company's operating segments, where it refers to maintenance services for commercial engines, or commercial MRO.

OEM business
OEM stands for original equipment manufacturer. At MTU, the term "OEM business" is used to designate one of the company's operating segments, where it refers to the development, manufacture and assembly of (new) commercial and military engines. Spare parts for (in-service) commercial and military engines and maintenance services for military engines are also included in this operating segment.

Risk- and revenue-sharing partnership
In a risk- and revenue-sharing partnership, each partner contributes a certain share of the resources needed for a specific engine program (work capacity and funding), thus bearing part of the risk. In return, each partner is entitled to a corresponding percentage of the overall sales revenue from that program.

Subsystem
A complete aircraft engine is made up of a number of subsystems. These include the high-pressure and low-pressure compressors, the combustor, the high-pressure and low-pressure turbines and the engine control system.

Thrust class
et engines are generally grouped into three thrust classes: engines with a thrust of between 2,500 and around 20,000 pounds (roughly 10 to 90 kN), mainly used to power business and regional jets; engines with a thrust of between 20,000 and approximately 50,000 pounds (roughly 90 to 225 kN), used to power medium-haul aircraft; and engines with a thrust ranging from 50,000 to over 100,000 pounds (roughly 225 to 450 kN), used to power long-haul aircraft.

Turbine
In a turbine, the energy contained in the gases emerging from the combustor is converted into mechanical energy. Like the compressor, the turbine is subdivided into a high-pressure and a low-pressure section, each of which is directly connected to the corresponding compressor via the respective shaft. The turbine has to withstand much higher stresses than the compressor, as it has to deal not only with the high gas temperatures but also with extreme centrifugal forces of several tons acting on the outer rim of its disks.

Turbine center frame
The turbine center frame connects the high-pressure to the low-pressure turbine. It has to be able to withstand high mechanical and thermal loads. The center frame includes struts, clad with an aerodynamic fairing, to support the shaft bearings and the air and oil supply lines.

Turbofan engine
The turbofan is an advancement of the turbojet principle, the main difference being its enlarged first compressor stage, the fan. While in turbojet engines all of the ingested air flows consecutively through the compressor, the combustor and the turbine, turbofans separate the air stream behind the fan. Part of the air flows through further compressor stages to the combustor and then the turbine, flowing through the core engine. The rest, however – which constitutes a much larger fraction – is channeled around the inner components, providing the engine's main thrust. The ratio between these two airflows is known as the bypass ratio. The greater the bypass ratio, the more economical, environmentally compatible and silent the engine.

Turboprop engine
The most noticeable external feature of a turboprop is its propeller. Inside, however, the engine differs only slightly from the turbojet and the turbofan. The turbine is larger and drives not only the compressor but also the propeller, the latter via a gear unit. Consequently, more energy has to be drawn from the exhaust gas stream in the turbine of a turboprop than in other engine types. Over 90% of the energy is required for the compressor and the propeller. Turboprop airplanes can achieve flight speeds of up to 800 km/h. They are thus slower than turbojet or turbofan airplanes, but they do have the advantage of consuming far less fuel. This predestines them for use in roles where speed is less important, such as on short-haul routes or for air freight.

Turboshaft engine
Turboshaft engines are used in helicopters and are similar to turboprops.

Overview of engines

Commercial engines	
Long-haul aircraft	
CF6	Airbus A300, A310, A330, Boeing 747, 767, DC-10, MD-11, KC-10
GE90-110B/-115B*	Boeing 777-200LR, 777-200F, 777-300ER
GE9X	Boeing 777X
GEnx	Boeing 787, 747-8
GP7000	Airbus A380
PW4000Growth	Boeing 777
Short- and medium-haul aircraft	
CF34*	Business and regional jets
CFM56*	Boeing 737, KC-135 Stratotanker, Airbus A318–A321
JT8D-200	Boeing MD-80
GTF engines	Airbus A320neo, A220, Mitsubishi SpaceJet, Embraer E-Jets Gen 2, Irkut MC-21
PW2000	Boeing 757, C-17
PW6000	Airbus A318
V2500	Airbus A319, A320, A321, Boeing MD-90, Embraer KC-390, C-390 Millennium
Business jets	
PT6A*	Business and utility aircraft
PW100/150A**	ATR42, 72, Fokker 50, Bombardier Q400
JT15D**	Cessna Citation I/II/V/Ultra, Beechjet 400
PW300	Medium-weight business and regional jets
PW500	Light and medium-weight business jets
PW600**	Cessna Mustang, Eclipse 500, Embraer Phenom 100
PW800	Gulfstream G400, G500, G600, Dassault Falcon 6X
Helicopters	
PT6B/-C/-T**	AgustaWestland 119, 139, Airbus Helicopters H175
PW200/PW210*	Light- to medium-weight helicopters

* *MRO only.*
** *MRO only; via Pratt & Whitney Canada Customer Service Centre Europe GmbH.*

Military engines	
Fighter jets	
Next European Fighter Engine (NEFE)***	Future Combat Air System
EJ200	Eurofighter
F110	Lockheed Martin F-16, Boeing F-15
F414	Boeing F/A-18E/F Super Hornet, Boeing EA-18G Growler, Saab Gripen Next Generation
Larzac 04	Dornier-Dassault Alpha Jet
RB199	Panavia Tornado
Helicopters	
T408	Sikorsky CH-53K
MTR390/MTR390 Enhanced	Airbus Helicopters Tiger
T64	Sikorsky CH-53G, GS, GA, GE
Transporters	
TP400-D6	Airbus A400M
Tyne	Transall C-160, Breguet Atlantic

*** *Projects.*

Industrial gas turbines	
LM2500/LM2500+/LM2500+G4	Power generators, mechanical power systems, oil and gas industry, power systems for ships
LM6000/LM6000-PF+	Power generators

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April 29, 2022	Quarterly Statement as of March 31, 2022
	Conference calls with journalists, analysts and investors
May 5, 2022	Annual General Meeting
July 27, 2022	Interim Report as of June 30, 2022
	Conference calls with journalists, analysts and investors
October 27, 2022	Quarterly Statement as of September 30, 2022
	Conference calls with journalists, analysts and investors
November 17, 2022	MTU Investor and Analyst Day

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Translation.
The German version takes precedence.

The annual report follows the rules for the use of inclusive language at MTU.

This annual report of MTU Aero Engines AG is also available in German. It can be found as a PDF in German and English on the MTU website.

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