Agenda

1. Our environment
2. Our track record
3. Our expertise
4. Your questions
Our environment

We shape the future of aviation!
Active fleet to double to 46,000 aircraft by 2036

A passenger aircraft is made up of up to 6 million components

Fuel consumption per 100 passenger kilometers: 2.9 liters of kerosene

~ 2 billion people out of 7 billion have flown in an aircraft to date

The geared turbofan reduces 75% of the noise footprint
# We shape the future of aviation!

## What we do

- **Design, development, production** and **support of aircraft engines** in all thrust categories
- **Commercial business:** 30% of aircraft have MTU technology on board
- **Military business:** full system capability, for more than 80 years
- **Commercial MRO:** worldwide leader in customized engine service solutions
- **MRO portfolio:** 1,000 shop visits per year for more than 30 different engine types
- **Fiscal year 2018:** Revenue €4.57 billion, EBIT adj. €0.67 billion

## How we do it

<table>
<thead>
<tr>
<th>People:</th>
<th>More than 10,000 engine experts at 15 locations</th>
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</thead>
<tbody>
<tr>
<td>Partnerships:</td>
<td>with all OEMs, airlines and the German Air Force (program shares from 5% up to 40%)</td>
</tr>
<tr>
<td>Technology:</td>
<td>150 technology projects, 400 patents and 200 invention disclosure reports per year</td>
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<tr>
<td>Products:</td>
<td>High-pressure compressor, low-pressure turbine, turbine center frame</td>
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<tr>
<td>Process:</td>
<td>Lifetime Excellence (lifecycles from 25 to 50 years)</td>
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<tr>
<td>Culture:</td>
<td>innovative and competent</td>
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</tbody>
</table>

~ **ninefold*** increase in share value since 2005


**€4 billion** invested in approx. 10 years

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The Geared Turbofan Is Setting New Standards

Noise Footprint

MTU Contribution

Chosen for five Airframes

Geared Turbofan reduces:
- Noise footprint by 75%
- Fuel consumption and CO₂-emissions by 16%
- NOₓ-emissions by 50%

High-speed low-pressure turbine
High-pressure compressor

Noise Simulation: Pratt & Whitney SEL Contour Source: Wyle Laboratories

Without Geared Turbofan

With Geared Turbofan

Munich International Airport (MUC)
MTU pursues a sustainable growth strategy in all of its business segments - based on stable and long-term customer relationships.
Partners and customers appreciate MTU’s excellence.
MTU looks back on many important names from the German industrial history – from 1934 to date

1934
BMW Flugmotorenbau GmbH is founded

1965
MAN takes over BMW Triebwerkbau

1969
MTU
50% Daimler Benz
50% MAN

1989
MTU becomes an affiliate of Deutsche Aerospace, later renamed DaimlerChrysler Aerospace (DASA)

2005
MTU goes public

Today
Shareholder structure
93% Institutional investors
6% Private shareholders
1% MTU-owned shares

Focus on military applications

Focus on commercial applications

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MTU is an essential partner in the engine value chain

Material suppliers*  Engine component suppliers*  Subsystem/module suppliers*  Engine OEMs*  Airframers*  Airline operations

*selected market participants
A balanced portfolio and products in all thrust categories ensure MTU’s long-term success.

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Our track record: partners and customers appreciate MTU’s excellence

**Commercial OEM business**
- Share of total revenues ca. 33%
- Balanced product portfolio in all thrust categories
- Decades of partnership with OEMs

**Military OEM business**
- Share of total revenues ca. 9%
- European and U.S. engine programs
- Full system capability
- Leading partner of the German Armed Forces

**Commercial MRO business**
- Share of total revenues ca. 58%
- Services: maintenance, leasing and asset management
- Global network
- Direct customer business, partner of OEMs and airlines

**MTU group fiscal year 2018:**
- Revenue € 4.57 billion / EBIT € 0.67 billion
MTU possesses unique capabilities and has a wealth of know-how.
Boasting comprehensive system expertise, MTU focuses on five core engine competencies - three core components and on unique manufacturing and maintenance processes.

- **High-pressure compressor (HPC)**
- **Low-pressure turbine (LPT)**
- **Turbine center frame (TCF)**

Manufacturing

Maintenance
The geared turbofan is setting new standards - together with our partners, MTU will continue to expand its technological leadership in the future

1\textsuperscript{st} generation geared turbofan - today

- 16\% reduction in fuel burn
- Approx. 75\% reduction of the noise footprint
- Fewer emissions: \( \text{CO}_2 / \text{NO}_x \)
- MRO cost savings: 25\% fewer stages, 45\% fewer blades, lower operating temperature

2\textsuperscript{nd} generation geared turbofan – EIS 2030+

- Lowest fan-pressure ratios at very high bypass ratios
  - BPR 14-20*
- Temperature-resistant \textbf{lightweight} materials
- High-speed, \textbf{highly efficient} expansion system

Source: P&W | * BPR = Bypass Ratio | ** OPR = Overall Pressure Ratio

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We boast more than 10,000 innovative and competent engine experts

More than 60
different nations
work under the umbrella
of MTU Aero Engines

Approx. 20 years
is the average job tenure
of MTU's workforce
(in Germany)

Approx. 80%
of the total
workforce are
engineers or technicians*

350
apprentices at
German locations

*incl. scientists

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With our locations worldwide we are close to our customers

- MTU Maintenance Canada
- MTU Maintenance Dallas
- Vericor Power Systems
- Ceramic Coating Center
- MTU Maintenance Hannover
- MTU Aero Engines Polska
- MTU Aero Engines, Munich headquarters
- Pratt & Whitney Canada Customer Service Center Europe
- MTU Maintenance Hannover
- MTU Maintenance Lease Services

Locations:
1. 80% MTU I 20% Sumitomo
2. 50% MTU I 50% Safran
3. 50% MTU I 50% P&WC
4. 50% MTU I 50% LHT
5. 50% MTU I 50% China Southern

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For questions relating to...

...our company

...our commercial engine business

...our commercial service portfolio

...our military engine business

...our military service portfolio

...our technological expertise

...the sustainability of our products

...our financial figures

...job opportunities at MTU

Click the relevant icon for more information
Let’s shape the future together!
Thank you.
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