MTU Aero Engines – Lifetime Excellence

July 2018
Agenda

1. Our environment
2. Our track record
3. Our expertise
4. Your questions
46,000 Aircrafts

The globally active fleet of 23,000 aircrafts will double by 2036.
Less than 2 billion people out of 7 billion have flown in an aircraft to date.
Up to 6 million components

A passenger aircraft is made up of up to 6 million components.
In 100 Years

is a pilot once forced to shut down an engine.
2.9 liters of kerosene fuel consumption per 100 passenger kilometers.
75% of the noise footprint is reduced by the geared turbofan.
We shape the future of aviation!
MTU pursues a sustainable growth strategy in all of its business segments - based on stable and long-term customer relationships.
Our track record

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
MTU is an essential partner in the engine value chain

<table>
<thead>
<tr>
<th>Material suppliers*</th>
<th>Engine component suppliers*</th>
<th>Subsystem/module suppliers*</th>
<th>Engine OEMs*</th>
<th>Airframers*</th>
<th>Airline operations</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPP</td>
<td>senior Aerospace</td>
<td>Kawasaki</td>
<td>GE Aviation</td>
<td>AIRBUS</td>
<td>Boeing</td>
</tr>
<tr>
<td>PCC</td>
<td>Hanwha Techwin</td>
<td>Mitsubishi</td>
<td>Rolls-Royce</td>
<td>BOMBARDIER</td>
<td>Bombardier</td>
</tr>
<tr>
<td>ALCOA</td>
<td></td>
<td>MB Aerospace</td>
<td>SAFRAN</td>
<td>EMBRAER</td>
<td></td>
</tr>
<tr>
<td>ATI</td>
<td></td>
<td>MTU Aero Engines</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

*selected market participants

OEM market

Aftermarket

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A balanced portfolio and products in all thrust categories ensure MTU’s long-term success

Return on investment periods in the commercial OEM business

Cumulated cash flow

Calendar years after market launch

| GE9X 777X | PW1000G family | GEnx 787, 747-8 | GP7000 A380 | V2500 A320 | PW2000 PW4000 757, C-17 777 | CF6-80, LM6000 747, 767, IGT A300, A310, A330 |
| Entry into service | | 0 | | | | |

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

<table>
<thead>
<tr>
<th>Commercial OEM business</th>
<th>Military OEM business</th>
<th>Commercial MRO business</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image1.png" alt="Commercial OEM image" /></td>
<td><img src="image2.png" alt="Military OEM image" /></td>
<td><img src="image3.png" alt="Commercial MRO image" /></td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Incident</th>
<th>Commercial OEM business</th>
<th>Military OEM business</th>
<th>Commercial MRO business</th>
</tr>
</thead>
<tbody>
<tr>
<td>Revenues: € 2.5 billion (48 %)*</td>
<td>Revenues: € 0.4 billion (8 %)*</td>
<td>Revenues: € 2.3 billion (44 %)*</td>
<td></td>
</tr>
<tr>
<td>Decades of partnerships with OEMs</td>
<td>European and U.S. engine programs</td>
<td>Services: maintenance, leasing and asset management</td>
<td></td>
</tr>
<tr>
<td>Balanced product portfolio in all thrust categories</td>
<td>Full system capability</td>
<td>Global network</td>
<td></td>
</tr>
<tr>
<td>Order volume secures business into the next decade</td>
<td>Leading partner of the German Armed Forces</td>
<td>Direct customer business, partner of OEMs and airlines</td>
<td></td>
</tr>
<tr>
<td>Partnerships with OEMs increasingly include maintenance</td>
<td>Service packages precisely tailored to the requirements of military partners</td>
<td>18,000 shop visits in 36+ years</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>More than 1,400 customers, including over 200 airlines</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Incident</th>
<th>OEM</th>
<th>MRO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Revenues</td>
<td>€ 2.9 billion*</td>
<td>€ 2.3 billion*</td>
</tr>
<tr>
<td>EBIT adj.</td>
<td>€ 0.4 billion*</td>
<td>€ 0.2 billion*</td>
</tr>
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</table>

* Basis: Fiscal 2017

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Commercial OEM business

Military OEM business

Commercial MRO business

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In the commercial OEM business, 30% of today’s aircraft have MTU technology on board and MTU is growing faster than the market as a whole.

### Business jets
- Revenues will **triple** in 10 years

### Regional jets
- Market share will **increase** from 0% to 90%

### Narrowbodies
- Excellent market position will **further improve**

### Widebodies
- New market segments have **opened up**

**Above-average growth**
Our track record: partners and customers appreciate MTU’s excellence

Commercial OEM business

Military OEM business

Commercial MRO business

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The military OEM business has been the basis for MTU's system capability – for more than 80 years now

Military OEM business

Growing responsibility and increasing complexity

MTU founded as BMW Flugmotoren GmbH

Production under license

Conventional MRO

Integrated services

Cooperation with the German Armed Forces

Performance-oriented logistics & service concept

Bo-105

RR250

Tornado

RB199

Eurofighter

EJ200

Tiger

MTR390

Ju52

BMW132

Phantom79

JJ79

… 1930s 1940s 1950s 1960s 1970s 1980s 1990s 2000s 2010s 2020s…
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Commercial OEM business

Military OEM business

Commercial MRO business

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MTU is one of the world’s leading service providers with the largest portfolio and the strongest growth rates in the market

Commercial MRO business

Direct customer business

- Analysis, consulting and engine expertise
- Customized and flexible solutions

OEM partnerships

- Standardization and industrialization of processes
- Reduction of costs and sharing of investments

Airline partnerships

- MRO know-how: processes, systems, people
- Best practice in a best-cost environment

Efficient flowline production in Hannover

Advanced GP7000 tested

Partnership with China Southern Airlines

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In 2017, MTU achieved record sales and earnings once again – we keep our promises

2017 financial figures

<table>
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<tr>
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</thead>
<tbody>
<tr>
<td>FY 2016</td>
<td>FY 2017</td>
<td>FY 2016</td>
<td>FY 2017</td>
</tr>
<tr>
<td>2,401</td>
<td>2,469</td>
<td>345</td>
<td>151</td>
</tr>
<tr>
<td>+3 %</td>
<td>+6 %</td>
<td>+24 %</td>
<td>+84 %</td>
</tr>
<tr>
<td>1,914</td>
<td>2,285</td>
<td>194</td>
<td>82</td>
</tr>
<tr>
<td>+19 %</td>
<td>+21 %</td>
<td>+7 %</td>
<td></td>
</tr>
<tr>
<td>504</td>
<td>404</td>
<td>322</td>
<td></td>
</tr>
<tr>
<td>-20 %</td>
<td>+28 %</td>
<td>+21 %</td>
<td></td>
</tr>
<tr>
<td>4,733*</td>
<td>5,036*</td>
<td>607</td>
<td></td>
</tr>
</tbody>
</table>

* Consolidated values

Comm. OEM business  Military OEM business  Total OEM business  Comm. MRO  Total

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MTU possesses unique capabilities and has a wealth of know-how.
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**Expertise**

**Technology**
We are continuously expanding our technological lead by identifying and setting revolutionary trends

**Processes**
We deliver on time, with the right quality and at reasonable costs – digitalization opens up further potential for MTU, sustainability is our basic principle

**Partnerships**
We enter into sustainable partnerships – an essential prerequisite for MTU’s long-term success

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

**Locations**
Through our 14 locations worldwide, we are close to our customers
Boasting comprehensive system expertise, MTU focuses on five core engine competencies - three core components and on unique manufacturing and maintenance processes.

1. High-pressure compressor (HPC)
2. Low-pressure turbine (LPT)
3. Turbine center frame (TCF)
4. Manufacturing
5. Maintenance
The geared turbofan is setting new standards - together with our partners, MTU will continue to expand its technological leadership in the future

Technology – today and tomorrow

The geared turbofan today

- 16 % reduction in fuel burn
- Approx. 75 % reduction of the noise footprint
- Fewer emissions: CO₂ / NOₓ
- MRO cost savings: 25 % fewer stages, 45 % fewer blades, lower operating temperature

The next-generation geared turbofan (EIS 2030+)

- Lowest fan-pressure ratios at very high bypass ratios: BPR 14 – 20*
- Very high overall pressure ratio: OPR 60+ **
- Temperature-resistant lightweight materials
- High-speed, highly efficient expansion system

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

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We deliver on time, in the right quality and at reasonable costs - digitalization opens up further potential for MTU, sustainability is our core principle

Processes

Research & Development

- In-depth understanding of the system
- **Our aim is** to continuously improve the products
- 1,000 engineers, 6 centers of competence and 17 university cooperations

Program Management

- Long-term partnerships
- Business secured for the next generation
- Balanced portfolio with content in all thrust categories

Production

- Highly automated and best-cost
- Total volume to double in the next 5 years
- 6,300 suppliers

Service

- Many years of experience with the **customer in the center** of consulting competence
- Optimization of operating costs, maximum asset utilization and recycling and remarketing, reduced risks
- Cutting-edge technologies

Sustainability & digitalization

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As a technology leader, MTU uses digitalization primarily to further optimize processes and tools, i.e. to continuously increase efficiency and reduce costs.
As a company, we take responsibility for our products, employees, customers, the environment and our society

Sustainability

Product responsibility

Responsibility toward employees

Environmental protection

Sustainable business practices

Commitment to society

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We create sustainable partnerships – an essential prerequisite for MTU’s long-term success

<table>
<thead>
<tr>
<th>Research &amp; Development</th>
<th>Production</th>
<th>Programs</th>
<th>Service</th>
</tr>
</thead>
<tbody>
<tr>
<td>• 6 centers of competence</td>
<td>• 6,300 suppliers</td>
<td>• Pratt &amp; Whitney</td>
<td>• Airline customers</td>
</tr>
<tr>
<td>• 17 cooperations with universities</td>
<td>• Long-term partnerships</td>
<td>• General Electric</td>
<td>• OEM networks</td>
</tr>
<tr>
<td>• National and EU research projects</td>
<td>• Double sourcing</td>
<td>• Rolls-Royce, Safran, Avio, ITP</td>
<td>• Airline joint ventures</td>
</tr>
<tr>
<td>• Technology network</td>
<td></td>
<td>• Air forces</td>
<td>• External vendors</td>
</tr>
</tbody>
</table>

- ✔ Risk minimization
- ✔ Increase in efficiency
- ✔ Complementary technology
- ✔ Revenues/market access

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

50 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

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We are innovative and competent

customer-oriented  committed  reliable
high-tech  connected  sustainable
results-oriented  excellent  efficient
With our 14 locations worldwide we are close to our customers
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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