
# Engine programs

MTU Aero Engines

# Engine expertise from a single source

In the aviation industry, three simple letters stand for top-notch engine technology: MTU has been providing propulsion systems to power aircraft for decades now, keeping a variety of fixed-wing and rotary-wing aircraft in the air with its innovative technologies, products and services.

MTU has a long tradition of success, the company's roots reaching back to the dawn of aviation more than a hundred years ago. Predecessor companies Rapp Motorenwerke, Daimler and Benz equipped the first powered airplanes. In 1934, BMW Flugmotorenbau GmbH, MTU Aero Engines' legal predecessor, was founded.

## An established global player

MTU Aero Engines designs, develops, manufactures, markets and supports commercial and military aircraft engines and industrial gas turbines. With its products, it has content in all engine thrust and power categories and on all major components and subsystems that go into an engine. MTU is Germany's leading, and in fact the country's only independent engine manufacturer. Moreover, the company has established itself as a major player in the global engine industry.

In the military arena, MTU is Germany's industrial lead company for practically all engines flown by the German Armed Forces. Within the framework of its cooperation with the German Armed Forces the company closely collaborates with the national customer. The Munich-based engine manufacturer also has stakes in U.S. military engines.

With its global network of maintenance shops and its unique repair expertise MTU Maintenance has established itself as one of the world's leading providers of commercial engine maintenance services.

MTU contributes the high-speed low-pressure turbine and the first four stages of the high-pressure compressor to the Pratt & Whitney GTF™ Engine Family.

# Commercial engines

Widebody jets

## CF6

Airbus
- A300
- A310
- A330

Boeing
- 747
- 767
- DC-10/KC-10
- MD-11

Two-spool 178–320-kN turbofan. The popular engine is among the best-selling in its class. It powers medium- and long-range widebodies.

## PW4000 Growth

- Boeing 777

Two-spool 352–450-kN turbofan. The PW4000 Growth ranks among the world's most powerful engines. Its sevenstage low-pressure turbine is the largest ever developed by MTU.

## GE9X

- Boeing 777X

The two-spool turbofan engine exclusively powers the Boeing 777X. MTU is responsible for the design, development and production of the turbine center frame.

Narrowbody and regional jets

## JT8D-200

- Boeing MD-80

Two-spool 82–97-kN turbofan. The JT8D-200 is among the world's most-sold jet engines.

## GEnx

- Boeing 787 Dreamliner
- Boeing 747-8I
- Boeing 747-8F

Two-spool 237–339-kN turbofan. MTU manufactures the engine's turbine center frame for which the company also has assumed design responsibility.

## GTF Engine Family

- Airbus A320neo
- Mitsubishi SpaceJet
- Airbus A220
- Irkut MC-21
- Embraer E-Jets E2

Twin-shaft turbofan engine in the 67–156-kN thrust range. The Pratt & Whitney GTF™ Engine Family cuts noise footprint levels up to 75 percent.

## GP7000

- Airbus A380

Two-spool 311–363-kN turbofan. The GP7000 is the ideal offering for long-haul service and impresses with its low fuel burn, weight and noise.

## PW2000

- Boeing 757
- Boeing C-17 military transport aircraft

Two-spool 167–191-kN turbofan. It was on the PW2000 that in a first for the company, MTU tackled the development of a commercial low-pressure turbine.

## PW6000

- Airbus A318

Two-spool 80–107-kN turbofan. This was the first time MTU could launch a high-pressure compressor of its own on a commercial engine. The compressor is a six-stage transonic configuration.

## V2500

Airbus
- A319
- A320
- A321

- Boeing MD-90

Boeing Embraer
- C-390 Millennium
- KC-390

Two-spool 98–146-kN turbofan. MTU develops and manufactures the V2500 engine in cooperation with Pratt & Whitney and Japanese Aero Engines Corporation.

## PW500

For example:
- Cessna Citation Bravo
- Cessna Citation XLS, XLS+
- Embraer Phenom 300

Two-spool 13–20-kN turbofan. The engine powers predominantly small and midsize business jets.

## PW800

- Gulfstream G500
- Gulfstream G600
- Dassault Falcon 6X

Two-spool 44–89-kN turbofan. MTU contributes its flagship products, the high-pressure compressor and the low-pressure turbine, to this commercial engine. The engine powers business jets.

Business jets

## PW300

For example:
- Dassault Falcon 7X, 8X
- Bombardier Learjet Model 60
- Dornier 328JET
- Cessna Citation Sovereign, Latitude

Two-spool 21–31-kN turbofan. The engine is in demand especially for midsize business jets and regional aircraft.

| | | Low-pressure compressor | High-pressure compressor | High-pressure turbine | Low-pressure turbine | Turbine center frame | Casing | Mixer | MRO |
|---|---|---|---|---|---|---|---|---|---|
| **Widebody jets** | CF6 | ■ | ■ | ■ | ■ | | | | ■ |
| | GE9X | | | | | ■ | | | |
| | GEnx | | | | | ■ | | | ■ |
| | GP7000 | | | ■ | ■ | ■ | | | ■ |
| **Narrowbody and regional jets** | PW4000 Growth | | | | ■ | | ■ | | |
| | JT8D-200 | | ■ | ■ | ■ | | ■ | | |
| | GTF Engine Family | | ■ | | ■ | | | | ■ |
| | PW2000 | | ■ | ■ | ■ | | ■ | | ■ |
| | PW6000 | | ■ | | ■ | | | | ■ |
| **Business jets** | V2500 | | | | ■ | | ■ | | ■ |
| | PW300 | | | | ■ | | ■ | ■ | ■ |
| | PW500 | | | | ■ | | ■ | ■ | ■ |
| | PW800 | | ■ | | ■ | | | | |

■ Development / Manufacturing ■ Maintenance, repair and overhaul

# Military engines

Fighter aircraft

## EJ200

- Eurofighter/Typhoon

Two-spool reheated 90-kN turbofan. Starting with its Tranche 2, the engine control and monitoring functions are combined into a single DECMU. MTU is responsible for the repair and overhaul of the engine under the cooperation with the German Armed Forces.

## F110

- Lockheed Martin F-16
- Boeing F-15

Afterburning turbofan engine rated at 120–142-kN of thrust. GE Aviation's engine, which has been in service since 1986, is among the most successful propulsion systems in its class.

## F414

- Boeing F/A-18E/F Super Hornet
- Boeing EA-18G Growler
- Saab Gripen Next Generation

Twin-shaft afterburning turbofan engine rated at 98-kN. MTU produces the high-pressure and low-pressure turbine shroud hangers for the powerhouse.

## Larzac 04


- Dornier-Dassault Alpha jet

Two-spool 14-kN turbofan. MTU's stake in the production of the Larzac 04 primarily includes the hot section–from the combustor inlet to the turbine exit.

## RB199

- Panavia Tornado

Three-spool, reheated 70–75-kN turbofan. The RB199 is the world's only engine sporting an integrated thrust reverser. The Tornado engines are maintained at MTU under the cooperation with the German Armed Forces.

Transport aircraft

## TP400-D6

- Airbus A400M

Three-spool 8,200-kW turboprop. The Western world's most powerful turboprop engine excels in tactical and strategic missions through its robustness, efficiency and moderate life-cycle costs. MTU has exclusive final assembly responsibility for the engines to power the Airbus A400M.

## Tyne

- Transall C-160
- Breguet Atlantic

4,226-kW turboprop. Dating back to the 1960s, the engine powers the Transall C-160 and Breguet Atlantic to this day.

## T408

• Sikorsky CH-53K

Turboshaft engine delivering a power output of around 5,600 kW. The first application for the T408 is the triple engine CH-53K heavy-lift transport helicopter.

## T64

• Sikorsky CH-53G, GS, GA, GE

The T64 is a turboshaft engine with a maximum power of 3,229 kW for applications on medium-size transport helicopters. A comprehensive modification program to upgrade the T64-7 to the more powerful T64-100 standard was completed in 2014.

## MTR390

• Airbus Helicopters Tiger

Turboshaft engine available in two power ratings. The MTR390-2C basic version has a takeoff power of 958 kW. Delivering 14 percent more power, the MTR390 Enhanced has a takeoff power of 1,094 kW. Both versions have a 21-percent contingency rating. MTU is responsible for the repair and overhaul of the engine under the cooperation with the German Armed Forces.

| | | Low-pressure compressor | Intermediate-pressure compressor | High-pressure compressor | Combustion chamber | High-pressure turbine | Intermediate-pressure turbine | Low-pressure/power turbine | Thrust reverser | Casing | Gearbox | Engine control/monitoring | Maintenance, repair and overhaul |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Fighter aircraft** | EJ200 | ■ | | ■ | | ■ | | | | | | ■ | ■ |
| | F110 | ■ | | | | | | | | | | | |
| | F414 | | | ■ | | ■ | | ■ | | | | | |
| | Larzac 04 | | | | ■ | ■ | | | | ■ | | | |
| **Helicopters** | RB199 | | ■ | ■ | | | ■ | | ■ | ■ | ■ | ■ | ■ |
| | T408 | | | | | | | ■ | | | | | |
| | MTR390 | | | | ■ | ■ | | | | ■ | | ■ | ■ |
| | T64 | | | ■ | ■ | ■ | | | | | ■ | | ■ |
| **Transport aircraft** | TP400-D6 | | ■ | | | | ■ | | | | | ■ | ■ |
| | Tyne | | | ■ | ■ | ■ | | ■ | | ■ | | | ■ |

■ Development / Manufacturing

■ Maintenance, repair and overhaul under the cooperation with the German Armed Forces

■ Maintenance, repair and overhaul at MTU Aero Engines

# At the cutting edge

The key to continued success are the engines to power tomorrow's aircraft which have to be fuelthriftier, cleaner and quieter. MTU is pressing ahead with their development in close cooperation with all of the big engine manufacturers and partners from research and science. The company is involved in all major technology programs and time and again provides new impetus with its advanced products, manufacturing and repair techniques. Its innovative power makes it a musthave partner and technology leader that actively shapes the future of aviation. Low-pressure turbines, high-pressure compressors, turbine center frames as well as manufacturing and repair techniques "made by MTU" rank among the finest to be found in the marketplace.

EJ200 teamwork: Specialists from the German Air Force work shoulder to shoulder with MTU experts as part of their collaboration.

| Program partners | | Pratt & Whitney | Pratt & Whitney Canada | GE Aviation | Rolls-Royce | SAFRAN-Group | GKN Aerospace | Avio Aero | ITP Aero | JAEC | Mitsubishi | Hanwha | Rolls-Royce Deutschland | Thrust and power categories |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Widebody jets** | CF6 | | | ■ | | ■ | ■ | ■ | | | | | | 178 – 320 kN |
| | GE9X | | | ■ | | ■ | | | | | | | | 450 – 470 kN |
| | GEnx | | | ■ | | ■ | ■ | ■ | | | | ■ | | 237 – 339 kN |
| | GP7000 | ■ | | ■ | | ■ | | | | | | | | 311 – 363 kN |
| | PW4000 Growth | ■ | | | | | | ■ | | | ■ | | | 352 – 450 kN |
| **Narrowbody and regional jets** | JT8D-200 | ■ | | | | | ■ | | | | ■ | | | 82 – 97 kN |
| | GTF Engine Family | ■ | | | | | ■ | | | ■ | | | | 67 – 156 kN |
| | PW2000 | ■ | | | | | ■ | ■ | | | | | | 167 – 191 kN |
| | PW6000 | ■ | | | | | | | | | ■ | | | 80 – 107 kN |
| | V2500 | ■ | | | | | | | | ■ | | | | 98 – 146 kN |
| **Business jets** | PW300 | | ■ | | | | | | | | | | | 21 – 31 kN |
| | PW500 | | ■ | | | | | | | | | | | 13 – 20 kN |
| | PW800 | | ■ | | | | | | | | | | | 44 – 89 kN |
| **Fighter aircraft** | EJ200 | | | | ■ | | | ■ | ■ | | | | | 90 kN |
| | F110 | | | ■ | | ■ | ■ | ■ | | | | | | 120 – 142 kN |
| | F414 | | | ■ | | ■ | ■ | | | | | | | 98 kN |
| | Larzac 04 | | | | | ■ | | | | | | | ■ | 14 kN |
| | RB199 | | | | ■ | | | ■ | | | | | | 70 – 75 kN |
| **Helicopters** | T408 | | | ■ | | | | | | | | | | 5,600 kW |
| | MTR390 | | | | ■ | ■ | | | ■ | | | | | 1,094 kW |
| | T64 | | | ■ | | | | | | | | | | 3,229 kW |
| **Transport aircraft** | TP400-D6 | | | | ■ | ■ | | | ■ | | | | | 8,200 kW |
| | Tyne | | | | ■ | ■ | | | | | | | | 4,226 kW |

■ Commercial programs ■ Military programs


MTU Aero Engines AG
Dachauer Straße 665
80995 Munich • Germany
Tel. +49 89 1489-0
Fax +49 89 1489-5500
info@mtu.de
www.mtu.de

GER 02/20/MUC/02000/AD/EB/E