

# Engine trend monitoring (ETM)

## Increased efficiency and lower cost through all-in-one tool for advanced diagnosis, analysis and prognosis



MTU's engine trend monitoring (ETM) is an independent and proprietary web application that monitors specific data sets from flight operations. We combine these with shop visit data. We introduced ETM in 2006 and continue to optimize the system – for instance, we recently introduced a web userface for all devices, new reporting functions and real-time visibility into the status of engines. The foundation is a full, MTU-developed thermodynamic engine model for each engine type.

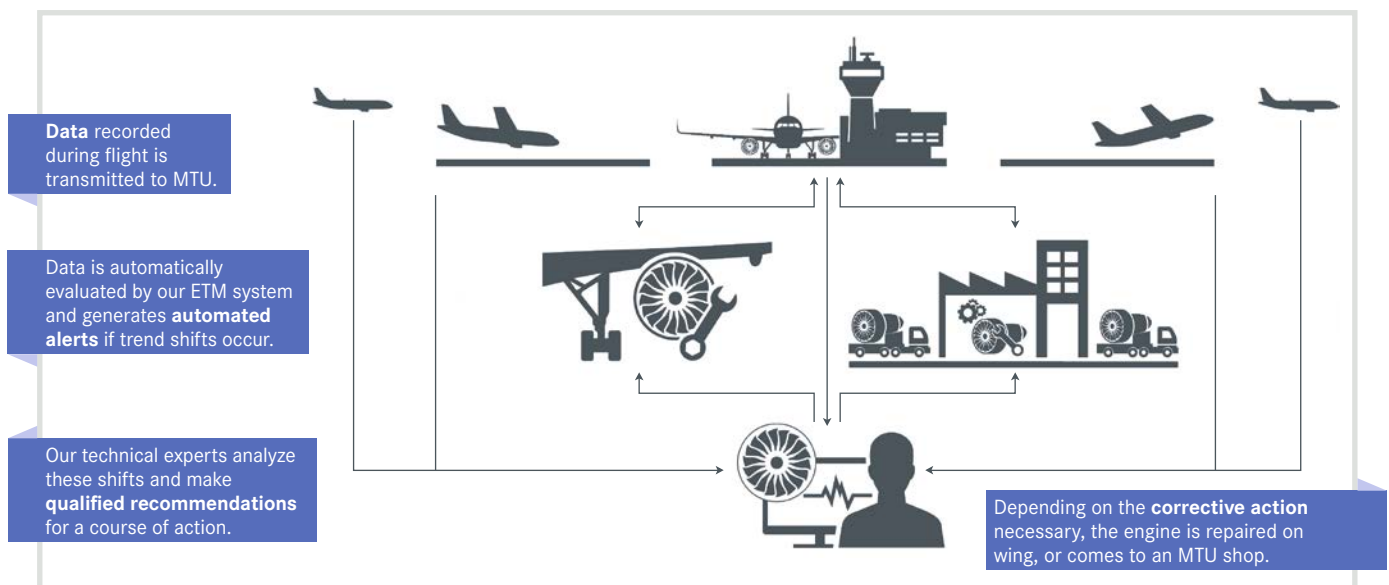
As an independent service, our ETM system can accommodate a wide range of engine types. For instance, we can monitor a customer's GE90 and V2500 fleet with the same tool. This is particularly helpful for engineers and technical managers and unusual in the industry.

We monitor CF34, CF6-80, CFM56, GE90, LEAP, PW2000 and V2500. Other engine types can be supported on request. Customers rely on high-quality trend analysis and customizable solutions – as part of a larger MRO arrangement, such as PERFORM<sup>Plus</sup>, or as a stand-alone service.

Each customer, engine and fleet is unique – and they all create individual data patterns. We identify these patterns for our customers and, as a result, can detect failures early before secondary damage occurs and prevent AOGs.

With ETM data we are able to better schedule shop visits and adjust the respective workscopes right down to module level. Also, on-wing maintenance and engine washes can be planned in such a way that engine efficiency and performance are improved and cost is minimized.

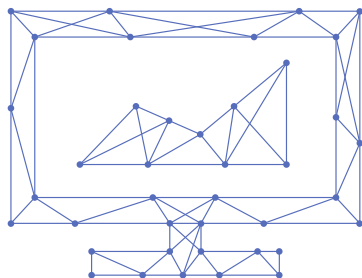
Predictions of remaining on-wing time augment fleet management abilities, as, for instance, purchasing material for a planned shop visit can start months before the actual removal. We combine ETM with our engineering and workscope expertise to optimize solutions for our customers. It is always a holistic and highly-customized process.





## How does it work?

The system observes various aircraft engine parameters, such as exhaust gas temperature (EGT), fuel flow, shaft speeds, oil parameters and bleed settings, and detects abnormalities. Any trend deviations are alerted to our expert



engineering team, who will assess the data and make qualified recommendations for a course of action to our customers.

## Continual development

We are always improving our ETM system and are currently focusing on the integration of continuous engine operational data and the management of very large data sets in near real time. Furthermore, we are working on an integrated digital services platform that will become an integral part of the customer experience at MTU. This new ecosystem will offer maximum benefits from digital developments, including artificial intelligence, combined with MTU's excellent and extensive technical understanding and over 40 years' experience in MRO. ETM will be one of the key building blocks within this new digital world.

## Special features

- Real-time visibility (customer log-in)
- Responsive application for all devices
- Automatic diagnosis and on-wing times prognosis
- Full transparency and immediate access to all data
- Interactive and individualized reports
- Easy visibility of maintenance recommendations

## Your benefits

- 24/7 expert analysis by MTU engineers
- Accurate and relevant alerts/recommendations
- Better engine performance and reduced SFC
- Longer/optimized on-wing times
- Minimized downtime (less spares)
- Reduced cost of ownership across the lifecycle
- Reliable/predictable planning

