



DRIVEN BY VISIONS
OF TOMORROW

openMDM® for aerospace – because why stop at cars?

5/24/2022 / Fabian Bayerlein, Andreas Putz

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1 Data in Aerospace

2 MDM @MTU

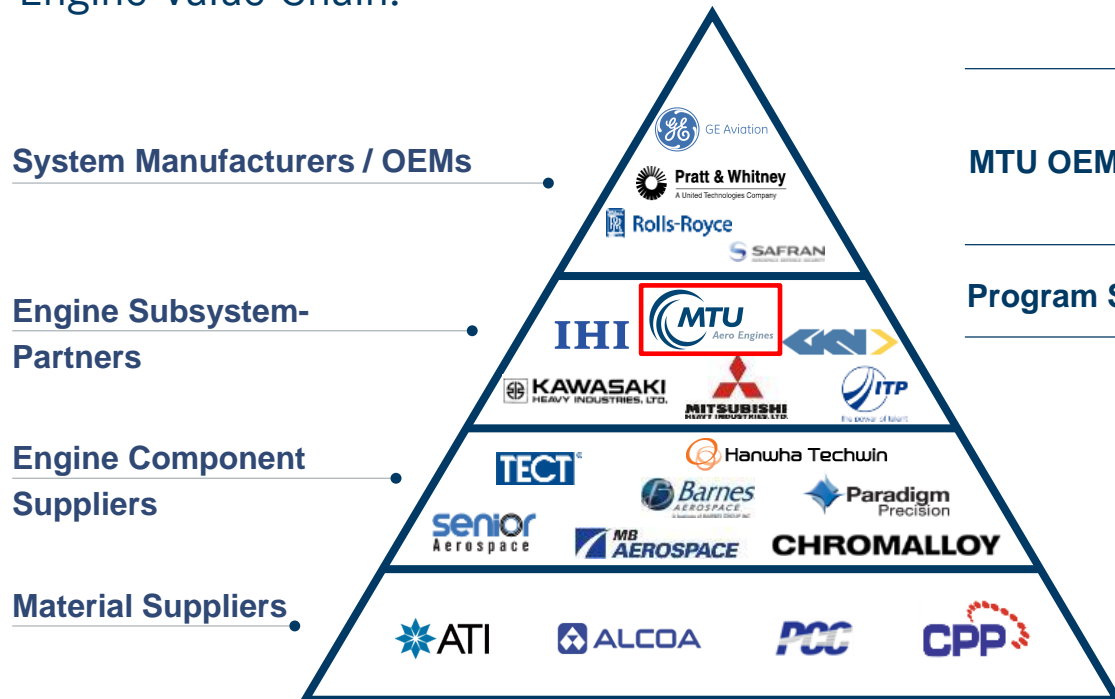
3 Itinerary

Agenda

Data in Aerospace

Who We Are and Where Our Data Comes From

MTU Is an Indispensable Partner in the Engine Value Chain:



Program	V2500	PW1000G	GE9X	GE9X	GP7000
MTU OEM Partner					
Program Share	16 %	15 – 18 %	6,6 %	4 %	22,5 %

Data Sources

- | Involvement in various engine programs → test data, pass-off data
- | World's largest independent engine MRO provider → MRO data
- | Engine Trend Monitoring Service → in-flight data

What Kind of Data Are We Dealing With in Aviation?

Kind of data

- | Gas path measurements (low frequency)
- | Vibration measurement data (high frequency)
- | Steady-state measurements at different operating points
- | Transient measurements of maneuvers

Data source

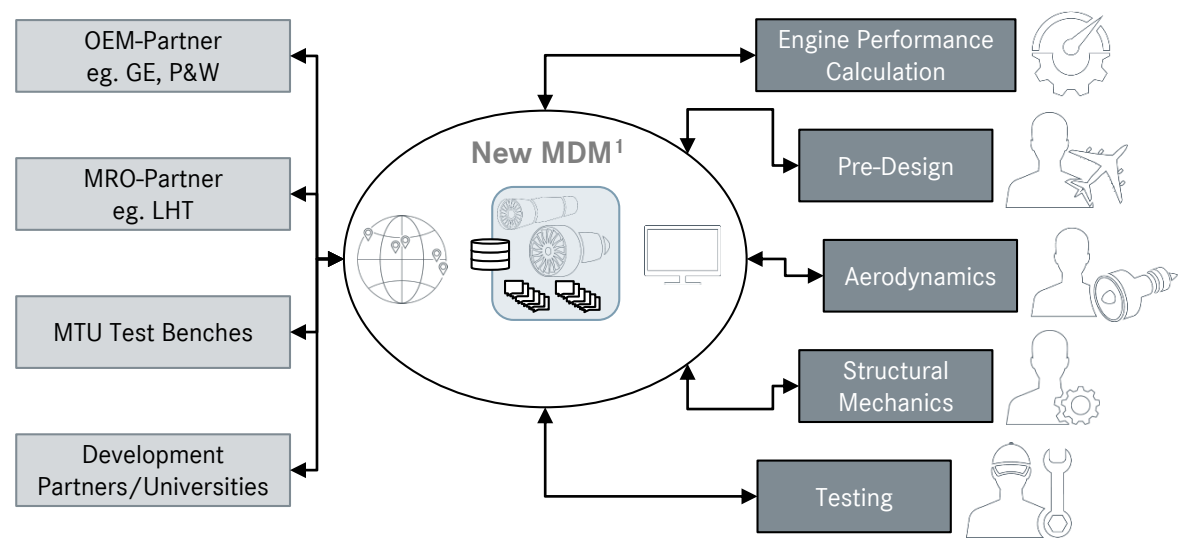
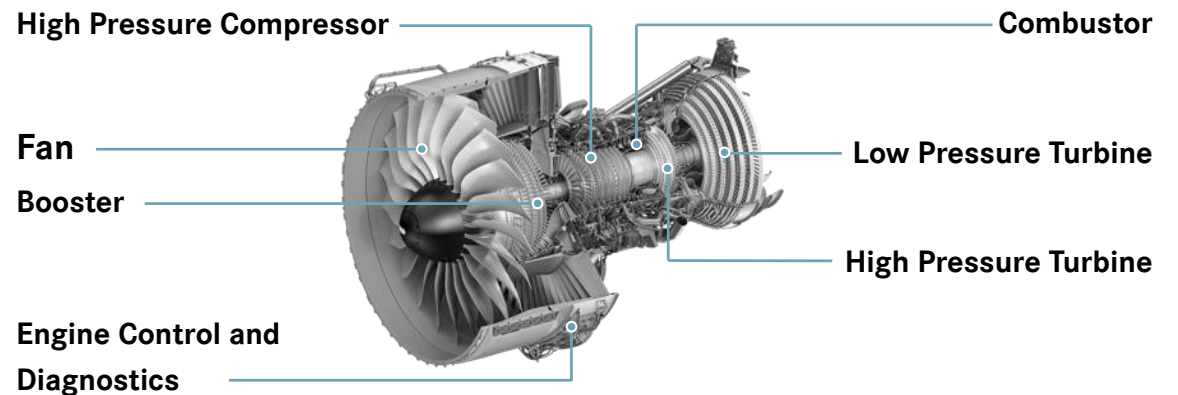
- | Measurement data acquisition on the test bench (engine/rig)
- | Simulation results (prediction)

Location of data acquisition

- | MTU-internal
- | External at partners

Characteristics of our measurement data

- | A LOT of channels (approx. 15.000)
- | Large amount of single-scan steady-state measurements
- | Long transient measurements (measurement time may span over multiple days)



¹ MDM = Measured Data Management



MDM @MTU

Why MDM? Why open? Why openMDM?

Motivation

Measured Data Management according to ASAM ODS

- | Overcome unnecessary technical hurdles for data access and usage of each individual type of data (“data silos”)
- | Established standard, wide adoption, stable
- | Ongoing work with eg. BigData



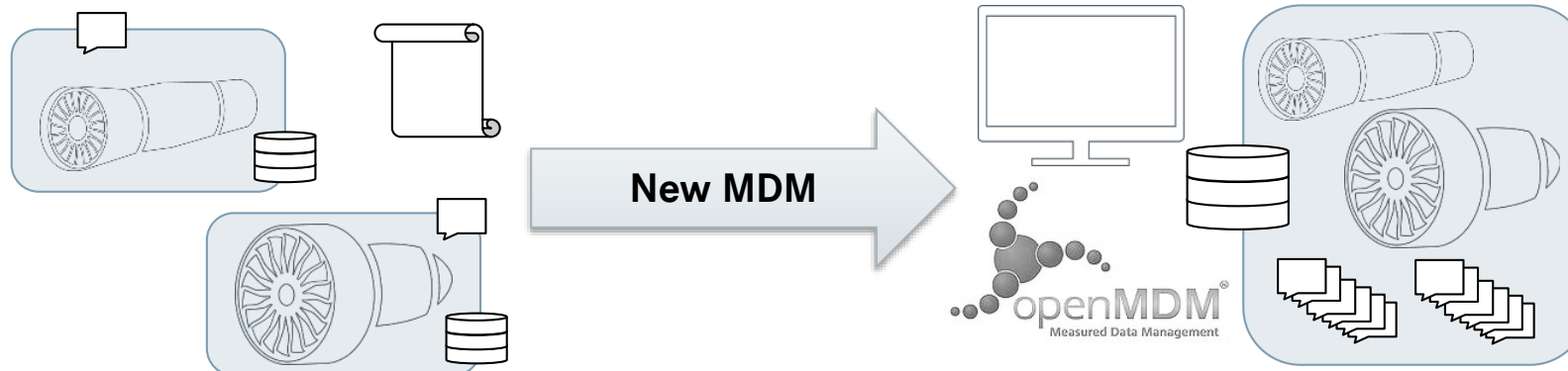
Open Source Software (OSS)

- | Debugging (Analysability*)
- | QuickFixes (Modifiability)
- | Understanding of Code Intent (Learnability)
- | Transparency, eg. Code Quality (Analysability)
- | Adjusting UX to “Corporate Design” (Adaptability)
- | Adding “proprietary features” if necessary (Adaptability)
- | Transparency of changes (Authenticity, Integrity)
- | No vendor Lock-in (Replaceability)



Benefits today

- | Standardization of metadata & physical storage
- | Harmonization of metadata per domain, semantic metadata
- | Unified interface, both GUI and API
- | Efficient and convenient global search and navigation
- | Flexible navigation via query trees
- | Consistent unit system (ie. unit conversion as a central service)
- | Scalable architecture & simple deployment
- | Multi-platform usage with familiar feel, quick access



Itinerary

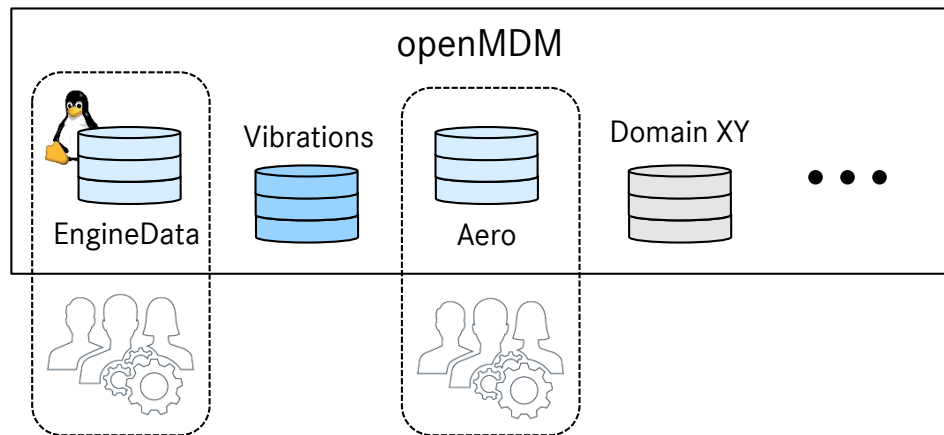
JET FUEL
MAX. PRESSURE
50 P.S.I. 3.5 BARS
MAX. SUCTION
11 P.S.I. 0.8 BARS

Come on board!

Itinerary

For us @MTU

| Heterogeneous, domain specific data with unified interface



| Necessary integrations for advanced analytics, eg. BigData



| “Data as a service”, ie. *if there is a use case and the authorization, allow an analyst to work in hours/days not weeks*

For openMDM

- | Wide range of industry adopters, more aerospace?
- | Active community & close collaboration to enable the best solutions to generic problems
- | Increased robustness
- | Additional backends?
- | Referencing of measurements
- | Simple analytics on the platform (eg. simple trend plots)



For ODS

- | Non-homogeneous timestamps
- | Native, efficient version handling, eg. with incremental diffs for external components
- | Enhanced validity flags



Vielen Dank für Ihre Aufmerksamkeit. / Thank you for your attention.





Für Fragen stehen wir Ihnen gerne zur Verfügung. /
Please contact us if you have any further questions.

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