Improving the Benefits of MERs [Maintenance Effectiveness Review]





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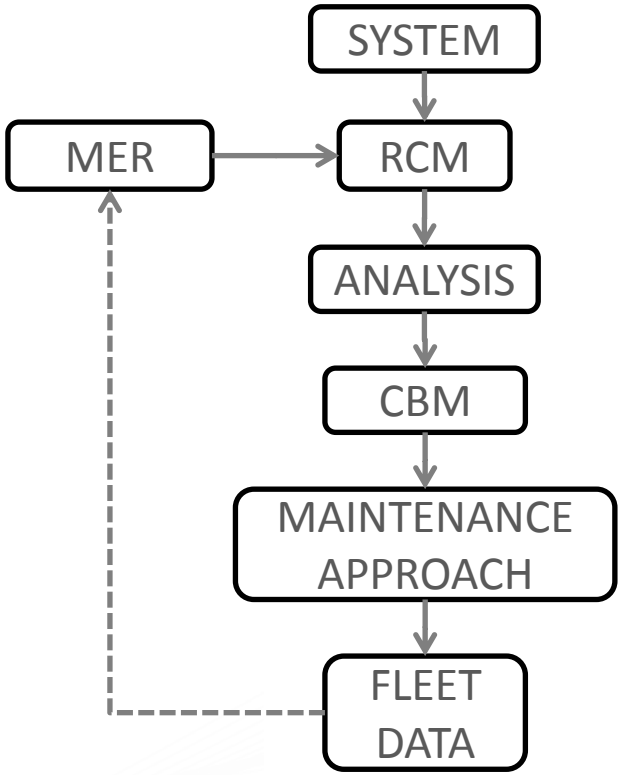
Maintenance Effectiveness Reviews (MER)

What is a MER? (aka RCM / MRD / MTA / MO / SAR)

A Maintenance Effectiveness Review is a **continuous improvement** program that utilizes Reliability Centered Maintenance (RCM) to ensure existing Maintenance Tasks / Programs are effective, applicable and based on DOD Condition Based Maintenance Plus (CBM+).

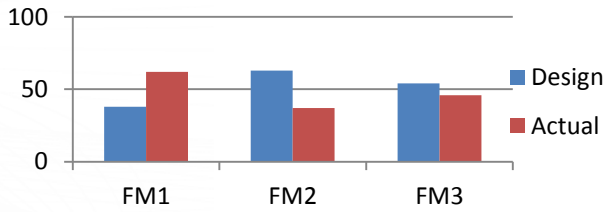


What is the value of a MER?

There can be a significant variance between the **anticipated (design) performance and the actual performance** of a complex system in an operational environment – MER resolves this.

What are the benefits of a MER?

The MER ensures **supportability costs are optimized** to achieve target system availability.



Current issues in conducting MER

Operational data

Updating the parameters used in the RCM analysis with the configuration changes, design changes and the parameters impacted by the variance between anticipated and operational reliability of a system based on usage, cycles, environment, etc.

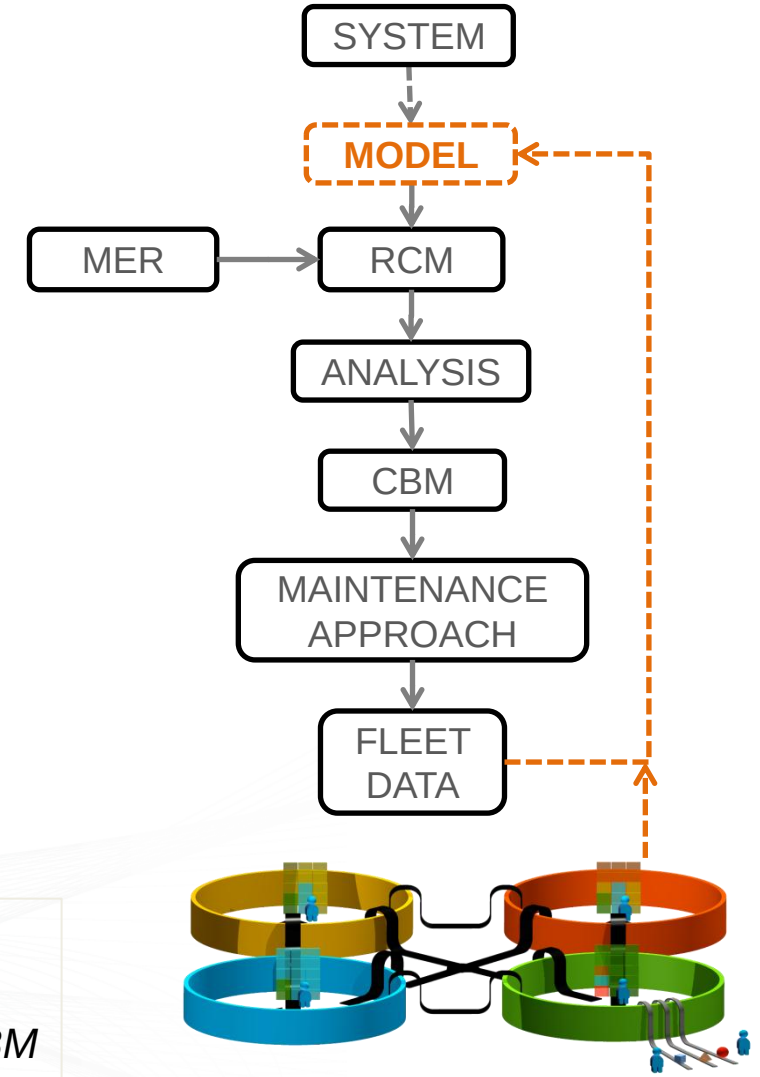
Integrated toolset

Analysis conducted on a common architecture **model that is extensible** and **readily updated with fleet data.**

What-if' capability

Simulate the effects of proposed changes in system performance identified by RCM – particularly **the impact of CBM capability.**

Solution: *a model based simulation tool with an integrated RCM analysis workflow that is readily updated with fleet data and suitable for designing CBM*



Modeling and Analysis requirements

made
MAINTENANCE AWARE DESIGN

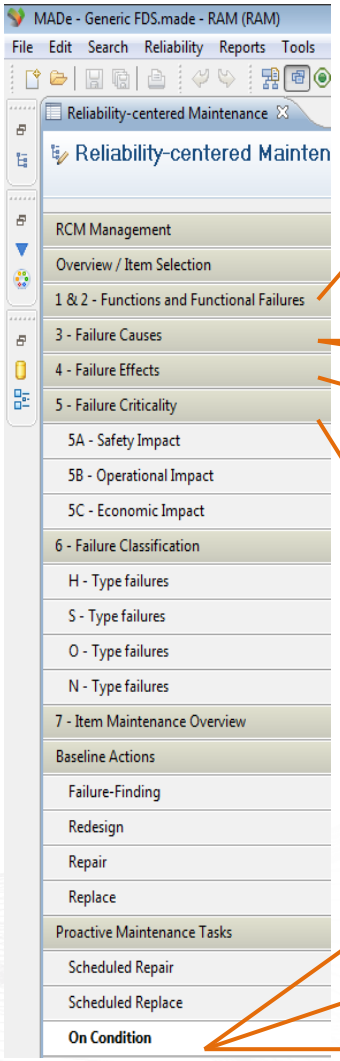
- model-based simulation technology that is extensible to enable configuration management of the analysis based on data
  – improve quality of the analysis

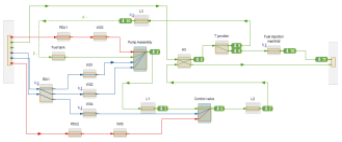
- validate the technical integrity of the maintenance approach and required actions across the life cycle
  – mitigate engineering risk

- utilise RCM to understand the impacts of alternate maintenance approaches such as CBM+
  – enable 'what-if' trade studies

- conduct structured MER / business case analysis
  – reduce costs of the analysis process

Value: *improve target system availability and optimize (reduce) through-life costs*

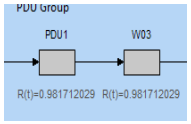



Functional Block Diagram

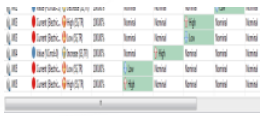

Physics of Failure

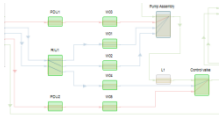

Fault Tree Analysis
FTA

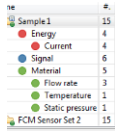

FMEA



Reliability Block Diagram
RBD


Fault Detection &
Isolation


Testability
V&V



Diagnostic Design
Sensor Set selection

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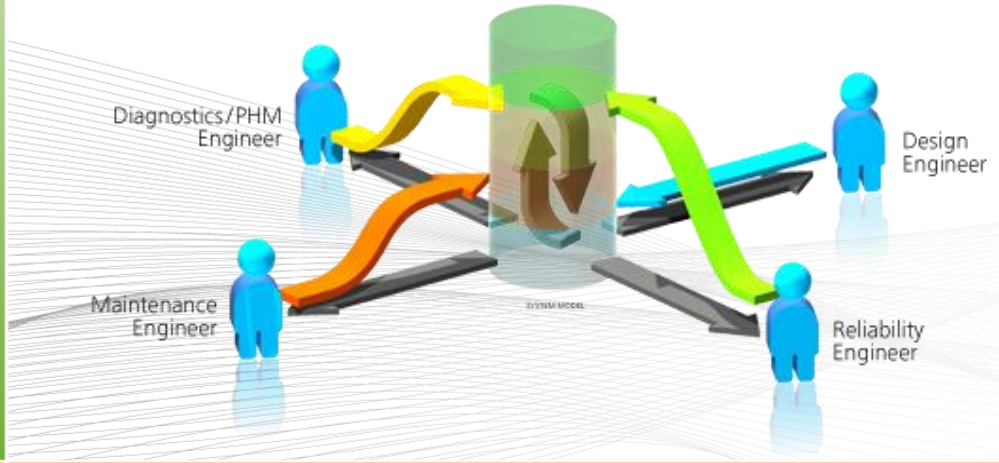
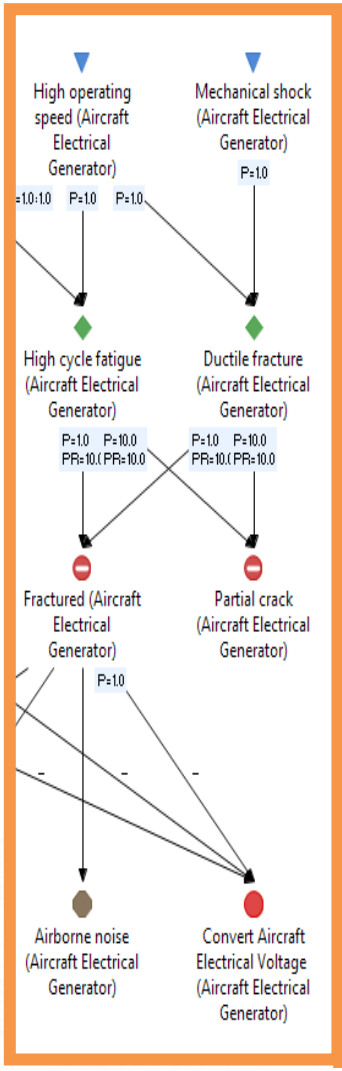
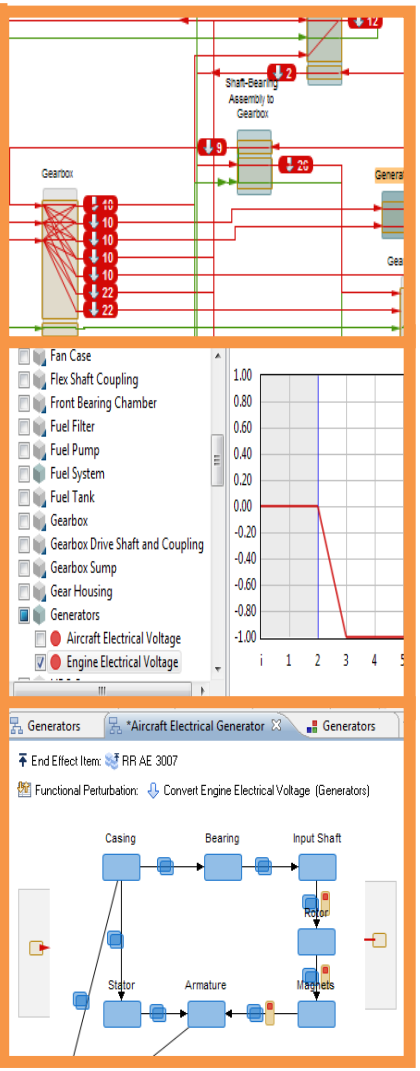
Maintenance Aware Design environment (MADe)

The Maintenance Aware Design environment (MADe) offers:

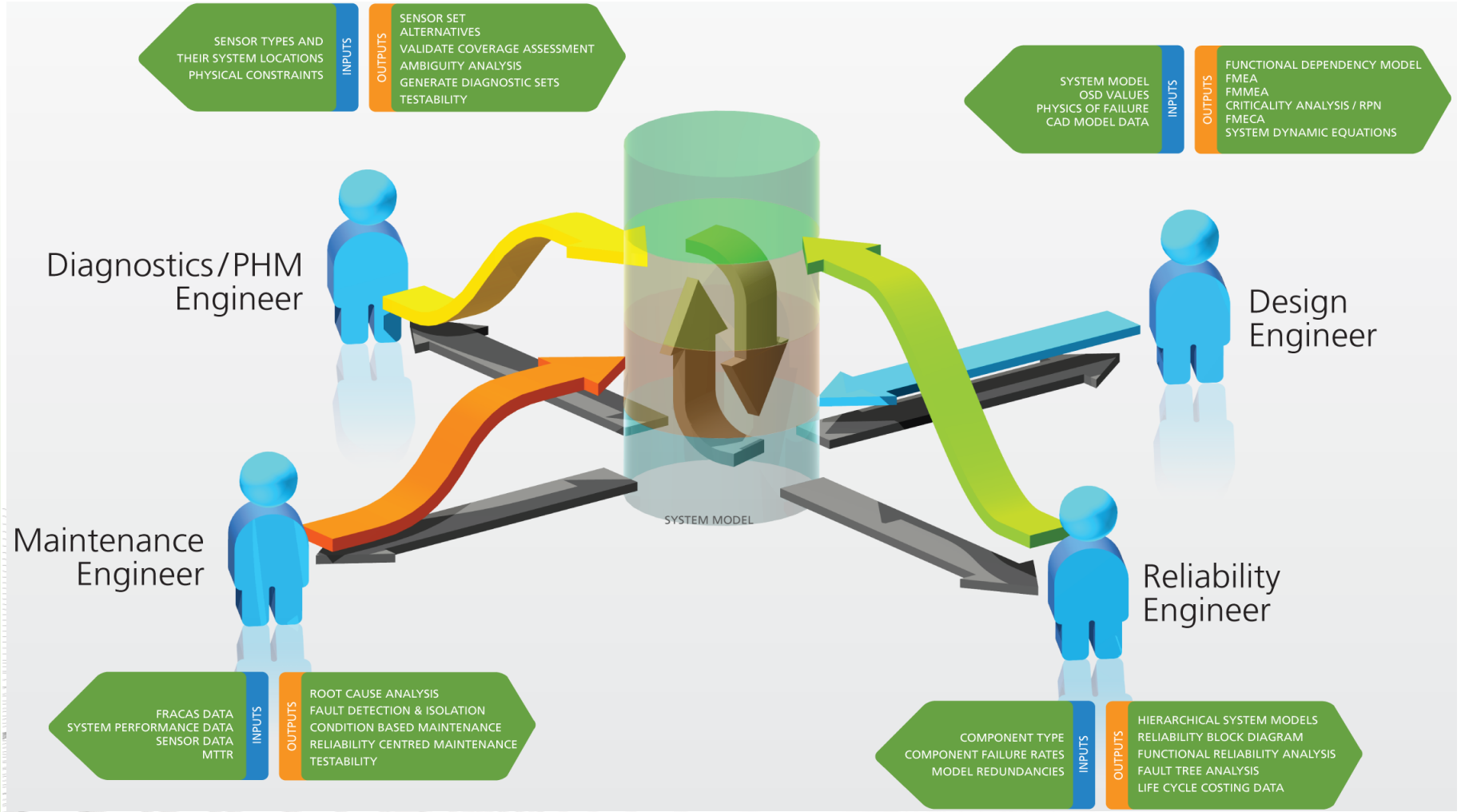
- significant **cost savings** to generate a model of the system
- a **'single point of truth'** for analysis and data
- mapping of complex integrated systems
- **configuration management** of analysis
- compounding analysis (leveraging the model)
- continuous improvement (**aligns with MER / RCM**)
- effective **knowledge capture**







Information Exchange using MADe



How does MADe improve the MER process?

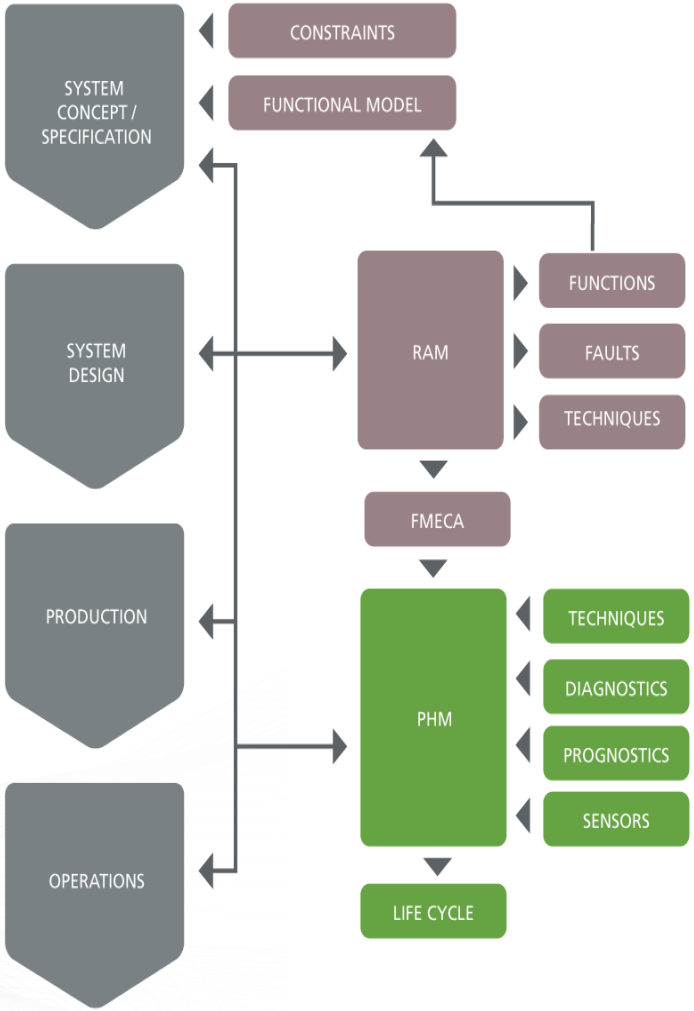
Requirement: *analysis of optimal maintenance approach to achieve target system reliability for minimum cost, based on operational data*

utilise model-based technology to enable configuration management of data used
– improve currency & quality of the analysis

simulate the impacts of alternate maintenance approaches such as CBM+
– enable 'what-if' trade studies

validate the technical integrity of the maintenance approach and required actions across the life cycle
– identify and *mitigate engineering risk*

conduct structured MER / business case analysis leveraging existing system models
– reduce costs



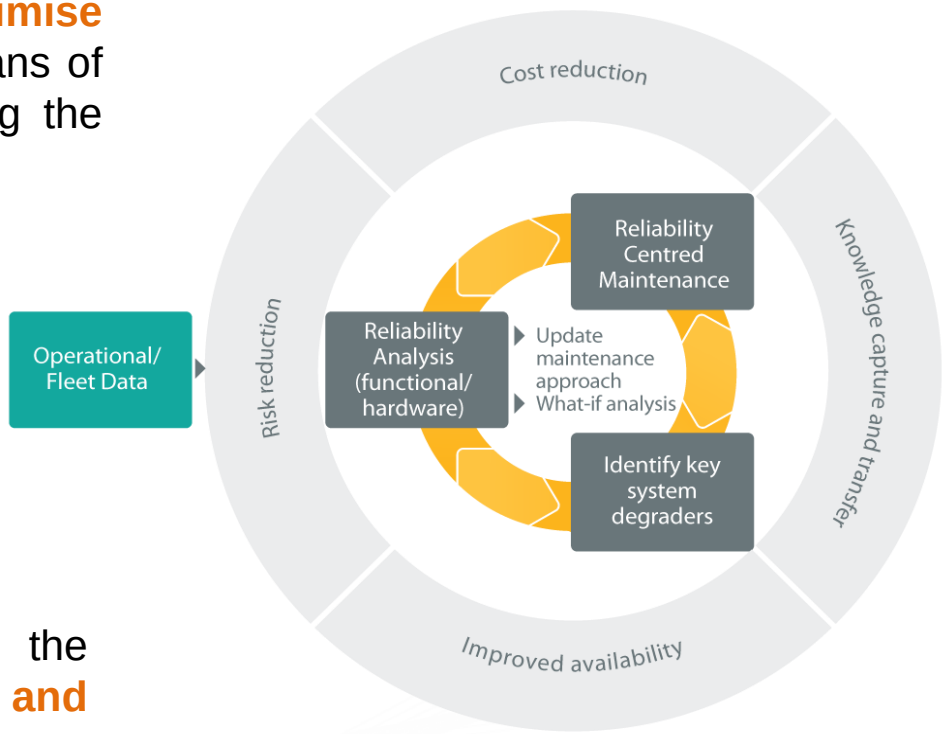
Summary

Why MER?

The MER process is designed to **optimise sustainment for DOD platforms** – a means of improving system availability and reducing the associated costs for complex systems.

The issues with MER?

Currently a time consuming and labor intensive manual process to reflect the variance between **anticipated and actual performance** of a system (not done continuously).



How can MADe optimize MER?

Simulation based solution that provides the technology to **rapidly capture, model and analyse system performance** in a continuous process .

The benefit of MADe for MER?

Improve the speed and quality of MER and RCM to reduce through-life costs

For further information on
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please visit or contact us:

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