



SDB NEXT

a step to virtual satellite

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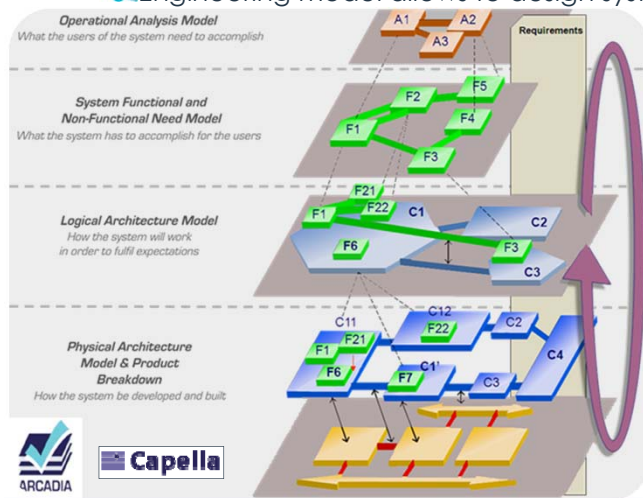


Model Based System for requirements and design

Model Based System Engineering is spreading

Model Based System Engineering widely deployed at Thales Alenia Space for Avionics design

- Use of Arcadia methodology with Melody Advance / Capella Modeling Tool (open source) <https://www.polarsys.org/capella/>
- System / sub-system transition approach : Modelling is performed at different levels
- Engineering model allows to design system elements (architectural aspects)



System

Spacecraft

Subsystem

AOCS

DHS

EPS

Payload

Equipment

RW

SS

...

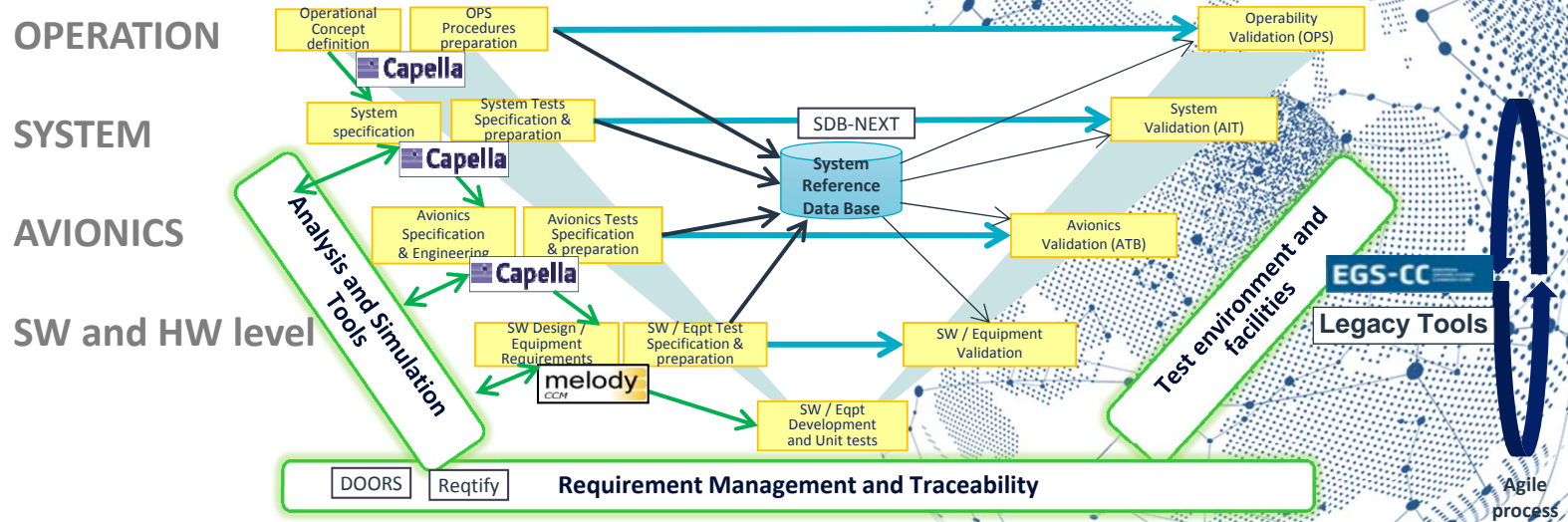
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BAT

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From Engineering Models to SRDB

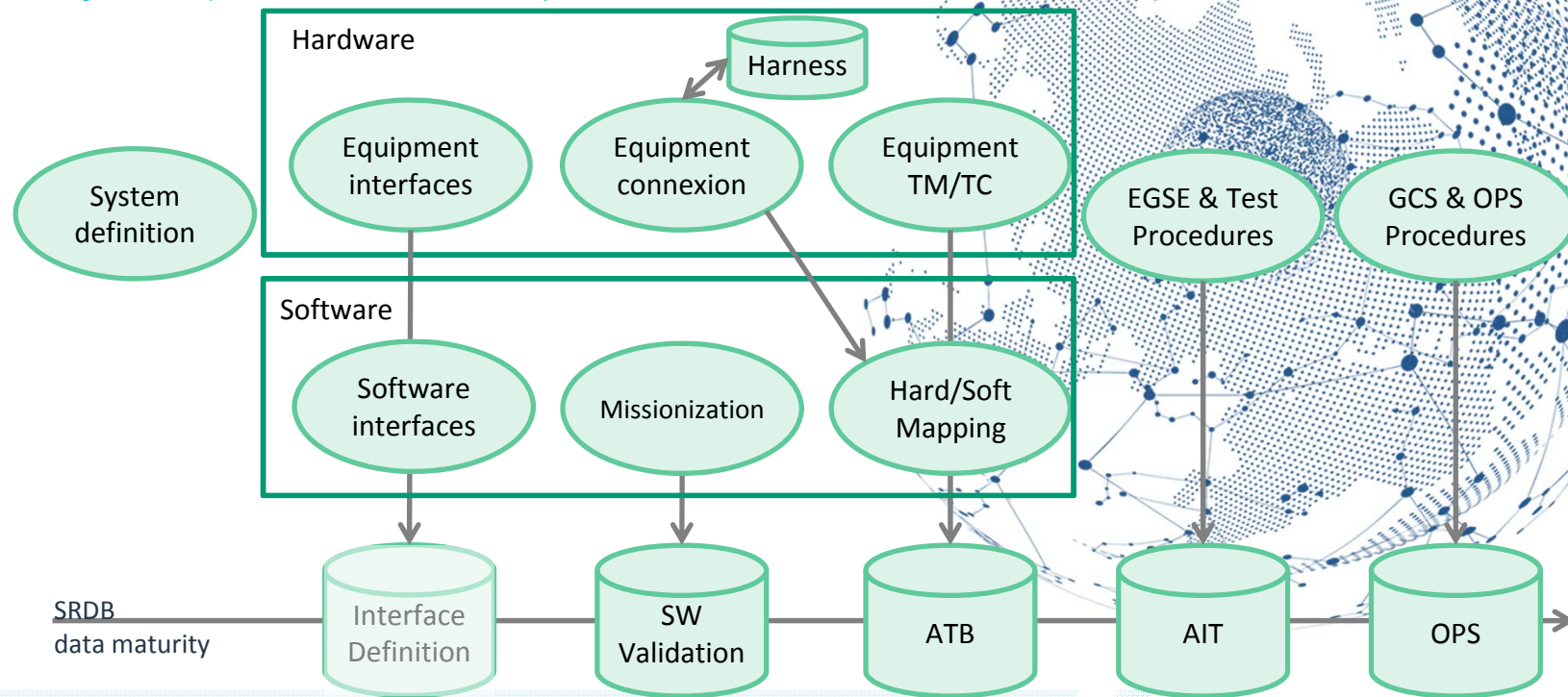
Engineering Domains detail technical data



System Reference Database is a data repository allowing for data management and data sharing.
 The repository is populated and continuously updated by Engineering domains.
 Technical data of the system elements is progressively detailed and refined.

SDB-Next - Data Population Process

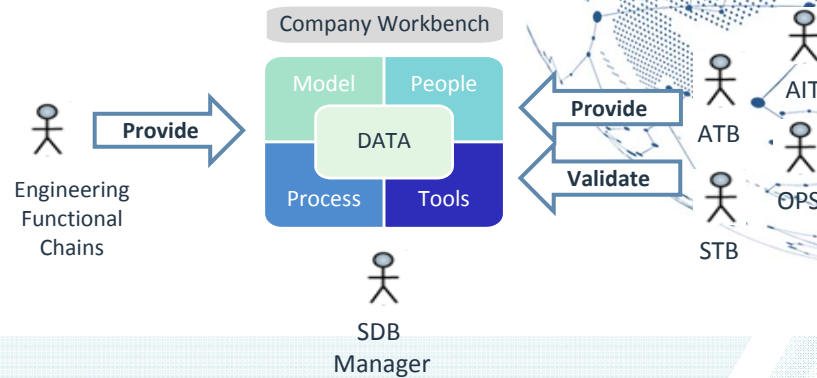
Progressive improvement of technical data by different domain contributions



SRDB new challenges

SRDB needs to evolve

In the past, SRDB was used only to share spacecraft M&C data across domains
Adoption of model based techniques creates need for more technical data sharing
SRDB perimeter is increasing : new domain users / new models taken into account
Product lines add requirements for reuse and traceability of system elements across space systems

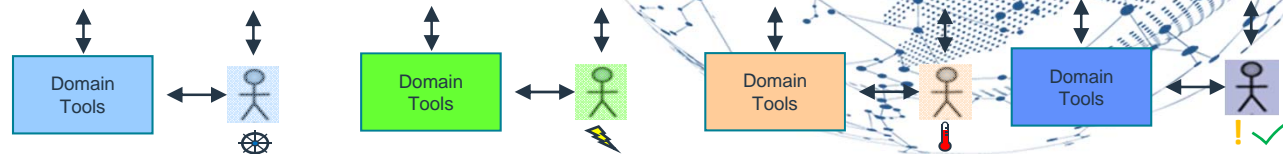


Thales Alenia Space product : SDB-NEXT

Plug-ins add Engineering Domain specific views

SDB Next has a modular architecture :

- SDB-Next Meta-model
 - Data is organized in system elements and defined within models
- SDB-Next Kernel
 - manages system elements change tracking and configuration definition
 - runs continuous model based checks to assess cohesion of the managed data
- SDB-Next Bridges
 - plugins to add data format transformations
- SDB-Next Editor
 - plugins to add domain views on the data

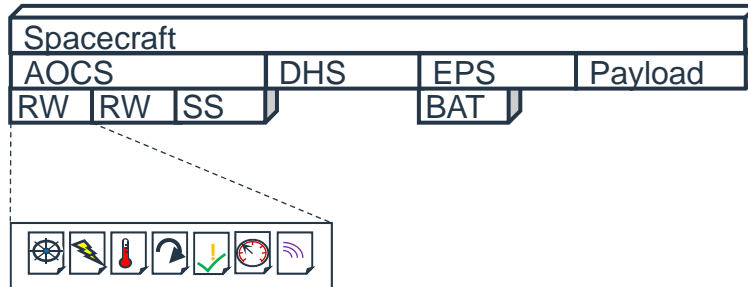


SDB-NEXT Data Organization

Data Organization follows ECSS standards

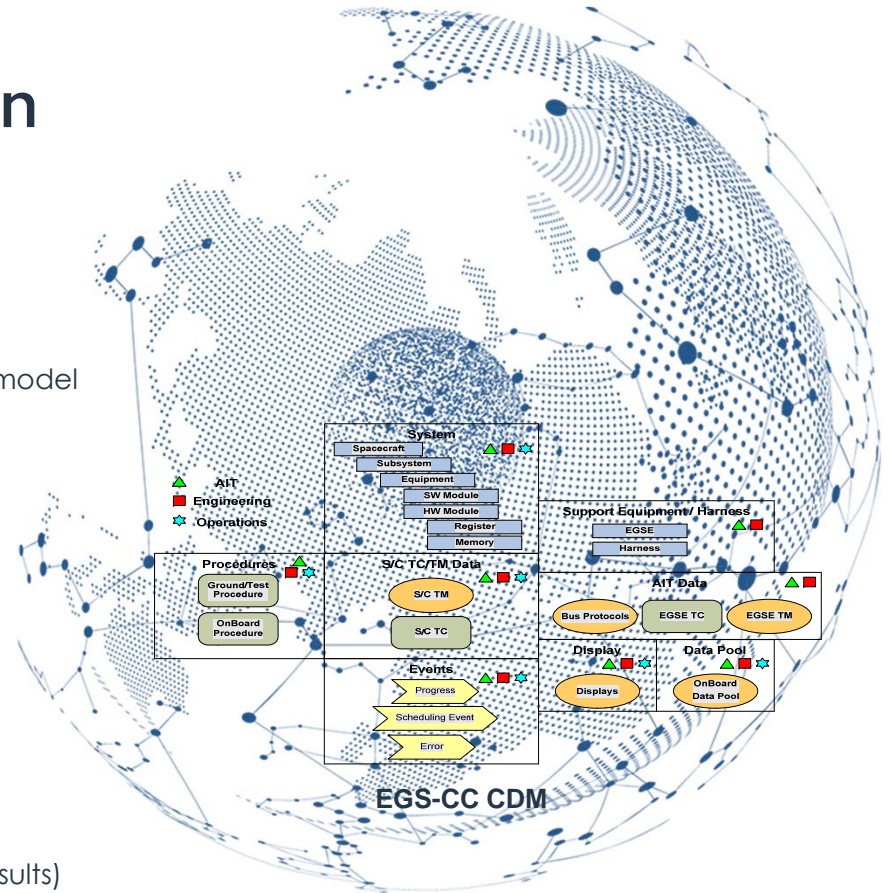
System Elements are defined by ECSS 10-23

- They host multiple data with domain specific models
- shared data is maintained within one common metamodel



Common metamodel conforms to EGS-CC CDM

- Starts from M&C perspective
- Extended for additional data (link with harness, test results)

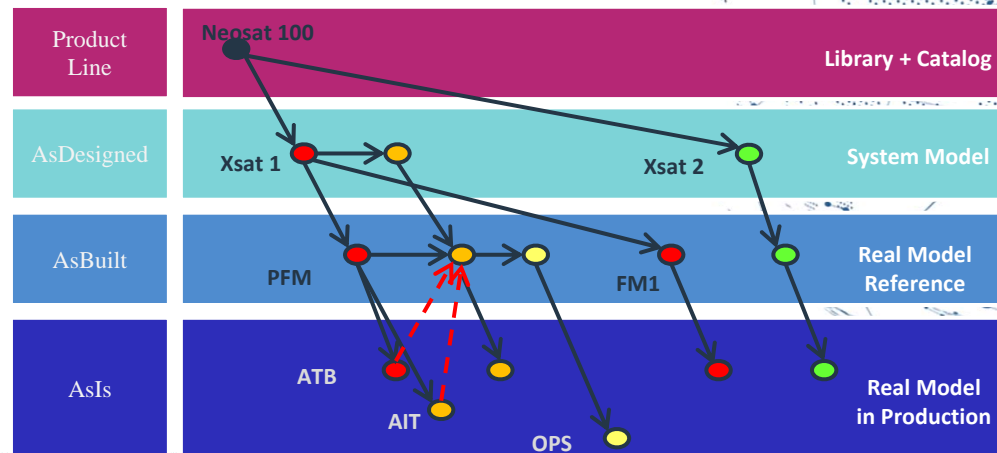


SDB-Next : Data Configuration Management

Smooth branch management is a key concept

Within SDB NEXT Kernel

- 🌐 Data is managed in configuration at System Element level
- 🌐 Rely on GIT for flexibility with tag and branch management
- 🌐 Change Tracking is performed in link with the tool currently used in TAS



SDB-Next : Model Evolutivity

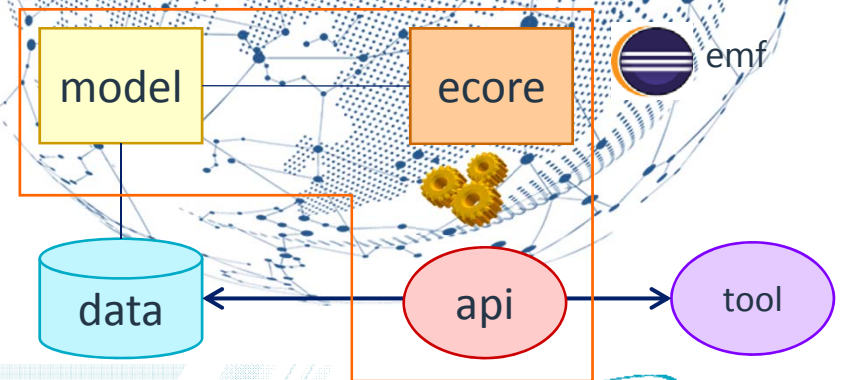
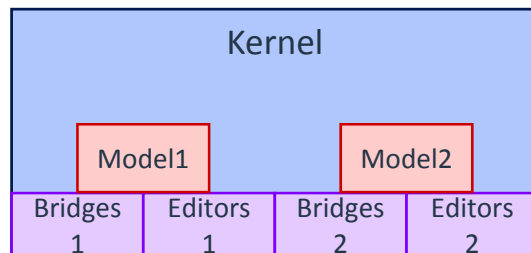
Eclipse Modelling Framework isolate metamodel evolution from applicative code

Metamodel will evolve in the timespan of a product line

- New needs come from engineering processes improvement

In SDB-NEXT Architecture:

- Most kernel services work at System Element level, independently of the data content
- Kernel is extended by plugins (typically to implement domain specific views)
- Data content aware services rely on metamodel generated plugins
 - Metamodel ecore representation allows some generic services such as checks and comparison
- Kernel is designed for multiple metamodels (e.g successive versions)
 - allows migration decision at program level

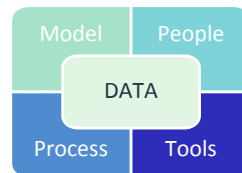
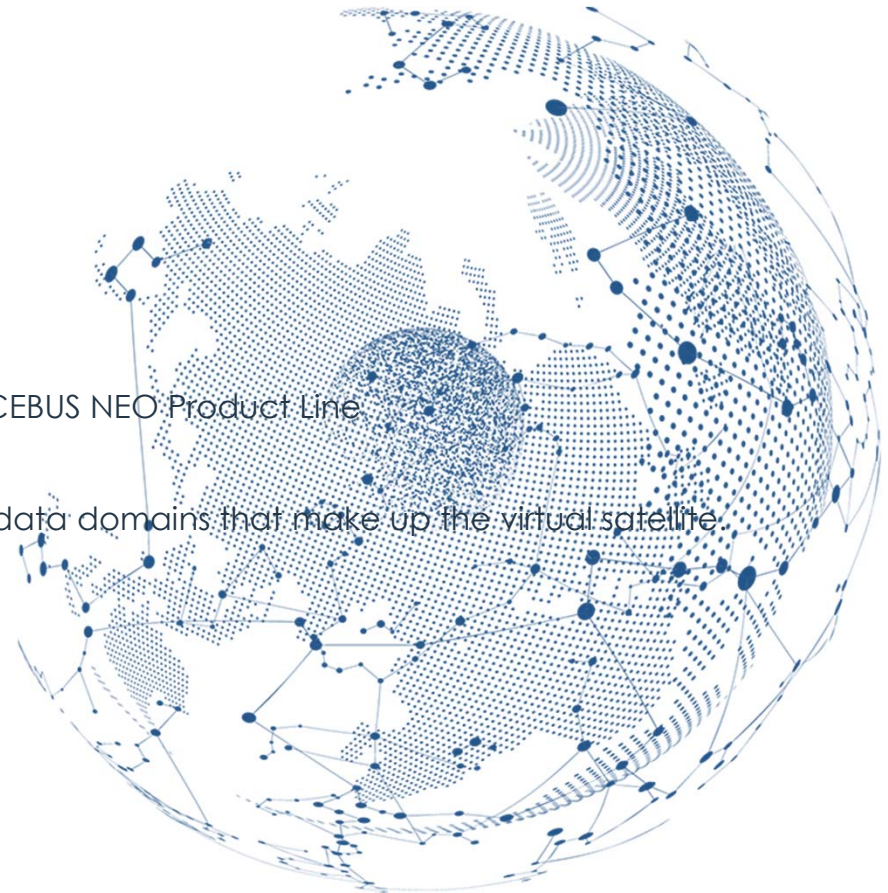


SDB-Next - Conclusion

SDB NEXT is under development

First objective is to manage M&C perspective of SPACEBUS NEO Product Line

Already designed for extension to cover all technical data domains that make up the virtual satellite



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Thank you for your attention
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Questions ?

