

# Electronic Data Sheets (EDS) Roadmap

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EDS related ESA activities (Past, Present)



Way forward (Roadmap)

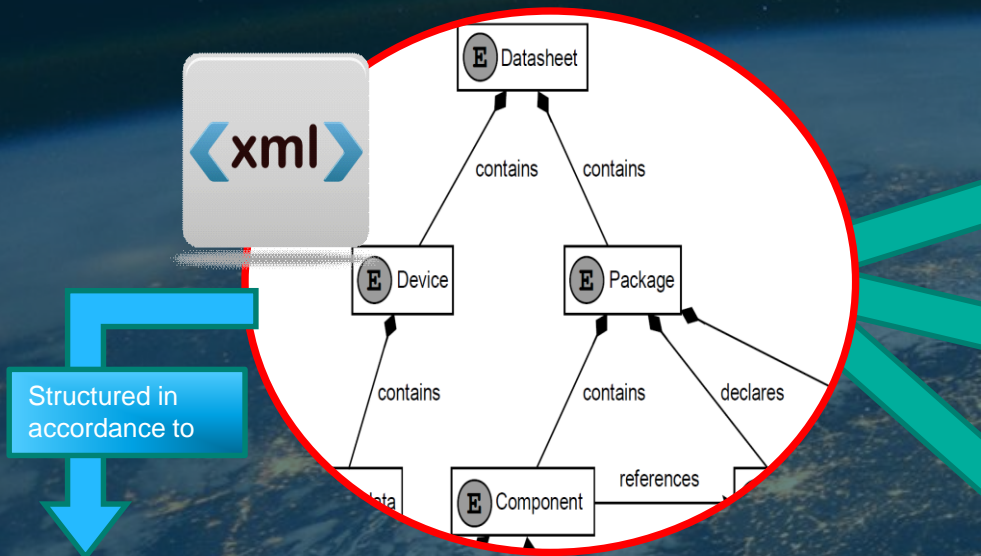


Summary



Open discussion

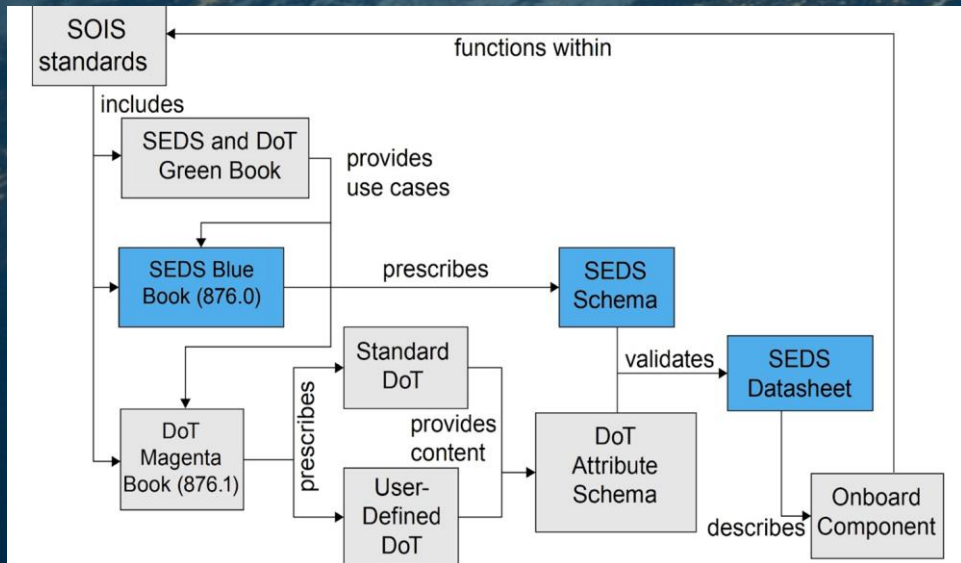
# What is Electronic Data Sheets (EDS)



Unambiguous machine readable interface specification replacing paper ICDs.

Integration with relevant System Reference DataBases (SRDB).

Suitable for automatic generation of artefacts (code, documents, ...)



Name	ESD_Protection	Isolation	PowerMode	ReferenceVoltage	ShortCircuitTolerance
ESD_Protection	ESD_Protection	Isolation	PowerMode	ReferenceVoltage	ShortCircuitTolerance
PowerConsumption	PowerConsumption	PowerOptions	PowerConsumption	PowerConsumption	PowerConsumption

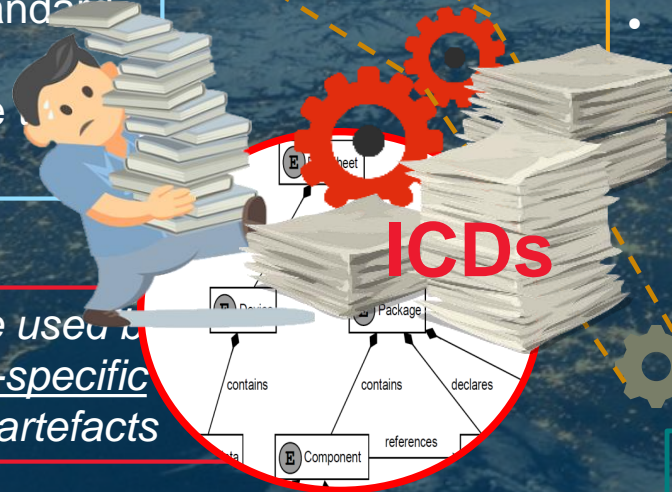


## Prime Contractors

- participating in the SOIS WG and together with NASA developed the Common EDS XML standard
- General EDS tools (authoring, validation)
- Help deploying the technology and update standard with NASA ("Pink Sheets")

- Request EDS from suppliers of avionics units
- Use their custom toolset to transform EDS into their engineering model and database

*Standardized EDS format to be used by suppliers and parsed by Prime-specific toolset to generate proprietary artefacts*



## Unit suppliers

- Provide EDS (together with their Units) to their Prime Contractors, throughout the System life cycle (multiple versions)
- Use their custom tools to generate EDS from their models

Use Case: Lunar Gateway is applying this approach:

- ❖ ESA involved (I-Hab, ERM, HLCS)
- ❖ Tailored SOIS EDS plus extensions (Gateway configuration/topology, operations tasks)
- ❖ Mostly FSW & database, not devices (SEDS + XTCE)

# EDS RELATED ACTIVITIES (2012 – 2022)

[2012] SOIS - Proof of concept

[2014] Adoption of Electronic Data Sheets

[2016] SAVOIR Communication Architecture

[2017] Deploying Plug and Play Avionics

[2018] Verification of Computer-Controlled Systems (VeriCoCoS)

[2019] First issue of the SOIS EDS standard (blue book)

[2021] Technologies for Future Simulation Models (FUSIMO) using EDS for simulator development

[2021] SEDS-C: SOIS EDS compiler

[2021] SAVOIR Electronic Data Sheet Definition

[2022] On Board Software Reference Architecture Demonstrator (OSRAD)

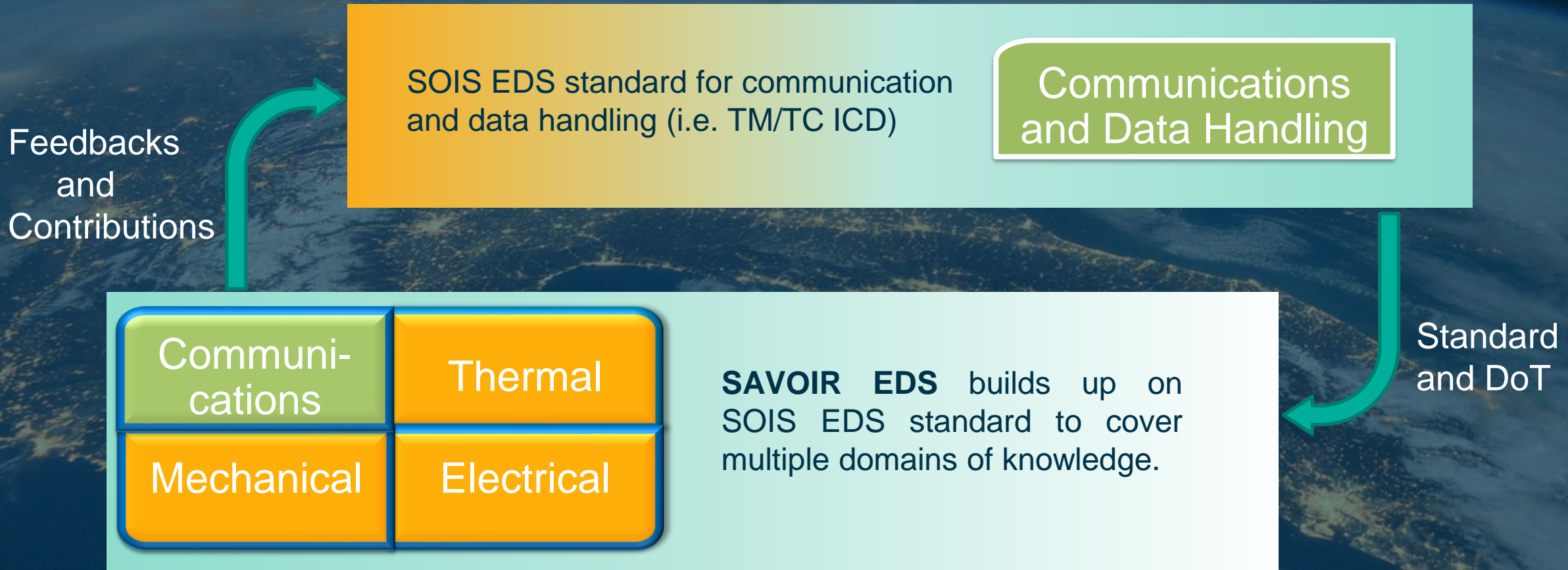
[On-going] From System to Simulation Architecture (FS2SA)

[On-going] Toolchain to Connect EDS and TASTE (ETB)

[On-going] Validating SEDS as a Bridge Between Hardware and Software Models (ETD)

# [2021] SAVOIR Electronic Data Sheet Definition

Space AVionics Open Interface aRchitecture (initiative to federate space avionics community)



**Motivation:** Primes suggested extending EDS to cover also other ICDs

- Electrical, Thermal, Mechanical

## Objectives:

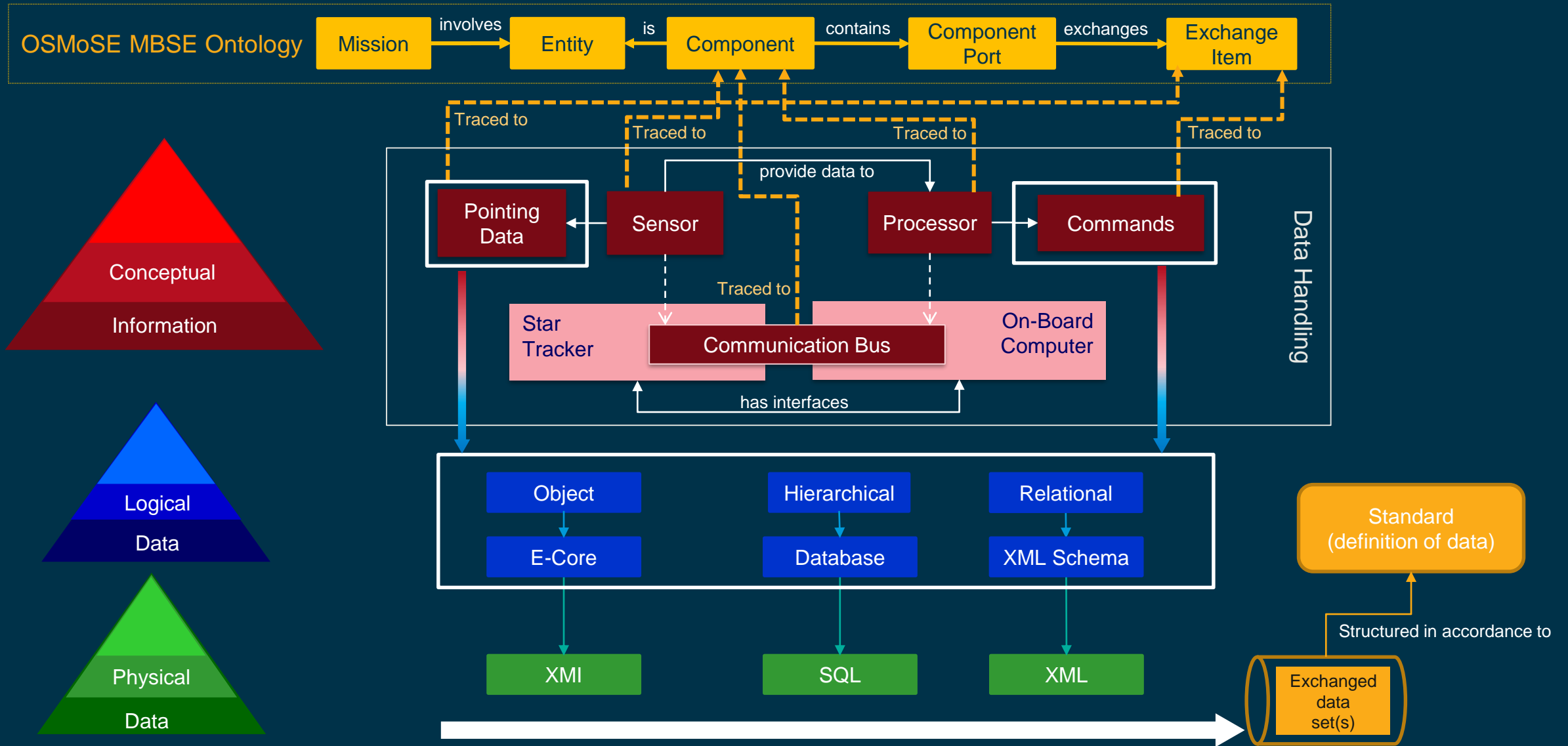
1. Specify user requirements covering current avionics development process and data exchange between primes and unit suppliers
  - ➡ Different kinds of EDS use
  - ➡ Various unit types (sensors/actuators, PCDU, SSMM, RTU, etc.)
2. Define the SAVOIR EDS data model
  - ➡ Feedback to standardization (CCSDS, SAVOIR, ECSS)
3. Assess the existing XML based exchange format developed in CCSDS
4. Development of SAVOIR EDS Common Toolset (SECT)
5. Development of multiple proof of concept prototypes reflecting various use cases
6. Propose a roadmap towards EDS adoption by European industry
  - ➡ Steps to be taken by primes, unit suppliers, agencies

# SAVOIR EDS DEFINITION – RESULTS

- **Developing domain model for communications/electrical/thermal/mechanical domains**
- **Capturing communications/electrical/thermal/mechanical info in a tool-readable form**
  - A number of use cases and prototypes
  - Wide range of electronic units
  - Generation of documentation/code/system database/V&V/simulation artefacts
  - Experimenting with EDS together with nominal production engineering tools
- **Last minutes choices made to implement the Domain Model**
  - Consortium's choice was to use CCSDS SEDS XML as exchange format
  - This decision was disputed after Proof-of-Concept use cases implementation
  - As a result there is no agreement how SAVOIR EDS captures extensions



# Multi-domain data model structured by ontological definitions



- **Standardisation & CCSDS WG activity**

- Stick to the XML format (as initially agreed in the SAVOIR EDS activity)
- ESA activities feedback to the CCSDS WG
- Dedicated ESA standardization activities
- Budget needed to support interoperability tests for CCSDS normative documents
- [SAVOIR EDS Standardisation]

- **Tool chain**

- Validation tool
- Authoring tool
- [SAVOIR EDS Common Toolchain Extension]
- [STAT-5825 - Improving Electronic Data Sheet (EDS) with a Simulation Language Compiler]

- **Help unit suppliers to provide EDS**

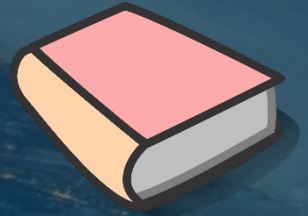
- Activity to author EDS and use it for engineering and V&V activities
- Use case + tool development
- [Assessment of Electronic Data Sheets Use in the Avionics Equipment Engineering Process]

- **Support Primes to adopt EDS**
  - ESA validation tool
  - Primes to import EDS to their legacy engineering models
    - Legacy tools to generate documentation, FSW, simulation and tests?
- **Use cases definition – where to focus?**
  - More units / devices / components to profile?
  - Any other prototyping needed?
  - Identify use cases e.g. Gateway & ADHA
  - System view: where to apply it?
- **Synergy with other activities**
  - MBSE
  - Domain modelling – ontology
- **Further R&D to explore and demonstrate capabilities**
  - [Modelling Operational Interfaces for File Based Operations]
  - [STAT-5851] Test Automation Using SAVOIR EDS
  - [STAT-6440] End to end digital continuity for validation and simulation (DICOVASI)

Recap of Electronic Datasheet and how it can be leveraged in the context of Digital Engineering

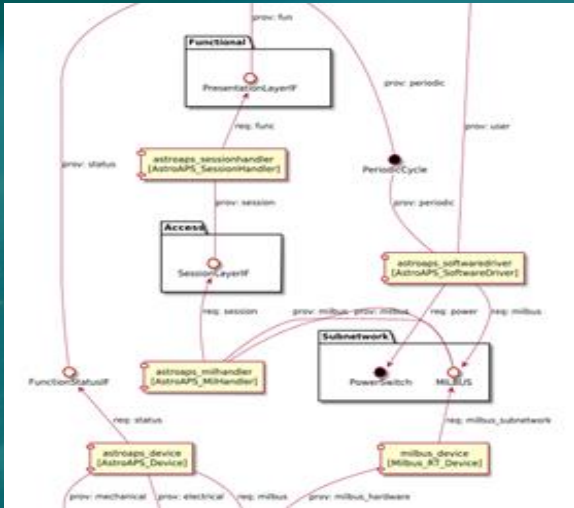


past and present: Presented an overview of ESA run activities related to EDS



Future: Proposed ESA Roadmap for EDS related activities, and stimulated discussion about priorities.

We would like to hear from you whether and how you would like us to push forward with EDS.





Suggestions

Use Cases

Activities

Questions



# Options for Standardization

Thanks for  
participating  
to EDS discussions!