OHB VIEWS ON SAVOIR

ADCSS 2024

22.10.2024

AGENDA

1 RECAP OF SAVOIR STRATEGIC INTEREST & ACHIEVEMENTS

2 NEEDS & GAPS: OUTLOOK & OHB VIEWS

3 CONCLUSIONS & PROPOSED WAY FORWARD

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RECAP OF SAVOIR STRATEGIC INTEREST & ACHIEVEMENTS

OHB VISION ON SAVOIR

RECAP OF SAVOIR OBJECTIVES, STRATEGIC INTEREST & ACHIEVEMENTS

1. To **reduce the schedule and risk** and thus cost of the avionics procurement and development, while **enabling future missions**
2. To improve **competitiveness** of avionics suppliers
3. To influence standardisation processes by **standardising at the right level** in order to get equipment interchangeability
4. To define the governance model to be used for the products, **generic specifications**, **interface definition** of the elements being produced under the SAVOIR initiative.

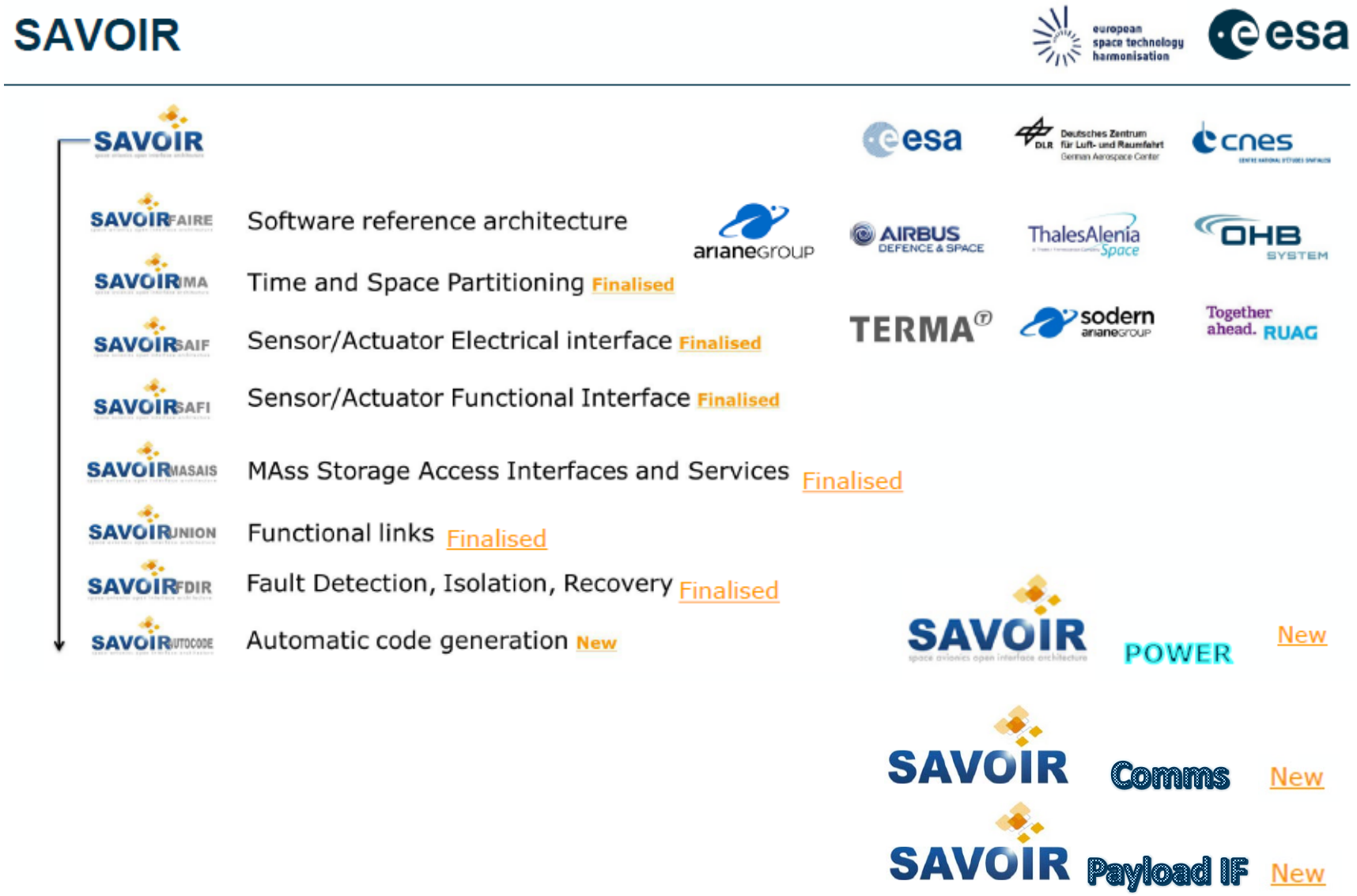
OHB VISION ON SAVOIR

RECAP OF SAVOIR OBJECTIVES, STRATEGIC INTEREST & ACHIEVEMENTS

SAVOIR LANDSCAPE:

Recently added initiatives:

1. POWER SAVOIR
2. SAVOIR COMMS
3. Payload Interfaces and Processing



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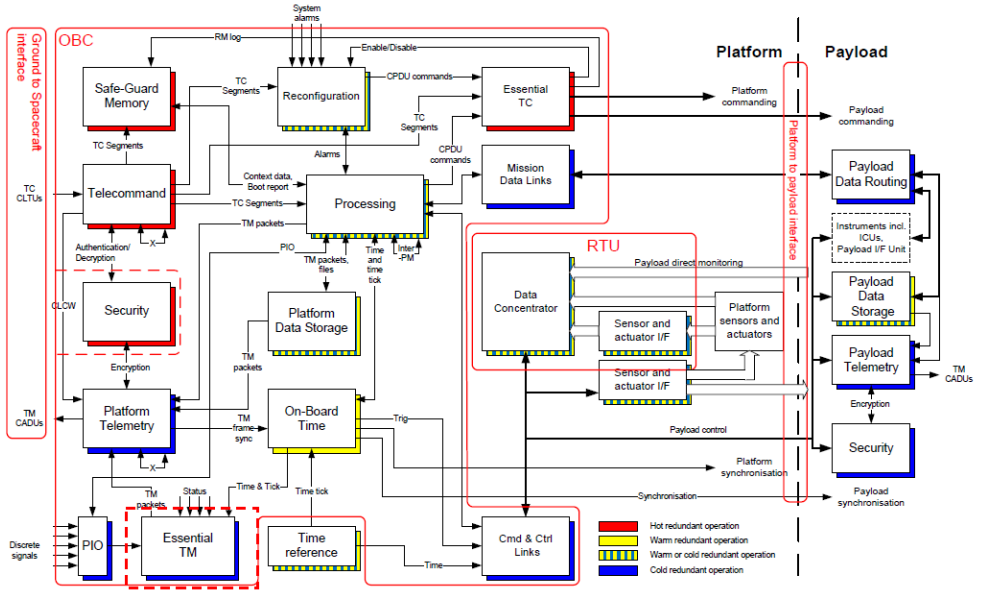
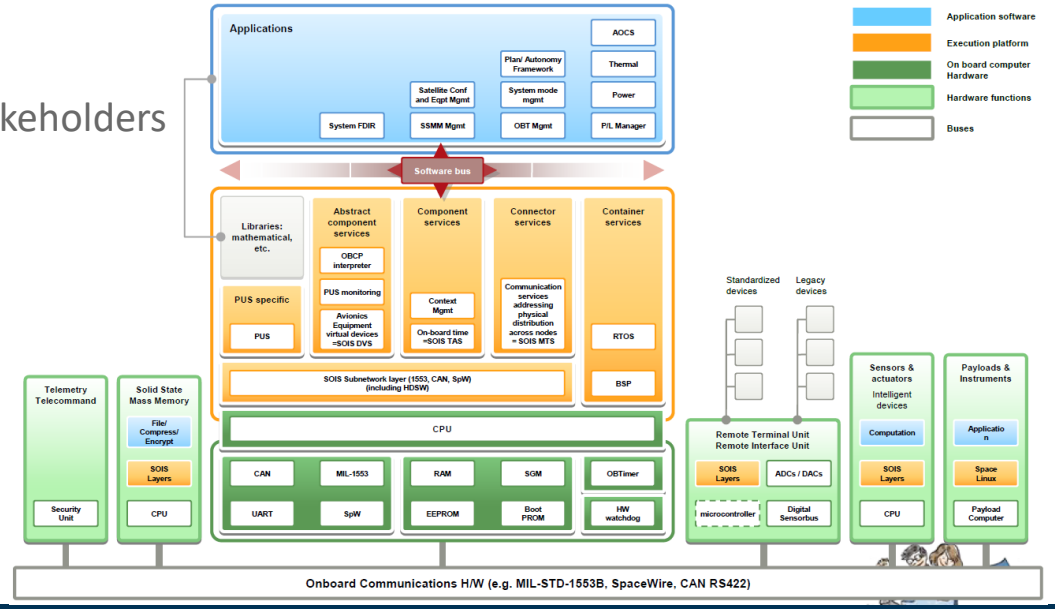
RECAP OF SAVOIR OBJECTIVES, STRATEGIC INTEREST & ACHIEVEMENTS

SAVOIR managed to federate the space Avionics Community to successfully:

1. Define a Common System Reference Architecture (**HW & SW**)
2. Identify **Key Building Blocks**
3. Specify Generic **Reference Functional Reqs**

While:
- Respecting product strategies of individual stakeholders
- Respecting and **promoting innovation**





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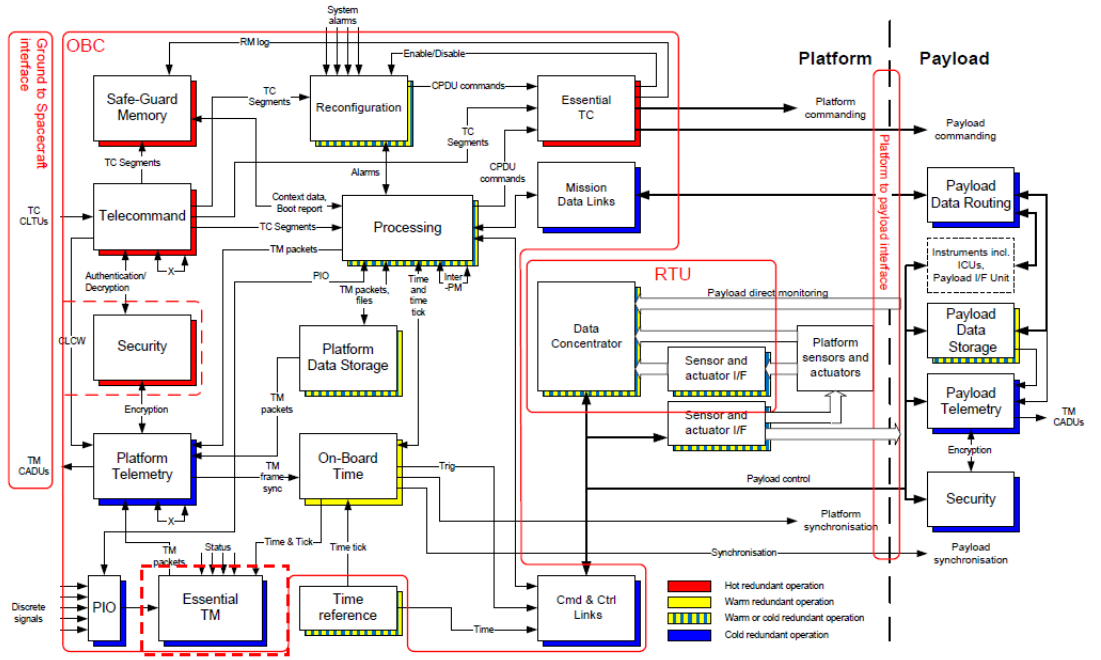
RECAP OF SAVOIR OBJECTIVES, STRATEGIC INTEREST & ACHIEVEMENTS

SAVOIR offers a **solid foundation for the Avionics architecture**:

1. **Suiting most Institutional missions** and related Customer requirements
2. Securing an **Industrial landscape** with products that fit the Ref Architecture.
3. Simplifies trades offs and reduces **development risks & efforts**



In practice:

- For customers: streamline the procurement process of spacecraft avionics
- For system integrators: facilitate the integration of the spacecraft avionics
- For suppliers, prepare the technical conditions for a more efficient product line organisation.

\+ Multiple Handbooks and Trainings offering guidelines on:

- How the various functions in ASRA should be used in real projects
- How and where to introduce cross-strappings, how to use features on the TM and TC links or data buses
- Definition of roles in a project and interactions across stakeholders to secure a robust development process

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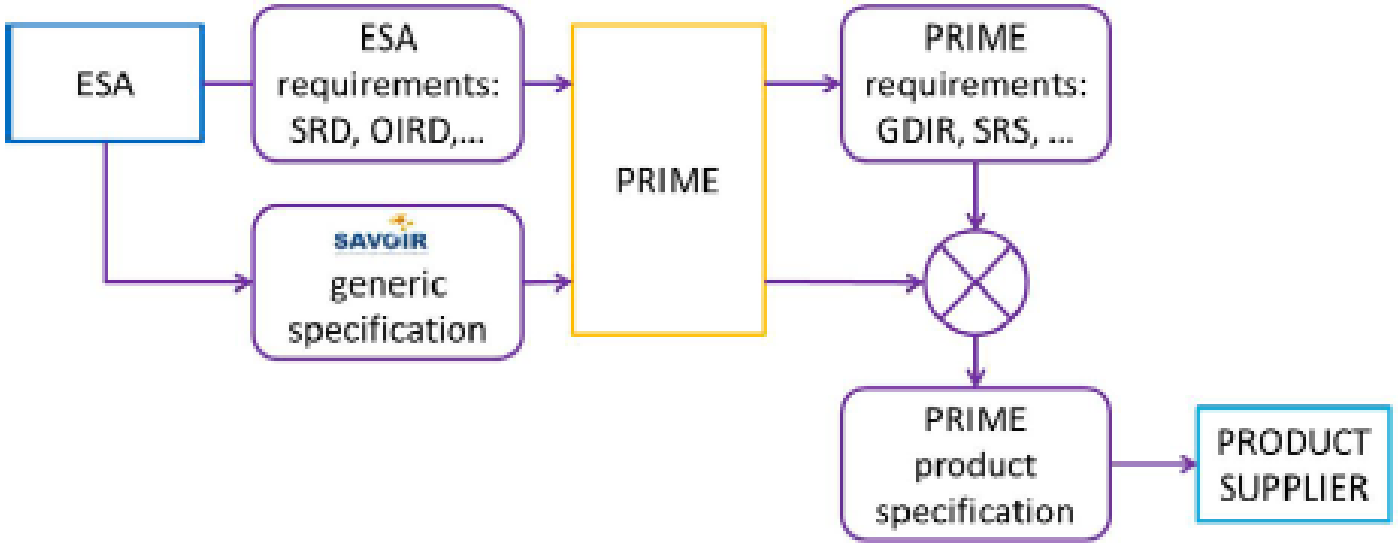
RECAP OF SAVOIR OBJECTIVES, STRATEGIC INTEREST & ACHIEVEMENTS

In particular at OHB, SAVOIR was the basis for **OHB Harmonized Avionics** deployed across multiple projects:

- PLATO (L2 Orbit): SSMM in spare-slot; 28VDC
- CO2M & HARMONY (LEO): 28VDC, with AU (authentication unit) as mezzanine on PM, no spare-slots
- National programs (LEO): Co-PMs in spare-slots, no AU (dedicated crypto units)
- TELECOM (H2Sat/ Electra): 50 & 100V variants



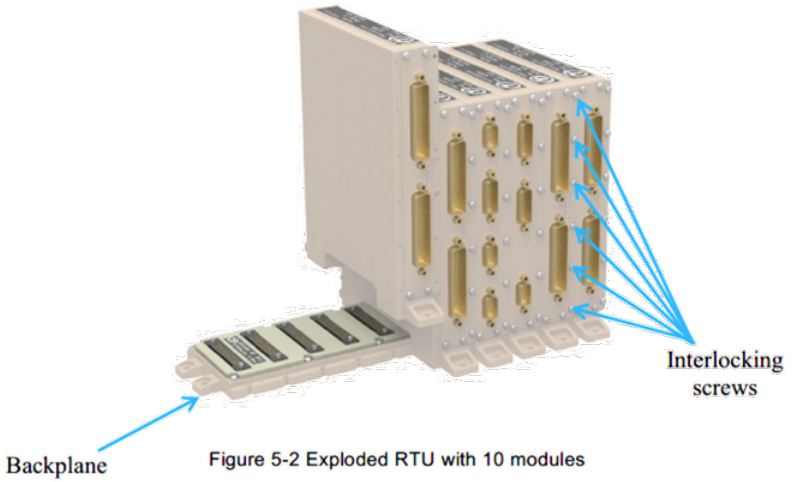


Figure 5-2 Exploded RTU with 10 modules

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NEEDS & GAPS: OUTLOOK & OHB VIEWS

OHB VISION ON SAVOIR

NEEDS & GAPS – CLASS III & IV MISSIONS (1/2)

- New **Class III/IV missions** emerging calling for a revision of certain SAVOIR concepts, founded with Class 1 Institutional applications in mind
- New **Emerging Avionics Developers** offering cost competitive products, not fully aligned with SAVOIR.
- No common consensus on the acceptability/suitability (**across Industry and Agencies**) of certain design implementations for these Missions

ESA MISSION CLASSIFICATION TABLE

Class type	I	II	III	IV	V
Mission Criteria and Marking					
Criticality to Agency strategy (Flagship mission, Internationnal cooperation, Impact on ESA strategic goals, and image)	Extremely high Criticality	High Criticality	Medium Criticality	Low Criticality	Educational purposes
Marking					
Mission Objectives (Directorate priority and purpose, e.g in orbit demonstration, educational)	Extremely high Priority	High Priority	Medium Priority	Low Priority	Educational purposes
Marking					
Cost (Cost at Completion, Including Phase E1)	>700 M€	200 - 700M€	50 - 200M€	1- 50M€	< 1M€
Marking					
Mission Lifetime (Nominal mission life duration)	> 10 years	5-10 years	2-5 years	2 years - 3 Months	< 3 Months
Marking					
Mission Complexity (Design interfaces unique payloads, New technology development)	High	High to Medium	Medium	Medium to Low	Low
Marking					

I - Critical safety issue (e.g. manned missions, Space Situational Awareness, operations center)

II - Performances should be met whatever it takes

III - Finding the best compromise between risk and cost to deliver the mission

IV - Mission is designed according to a hard cost limit (affordability approach)

V - Almost full delegation to industry (e.g. newspace service contract, Public-Private Partnerships)

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NEEDS & GAPS – CLASS III & IV MISSIONS (2/2)

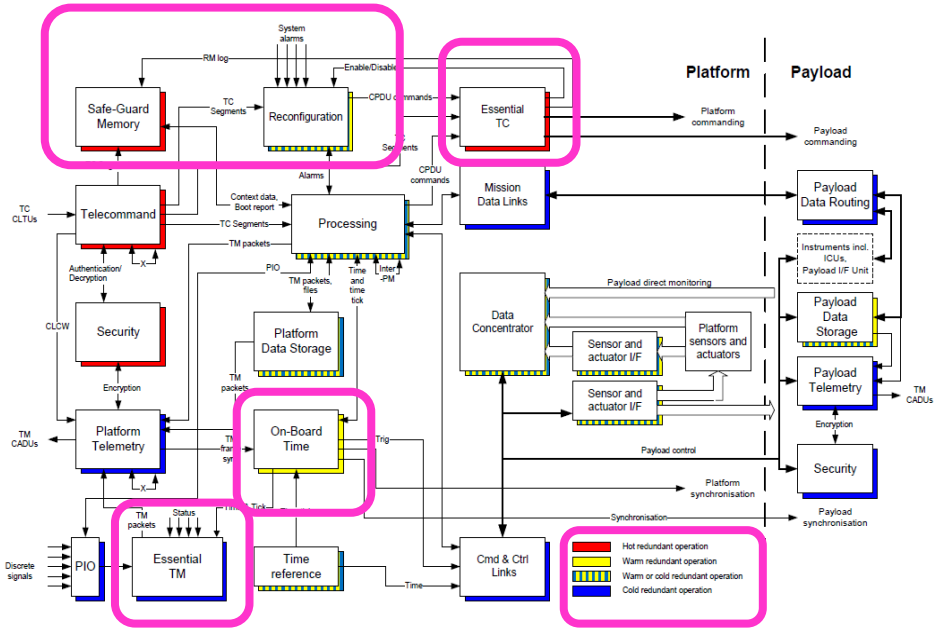
In particular, the following functions are considered to require a revision:

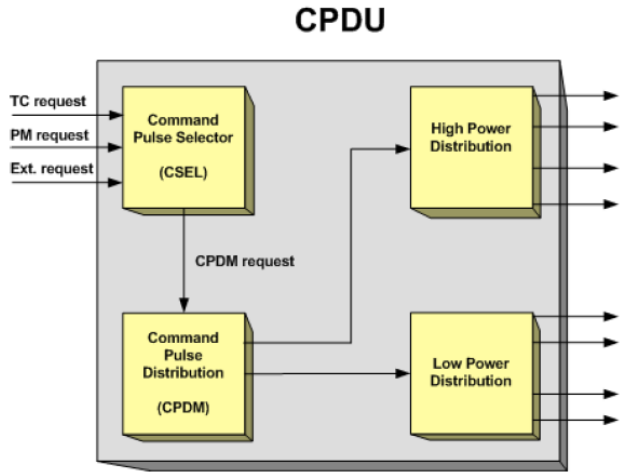
1. **Reconfiguration function, Redundancy concept & FDIR Concept:** function that maintains the operation of the processing function even in case of errors.

2. **Essential TCs**: It consists of one or more Command Pulse Distribution Units (CPDUs) that accept TC Segments and generate command pulses of specific durations in order to execute basic and “high priority” commands (HPC)

3. **Essential TMs**: The Essential TM function manages the acquisition of essential telemetry and the download of the acquired parameter through a dedicated virtual channel >> Already declared as Optional in SAVOIR.

4. **Others?**





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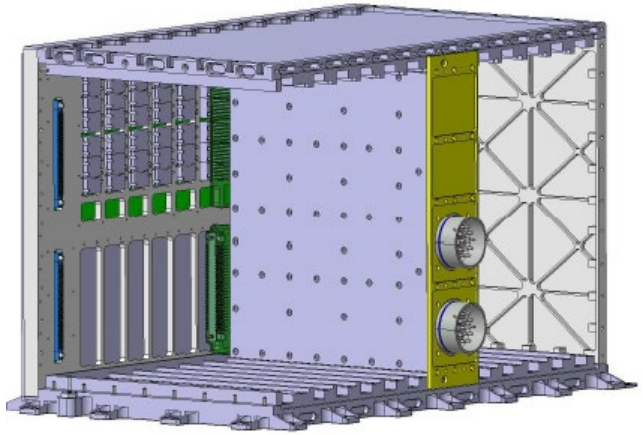
NEEDS & GAPS – FEDERATION WITH OTHER STANDARIZATION ACTIVITIES

New initiatives have been launched in the recent years sharing major goals with SAVOIR but going deeper into the standardization level, to facilitate a Real dual source procurement approach and exchangeability

1. **ADHA & APA:**
   Primary goal: Develop a new generation of Platform and Payload Data Handling & Power Units, based on standardized, inter-operable and inter-changeable modules
   Target: development of standardized architectures and building blocks that can be easily adopted.

2. **Intelligent System:**
   Primary goal: to increase the autonomy of our future systems.
   Target: development of standardized architectures and building blocks that can be easily adopted.



These initiatives are also preparing an Industrial landscape for Class III/IV missions

It is considered essential to ensure a good alignment between SAVOIR (and potentially some SAVOIR tailorings) and these initiatives.

3

CONCLUSIONS & PROPOSED WAY FORWARD

OHB VISION ON SAVOIR

CONCLUSIONS AND PROPOSED WAY FORWARD

1. It is suggested to work on harmonizing a SAVOIR Architecture Tailored for Class III & IV missions

   - Involving emerging Avionics suppliers
   - In close collaboration across Technical domains: Avionics; SW; FDIR & OPS

   The following products may require to be acted upon / tailored:

   - SAVOIR-TN-001 SAVOIR Functional Reference Architecture
   - SAVOIR-HB-002 SAVOIR Data Handling Handbook
   - SAVOIR-GS-001 SAVOIR Reference OBC Specifications
   - SAVOIR FDIR Handbook
   - SAVOIR OSRA - Execution Platform Functional Specification - TBC

   Timeline: Considered essential to go for a Fast-Track harmonization exercise: until end of 2025,

2. It is suggested to:

   - continue expanding and building on the valuable work of running SAVOIR WGs >> Power, Payload, Comms…
   - ensure alignment with related initiatives with certain common goals (APA; ADHA…)

THANK YOU