SAVOIR

space avionics open interface architecture

Introduction and Status of SAVOIR

On behalf of the SAVOIR Advisory Group
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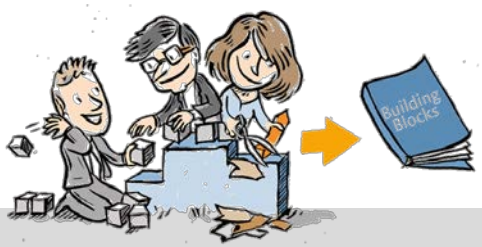
Head of Software Systems Division



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SAVOIR.

SAVOIR means ***S**pace **A**vionics **O**pen **I**nterface a**R**chitecture*.

It is an initiative to federate the space avionics community and to work together in order to improve the way that the European Space community builds avionics subsystems.

SAVOIR is coordinated by the Savoir Advisory Group including representative of ESA, CNES, DLR, Astrium, Thales, OHB, RUAG, Selex Galileo, Terma.

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What is it all about.

- Improve the way we deliver space systems.
- Support industrial competitiveness.
- Enhance product orientation.

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Product orientation

Improve the way we deliver Space Systems (cost & schedule) by

- **Pre-developed Products / Building Blocks based on**
  - **well defined Specification & Interfaces based on**
    - **an agreed Reference Architecture**

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SAVOIR objectives

- to reduce the **schedule** and **risk** and thus cost of the avionics procurement and development, while preparing for the future,
- to improve **competitiveness** of avionics suppliers,
- to influence **standardization** processes by standardizing at the right level in order to get equipment interchangeability (the topology remains specific to a project).
- to define the **governance** model to be used for the products, generic specifications, interface definition of the elements being produced under the SAVOIR initiative.

The process is intended to be applied as part of the Agencies ITTs, and throughout the subsequent procurements and development process. A particular goal is to have SAVOIR outputs exploited in future projects and relevant products as part of European supplier's portfolios.

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SAVOIR Output

The primary outputs of Savoir are:

- **reference avionics architecture** for spacecraft platform hardware and software,
- a set of avionics external and internal **interface specifications**,
- the definition of **building blocks** composing the architecture,
- the **functional specification** of selected building blocks comprising the architecture,
- Demonstrate **maturity** of the functional & Interface specification by performing prototyping activities

- Facilitating the implementation of selected **building blocks.**

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SAVOIR expected benefits

SAVOIR supports:

- space avionics **customers** and **system architects**,
- **system integrators**,
- avionics and technology **suppliers**,
- standardization bodies.

It is a tool for the industrial policy and R&D planning makers.

The expected benefits of SAVOIR are:

- for **customers**, streamline the procurement process of spacecraft avionics,
- for **system integrators**, facilitate the procurement and integration of the spacecraft avionics,
- for **suppliers**, prepare the technical conditions for an efficient product line organization.

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Organisation

SAVOIR space avionics open interface architecture **Advisory Group**

SAVOIR FAIRE	SAVOIR IMA	SAVOIR SAIF	SAVOIR SAIF
Software reference architecture	TSP based Software reference architecture	Electrical interface (Data & Power)	Sensor/Actuator Functional Interface

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SAVOIR perimeter

- SAVOIR focus on the Platform Avionics including Payload Interfacing
- Build on the pillars
  - Data Handling Hardware
  - Control Sensors & Actuators
  - On-board Communication
  - Flight Software
- Related topics
  - The operations view
  - Development and Verification Process.
    - Model Based Development
    - Functional Verification strategy.
    - Links the system data repository.

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The SAVOIR wheel

Domain of reuse

Agree on which functions compose the perimeter of avionics and how to allocate them to BB if needed.

Domain design

Agree on the most important BB to standardize and develop. Propose a roadmap to implement them.

Key Performance Indicators

Measure the effectiveness of SAVOIR recommendations and approach, in terms of costs and effectiveness.

Reusable spec & I/F standards

Agree on variability and modularity of the specifications for the selected BB or for groups of BB.

System Reference Architecture 1

Define Interface (IRD)

Building Blocks Selection 2

Refine Interface (ICD)

Product Use Assesment 4

Generic Functional Specification 3

SAVOIR is an initiative to federate the space avionics community to work together in order to:

- Improve the way to deliver space programs.
- Set a « product philosophy » approach.
- Deliver elements usable by the customers, the system integrators and the suppliers.

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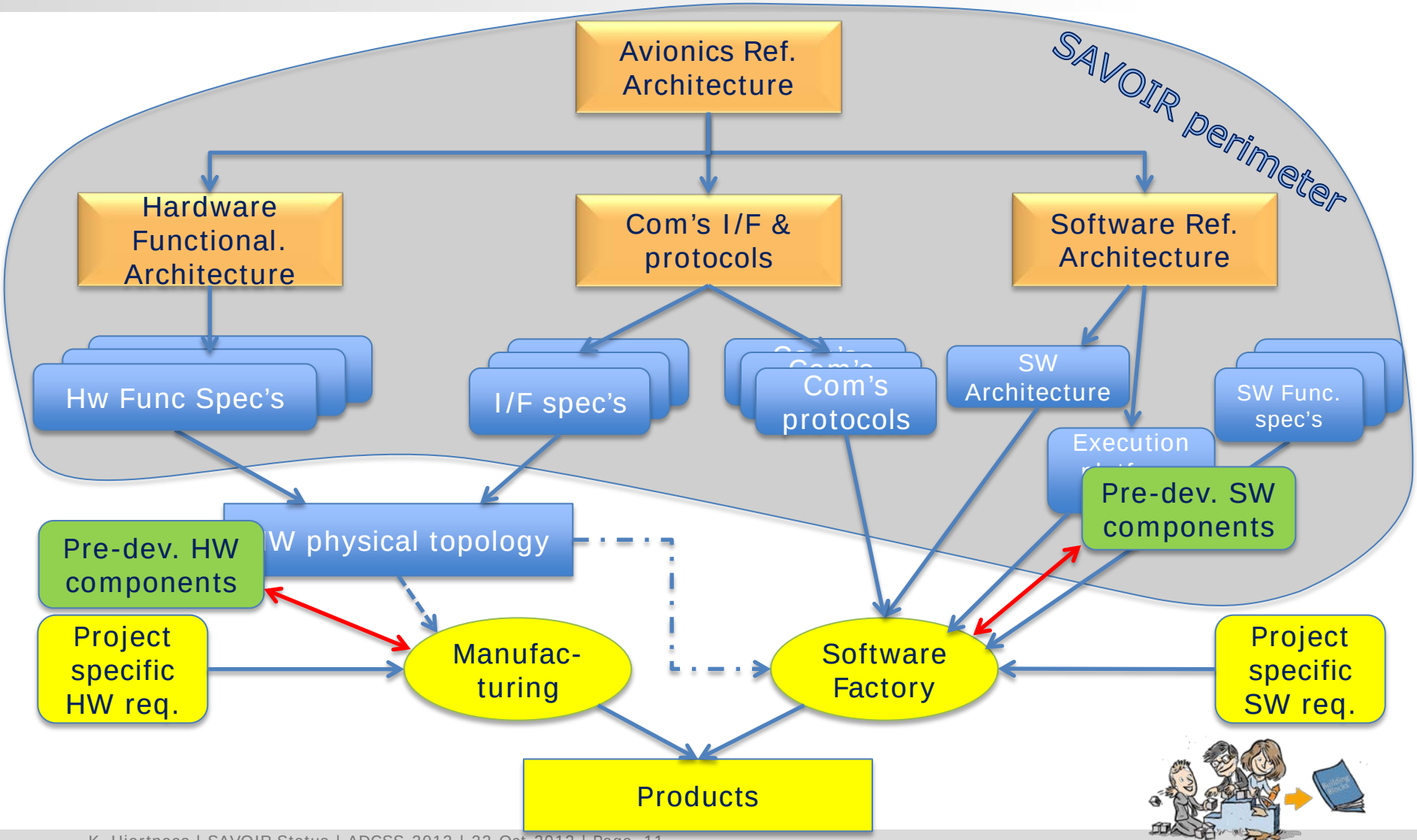
SAVOIR process



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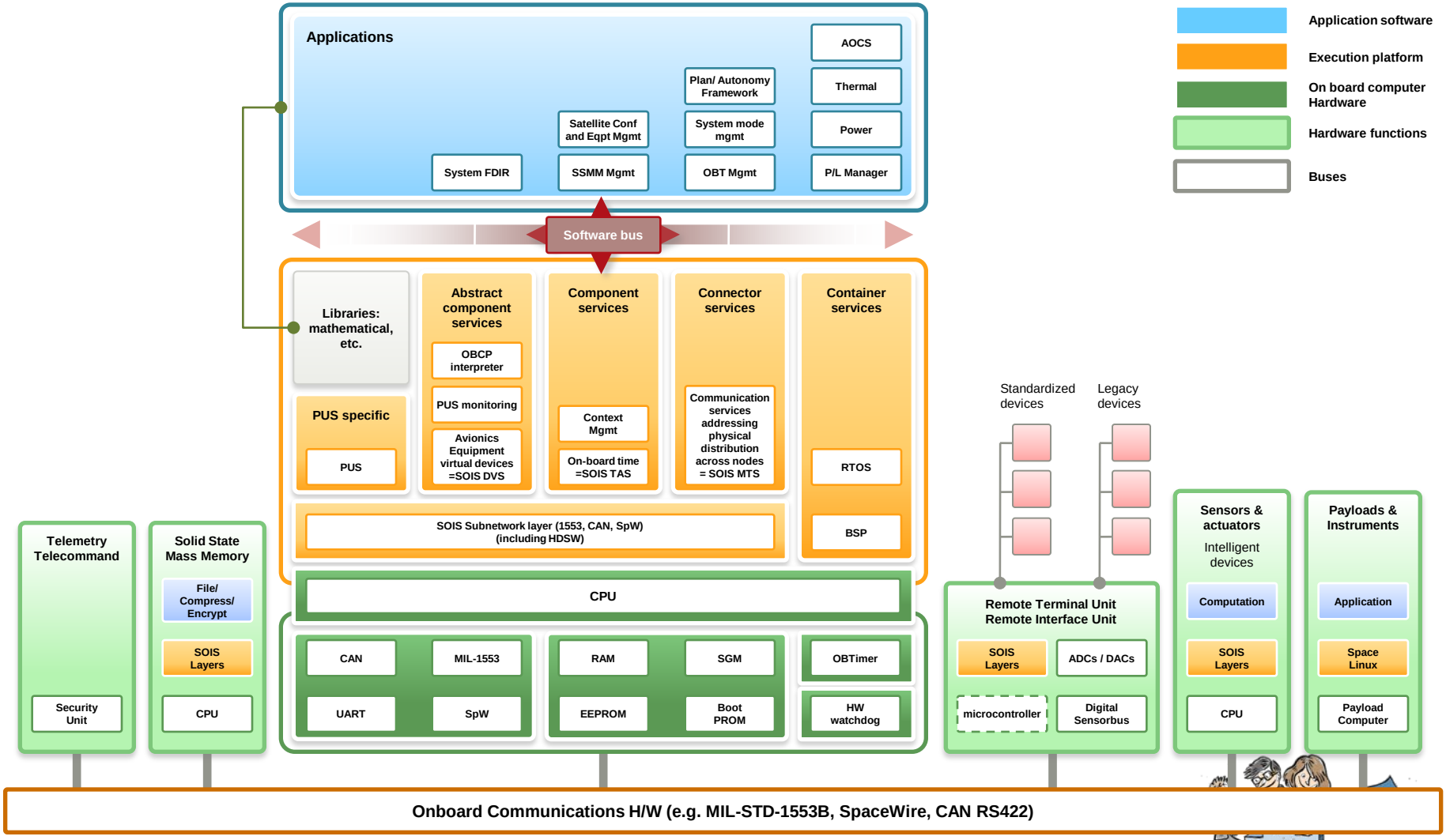
The Avionics Reference Architecture



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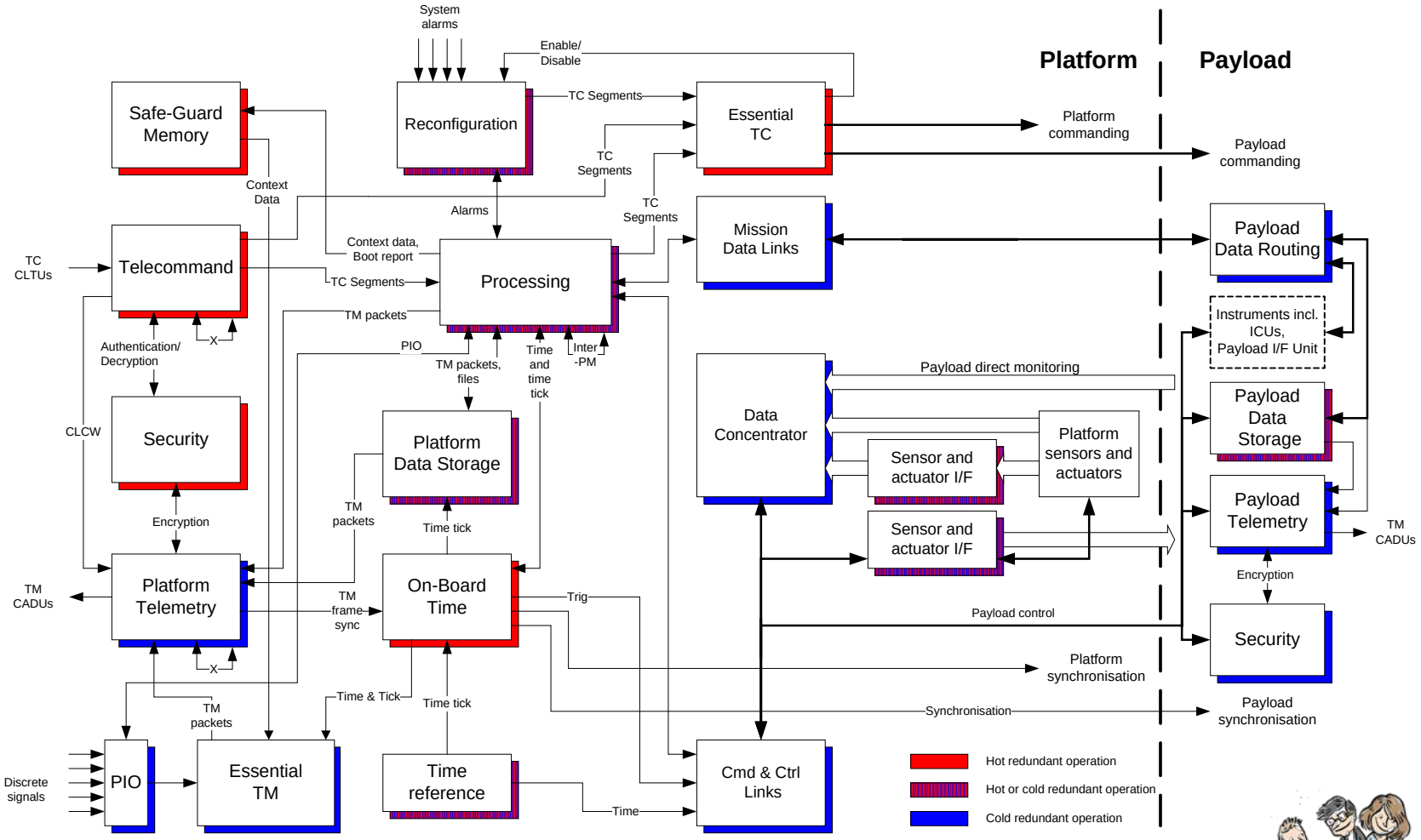
SAVOIR HW Reference Architecture Functional View.



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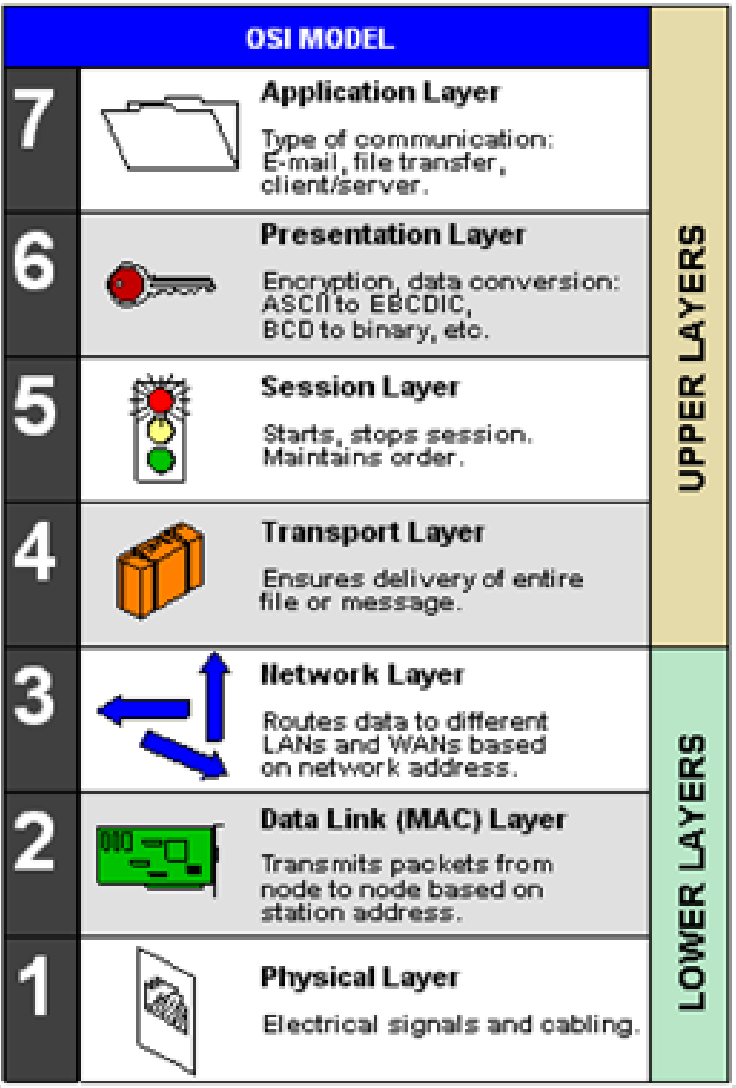
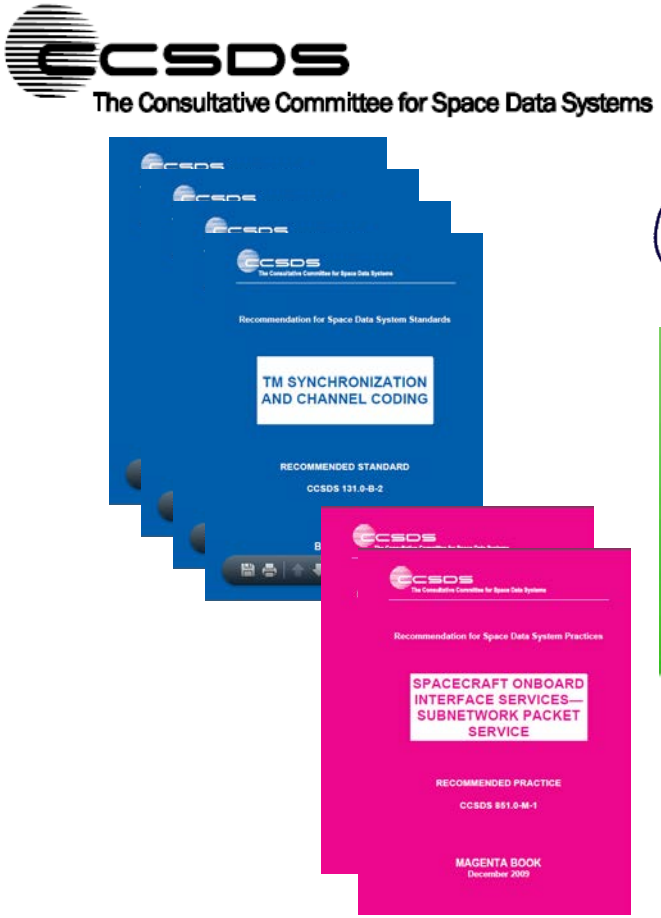
Communication Network & Protocols





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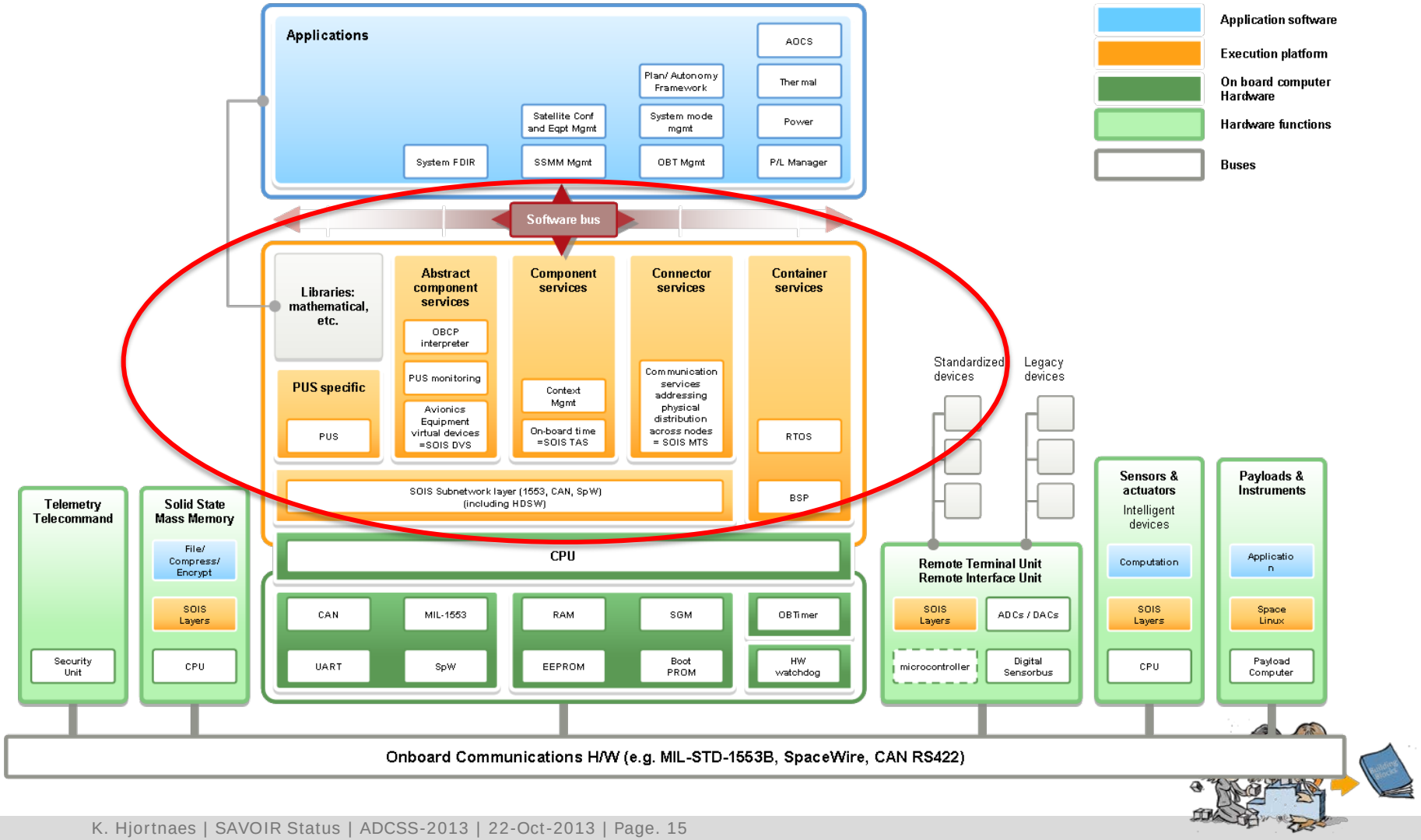
Software Reference Architecture



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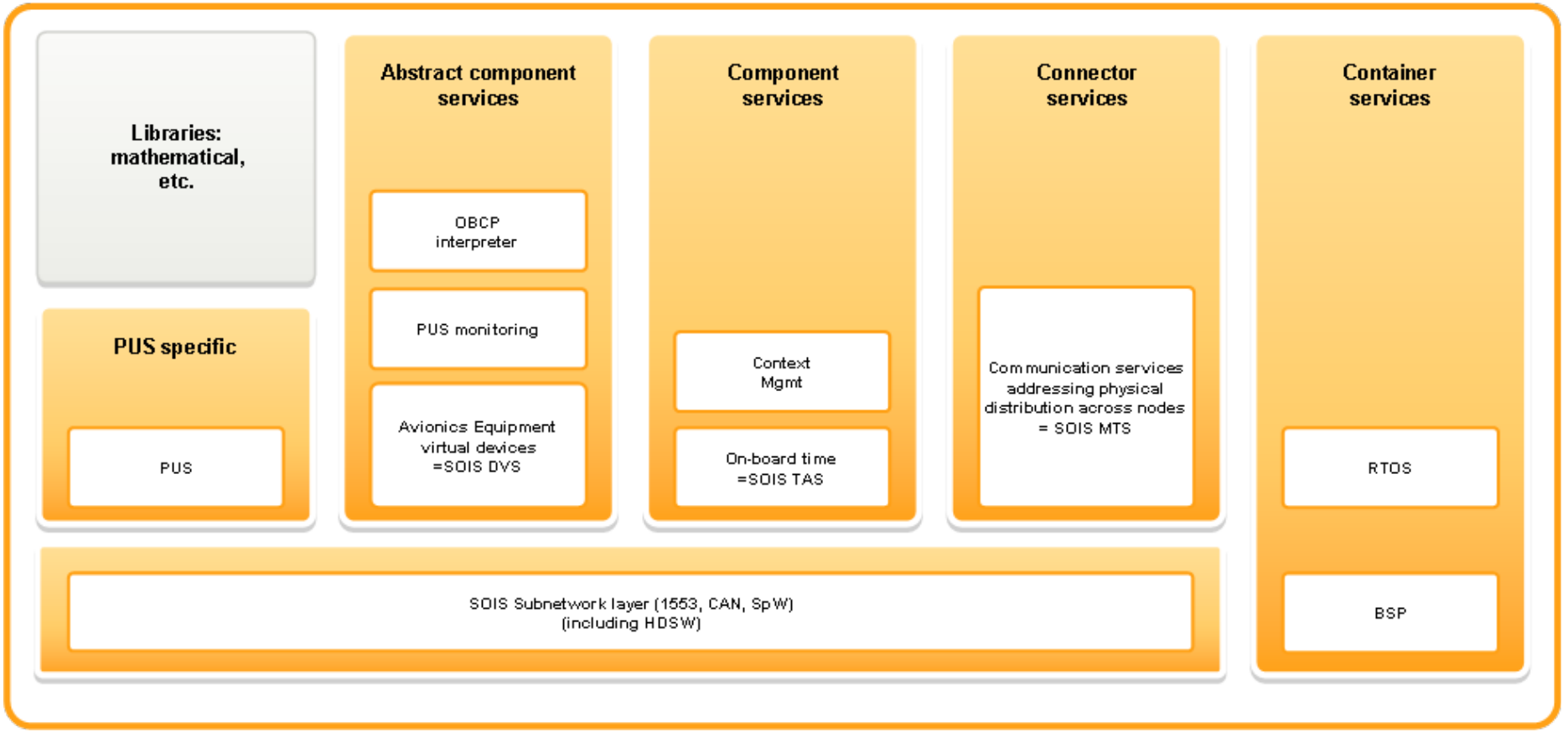
Software Reference Architecture
Execution platform – 'Classic'



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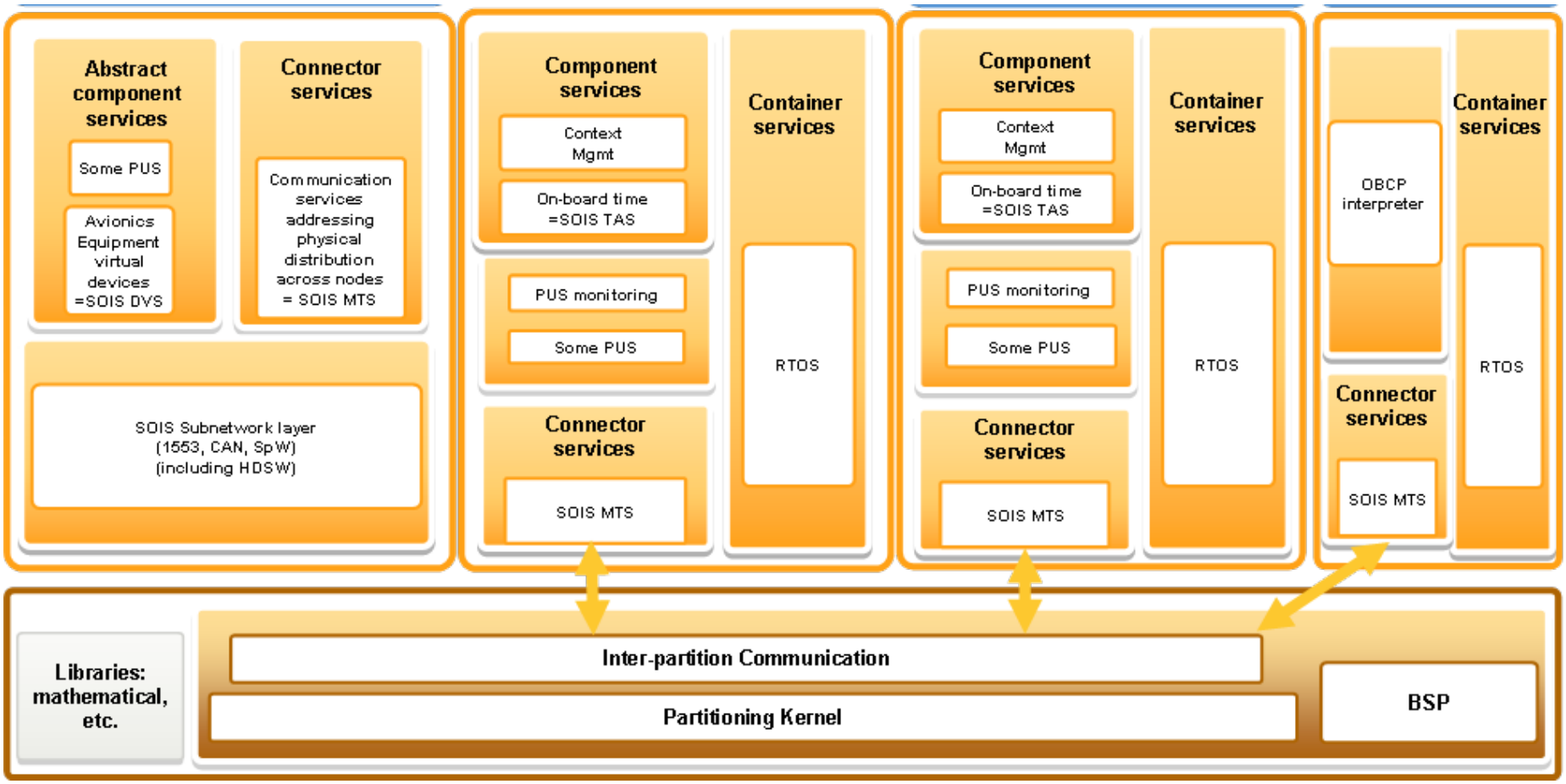
Software Reference Architecture
Execution Platform – 'Time & Space Partitioning'



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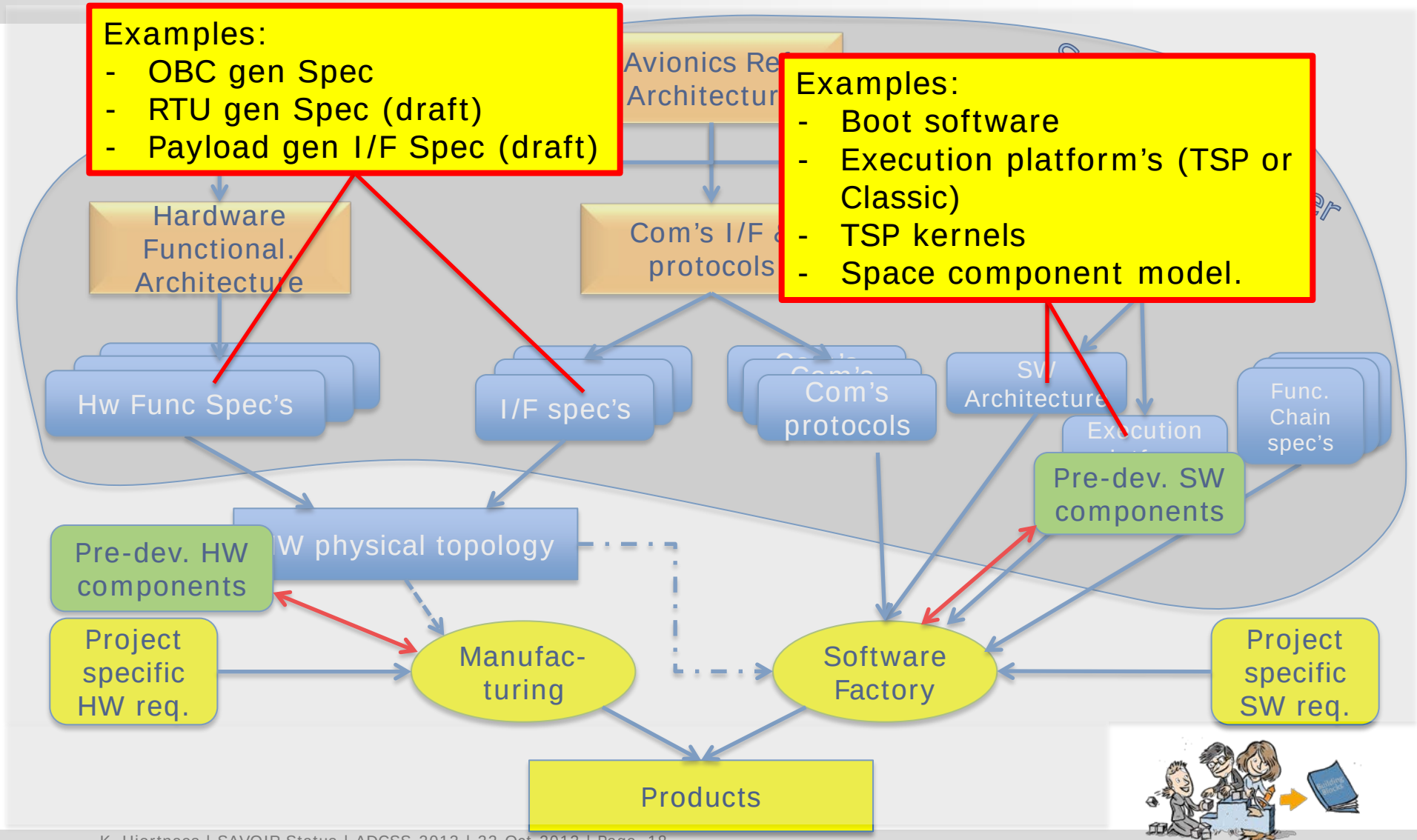
SAVOIR process



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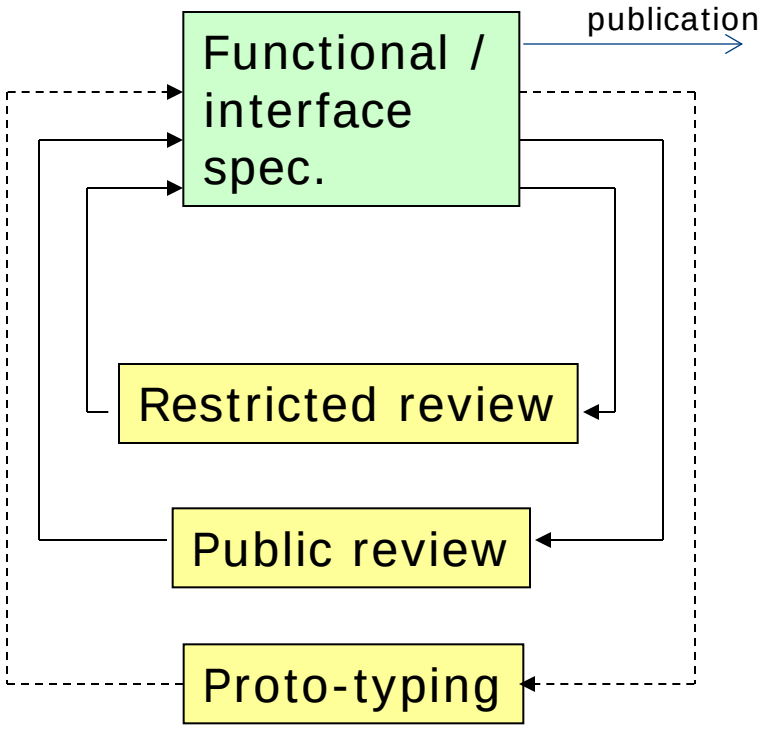
Specification production scheme.

Under SAG agreement;

1. A draft version is produced;
   - By a SAG working group
   - Output of an R&D activity
   - Proposed by Industry
   - ESA internal
2. Submitted for **restricted review** and updated as needed
   - Check compliance to SAVOIR architecture and principle
   - Completeness / consistency / etc
3. Submitted for **public review** and updated (same objective as 2)
4. Verified by **prototyping** – to demonstrate maturity of the spec., consistency with the ref architecture (as far as possible on a case by case basis)
5. **Publication**



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Public review of SAVOIR spec.

- Public review of SAVOIR documents will be restricted member states only.
- Objectives will be to verify
  - Completeness, consistency, coherence
  - Reusability, domain of reuse
  - Compliance to SAVOIR reference architecture
  - Dissemination aspects
    (e.g. proprietary information, IPR infringements)

- Discussion with ECSS TA on-going
  - The role of the Savoir within ECSS still to be agreed

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Visit the SAVOIR website

http://savoir.estec.esa.int/

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What are the objectives?

- To reduce the schedule and risk and thus cost of the avionics procurement and development, while preparing fo the future
- To improve competitiveness of avionics suppliers

More information:

- SAVOIR Home
- SAVOIR Process
- SAVOIR Ecosystem
- SAVOIR Organisation
- SAVOIR Output
- SAVOIR History

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Contact

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- Bernard Bruenjes- OHB
- Carsten Jørgensen – Terma
- Torbjörn Hult – RUAG
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