SAVOIR

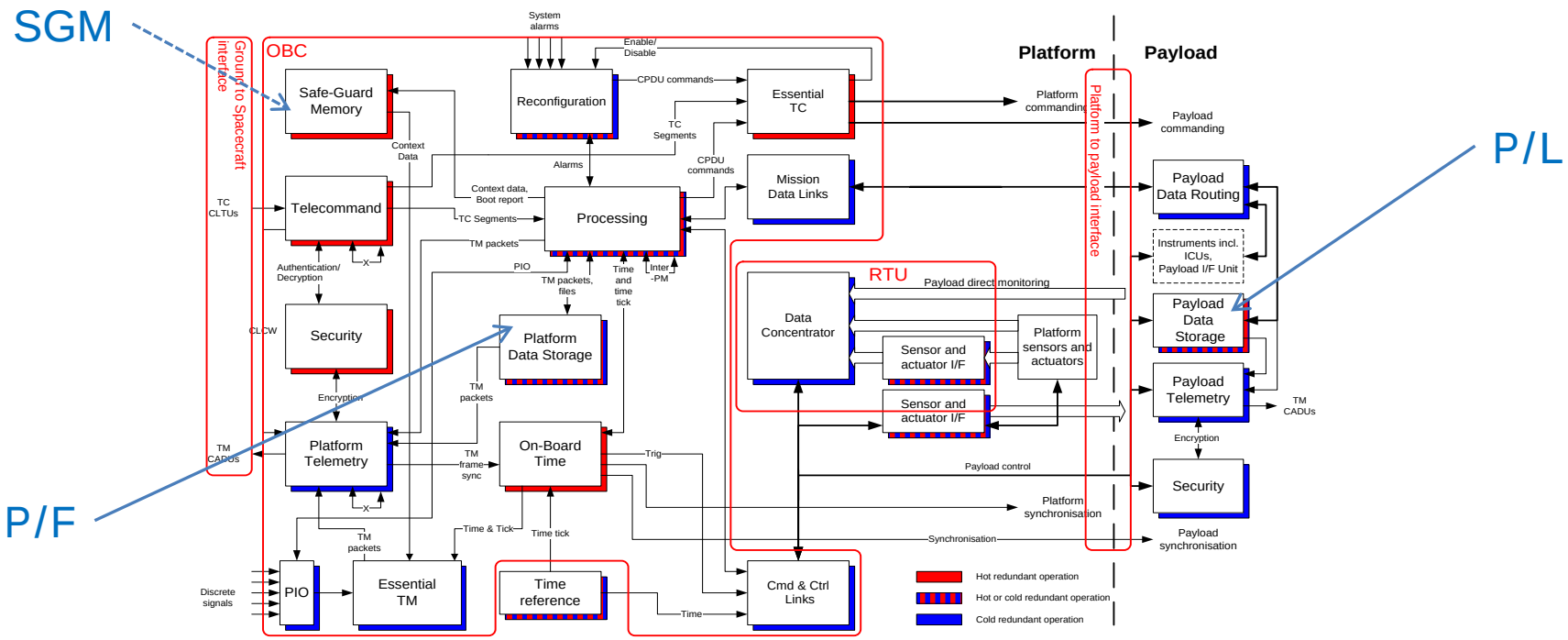
space avionics open interface architecture

SAVOIR MASAIS Working Group
“MAss Storage Access Interfaces and Services”

SAVOIRMASAIS

space avionics open interface architecture

SAVOIR architecture & Mass Memory



- The SAVOIR functional reference architecture shows and describes two different types of mass memory functions:
  - the Platform Data Storage
  - the Payload Data Storage
  - … and the SafeGuard Memory

SAVOIR-MASAIS Working Group Functions

- Platform data storage
  - store spacecraft housekeeping data
  - store housekeeping data
  - operational data (mission timeline, OBCPs etc.)
  - small/medium size mainly driven by communication characteristics
  - Mainly driven by autonomy required by the mission
- Payload data storage
  - store P/L scientific data from instruments
  - implemented depending on the mission needs
  - Mainly driven by autonomy required by the mission and the instruments
- Safe-Guard memory
  - Store critical data that survive to reinitialisation of the spacecraft
  - EEPROM/Flash – small capacity

SAVOIR-MASAIS Working Group Scope

- The SAVOIR-MASAIS Working Group has as main goal the definition of the functional performance and interface requirements of the on-Board Mass Memory function and its management.
- The requirements will be organized in a document that will use the template a of the SAVOIR OBC spec (Functional, Performances and Interface Requirements, list of MM requirement for a Generic SRD).
- Use cases and User requirements of Mass Memories will be listed and discussed. User refers to Projects and Instrument Principal Investigators, Operations and system Architects (Payload and Platform).

SAVOIR-MASAIS Working Group Composition

- Two steps process

V0: SRD/OIRD

Agencies & LSI

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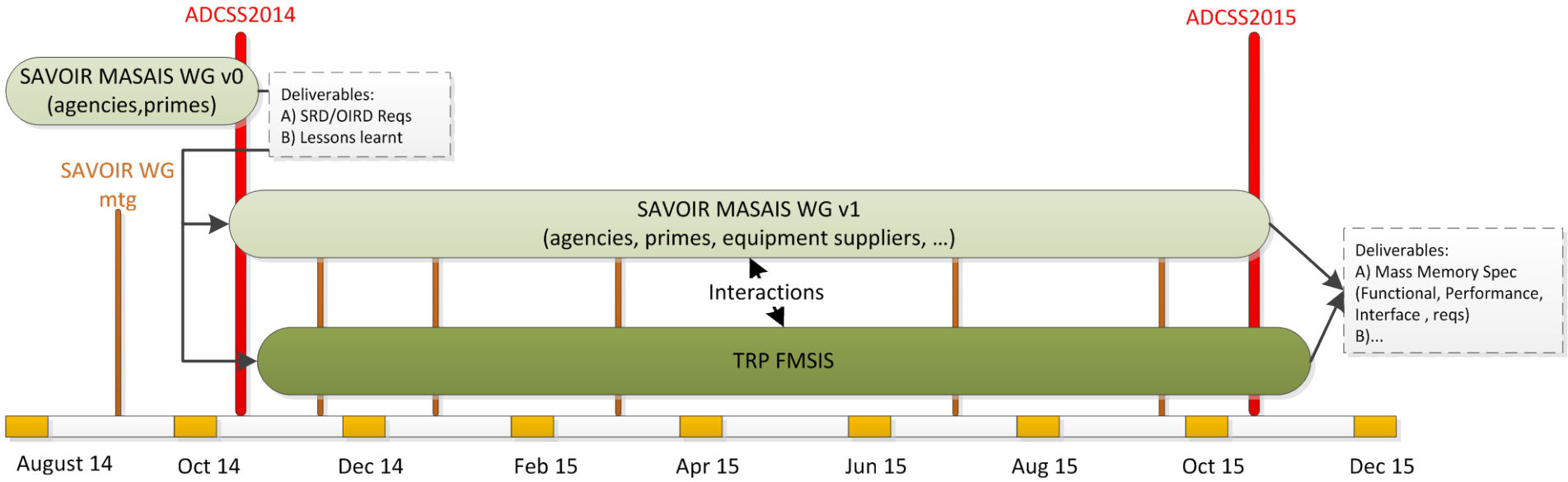
V1: MM Specification

Agencies, Primes, MM Industries

TBD

SAVOIR-MASAIS Working Group Planning

- The Working Group will be supported by a TRP activity in charge of performing the relevant analyses, requirement processing and verification (through prototyping).



SAVOIR-MASAIS Working Group
SRD/OIRD Concepts

- The requirement documents refers to ECSS and CCSDS standards:
  - ECSS-E-ST-70-41C Telemetry and telecommand packet utilization
  - ECSS-E-ST-10C – System engineering general requirements
  - ECSS-E-ST-10-06C – Technical requirements specification
  - ECSS-E-ST-20C – Electrical and electronic
  - ECSS-E-ST-40C – Software
  - ECSS-Q-ST-60-02C – ASIC and FPGA development
  - ECSS-Q-ST-80C – Software product assurance
  - CCSDS 851.0-M-1 SOIS Subnetwork Packet Service
  - CCSDS 852.0-M-1 SOIS Subnetwork Memory Access Service
  - CCSDS 872.0-M-1 SOIS Time Access Service
  - CCSDS 873.0-M-1 SOIS File and Packet Store Services
  - CCSDS 727.0-B-4 FILE DELIVERY PROTOCOL (CFDP)

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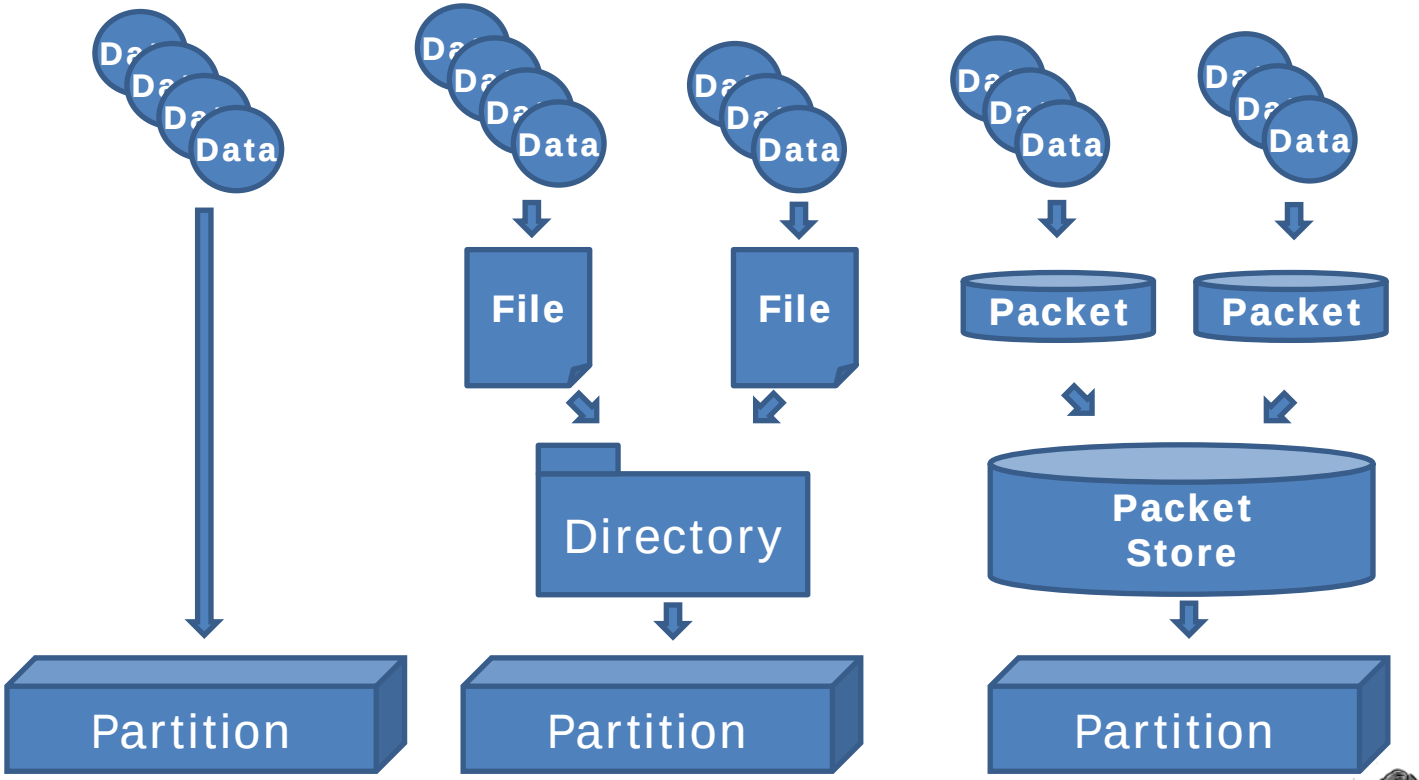
SRD/OIRD Concepts

- The SRD/OIRD mainly addresses the logical concepts of data storage:



SAVOIR-MASAIS Working Group Requirements

- The latest version of the SRD/OIRD covers:
  - Generic aspects (14)
  - Interfaces (9)
  - Space-Ground File Transfer (8)
  - Organisation (7)
  - Performances (8)
  - FDIR (4)
- For a total of 50 requirements up to now.
- Each requirements apply to complete Data Storage System (DSS) or any of Payload data Storage function (PLS), Platform data Storage function (PFS) and the SafeGuard Memory (SGM).

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Requirement examples 1

SAVOIR.MMSRD.GEN.120

The (DSS) capacity shall be expressed at EOL.

The capacity required by the mission is a main driver for the design of the (DSS). It shall be sufficient to store all missions data, e.g. Science data for <max-#- hours-science> hours, Platform housekeeping for <max-#-hours-hk> hours, On-board Control Procedures, timelines, Software images and patches, etc.

SAVOIR.MMSRD.IF.200

The (DSS) shall support the link between a file and any "identified input" and the automatic storage of the data coming on that input to the corresponding file.

Option: Instrument without FMS capability

This is to automatically store the data from instruments having no FMS capability into previously created files. Note that the notion of "identified input" may be related to a specific interface (e.g. SpW port or SpW logical address) or to a CCSDS application process identifier (APID).

SAVOIR.MMSRD.FDP.100

The exchange of files between space and ground shall comply with the CCSDS 727.0-B-4 CCSDS File Delivery Protocol (CFDP)

CFDP shall be used to transfer files between Flight and Ground segments.

Note: requirement numbers are still provisional

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Requirement examples 2

SAVOIR.MMSRD.ORG.120

The (DSS) shall support one or more Partition Management Systems.

Specific Partition Management System may be necessary to:

** optimize the use of the memory resources, e.g. one Partition Management System for managing numerous small files and one Partition Management System for managing few large files;*

** optimize the access to data depending on their type, e.g. one Partition Management System for managing files and one Partition Management System for managing packet stores;*

** optimize the access to memory storage depending on their technology, e.g. one Partition Management System for managing Flash based memory devices and one Partition Management System for managing the SDRAM based memory devices.*

SAVOIR.MMSRD.PER.155

The (DSS) shall be able to handle simultaneous data read and data write operations without degradation of performances.

The (DSS) shall be able to record all the data coming from all sources and send data to all destinations concurrently while respecting the performances required by the mission.

Note: requirement numbers are still provisional

Contacts

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