Introduction
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Validation activities

l'Observatoire de Paris | LESIA

Laboratoire d'Études Spatiales et d'Instrumentation en Astrophysique

cnrs — dépasser les frontières

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Glossary and definitions

- **Verification and validation**: procedures that are used together for checking that a system (, product or service) meets requirements and specifications and that it fulfills its intended purpose.

- **Validation**: The assurance that a product, service, or system meets the needs of the final user(s).

- **Verification**. The evaluation of whether or not a product, service, or system complies with a regulation, requirement, specification, or imposed condition.

Validation activities

- Infrastructure validation:
  Set of tools called **RSS**, implements the functions defined in the ROC **Concept and Implementation Requirements Document** (CIRD) an specified in the ROC Software System Specification (**RSSS**)
  - Pipelines (RODP, ROC-SGSE, RIVP, LLVM)
  - The Monitoring and control sub-system User Interface (MUsIC)
    - ➔ Validation and verification: **ROC Software System Validation Plan** (**CIRD** level)
    - ➔ Tests: **Software Test Plans** (**RSSS** level)
    - ➔ **to be completed**

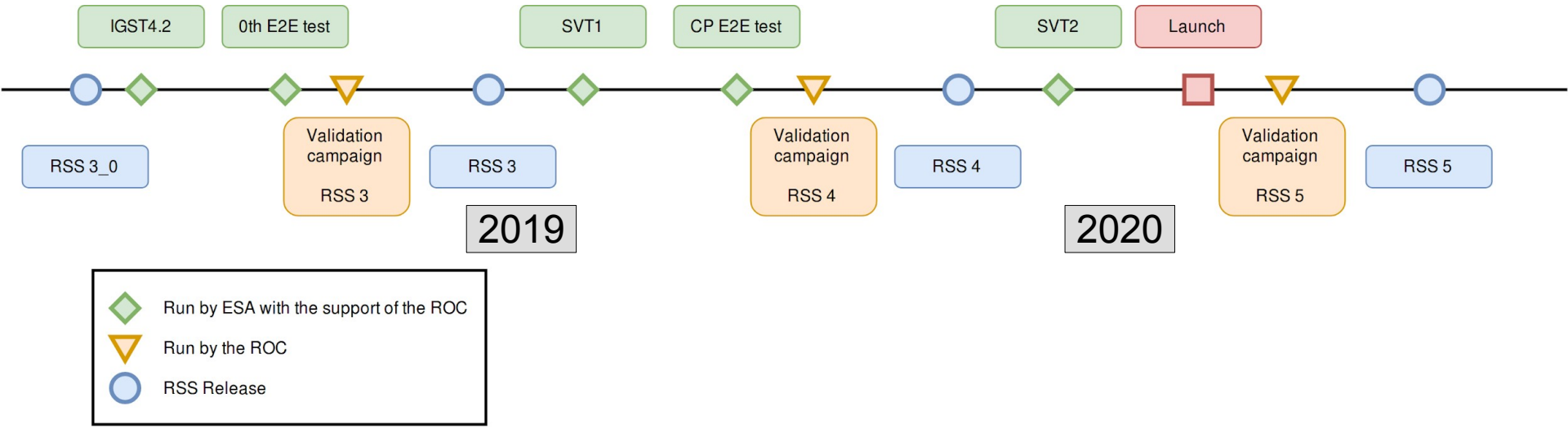
- Instrument validation:
  - Instrument status
  - Science performance
  - …
    - ➔ Validation and verification: **TBW**

- Data products:
  - LZ
  - L0
  - …
    - ➔ Validation and verification: **TBW**

Software System Validation Plan

Context & Schedule

- No formal review of the instrument ground segment by ESA before the launch
- No formal validation of the instrument ground segment design by ESA
- Review at the end of the commissioning phase



The ROC will hence organize a **software validation campaign** before each RSS release

RSS3 → training campaign
RSS4 → formal validation before launch
RSS3 → formal validation after launch

Validation planning

- Validation of **software units** (MUsIC, RODP, LLVM, etc.):
  - Unit tests
  - Integration tests
  - Validation tests

- Validation of **interfaces/format**:
  - Mission Operations Centre (**MOC**) → DDS and GFTS
  - Science Operations Centre (**SOC**) → GFTS

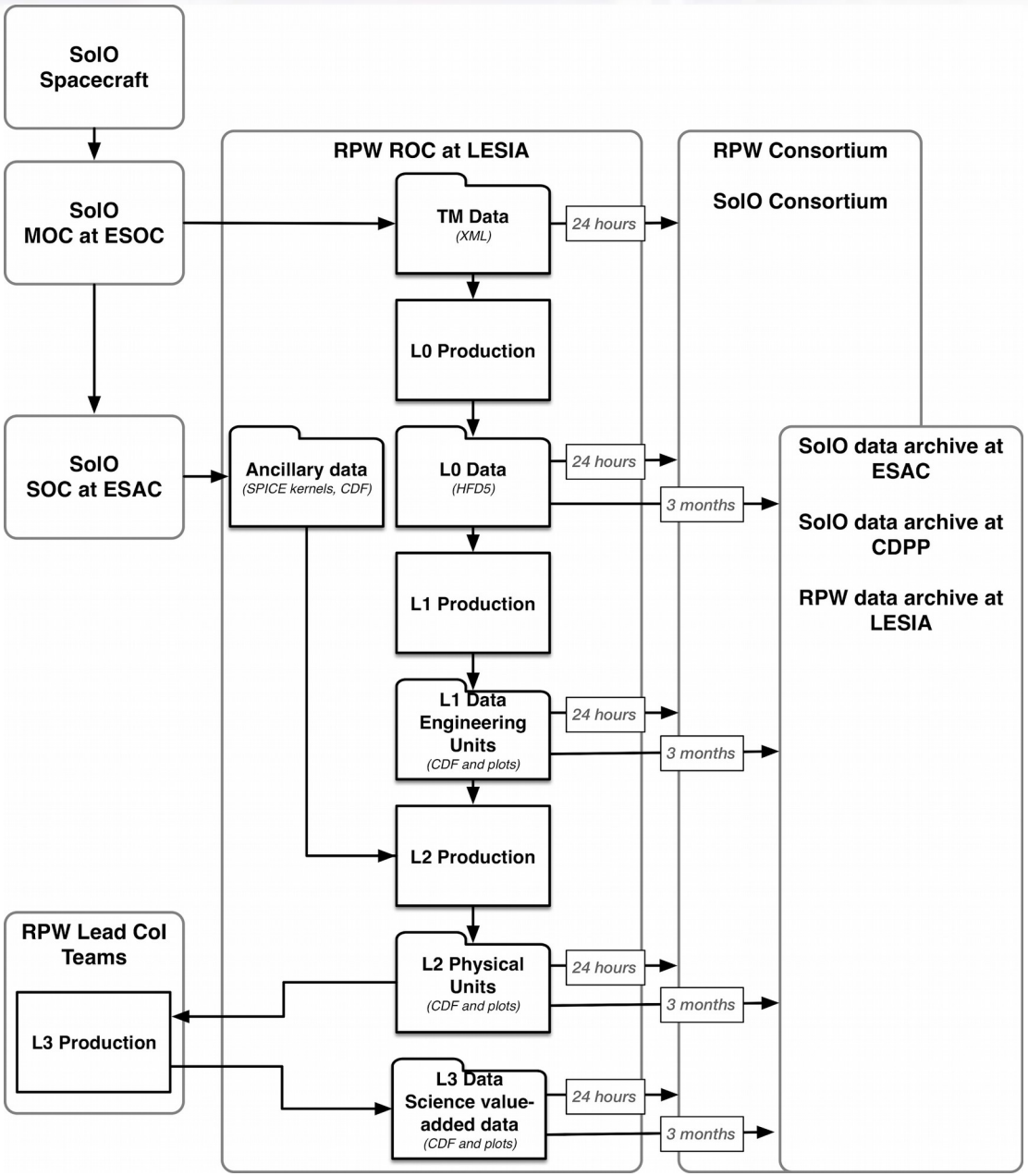
- Validation of the RPW Calibration Software (**RCS**), delivered by
  - THR (CALBAR)
  - TDS (CALBA)
  - LFR (CALBUT)
  - SCM (SCMCAL)
  - Bias (BICAS)

TBW/TBD/TBC

- **Responsibilities**: who writes the verification procedures ?
- **Requirements traceability**: who generates the traceability matrix ?
- **Control procedures**: problem reporting and resolution, deviation and waiver
- **Quality control**: Sonarqube reports ? With a plugin ?
- **Scientific validation of data products**: responsibilities ? personnel ? (to be discussed this afternoon)
- **Datasets**:
  - need of representative data for validation/verification (also for **RCS**)
  - determine the data used to validate each functionality
- **Missing verification procedures** for:
  - Communication and science support (RPW public web page)
  - … ?
- Determine the **validation test strategy** for:
  - MusIC → ?
  - Pipelines → define testcases and workflows
- **Management of issues and versions**: incidents, anomalies and evolutions
  - Suggestion: Jira/Gitlab

Data product validation

Data processing flow



- Delivery to the **Consortium**: **24h**
- Data archiving at **ESAC**: **3 months**

Data products and validation/verification process

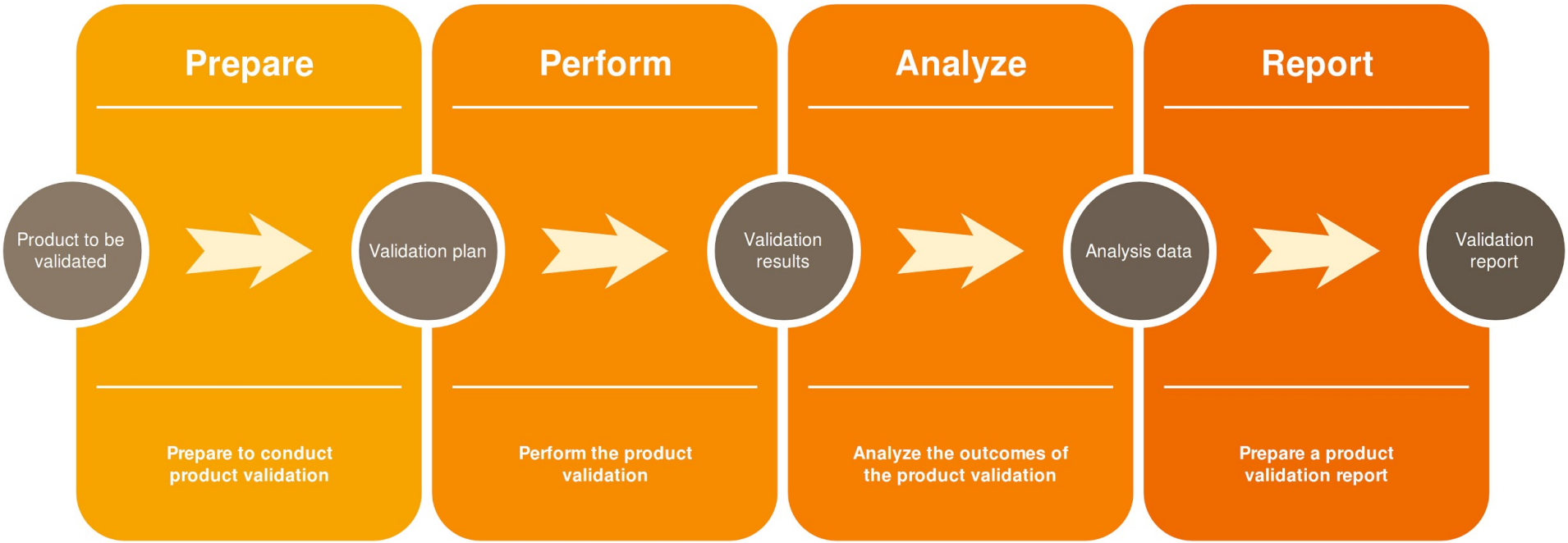
- LZ
  - Packet integrity
- L0
  - Metadata + format compliance
- L1
  - Metadata + format compliance
  - Format compliance
- L2
  - Metadata + format compliance
  - Calibration ?
  - Manual validation ?
  - Statistical threshold ?
- L3
  - Metadata + format compliance
  - Calibration ?
  - Manual validation ?
  - Statistical threshold ?

Responsibilities

- The ROC is in charge of the **formal validation**
  - Format compliance
  - Metadata (in particular the **validate flag**)

- Calibration Software teams are in charge of the **science quality**
  - Calibration
  - **Quality flags**
  - …
- To check the science quality of the data, Calibration Software teams need:
  - The **data** (provided by the ROC)
  - Some **tools** ? (which one ?)

Validation process



Validation plan

- Formal validation
  - **Procedures** for each data product: purpose and objectives of steps
  - Any necessary pre and post test actions ?
  - **Criteria** for success vs. failure
  - Requirements to compare against validation (RSSS, CIRD)

- Science quality verification
  - **Procedures** for each data product
  - **Criteria** to determine the **quality factor**
  - Requirements ?