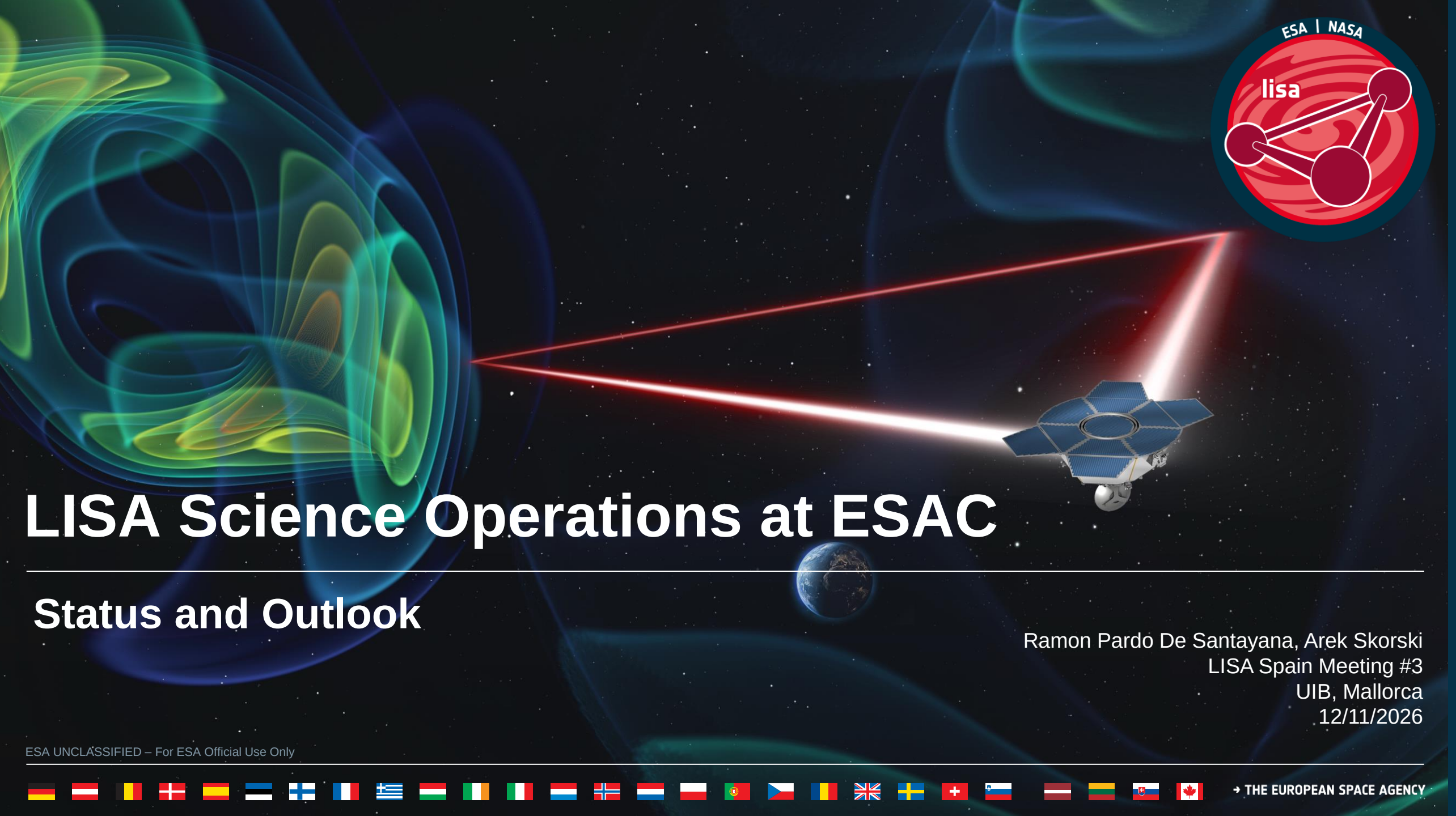

LISA Science Operations at ESAC

Status and Outlook

Ramon Pardo De Santayana, Arek Skorski
LISA Spain Meeting #3
UIB, Mallorca
12/11/2026

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Presentation outline

- SGS roles, architecture and science operations
- LISSEN and SOC development progress
- SOC interim review, SGS RqR and integration milestones
- SOC team and upcoming Science Operations Scientist vacancy
- Questions and discussion

The LISA Science Ground Segment (SGS)

SOC

Science Operations, L0/L1, alerts, mission data repository and public archive

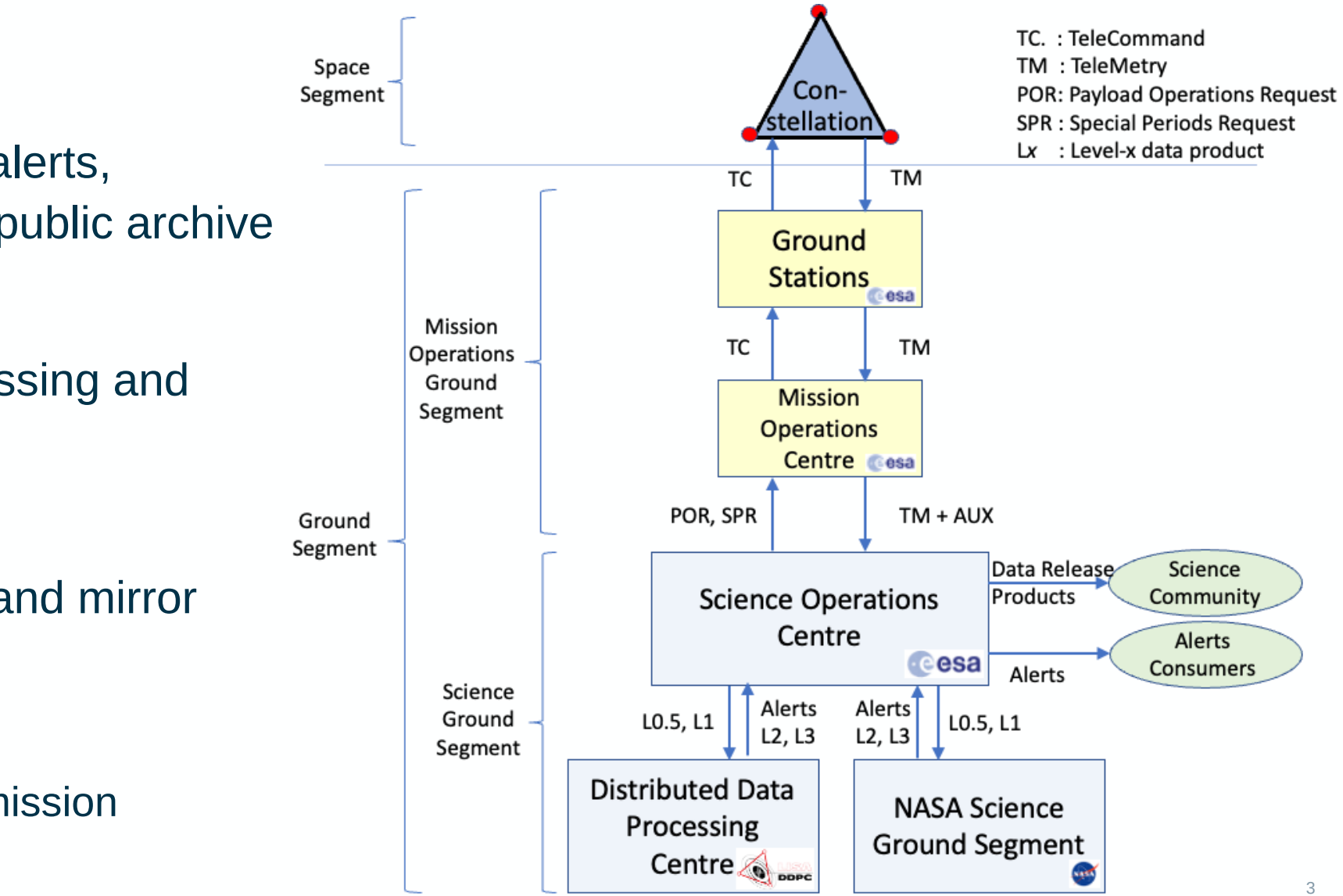
DDPC

Scientific modules, L2 processing and simulator

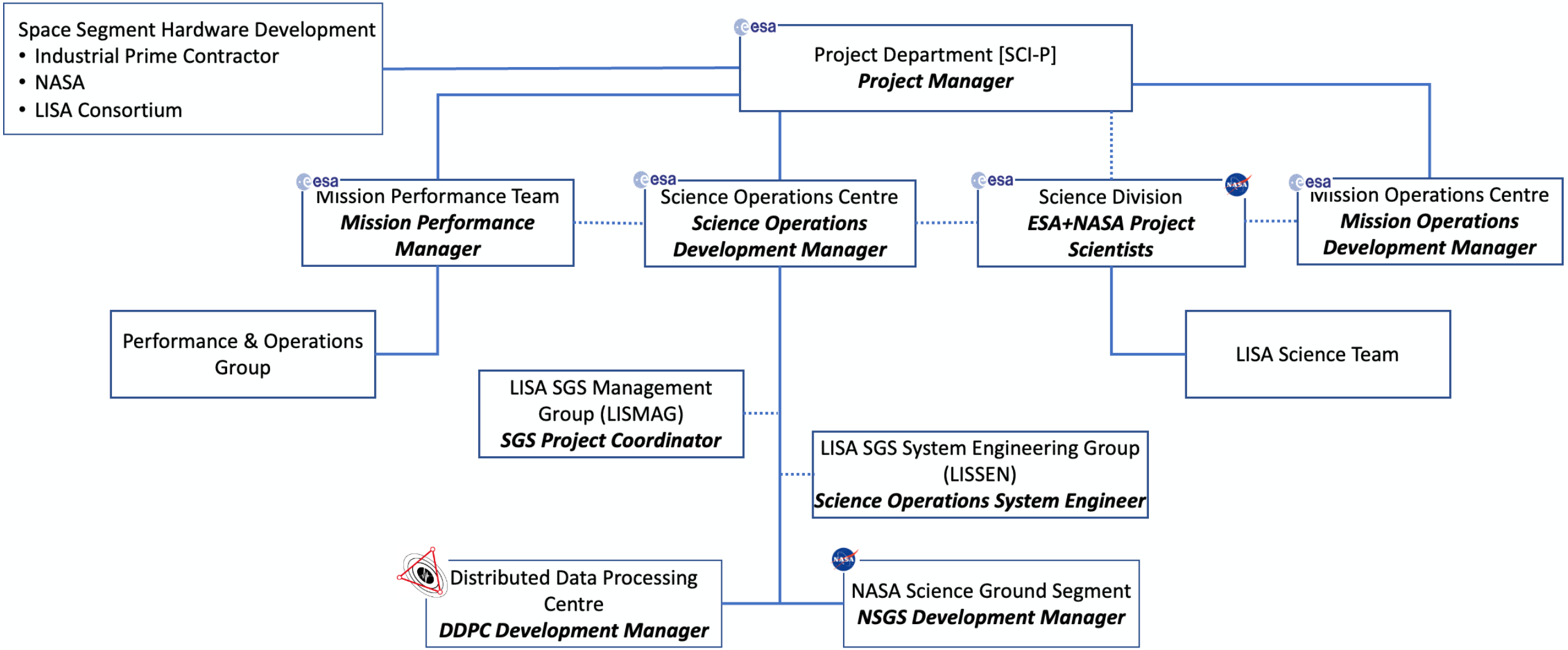
N-SGS

Parallel science processing and mirror archive

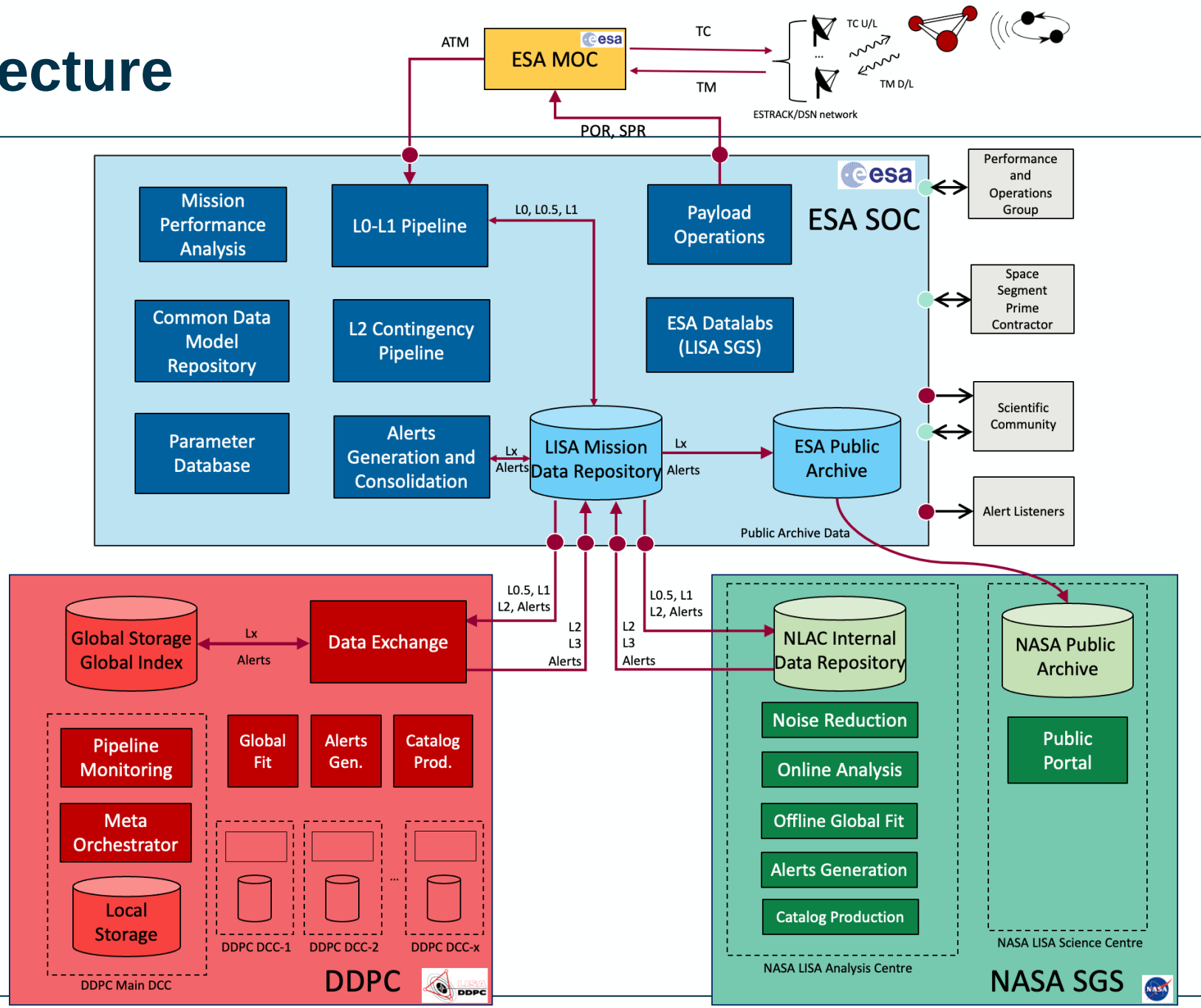
P&O supports calibration and mission performance



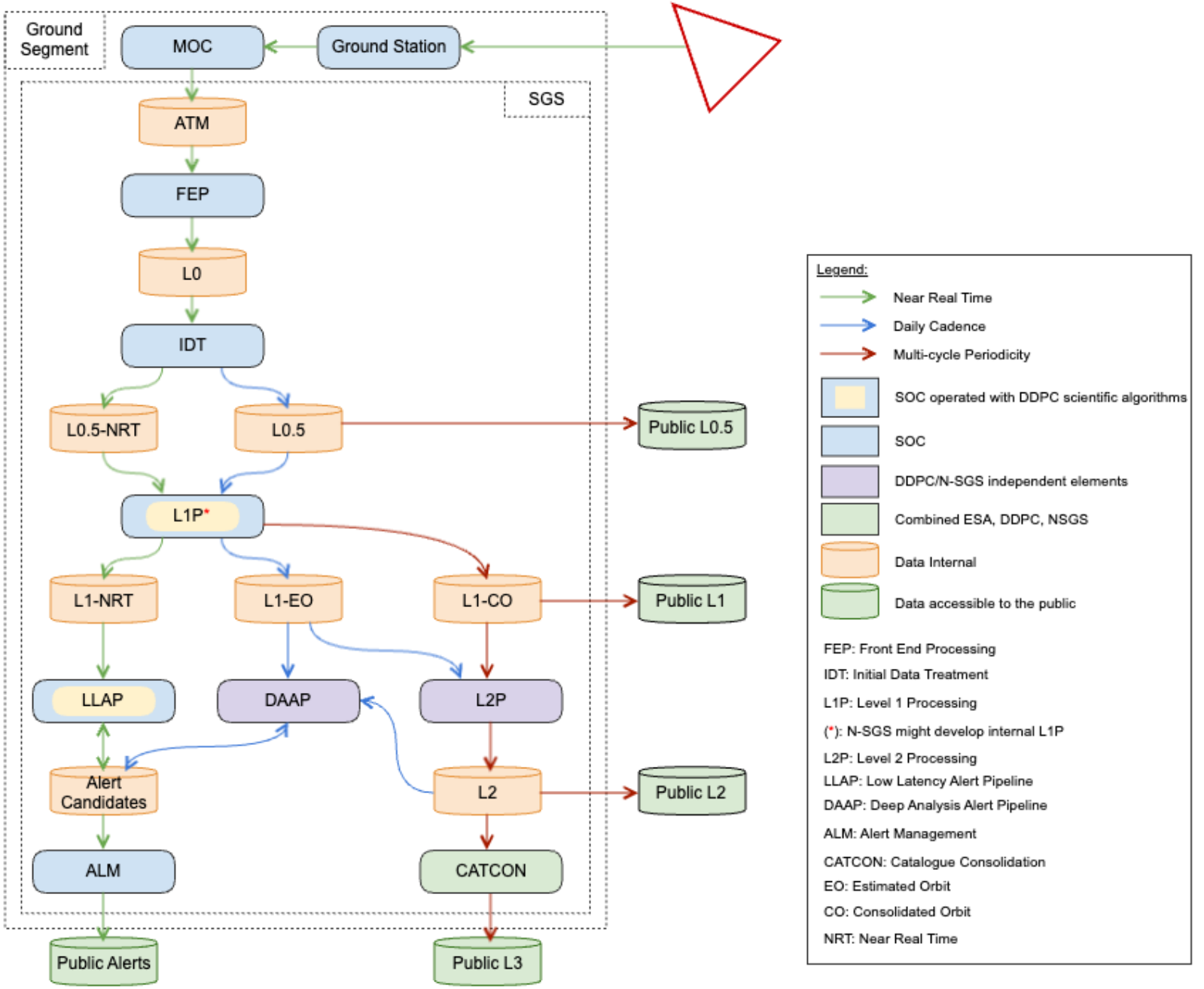
SGS Organization



SGS architecture

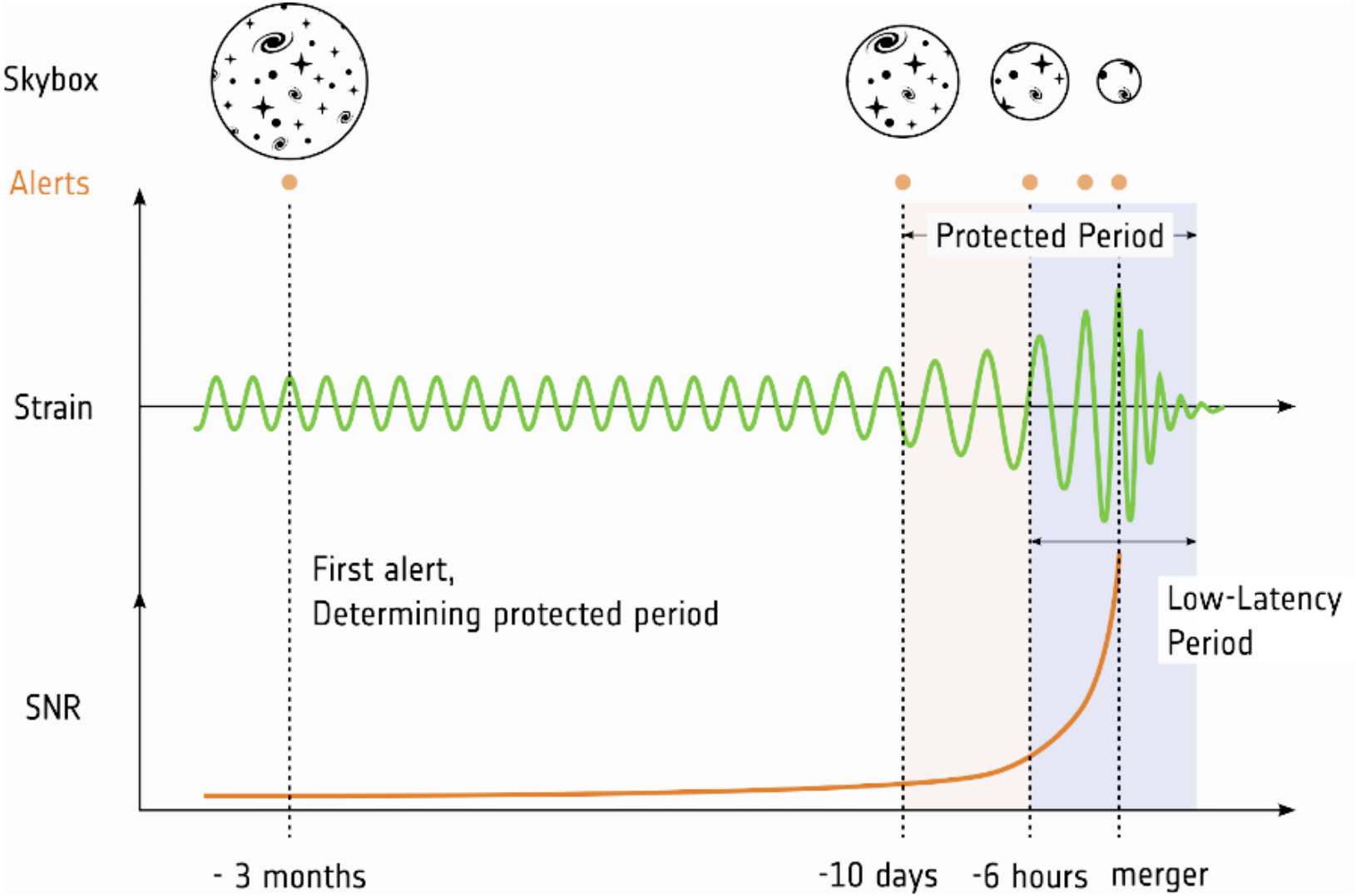


Data Flow, Processing Steps and Cadence



From SOCD v1.1

Uplink and special periods



Routine commanding

Frequency Offset locks, Test Mass charge management, Test Mass stray electrostatic potentials and payload settings

Protected periods

Uninterrupted science collection

Low-latency periods

Ground contact and alert follow-up

Special Periods TN prepared in 2026

LISA SGS System Engineering Group (LISSEN)

An advisory forum for shared technical work across the SGS

Working groups:

1. Operations concepts
2. Architecture and interfaces
3. Requirements engineering
4. Software development guidelines
5. Common software
6. Data models

Expected Output:

1. Science Ops. Concept Doc (SOCD)
2. SGS System Dev. Plan (SDP)
3. SOC/DDPC/N-SGS/IF RD
4. SGS Eng. Guidelines for Users (SEGU)
5. SW Development Kit (SDK)
6. Common Data Models (CDM): L0.5, L1, L2, L3

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SOC Development Update

- Parameter Database:
  - WebUI: https://pdb.lisa.esa.int
  - Static library (v0.2.0): lisa-pdb
- FELIX: AI agent prototype from APC being deployed at ESAC
- Requirements flow-down from SIRD 2.1 on 80% complete
- DDPC's Pipeline-Runner being integrated at ESAC
- SGS-MOC IRD and Special Periods TN prepared
- CD1L (Mojito Light) accessible from LISA SGS datalab on ESA Datalabs: https://datalabs.esa.int
- SGS/SOC System Development Plan drafted
- S3 Object Storage Proof of Concept successfully tested.
- Cross-mission PDB & CDM under development through external contract
- LISA Helpdesk: https://helpdesk.lisa.esa.int
- First compute node procured

SOC interim review and SGS readiness

✓ **Successful SOC interim review:**

29 September – 8 October 2026

ESA/SCI-S internal sessions:

1. Management
2. Engineering
3. Science operations

➢ **Next milestone: SGS Requirements Review (SGS RqR)**

March–May 2027

Requirements and development baseline ahead of SGS PDR

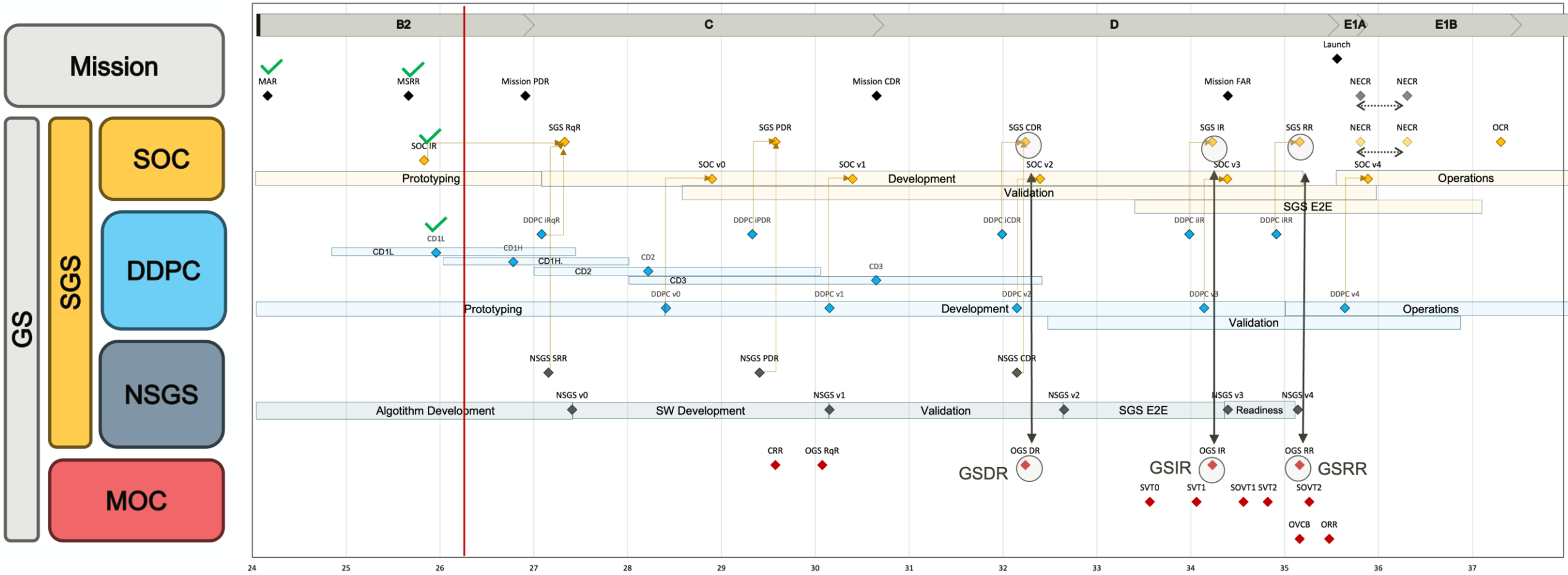
SOC and DDPC, including interfaces with N-SGS and MOC

Requirements completeness, allocation and traceability

N-SGS internal readiness outside formal assessment

Source: SGS PM#3 minutes, draft SGS RqR procedure (October 2026). Dates subject to partner agreement.

SGS schedule and integration milestones

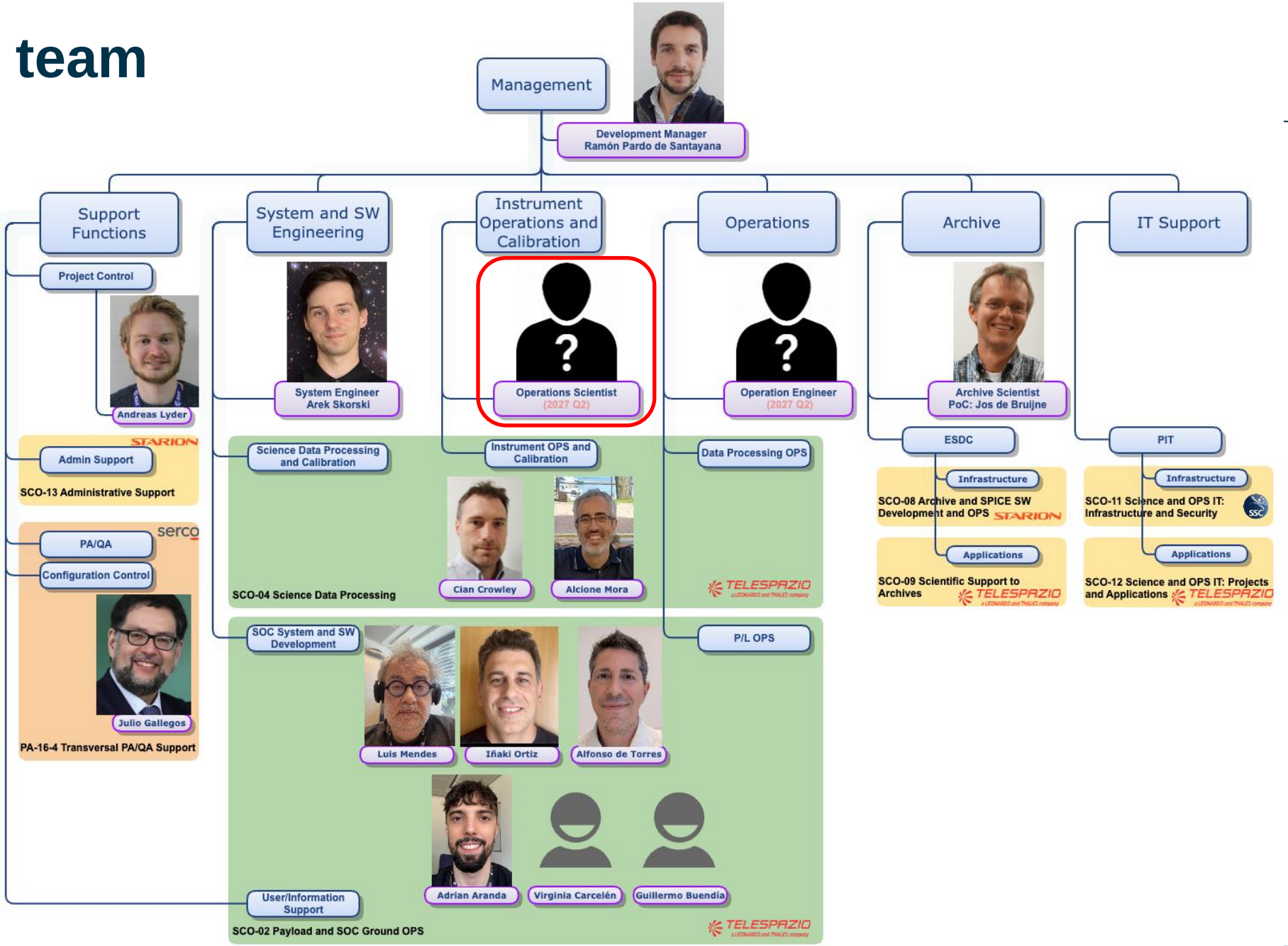


SGS RqR: proposed spring 2027

V0: PDR V1: CDR V2/V3: SOVTs V4: OCR

Common datasets drive L1P / LLAP integration

LISA SOC team



Science Operations Scientist: upcoming vacancy

LISA at ESAC, Madrid, Spain

Science operations with continued research at ESA

Role:

Coordinate science performance, calibration planning, payload operations and data product quality

Develop and validate SOC science processing and LISA data products

SOC scientific interface with LST, DDPC, N-SGS and performance and operations team

Operations tools, acceptance tests and LISA user support

Publication expected before the end of 2026

ESA Careers: jobs.esa.int



Candidate profile

PhD in astronomy, physics or equivalent, plus 3 years of relevant experience

Active research relevant to LISA

Scientific experiments, calibration or processing validation

Questions?



Source-deck visual credits: Nora Lutzgendorf (slides 5, 9); Martin Hewitson (slides 2–4).