



Management and control philosophy of the array

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for the ASTRI Project

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- The **ASTRI Mini Array (MA)** consists of 9 dual-mirror telescopes of 4 m diameter and will use:
 - the **Imaging Atmospheric Cherenkov Technique (IACT)** approach to study high energy emission from galactic and extragalactic sources in the TeV band (up to >100 TeV).
 - **Intensity interferometry** to study stellar sources with unprecedented angular resolution.
- The **ASTRI MA** will start activities at Teide Observatory in September 2022 and will continue for an **initial period of four years**, which could be extended in agreement with IAC for a further four years period.

ASTRI
Mini-Array

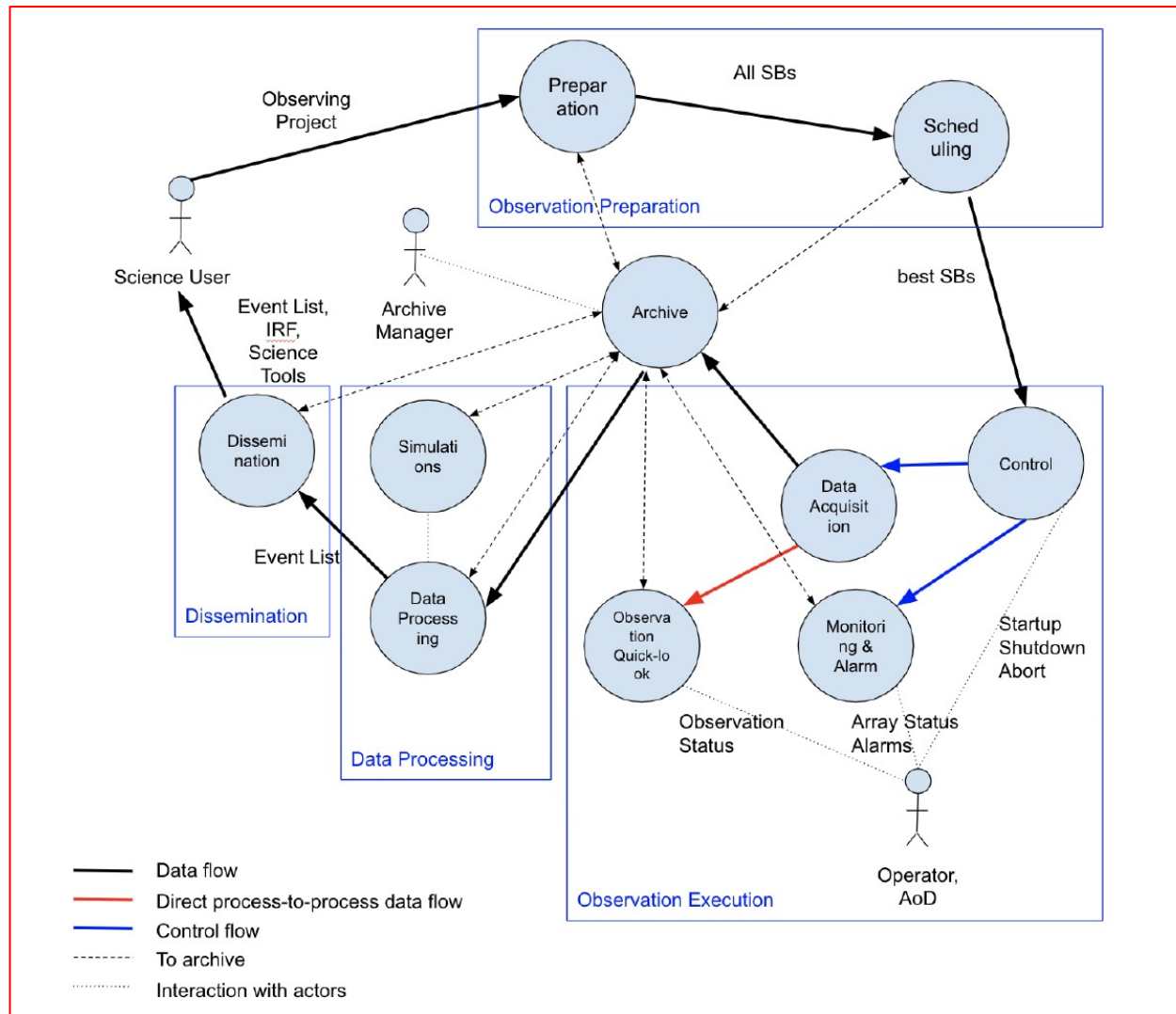
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Operations & Array Control

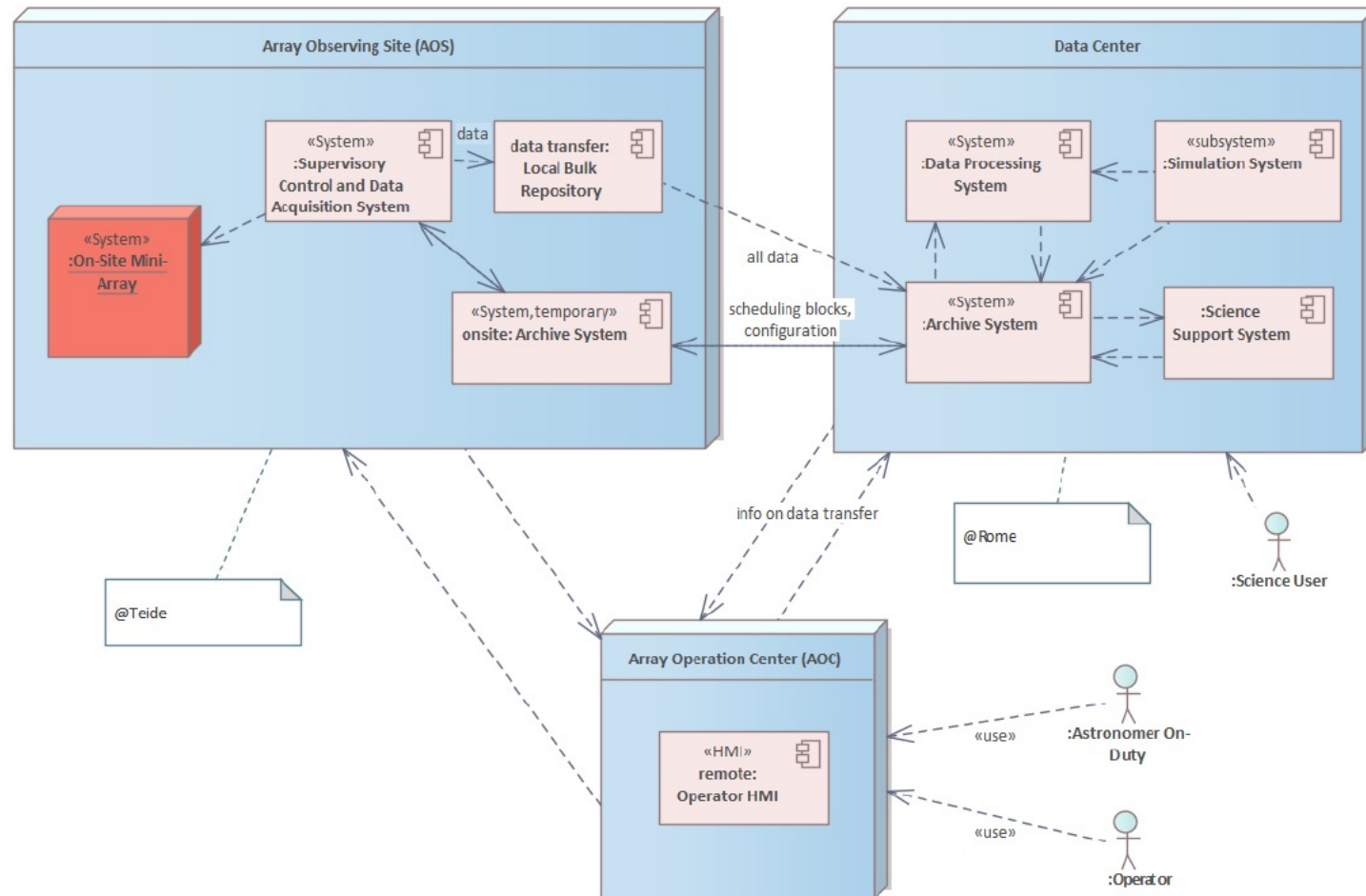
The MA Operations activities can be grouped in four categories:

- **Science Operations**
 - To produce data of high scientific quality
- **Maintenance/Technical Operations**
 - To ensure optimal performance and minimal technical downtime
- **Safety and Security**
 - Prevention from hazard for people and assets.
- **Outreach**
 - promoting ASTRI mini array capabilities and results

Science Operations Cycle



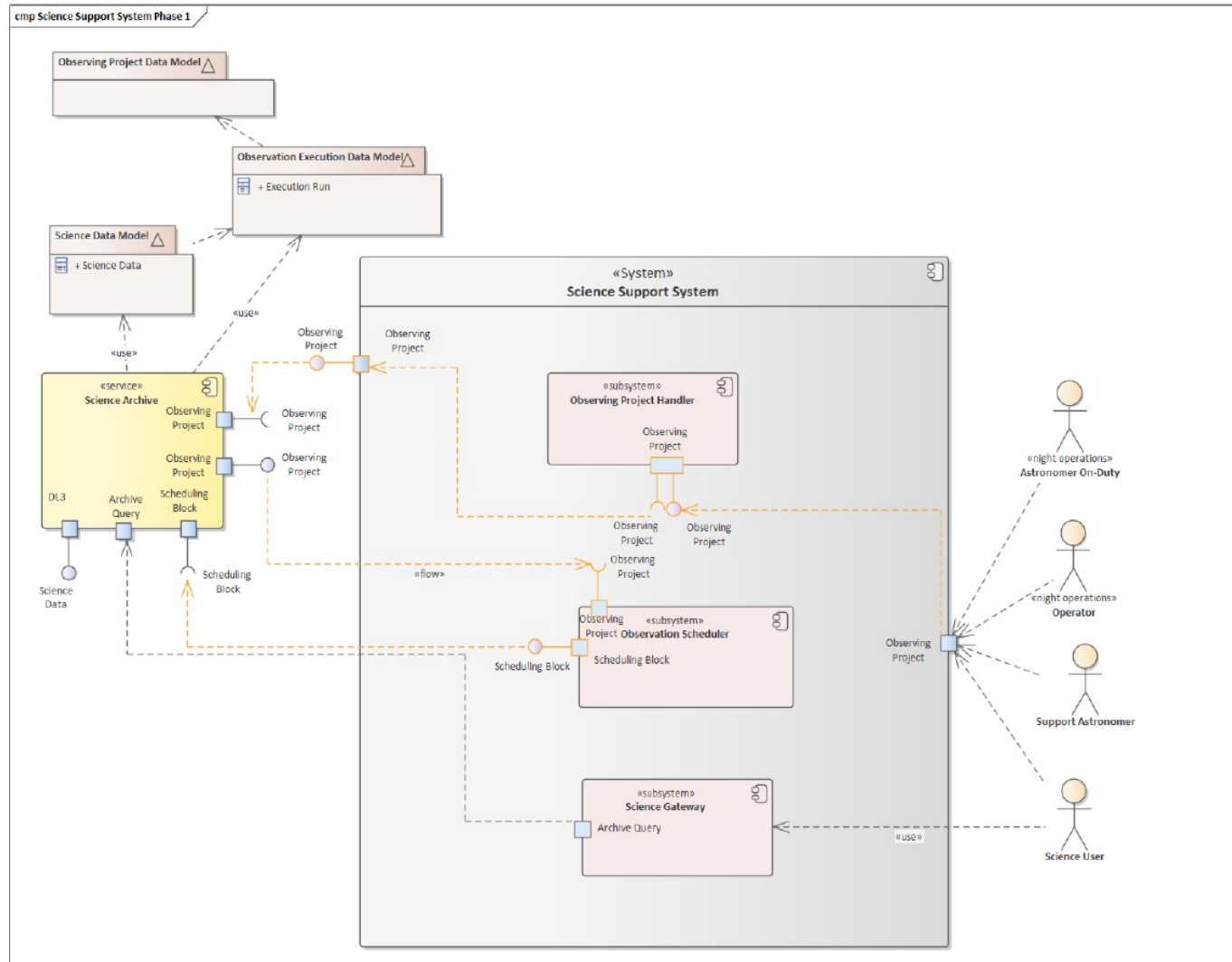
Operation SW deployment



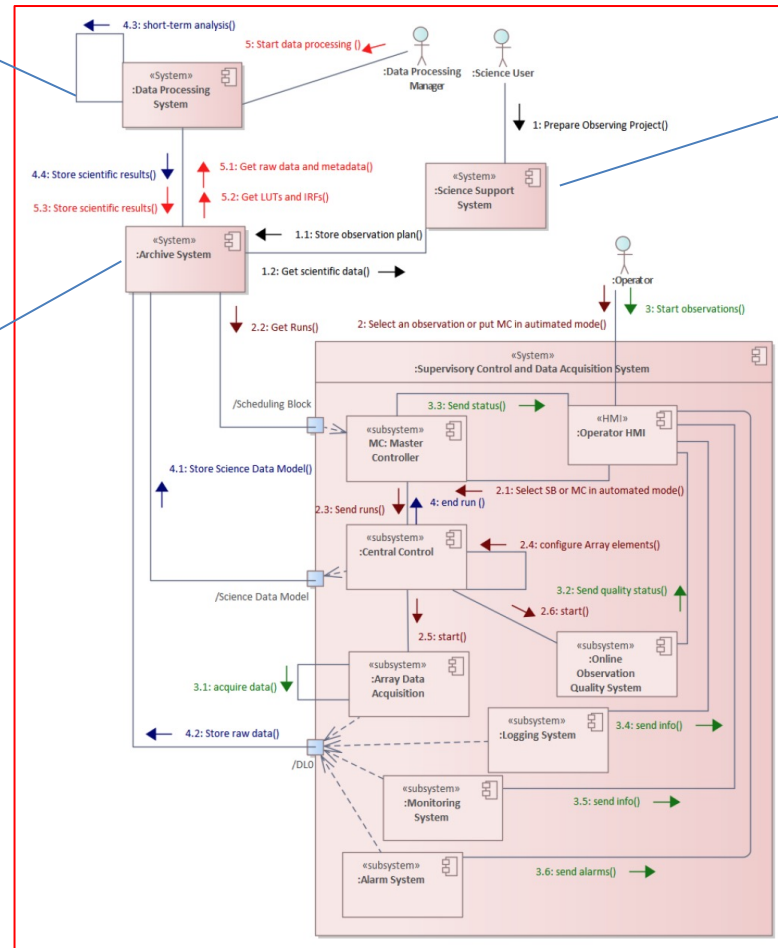
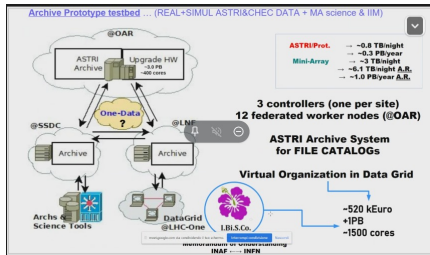
Science operation principles

- Night Science operations will be controlled from the remote control room located in La Laguna @ IAC.
- During the first 3 years of operations the ASTRI MA will be run as an experiment (Phase I). After this initial period the ASTRI MA probably will move towards an observatory model with a fraction of time made available to the community (Phase II).
- In Phase I the ASTRI MA observing time will be dedicated to a limited number of programs with clearly defined by the ASTRI Science team (see Stefano and Andrea talks).
- Target of Opportunity observations of interesting target will be managed manually (reaction time can be of order of hours or longer)
- Coordinated observations with other IACTs Telescopes, e.g. LST, MAGIC, HAWC et al., could be possible. In particular simultaneous LST, MAGIC and ASTRI MA observations could be possible and auspicated.
- No subarray operation is foreseen for the ASTRI MA.
- No real time analysis of the data is foreseen but only a data quality check. All data will be transferred (in quasi-streaming mode) for archiving and processing at the ASTRI Data Centre in Rome
- No array trigger (stereo trigger) will be implemented on-line. The search for multi-telescope triggers will be performed via software off-line at the Rome ASTRI Data Centre.

Observation Preparation/Dissemination

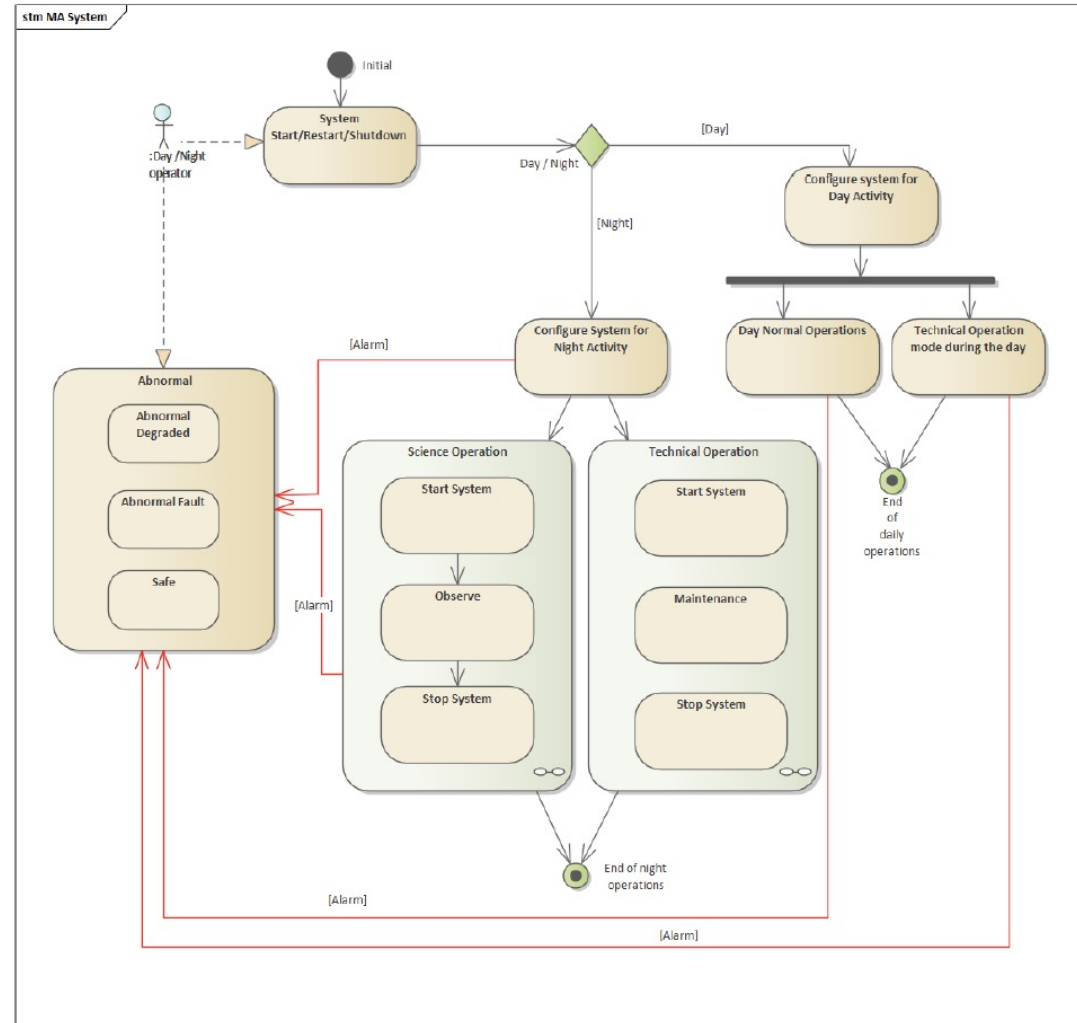


ASTRI
Mini-Array

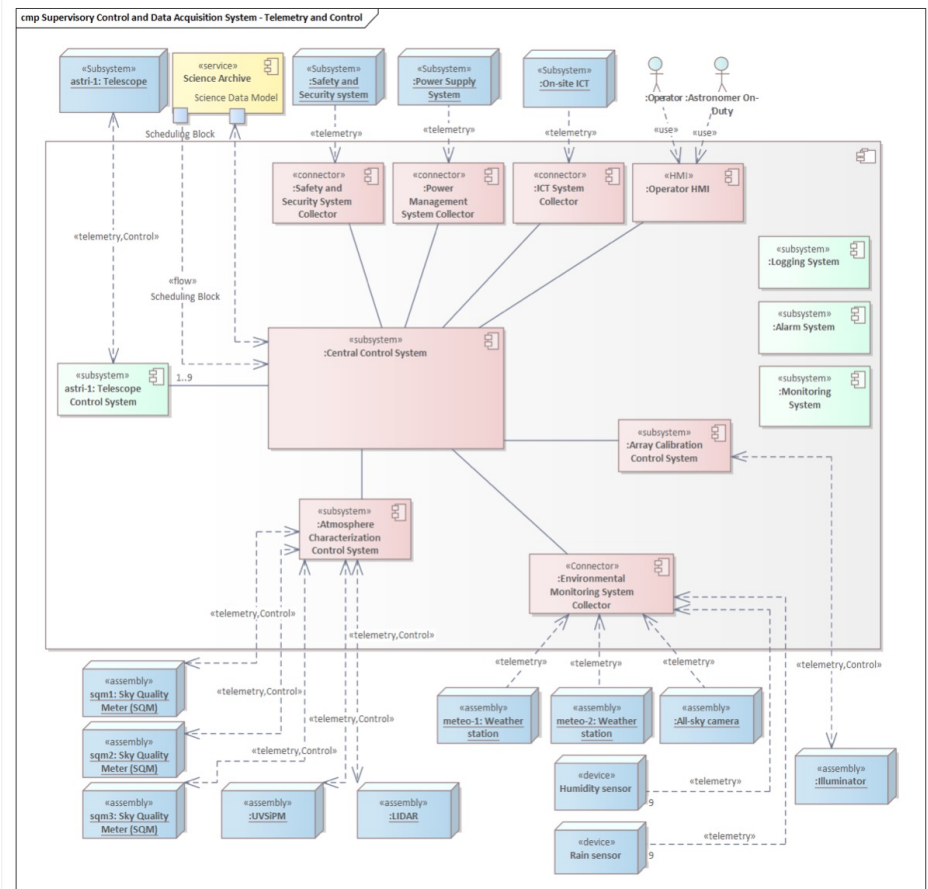
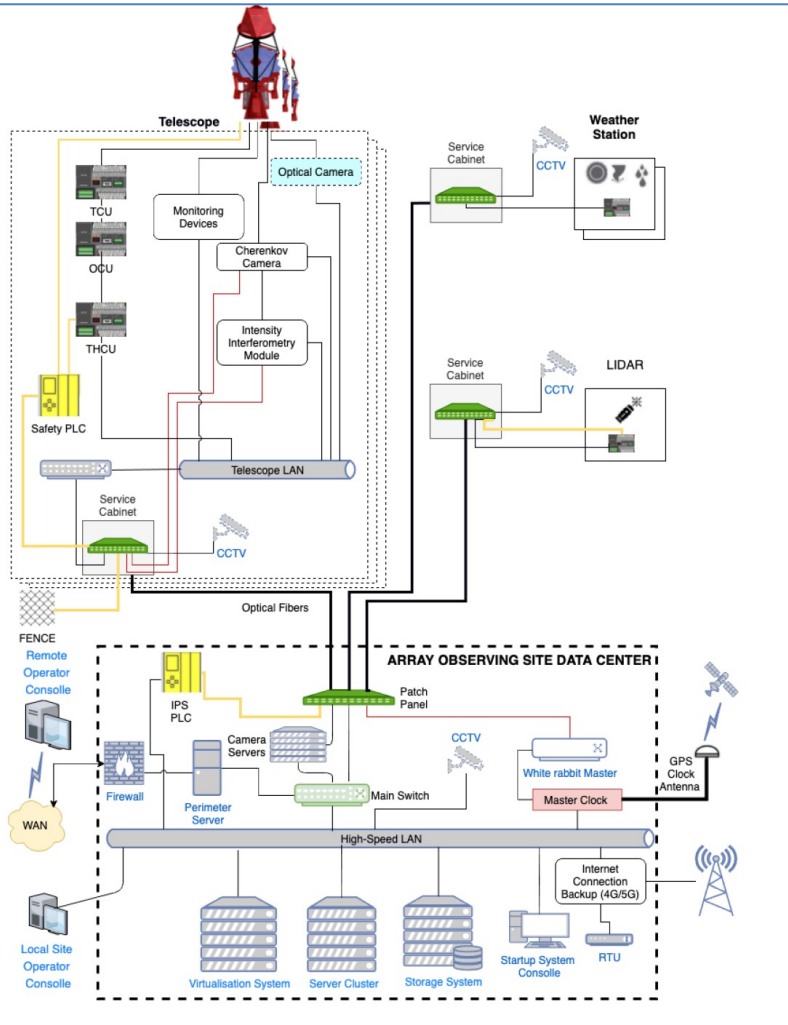


On-Site Operation Modes

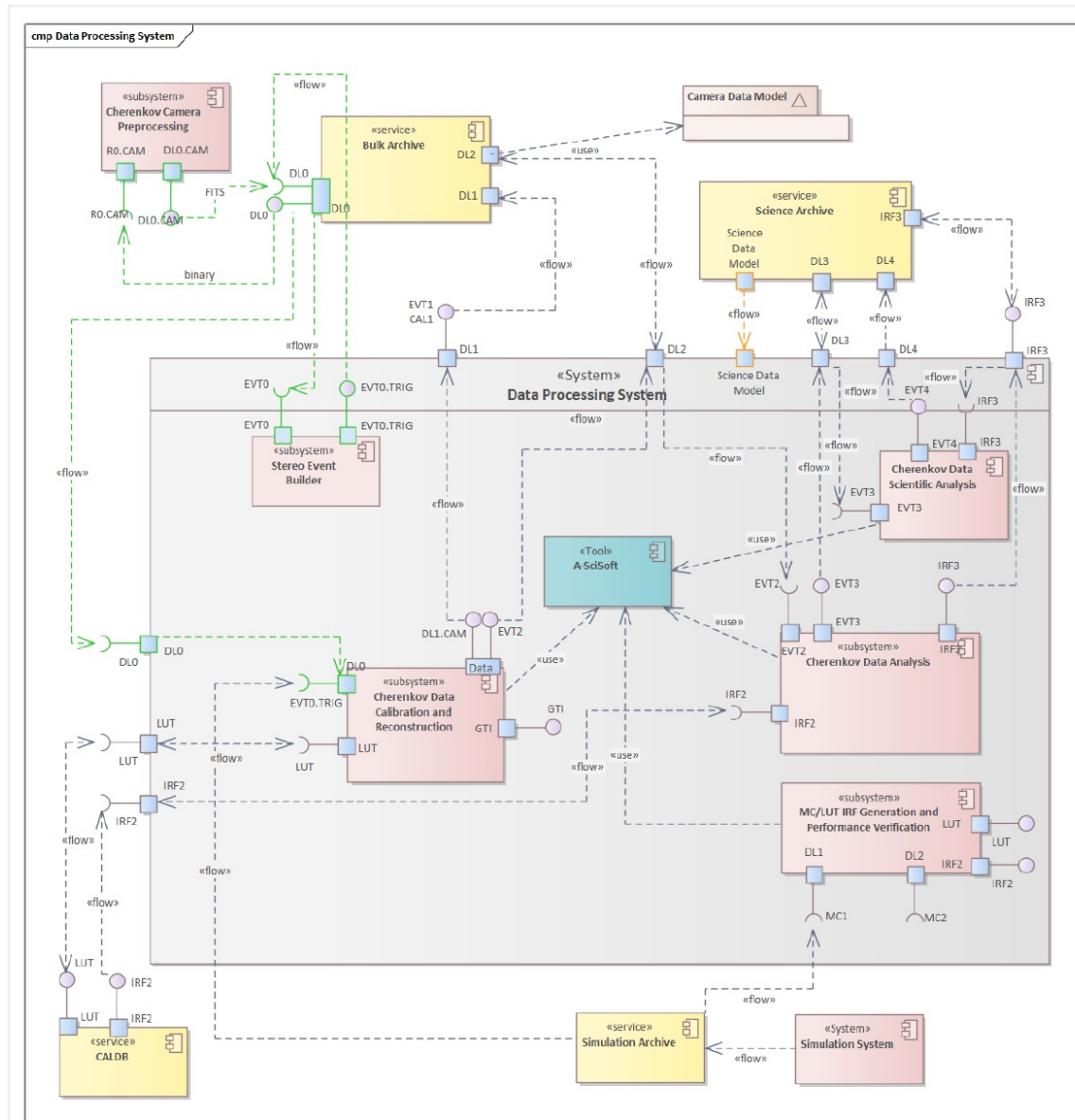
- **NIGHT:** normal/science operation of the ASTRI MA, no persons are foreseen on site at the Teide Observatory.
- **DAY:** maintenance operations, during daytime, 2 to 3 persons will be present on site occasionally.



The On-site Array Control & Data Acquisition System

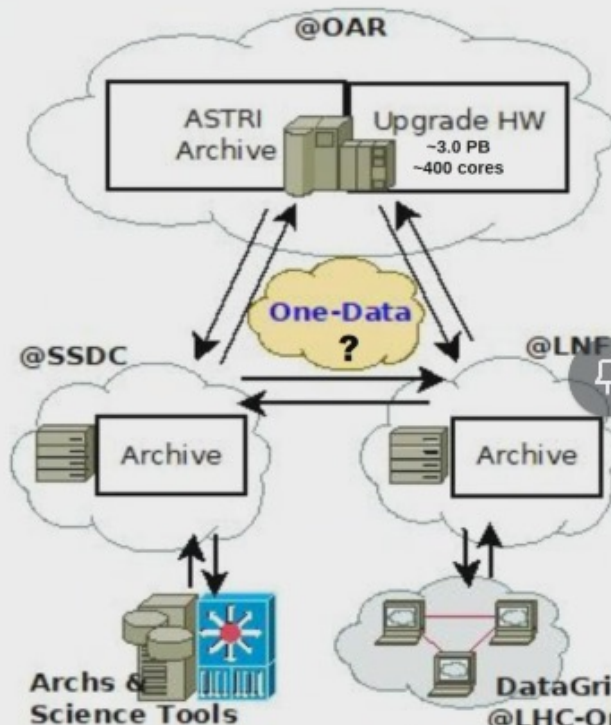


Data Processing



Off-Site : Archive

Archive Prototype testbed ... (REAL+SIMUL ASTRI&CHEC DATA + MA science & IIM)



ASTRI/Prot. → ~0.8 TB/night
→ ~0.3 PB/year
Mini-Array → ~3 TB/night
→ ~6.1 TB/night **A.R.**
→ ~1.0 PB/year **A.R.**

3 controllers (one per site)
12 federated worker nodes (@OAR)

**ASTRI Archive System
for FILE CATALOGs**

Virtual Organization in Data Grid

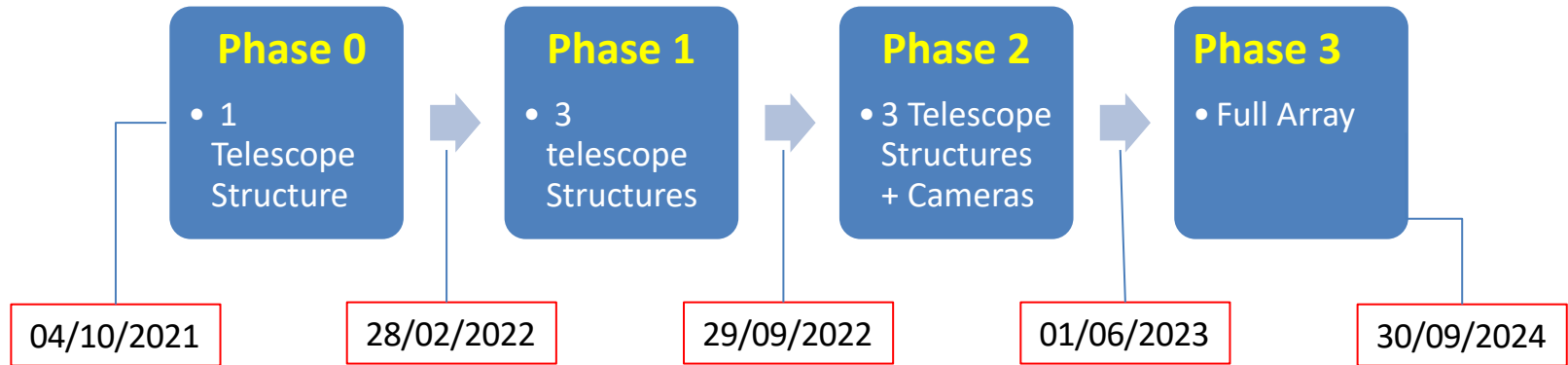


~520 kEuro
+1PB
~1500 cores

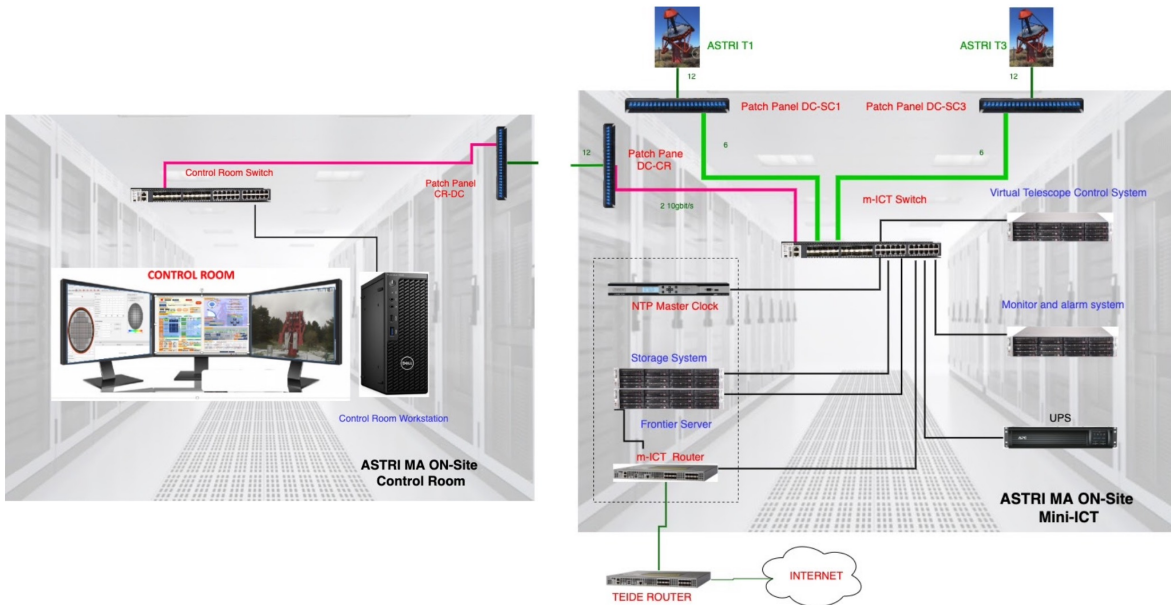
meet.google.com sta condividendo il tuo schermo. Interrompi condivisioni Nascondi

memorandum of understanding
INAF ↔ INFN

Implementation Phases



The On-site Operations (Telescopes+SW) will be implemented incrementally



Questions?