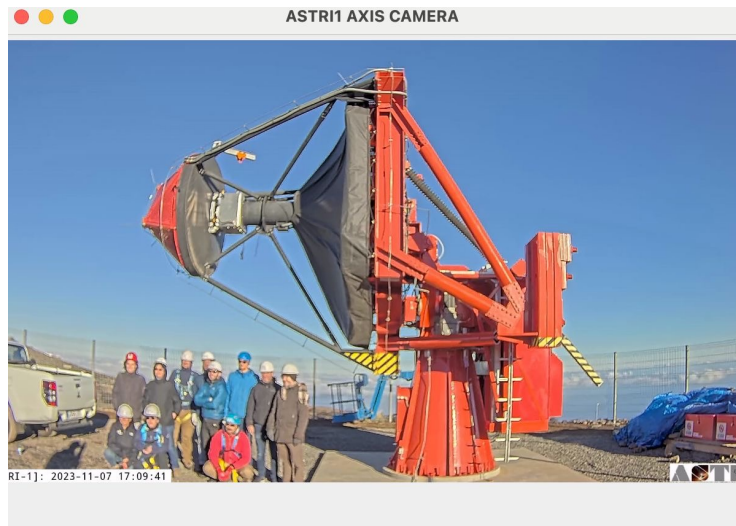


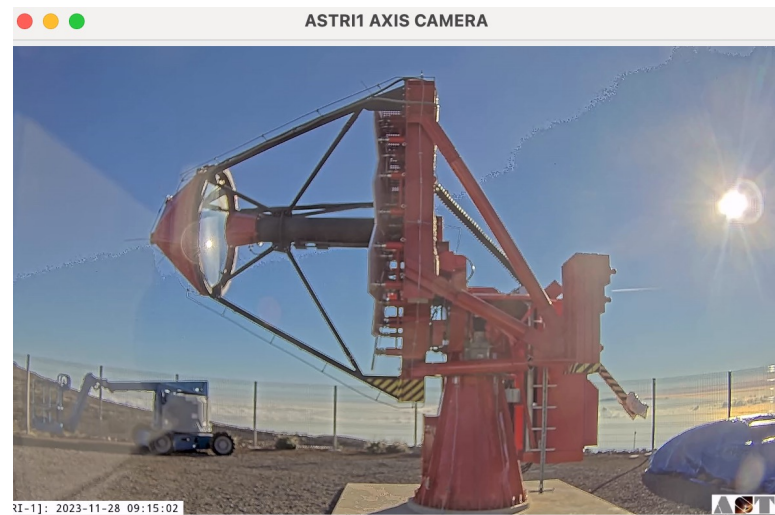
The SST Structure SW Architecture(including LCS Sw)

G. Tosti 19/02/2024

SST: ASTRI Mini-Array → SST



SST Camera Engineering Model
mounted on ASTRI 1

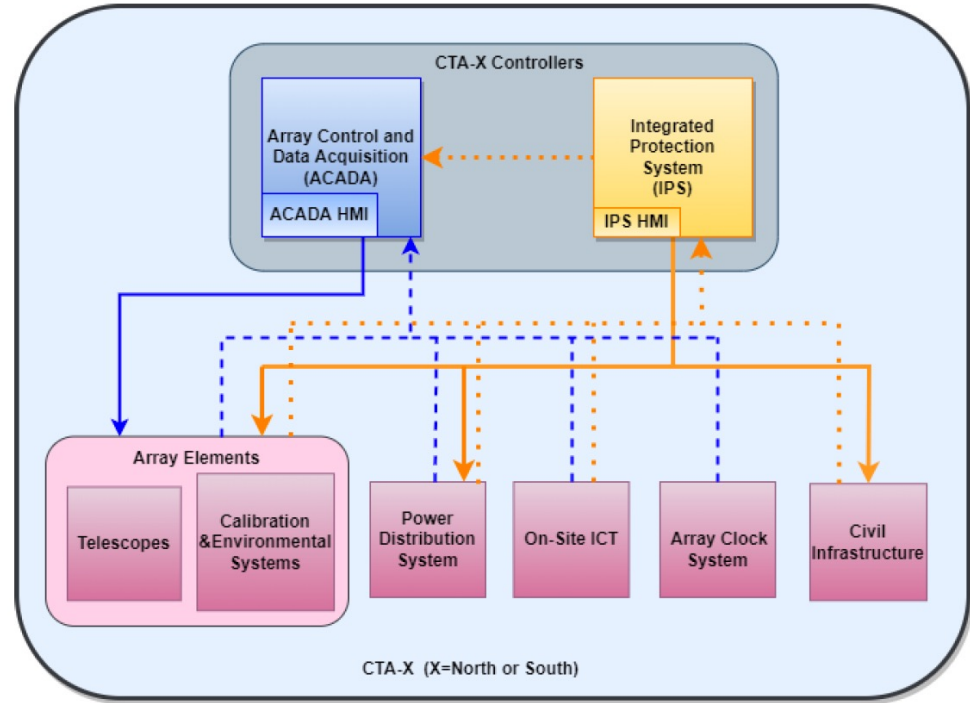


SST Equipped with the Optical Camera

CTAO Control Systems

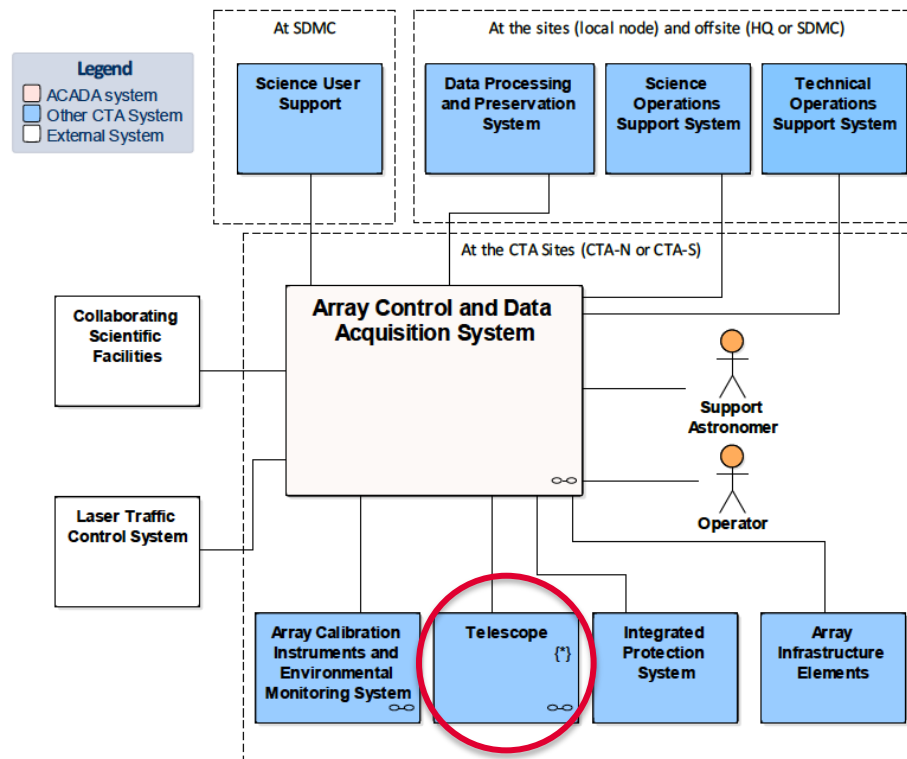
ACADA manages the control functions (blue line) and provides the service for monitoring and display of the non-safety related parameters (blue dashed lines) of the controllable items.

The **IPS** takes care of the site interlocks and safety and security functions of the controllable items (orange line), together with the acquisition and display of the safety-related parameters of the controllable items.



ACADA

ACADA is the Supervisory Control and Data Acquisition (SCADA) system of the scientific instrumentation at each CTAO array site.



ACADA Context diagram

ACADA Documents relevant for SST SW (partial list)



- CTA-DER-SEI-000000-0001_1a_DRAFT_CTA-Architecture.pdf
- CTA-SPE-OSO-000000-0001_1b_Top-level Data Model.pdf
- CTA-TRE-COM-303000-0001_3a_ACADA Architecture Design.pdf
- CTA-TRE-COM-003000-0001_4a_ACADA_Use_Cases.pdf
- CTA-STD-ACA-303000-0003_1b_ACADA standardized development environment_released.pdf

- CTA-ICD-SEI-000000-0004_1b_ICD for ACADA - Array Element Monitoring.pdf
- CTA-TRE-SEI-000000-0019_1a_CTAO Alarm System Concept.pdf

- CTA-SPE-TEL-000000-0001_2h_Generic Telescope State Machine.pdf
- CTA-TRE-SEI-000000-0015_2i_Generic Telescope Use Cases.docx

- CTA-ICD-SEI-000000-0005_1b_ACADA - Array Element Logging ICD.pdf
- CTA-ICD-SEI-000000-0048_1a ACADA - SST Monitoring ICD_DRAFT01.docx
- CTA-ICD-SEI-000000-0028_1a ACADA-AE Configuration ICD.pdf
- CTA-ICD-SEI-000000-0002_2l_ICD for ACADA - Generic Telescope Control.pdf
- CTA-ICD-SEI-000000-0012-1b_ACADA Telescope Camera Event and Timestamping ICD_signed.pdf

- CTA-ICD-SEI-000000-0035_1a_ARRAY CLOCK SYSTEM TO TEL ICD_.pdf
- CTA-INS-SEI-000000-0027_1 DRAFT 01c IPS-telescope ICD.docx

Useful references:

- CTA-PLA-ACA-303000-0010_ACADA REL1-LST1 Integration and Test Plan_1a.pdf
- CTA-ICD-SEI-000000-0039_1a ACADA - LST Monitoring ICD_released.pdf

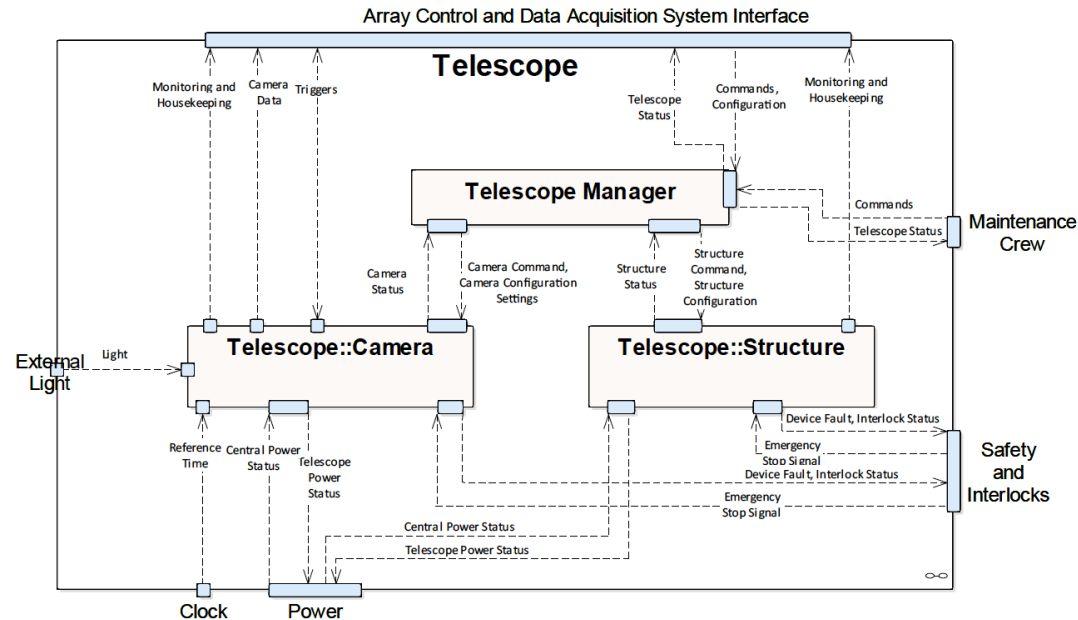
Context: ACADA/CTAO Documents

Control Systems:

- CTA-STD-SEI-000000-0004-1a_CTAO_System_Control_Standards.pdf
- CTA-TRE-SEI-000000-0016-1a Control Concept.pdf
- CTA-TRE-SEI-000000-0017-1a Development Guidelines.pdf
- CTA-CRE-SEI-000000-0031_1a_Changes related to the Control Concept Release 1.pdf (impacts some ACADA documents related to Telescopes)

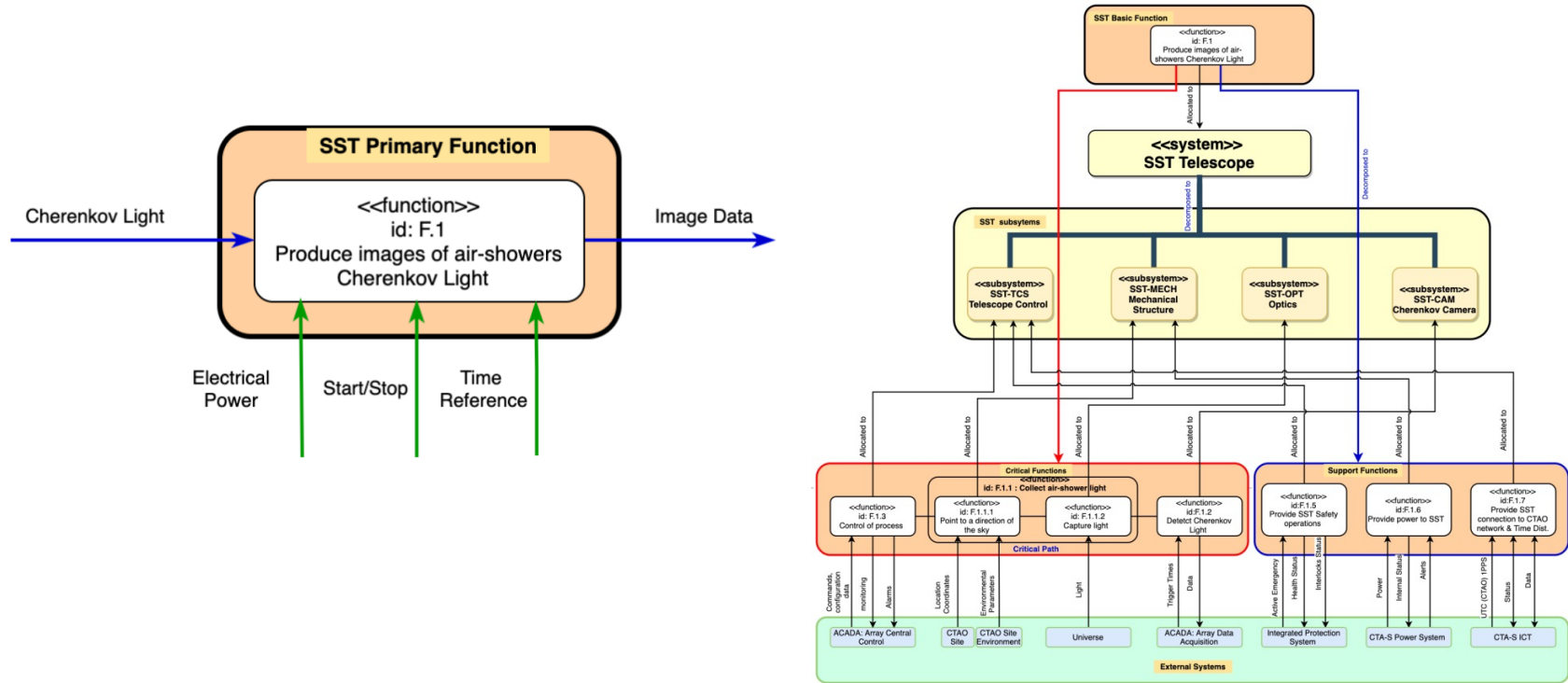
SST: Software Overview

- The SST Telescope Control System (TCS) is responsible for coordinating all telescope assemblies.
 - starting up, configuring, and shutting down the assemblies of the Telescope;
 - Supervising:
 - optical system control,
 - telescope mount control
 - instrument control (Cherenkov Camera)



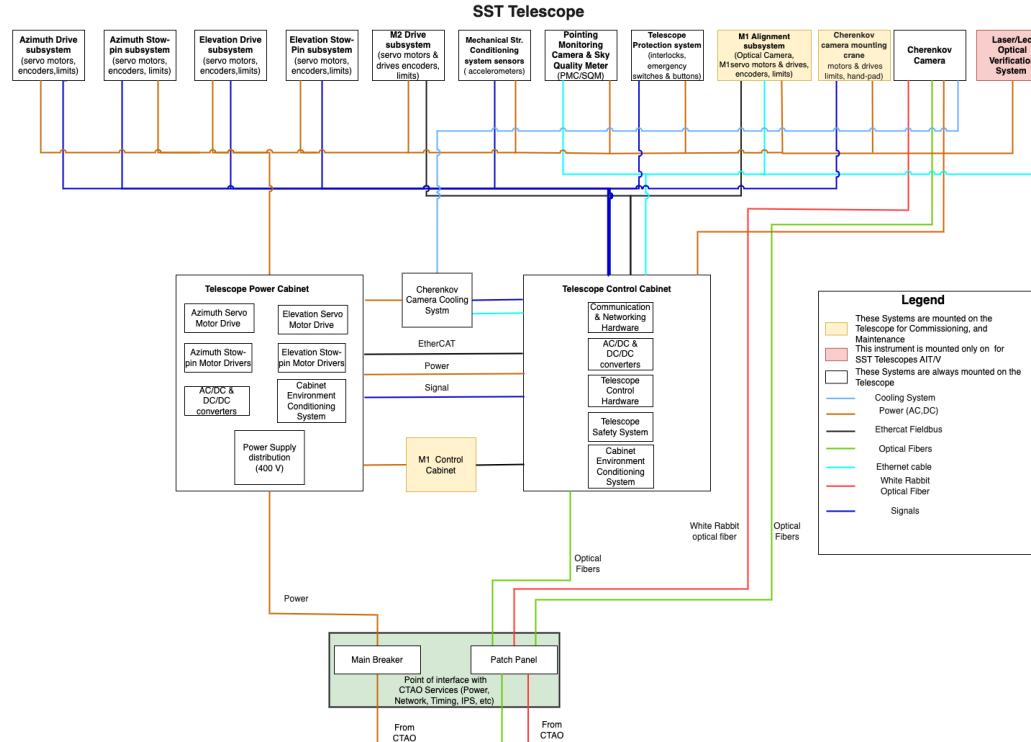
CTA-DER-SEI-000000-0001_1a_DRAFT_CTA-Architecture.pdf

SST Functional Architecture



SST: SST HW Architecture

However the TCS is only a Fraction of all the SW needed to develop, verify and make the system able to operate under ACADA, IPS Control.



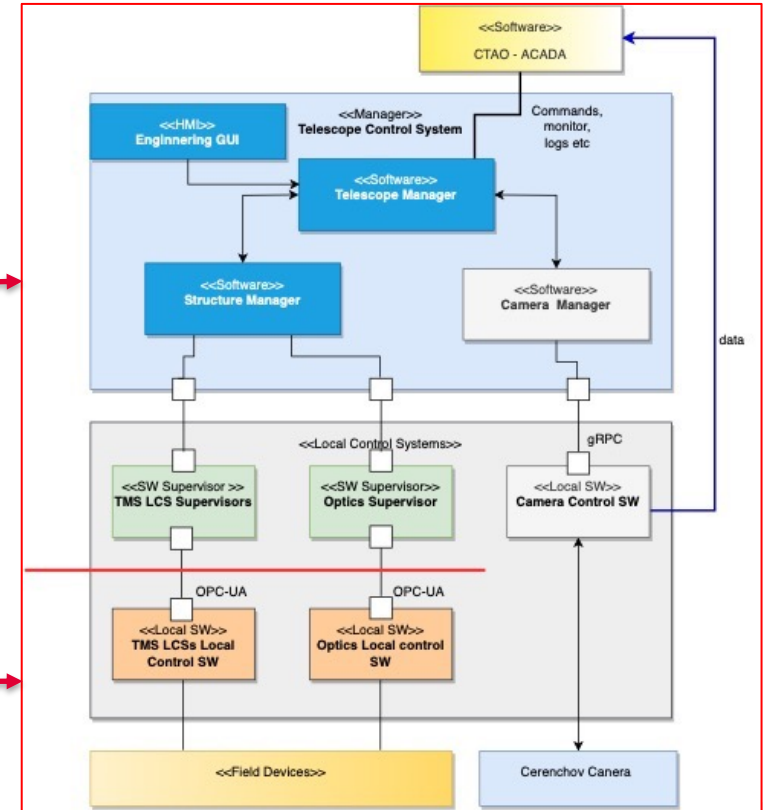
SST: Software Overview

- The SST Telescope Control System (TCS) is responsible for coordinating all telescope assemblies:
 - starting up, configuring, and shutting down the assemblies of the Telescope;
 - Manages the Operation Modes and States
 - Supervises:
 - optical system control,
 - telescope mount control
 - instrument control (Cherenkov Camera)

SST Team
responsibility

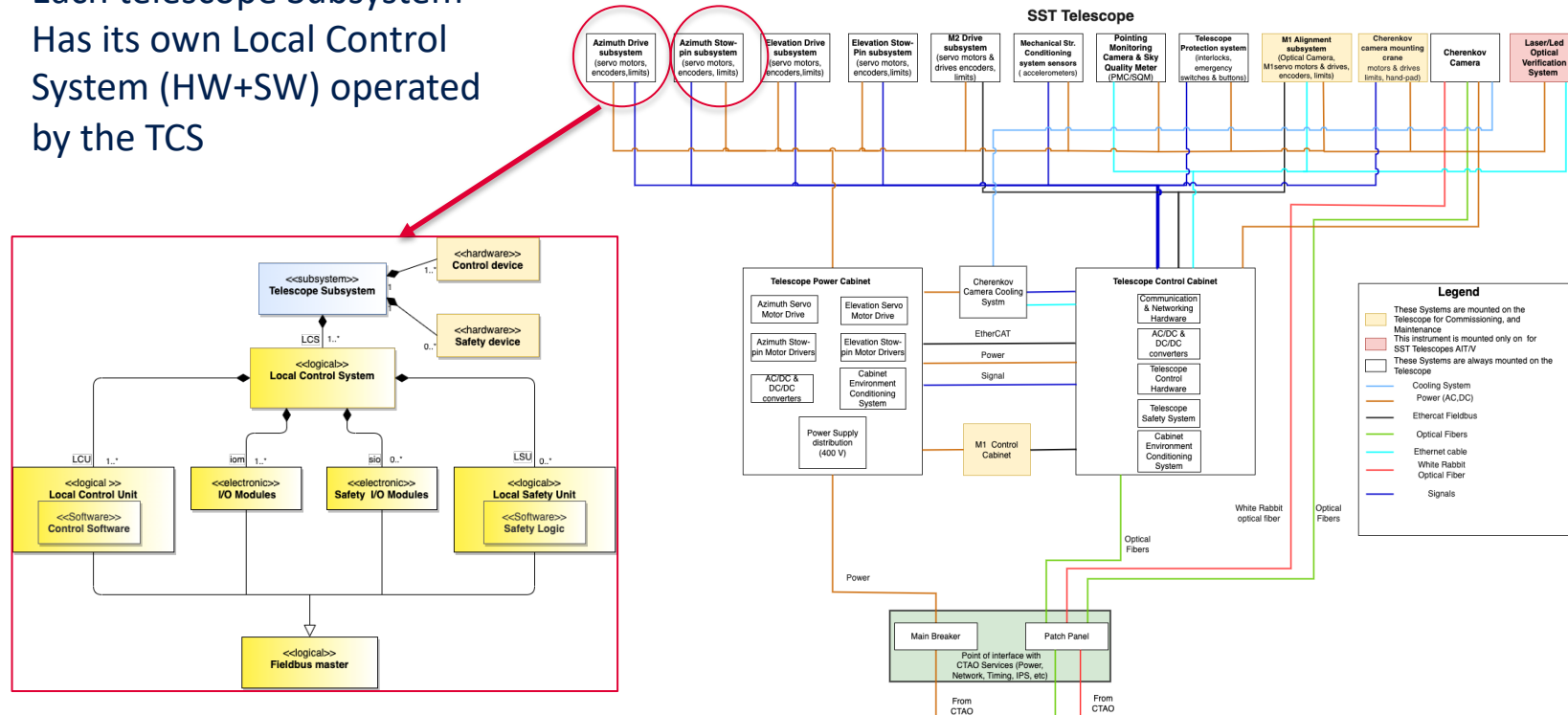
SST Team/Contractors
responsibility

Local Control Systems

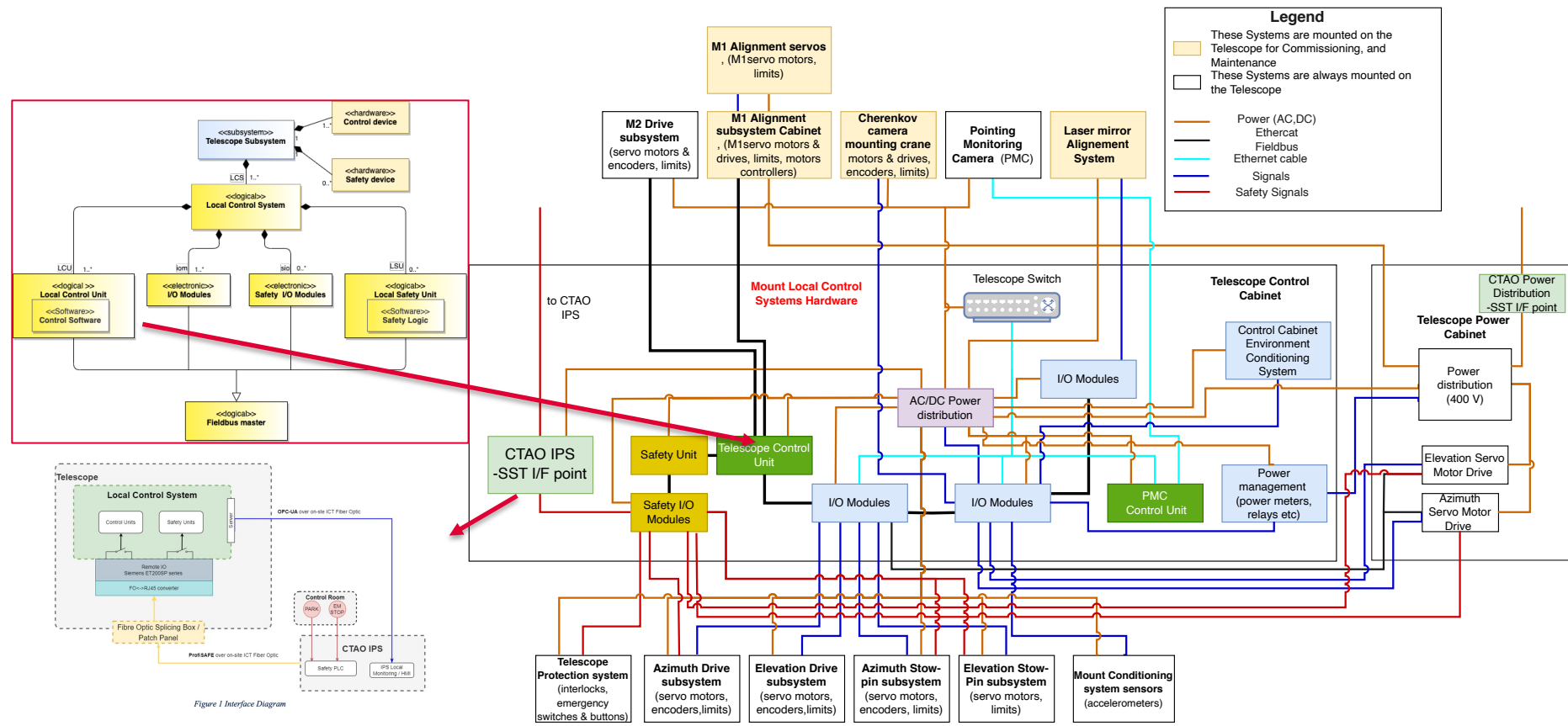


SST: SST HW Architecture & Local Control systems

Each telescope Subsystem
Has its own Local Control
System (HW+SW) operated
by the TCS



SST Structure Local Control Systems Details



SST Telescope Use cases

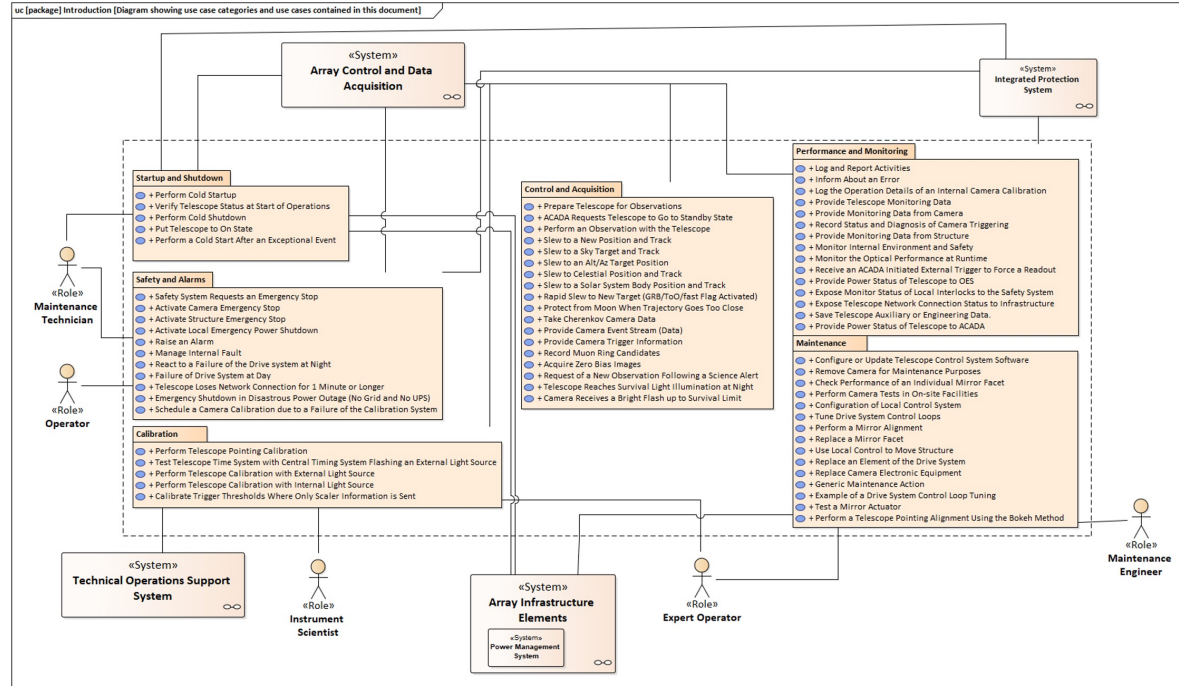
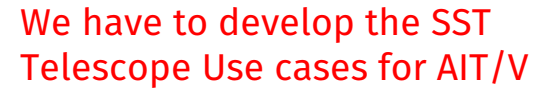
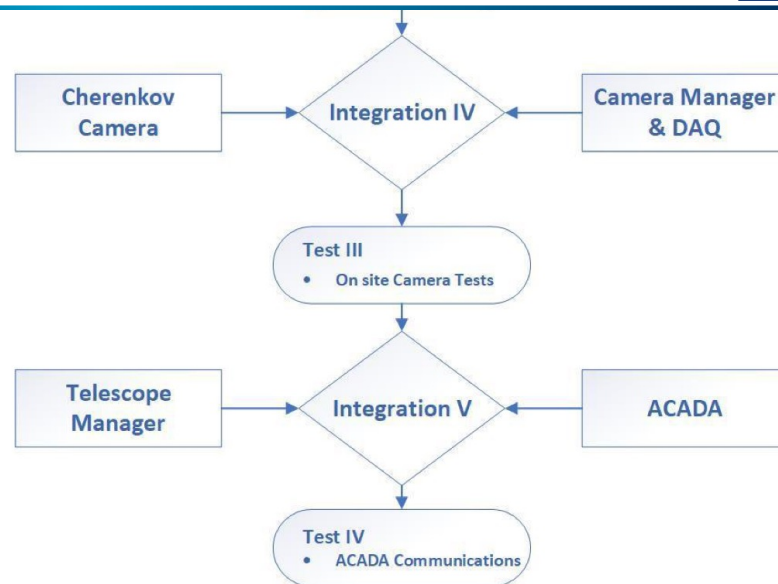
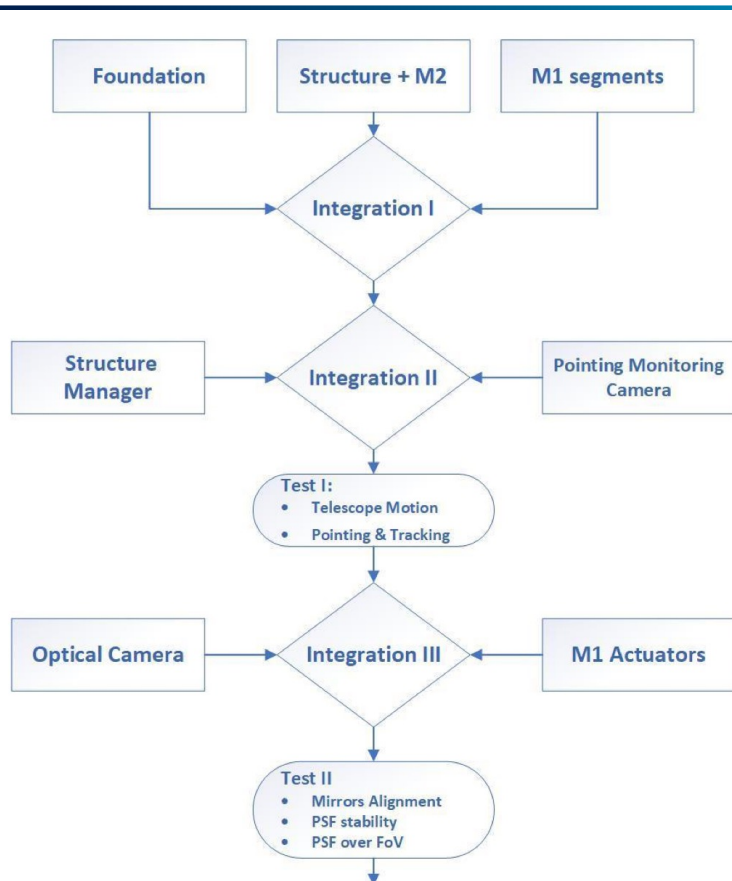


Figure 1: Diagram showing use case categories and use cases contained in this document. The use cases have been grouped into categories that illustrate their main purpose. In addition, the relevant Actors (both human as well as surrounding systems) are shown. If the Actors takes part in the use case this is indicated with a link of Actor to the use case category.

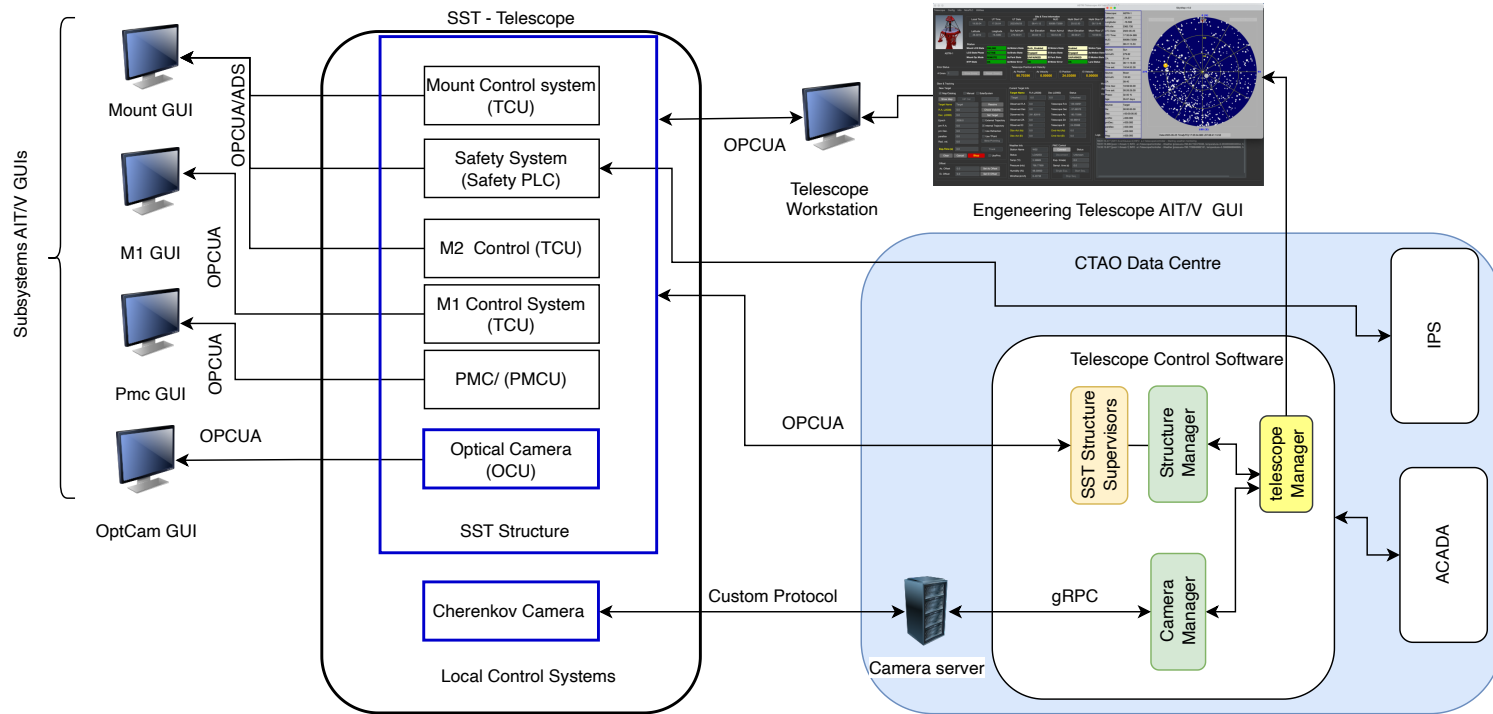


On Site AIV: Key Steps



We have to develop the SST Telescope Use cases for AIT/V

SST: SST SW High Level Architecture



- TCS Requirement specifications
- SW Quality Plan
- TCS Development and Verification plan
- TCS Architecture and Design Report
- Use Cases