

# Cosylab Switzerland and SKA

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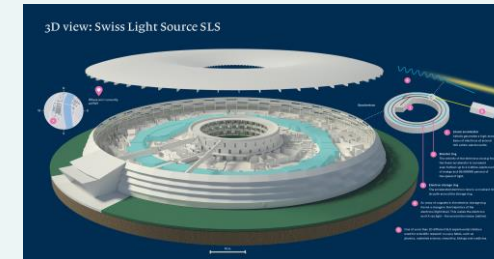
# About Cosylab

# Cosylab at a glance

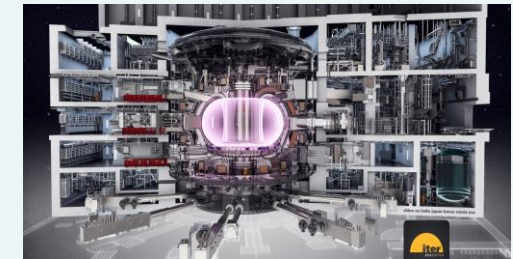
- World's leading provider of **software solutions** for the planet's most complex, precise, and advanced systems for **20+ years**
- Cross-functional team of **300+ highly skilled engineers, physicists, and domain experts**
- Established processes, **ISO and IEC**
- Highest credit rating **SB1 (AA by S&P)**
- HQ in Slovenia; subsidiaries **worldwide (Switzerland, Sweden, USA, China, Japan)**



# Cosylab SW is powering big physics infrastructure



PSI - Switzerland



ITER - France



CERN - Switzerland



ALMA - Chile



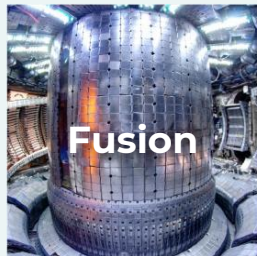
ESA EGC-CC



SKA - Worldwide

# What we do in Cosylab Switzerland?

## SCIENTIFIC



Fusion

Research  
Facilities



SCADA  
Systems

## INDUSTRIAL

Start ups

Medical  
Services



Radiation  
therapy

## MEDICAL

Device  
Manufacturers



Accelerators

Space &  
Astronomy



Enterprises



Complex  
Machines



Quantum  
Technology



Complex  
Medical  
Devices



Medical  
Products

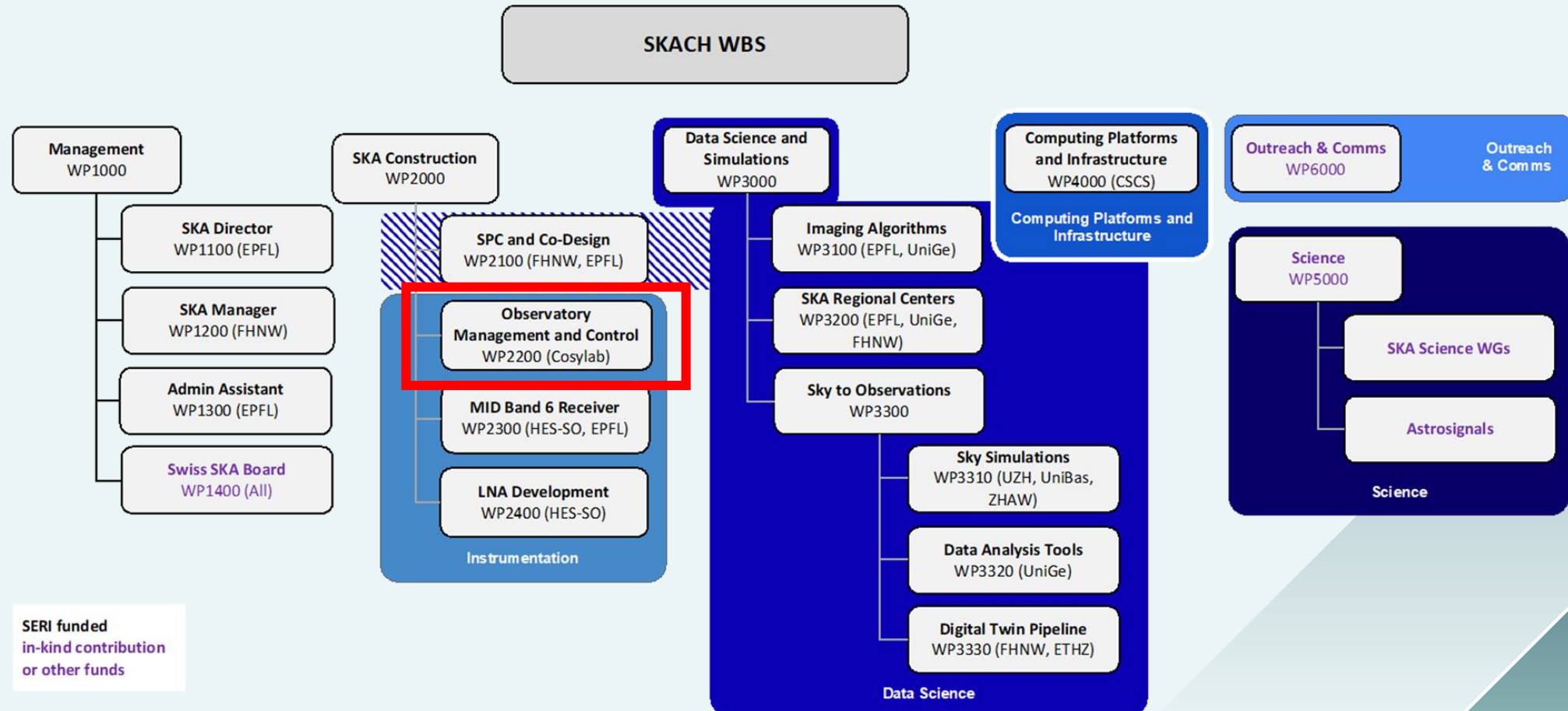


Device  
Manufacturers



# Cosylab at SKA

# Observation Management and Control

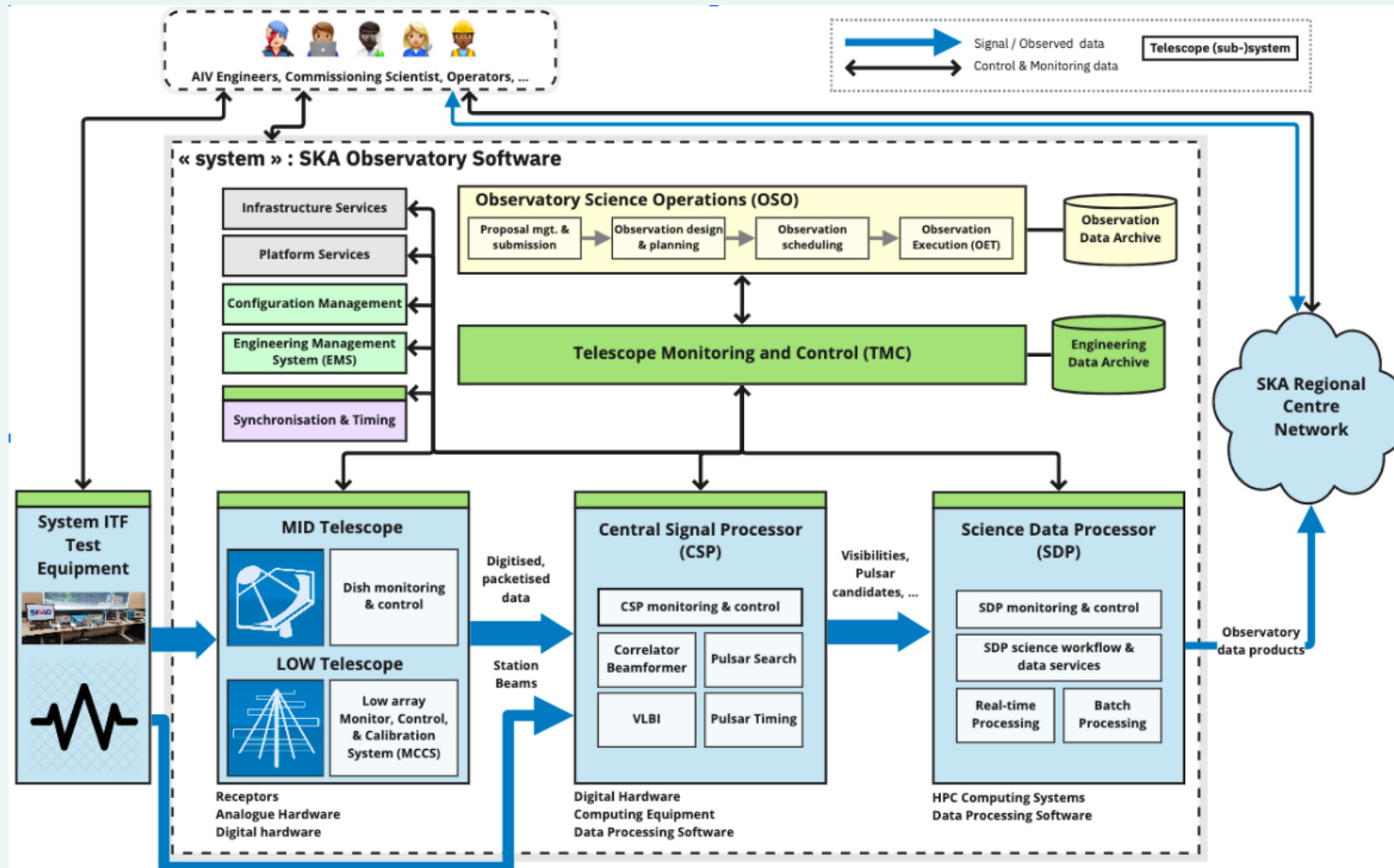


# Cosylab at SKA

## Past and Current state

- Contribution through EPFL/SERI - Bridging phase (June 2021 – May 2022)
  - 2 FTEs funded by EPFL/SERI
- Contribution as an **independent Software Supplier** of SKAO - Framework agreement
  - 2 FTEs directly funded by SKAO from May 2022 – present
  - Switzerland joining as a full time member Jan 2022
  - Planned budget for Cosylab to be consumed **until March 2024**

# SKA Software



Courtesy of Marco Bartolini (SKA Onboarding materials)

# Teams working on SKA Software



# Teams working on SKA Software



# Cream Team

- Lead by INAF in Italy (Florence Arcetri Observatory)
- Team Members
  - Italy: 5
  - Switzerland: 2
  - Portugal: 1
  - India: 1
  - UK: 1
- Cosylab Team
  - Ivana Novak
    - M.Sc Physics, Astronomy
    - 7 years of experience in control systems
  - Martino Colciago
    - M.Sc Automation Engineering
    - 13 years of experience in control systems
  - Alexander Söderqvist (former member)
    - M.Sc Electrical Engineering
    - 11 years of experience in control systems

- Focus on:
  - Central Signal Processor Local Monitoring and Control (**CSP.LMC**)
  - **Taranta**: tool for creating web-based engineering UIs
- Part of Observation Management and Control (OMC)
- Scaled Agile Framework (SAFe) practices

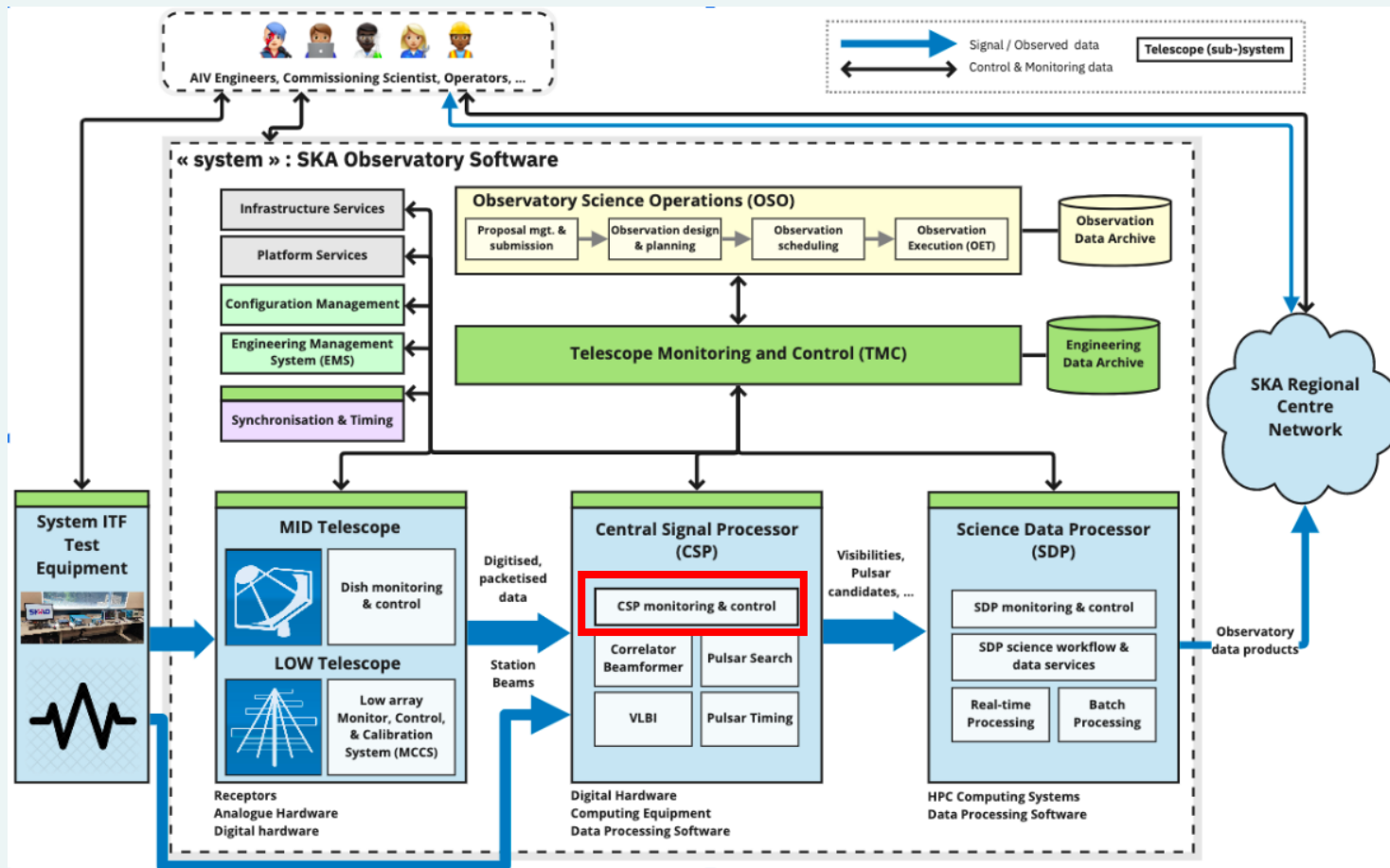


Observation  
Management and  
Control

Central  
Signal  
Processor

Local  
Monitoring  
Control

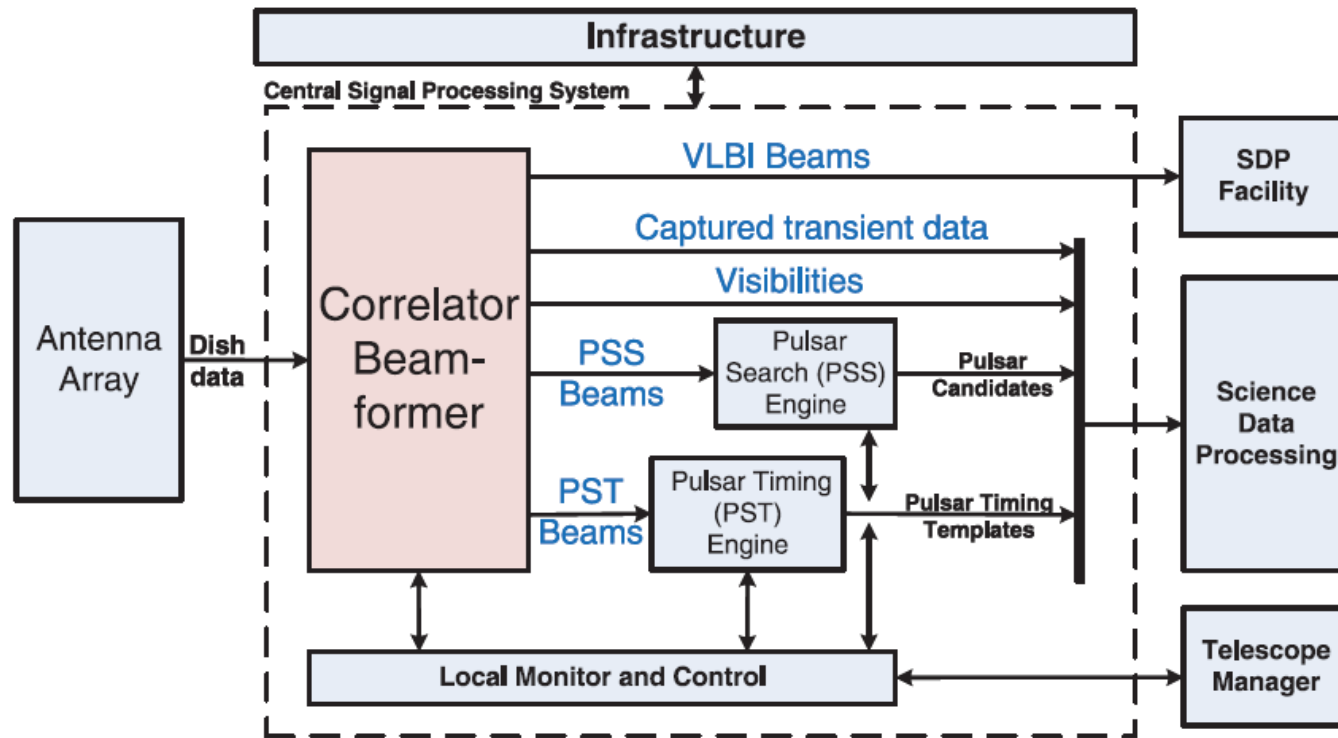
# SKA Software



**Central Signal Processor Local Monitoring and Control (CSP.LMC)** are the responsibility of the Cream Team

Courtesy of Marco Bartolini

# Central Signal Processor



29 August 2022

## Software design for CSP.LMC in SKA

G. Marotta, E. Giani, I. Novak, A. Söderqvist, C. Baffa

Author Affiliations -

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<sup>1</sup>INAF - Osservatorio Astrofisico di Arcetri (Italy)

<sup>2</sup>Cosylab Switzerland (Switzerland)

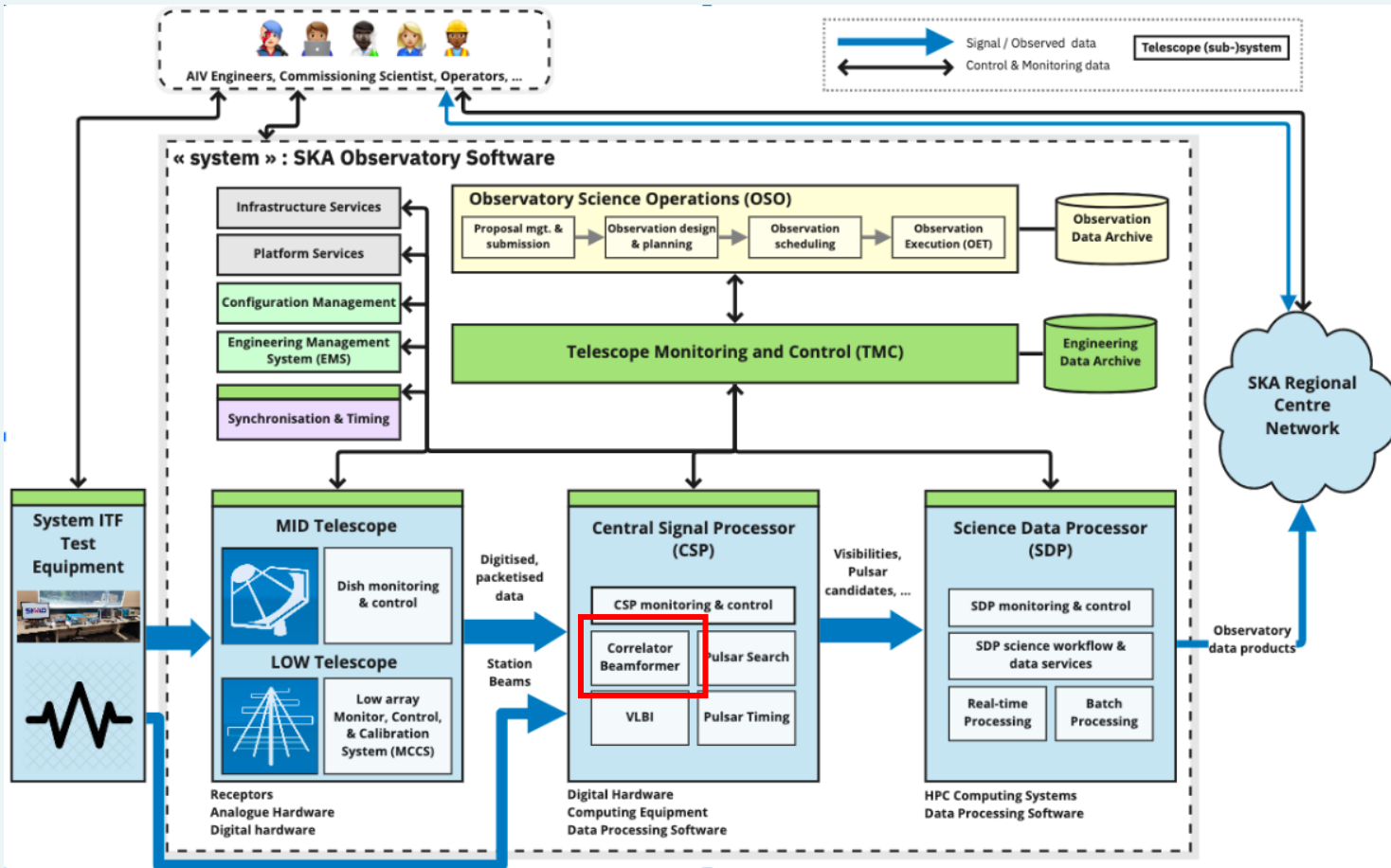
<sup>3</sup>Cosylab Switzerland (Switzerland)

[SPIE Article](#)

# Collaboration with other teams

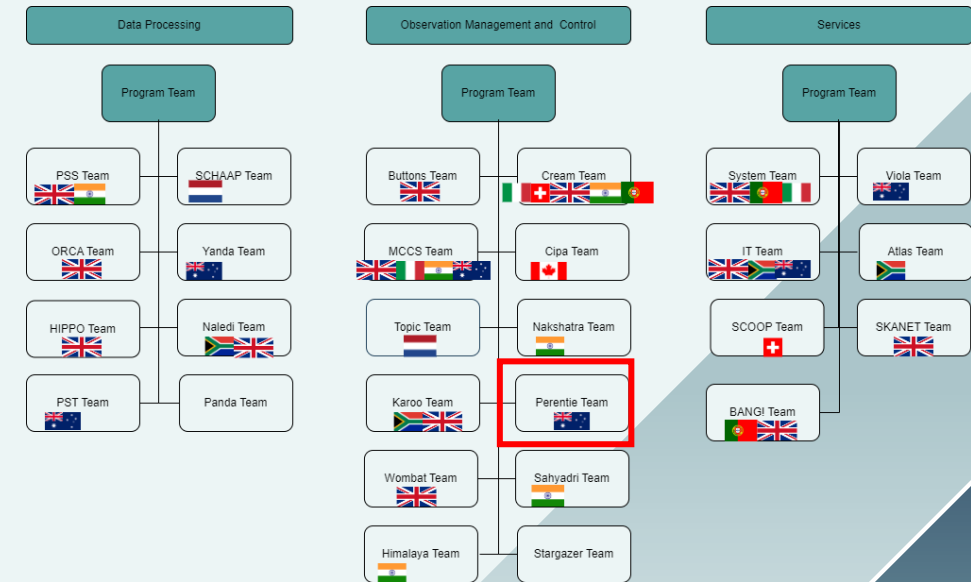
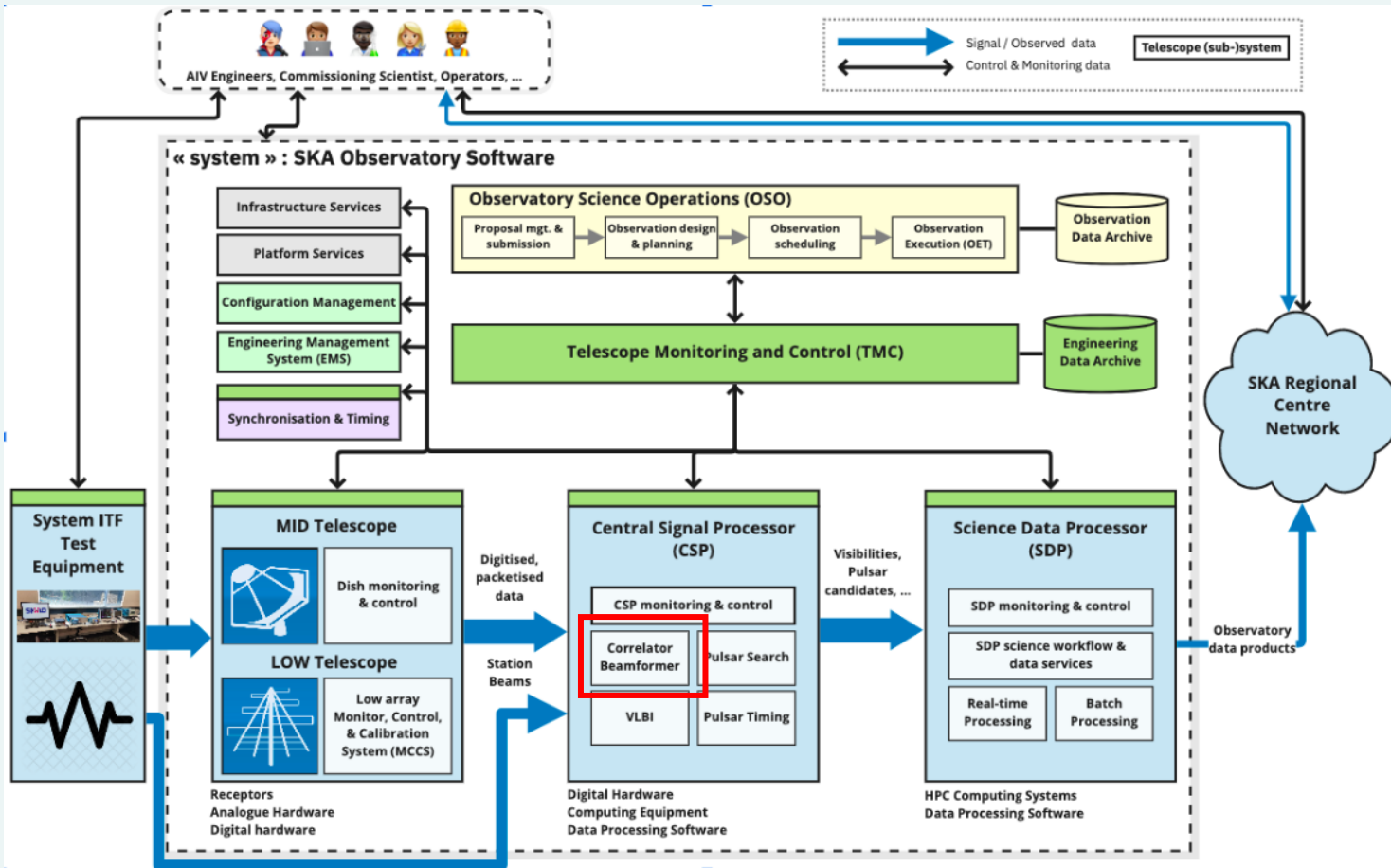


# Colaboration with other teams



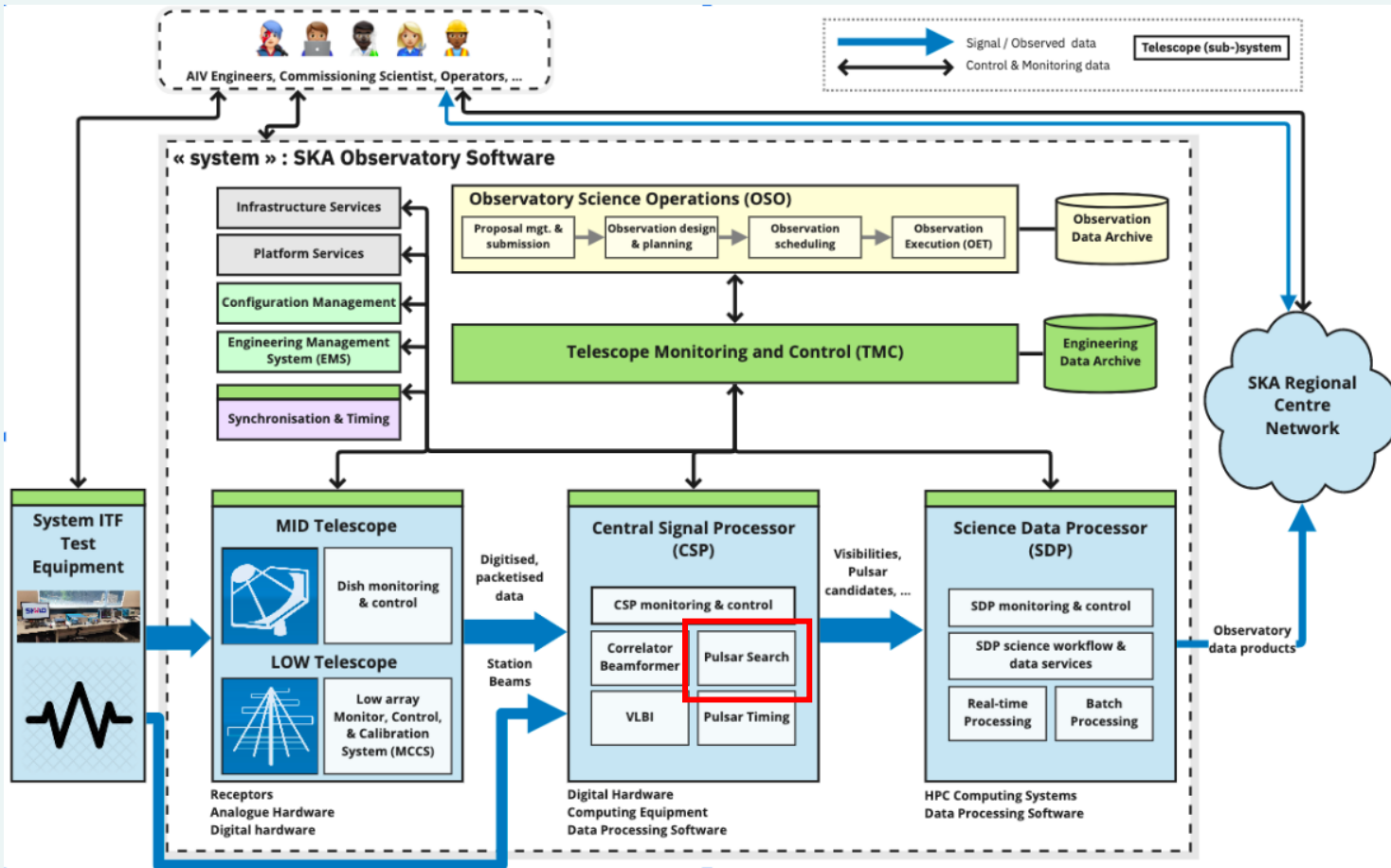
CIPA Team = responsible for Mid.CBF

# Colaboration with other teams



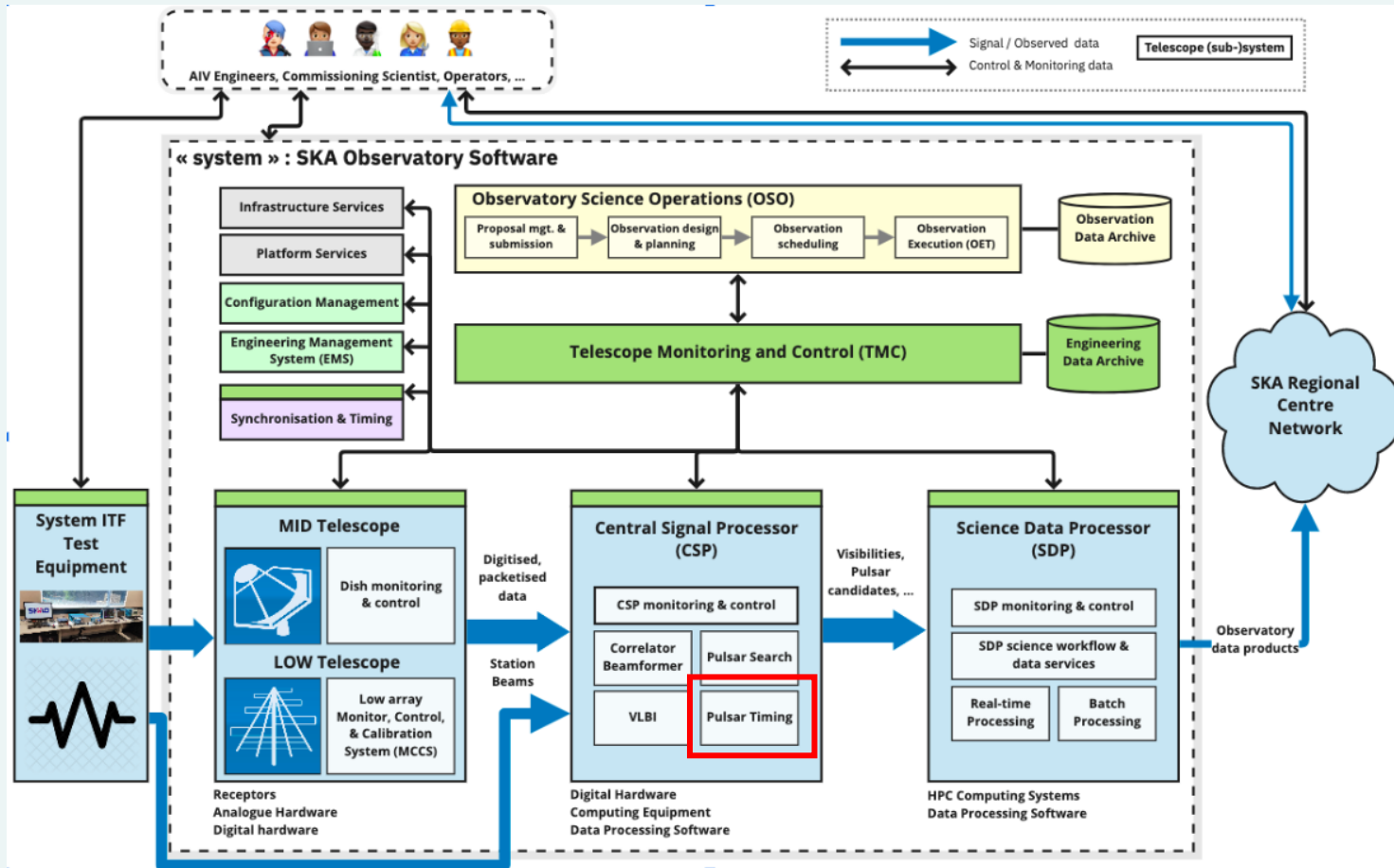
Perentie Team = responsible for Low.CBF

# Colaboration with other teams



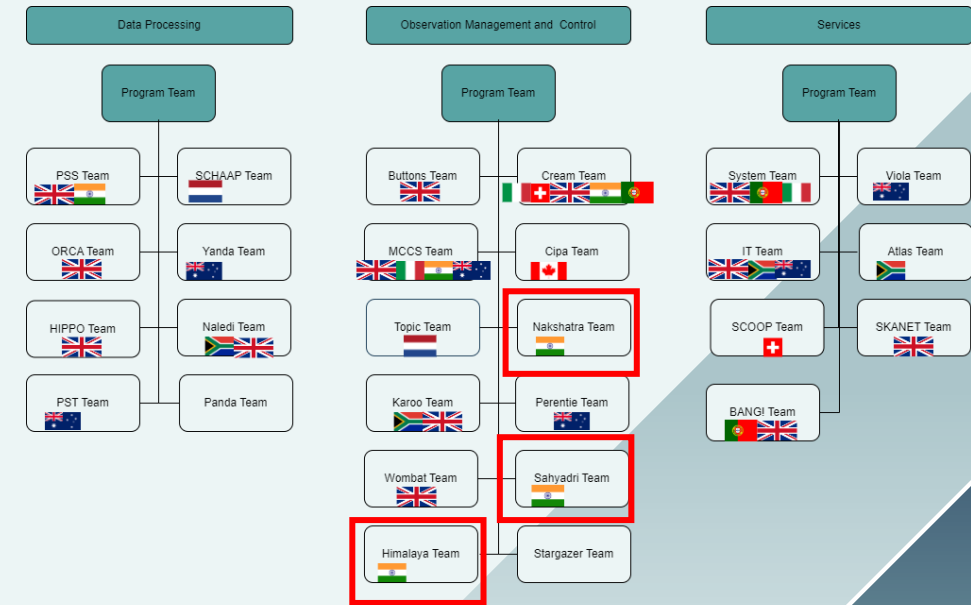
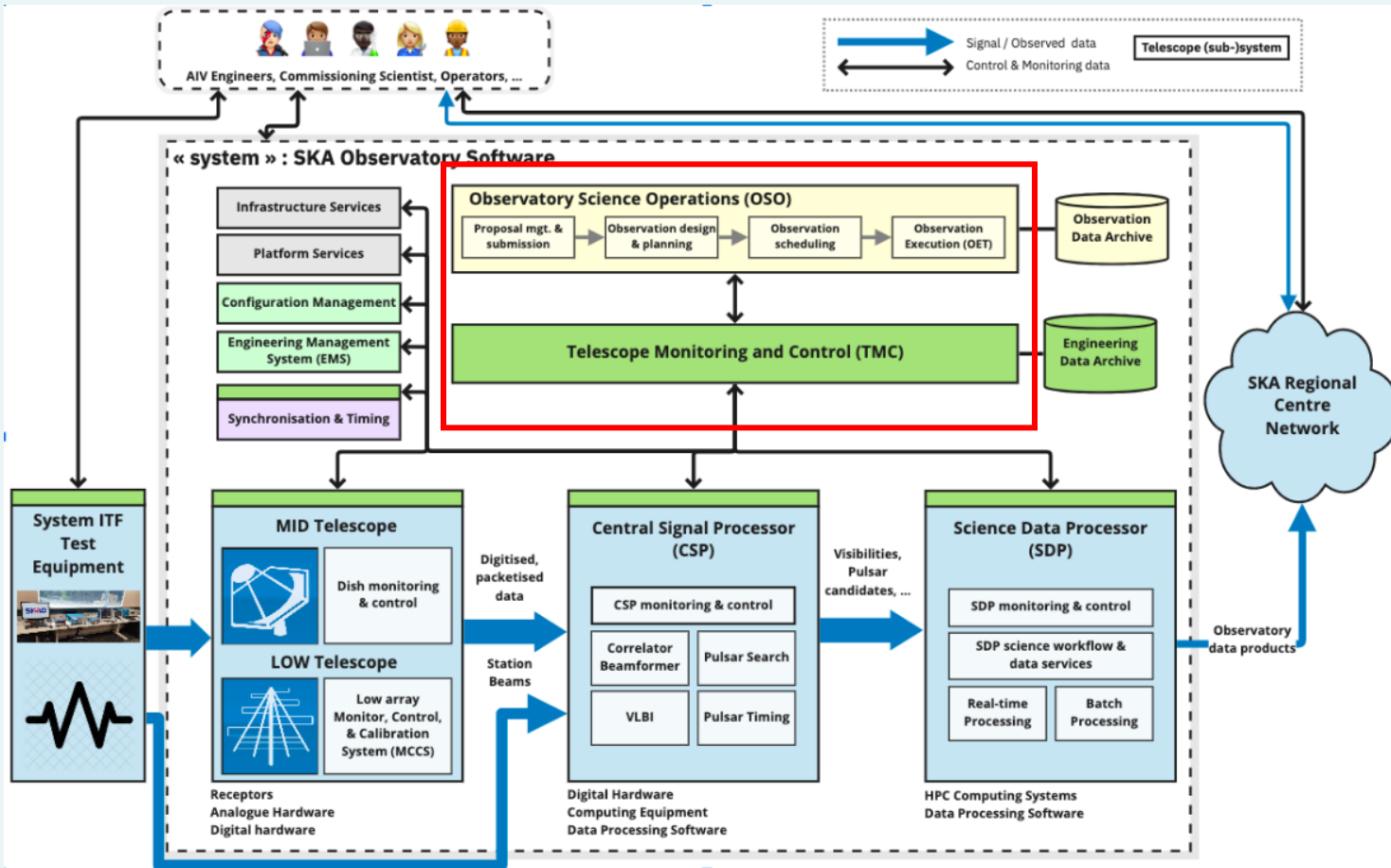
PSS Team = responsible for PSS component

# Colaboration with other teams



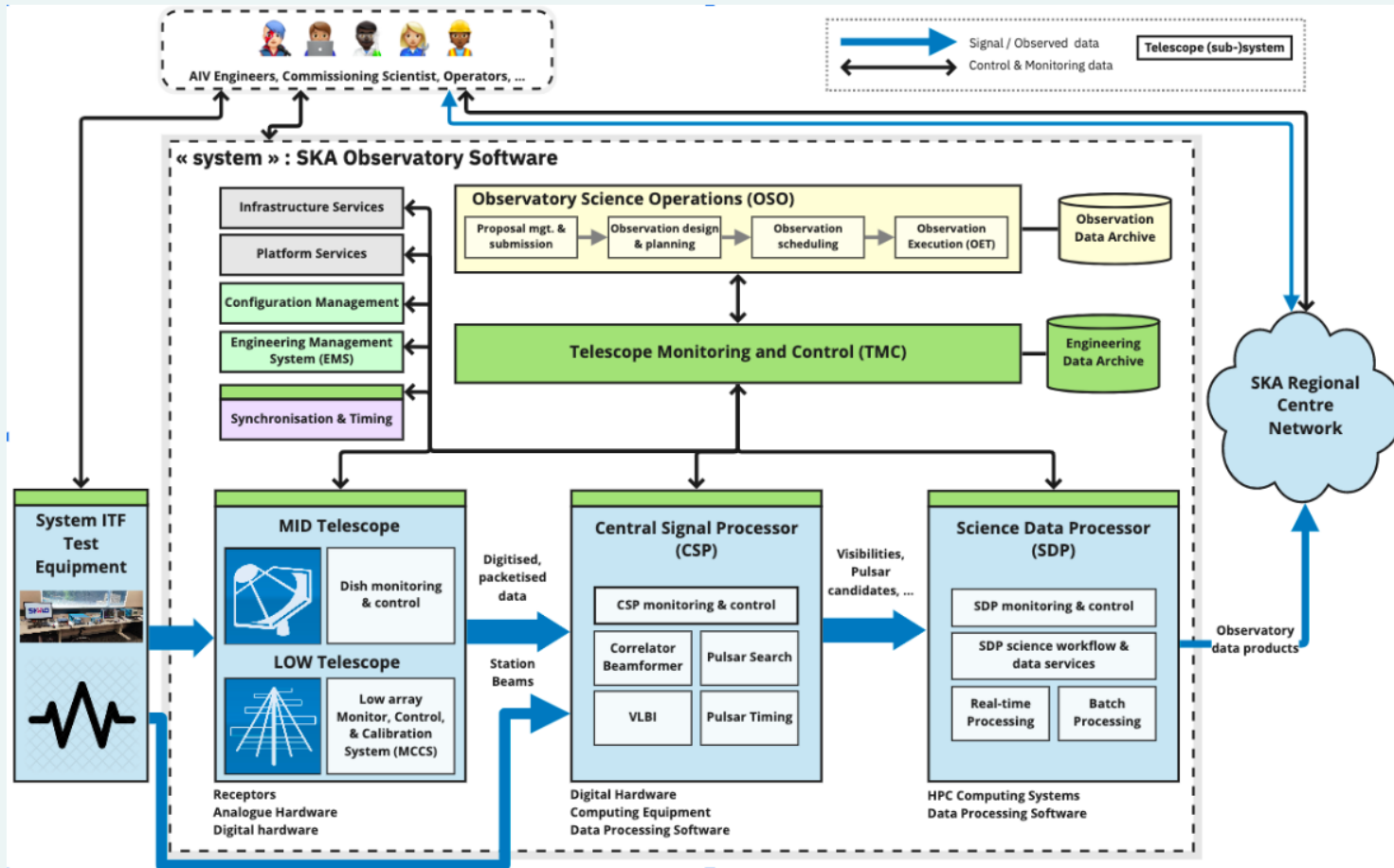
PST Team = responsible for PST component

# Colaboration with other teams



Himalaya, Sahyadri and Naksharta teams = responsible for OSO and TMC components

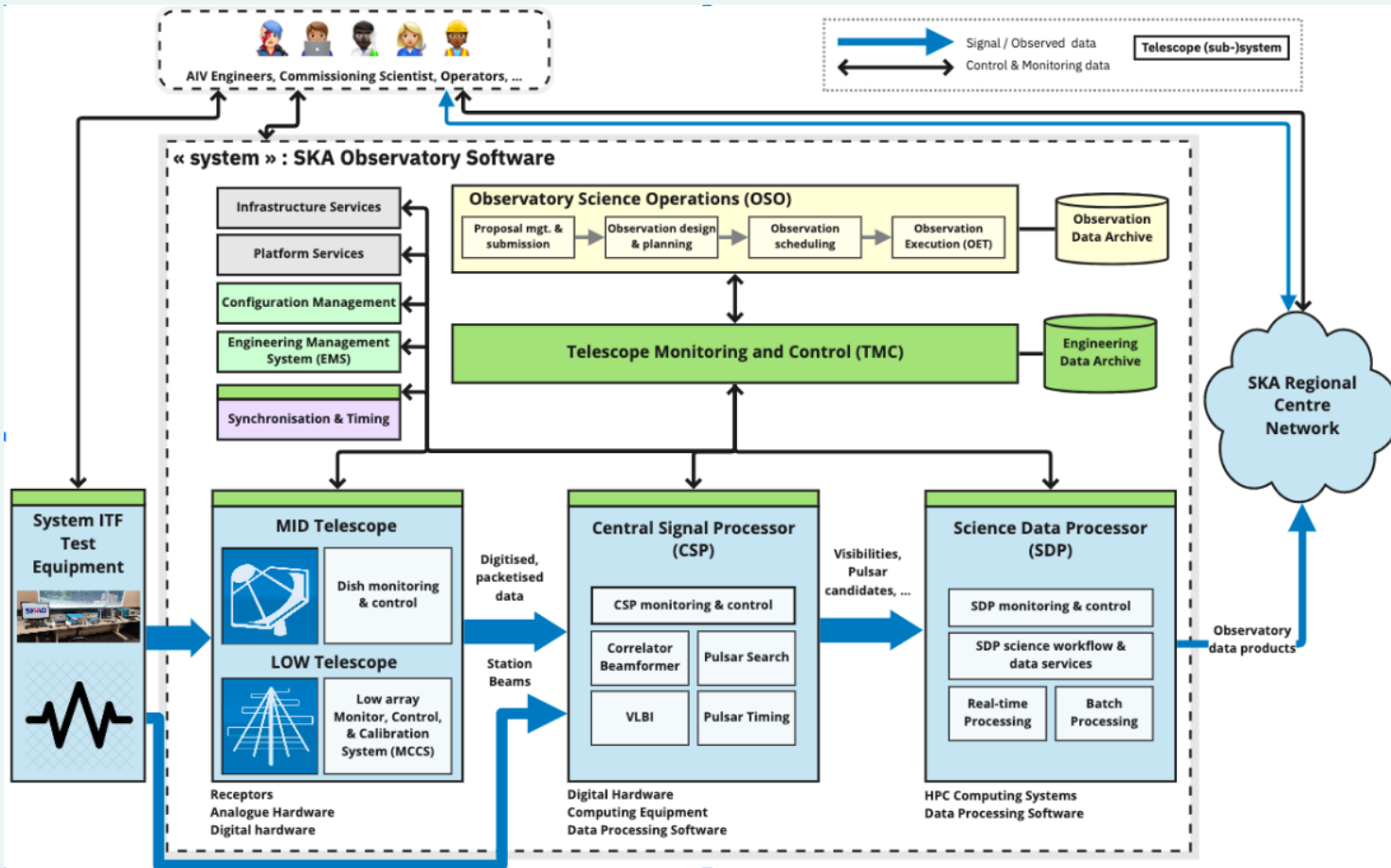
# Colaboration with other teams



System Team = responsible for CI/CD and testing infrastructure

Bang! Team = responsible for platforms and services

# Colaboration with other teams



TOPIC Team = responsible for integration of CSP LOW components at PSI facility

Viola Team = leading work on AIV LOW

Atlas Team = leading work on AIV MID

# Array Assembly 0.5

- 4 dishes/6 stations deployment on site
- Goal: end-to-end test of interferometry
- Most of the subsystems deployed
  - Verification of system performance
  - Test of interfaces

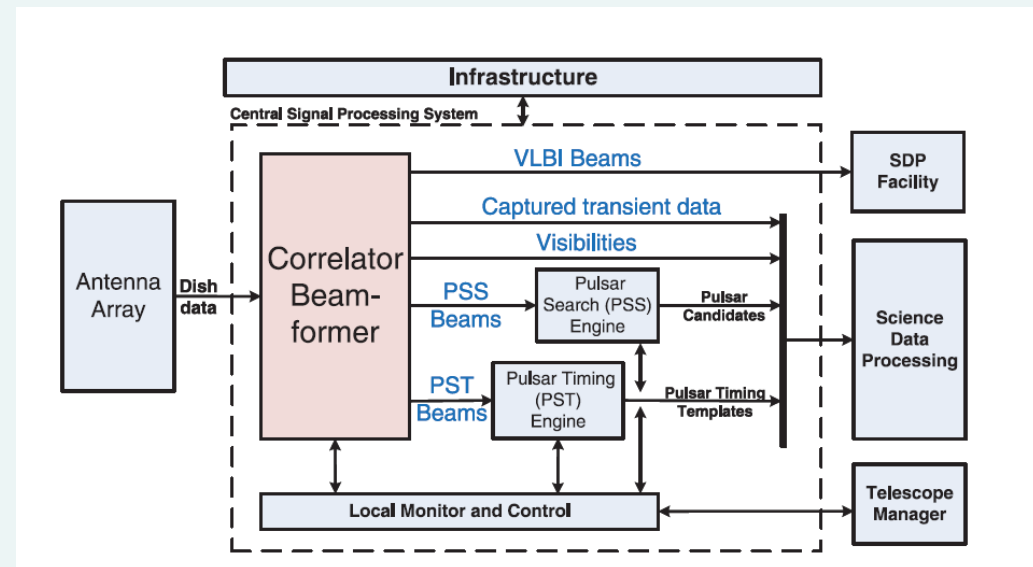
## Key project milestones

(as per the SKA Construction Proposal, June 2021)

	SKA-Low	SKA-Mid
Start of construction (T0)	JULY 2021	JULY 2021
Earliest start of major contracts (C0)	AUGUST 2021	AUGUST 2021
Array Assembly 0.5 finish (AA0.5)	FEBRUARY 2024	MARCH 2024
SKA-Low = 6-station array		
SKA-Mid = 4-dish array		
Array Assembly 1 finish (AA1)	FEBRUARY 2025	FEBRUARY 2025
SKA-Low = 18-station array		
SKA-Mid = 8-dish array		
Array Assembly 2 finish (AA2)	FEBRUARY 2026	DECEMBER 2025
SKA-Low = 64-station array		
SKA-Mid = 64-dish array, baselines mostly <20km		
Array Assembly 3 finish (AA3)	JANUARY 2027	SEPTEMBER 2026
SKA-Low = 256-station array, including long baselines		
SKA-Mid = 133-dish array, including long baselines		
Array Assembly 4 finish (AA4)	NOVEMBER 2027	JUNE 2027
SKA-Low = full Low array		
SKA-Mid = full Mid array, including MeerKAT dishes		
Operations Readiness Review (ORR)	JANUARY 2028	DECEMBER 2027
End of construction	JULY 2029	JULY 2029

# CSP.LMC Work

- Focus on integration with other components in preparation for AA0.5
  - Mid.CBF
  - Low.CBF
  - PST
  - TMC
- Testing
  - At integration facilities
  - SKAMPI (integration environment)



Correlator and  
BeamFormer

PulSar  
Timing

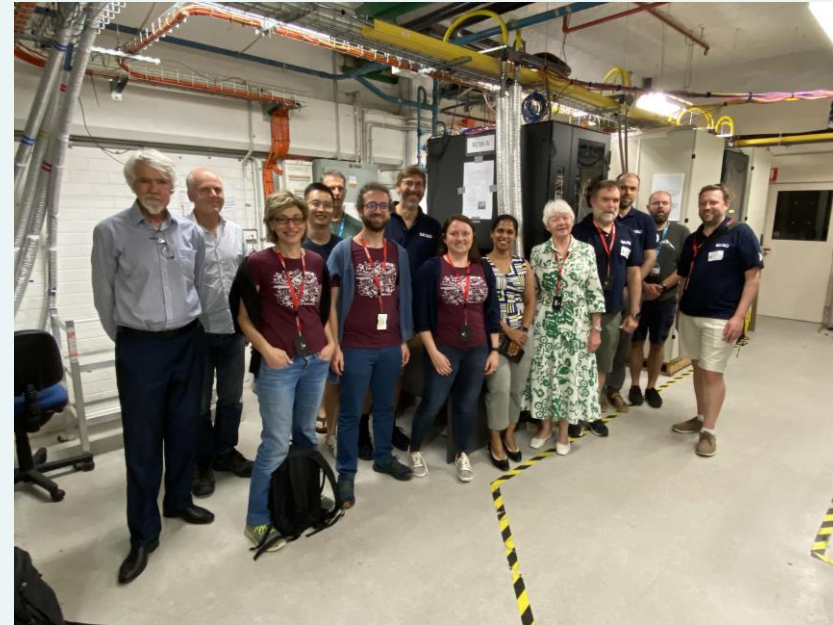
Correlator and  
BeamFormer

Telescope  
Monitoring and  
Control

SKA  
MVP  
Prototype  
Integration

# Onsite visit

- Visit at CSIRO, Marsfield Site in Sydney, Australia
- Collaboration with teams working on Low.CBF and PST components
  - Architectural workshop and interface alignment
  - Integration testing at LOW PSI



# OMC & Services PI Planning at SKAO HQ



# Future?

# Thank you.



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