LOFAR2.0

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2019/11/07 – ILT TO

Outline

01.
LOFAR2.0: motivation, scope, organisation

02.
Upgrade of international stations

03.
Current status

04.
Your involvement

- Ensure that the International LOFAR Telescope is a world class instrument to 2030 and perhaps even beyond

LOFAR

herlands Institute for Radio Astronomy

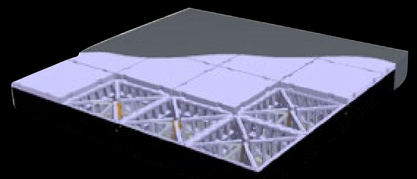
The challenge of Stage 1

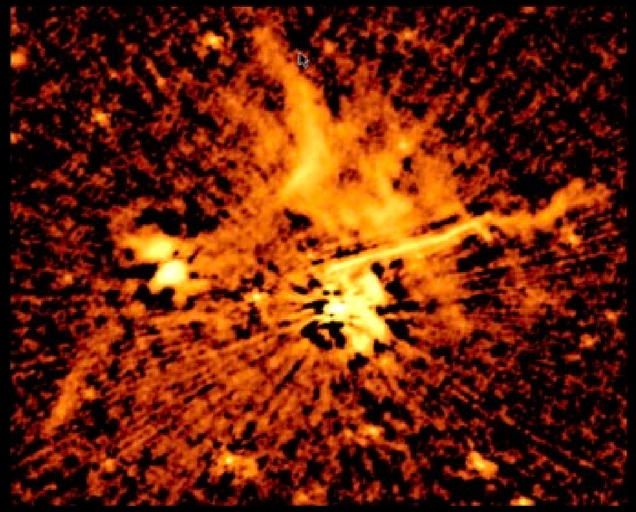
credit: Jason Hessels

Scientifically limited

Rich in science

High-Band





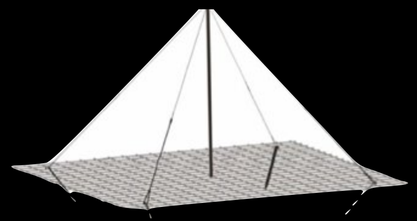
Breakthrough techniques

No ionospheric correction

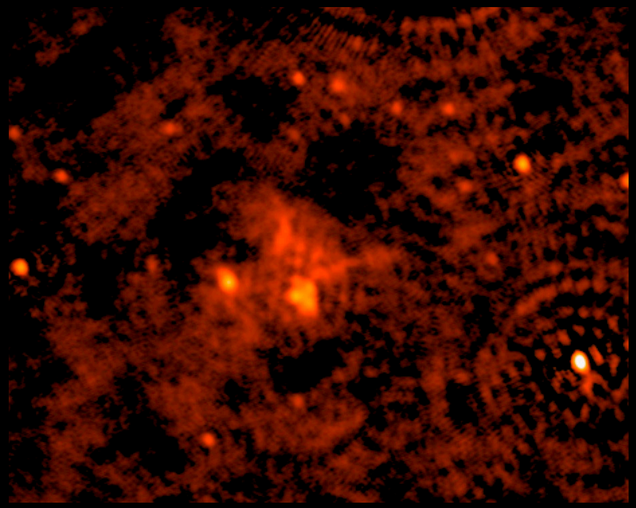
Transfer Information

Ionosphere well modeled

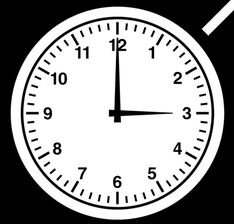
Low-Band



2x



DUPLLO

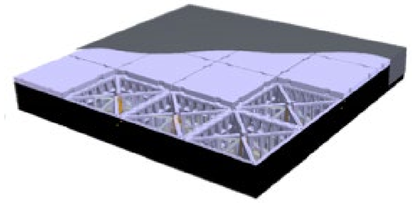


Precision clock

The Goal

Strategic timeline

2018 2020 2022 2024 2026 2028 2030 2032



LOFAR High-Band Survey

DUPLLO Project

LOFAR Low-Band Survey

LOFAR2.0

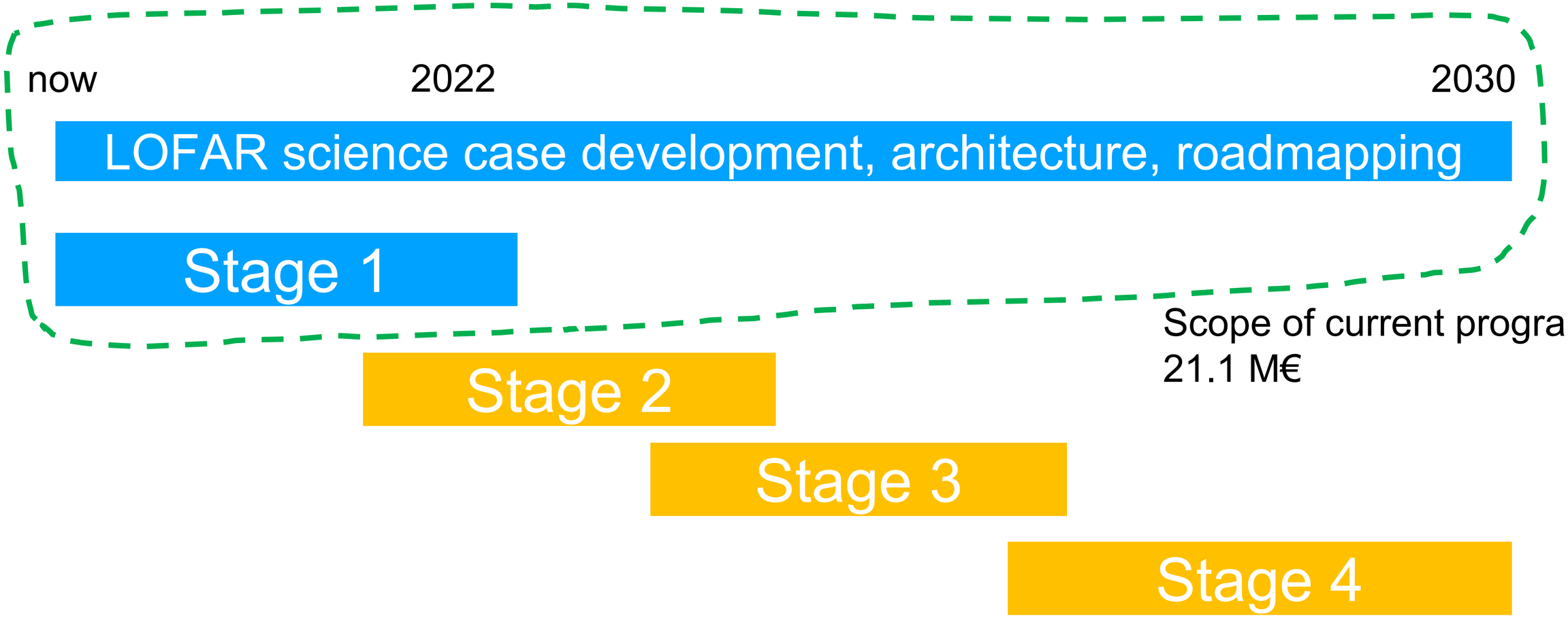
Ultra-high resolu
24/7 space weath

Scientific & technical synergy

Square Kilometre Array

Netherlands Ins

LOFAR 2.0 program scope



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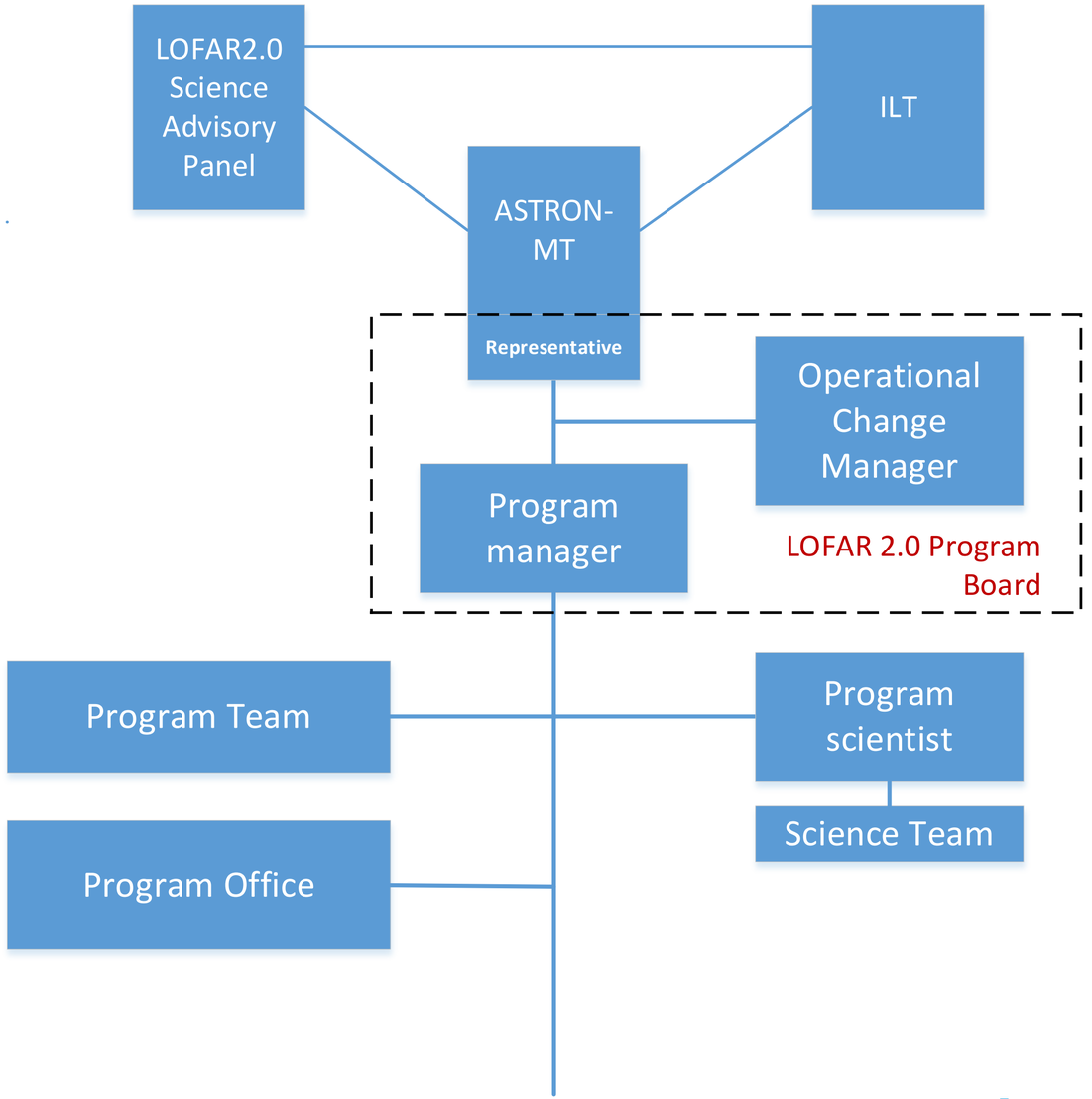
Stage 1 scope

- Simultaneous LBA-HBA operation
- Central clock to all Dutch stations
- LBA-HBA calibration pipeline
- COBALT2.0 Megamode
- Single and dual beam HBA-FE *design*
  - New HBA-FE is only compatible with new RCU
  - New RCU is compatible with old and new HBA-FE
- The LBA and HBA antennas/tiles are **not** affected by the upgrade.

Governance

- The ILT Board tasked ASTRON to lead the Stage 1 upgrade
- Agreed on budget and timeline

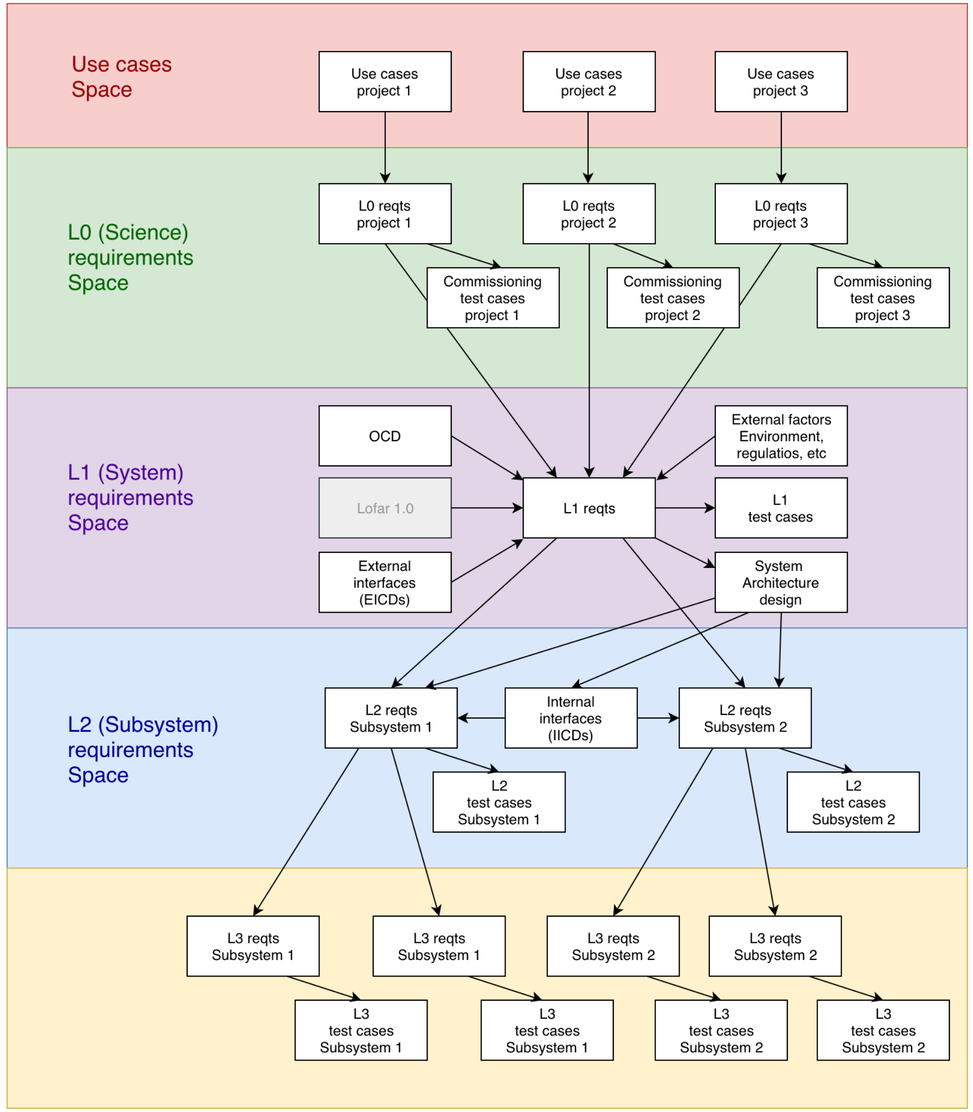


Agreed with ILT Board

- The goal is to eventually upgrade all ILT stations.
- The changes will inevitably change the functionality of the station and the interfaces (monitoring, control and data). This will impact stand-alone and ILT single-station and array mode operations of upgraded stations.
- Support and maintainability for the old station electronics, with associated firmware and software, will inevitably end at some point in time. This will affect stand-alone and ILT single-station and array mode operations of any station that is not upgraded.
- All station upgrade contracts that have been signed at the latest by 1 September 2021 can join the collaborative purchase and will result in hardware delivery before the end of 2022

Approach

- Delivery on time and budget is essential
- Systems engineering



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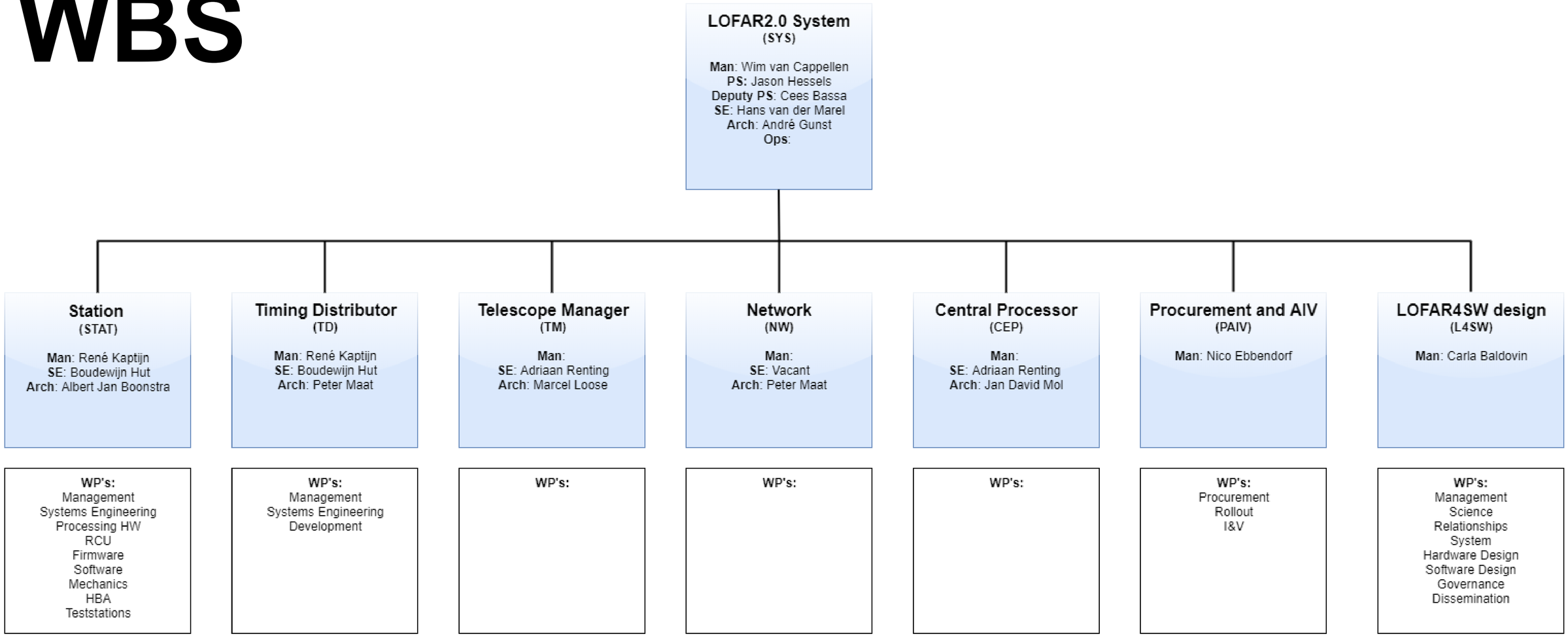
WBS



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Timeline (hardware)

- 2018 – 2021 Development
- 2021H2 Hardware production
- 2022 – 2023 Station upgrades
- 2023 Commissioning
- 2024 Science operations

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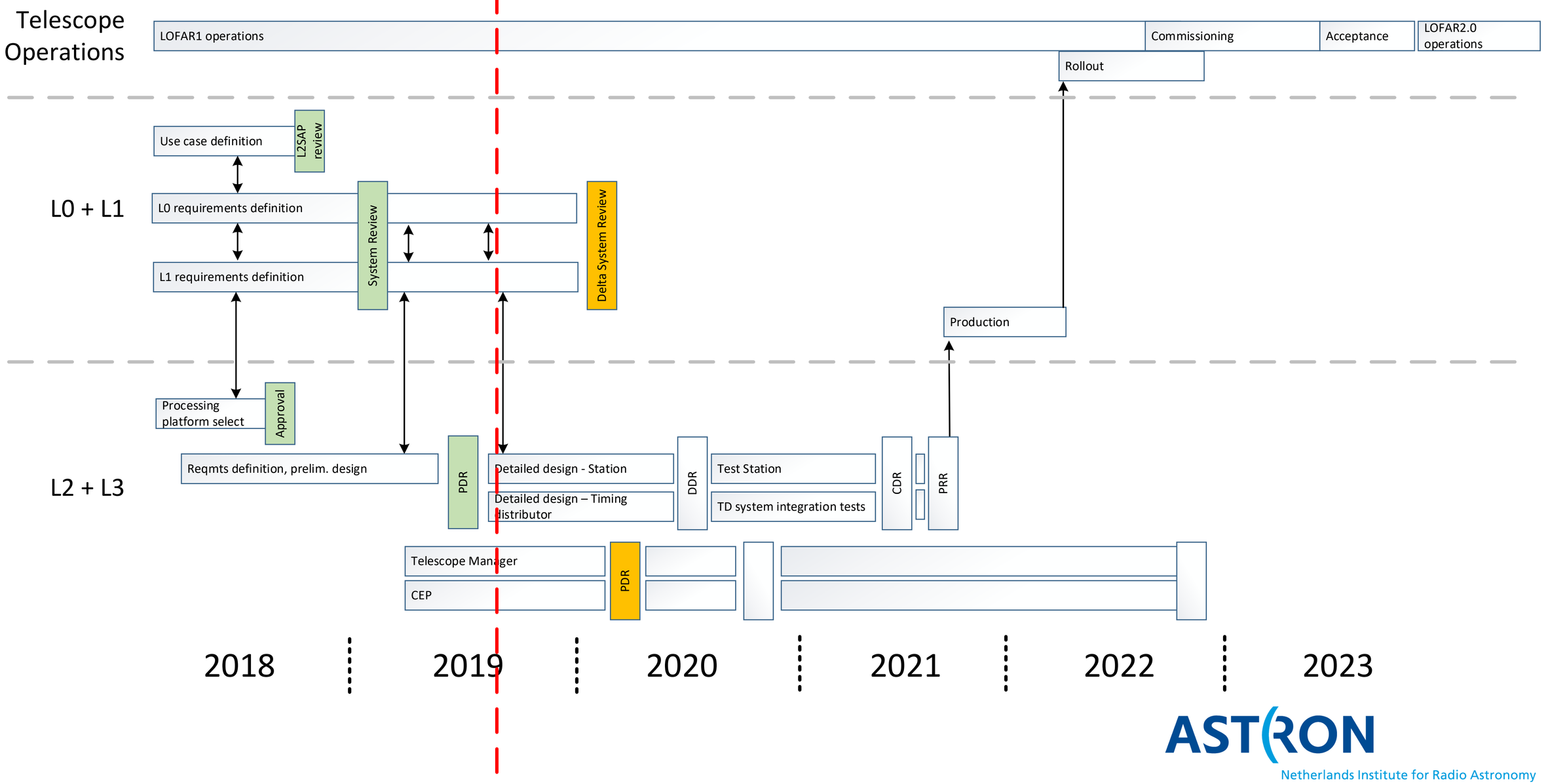
Current status



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Stand alone mode

- A station stand-alone mode is part of the design
- Contact persons per consortium were involved in the Station PDR
- Signal high impacts of the new station design in the stand alone operations
- Additional functionality requires formal changes

Contact persons

- FLOW Jean-Mathias Griessmeier
- GLOW Francesco de Gasperin
- I-LOFAR t.b.d.
- IT-LOFAR t.b.d.
- Latvia t.b.d.
- POLFAR Leszek Blaszkiewicz
- Sweden t.b.d.
- UK Aris Karastergiou

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Your involvement

- Review the design as it progresses, questions to Albert-Jan
- Through the contact persons:
  - Signal issues to Albert-Jan
  - Contribute to the interface definition of the Stand-alone mode
- Support the acquisition of upgrade funds where possible

Documentation

- Download link:

  https://www.dropbox.com/s/8gh8givj849ak93/LOFAR2.0%20Station%20for%20ILT-TO.zip?dl=0