

The International LOFAR telescope is the world's most powerful very-low-frequency and long-baseline radio interferometer until at least 2030.



ILO-net industriemiddag
NIJMEGEN 21 April 2022

LOFAR2.0 upgrade programma

To exploit the full scientific promise of the LOFAR low-band antennas (10-90 MHz).

Business opportunities uit aankomende aanbestedingen

Ronald Halfwerk

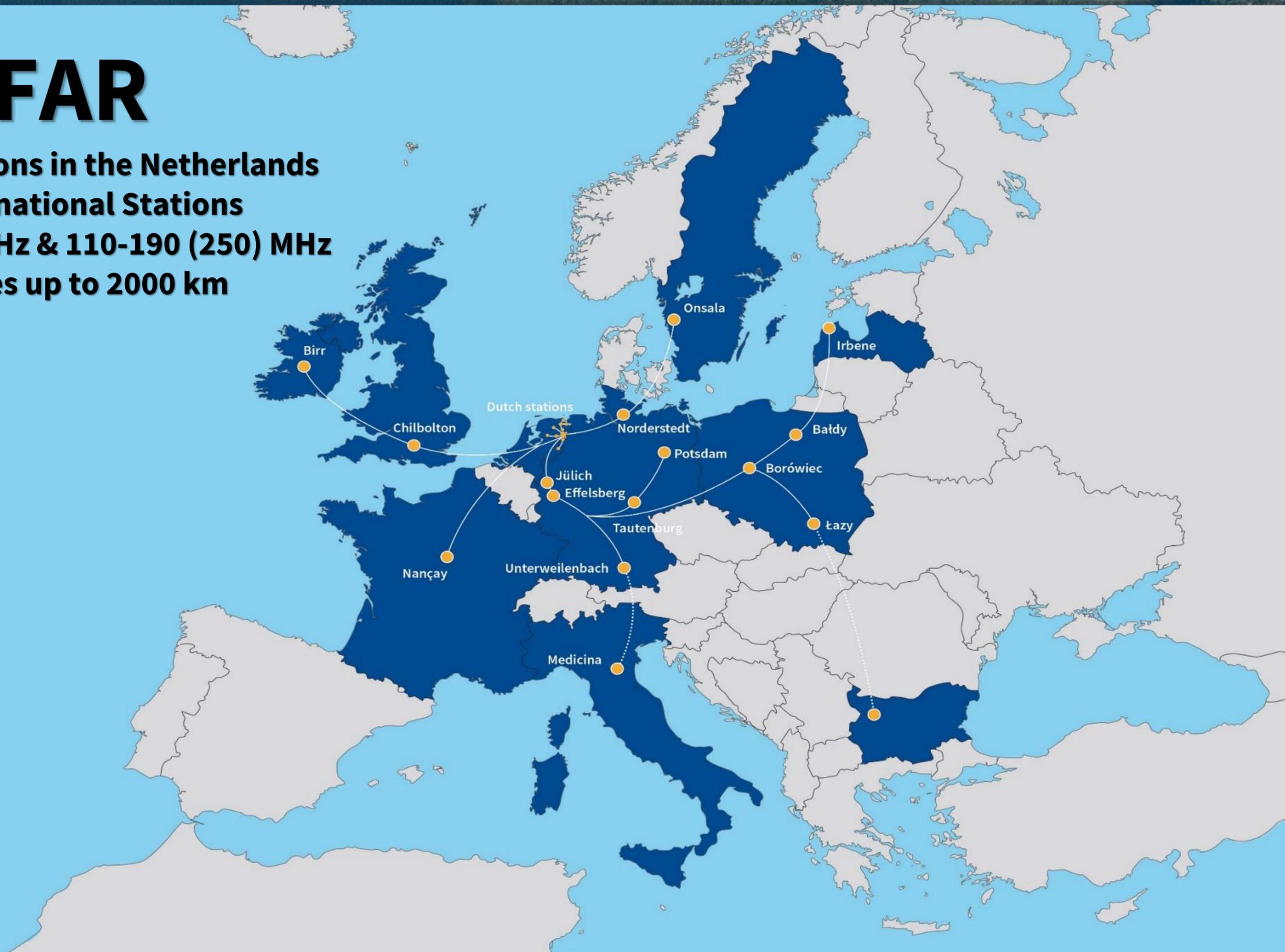
Credits (some slides):
Wim van Cappellen
Jason Hessels
Cees Bassa
André Gunst
Boudewijn Hut





LOFAR

38 Stations in the Netherlands
14 International Stations
10-80 MHz & 110-190 (250) MHz
Baselines up to 2000 km





Credit: Onsala Space Observatory/Leif Hellner



Credit: Alison Delaney, Birr Castle

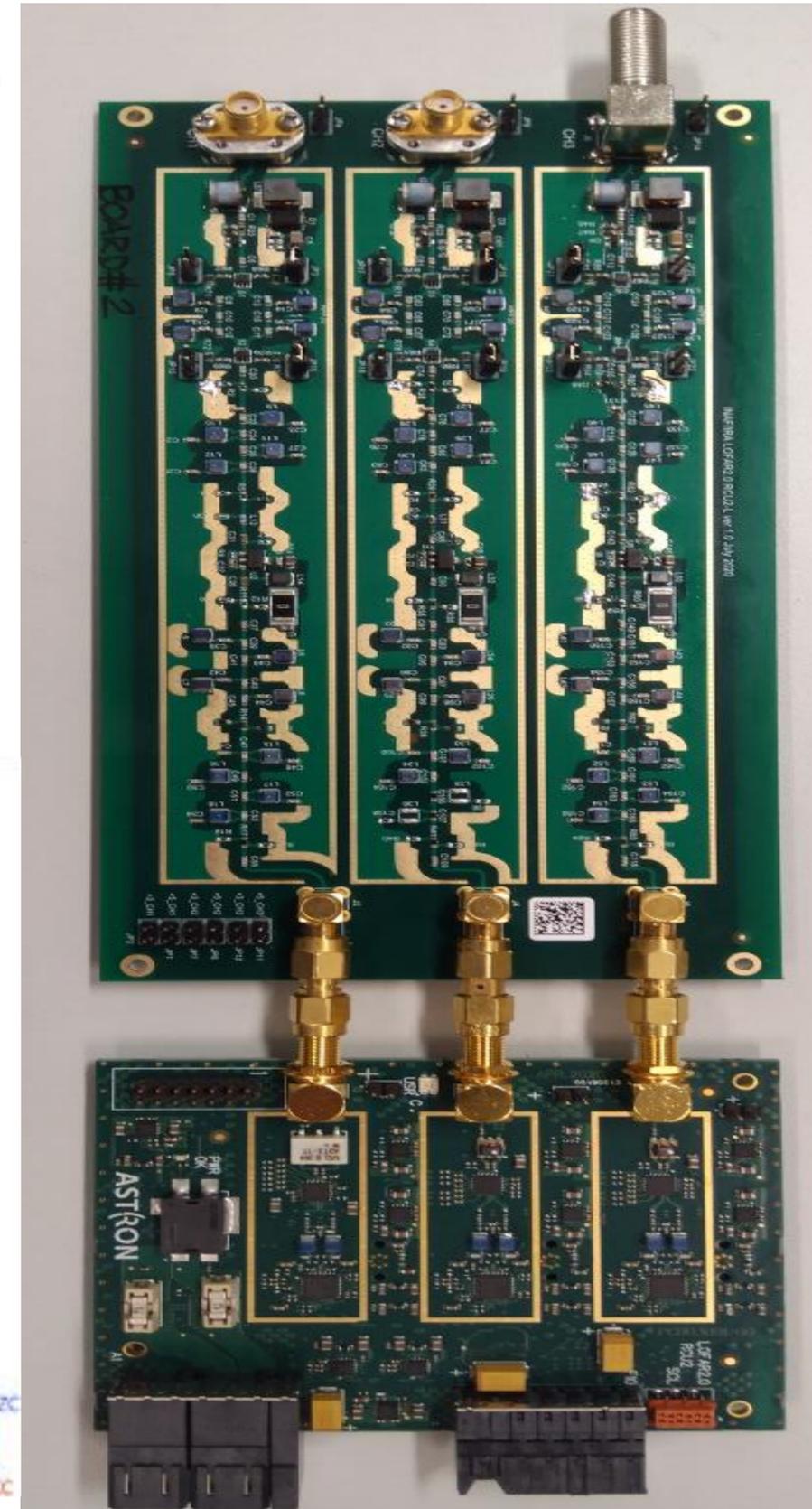
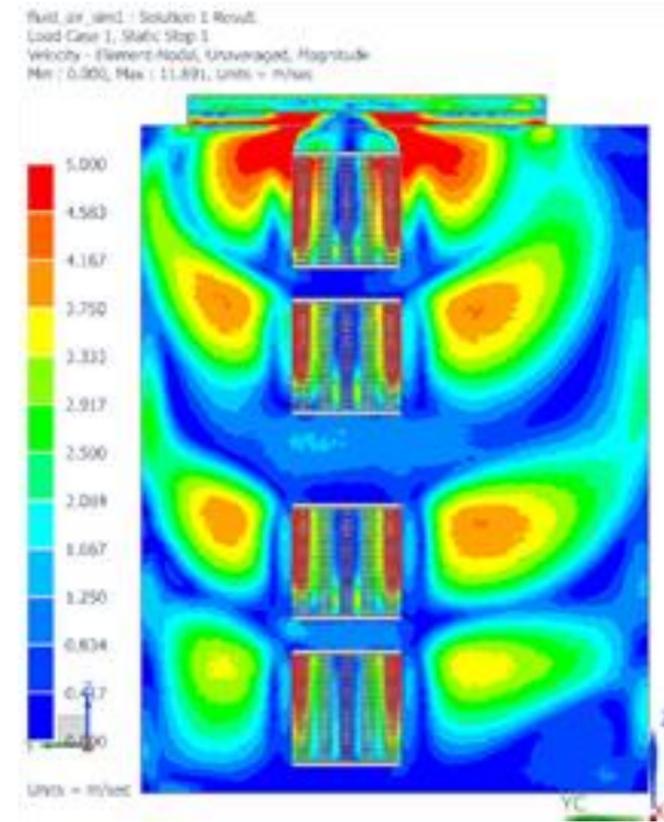
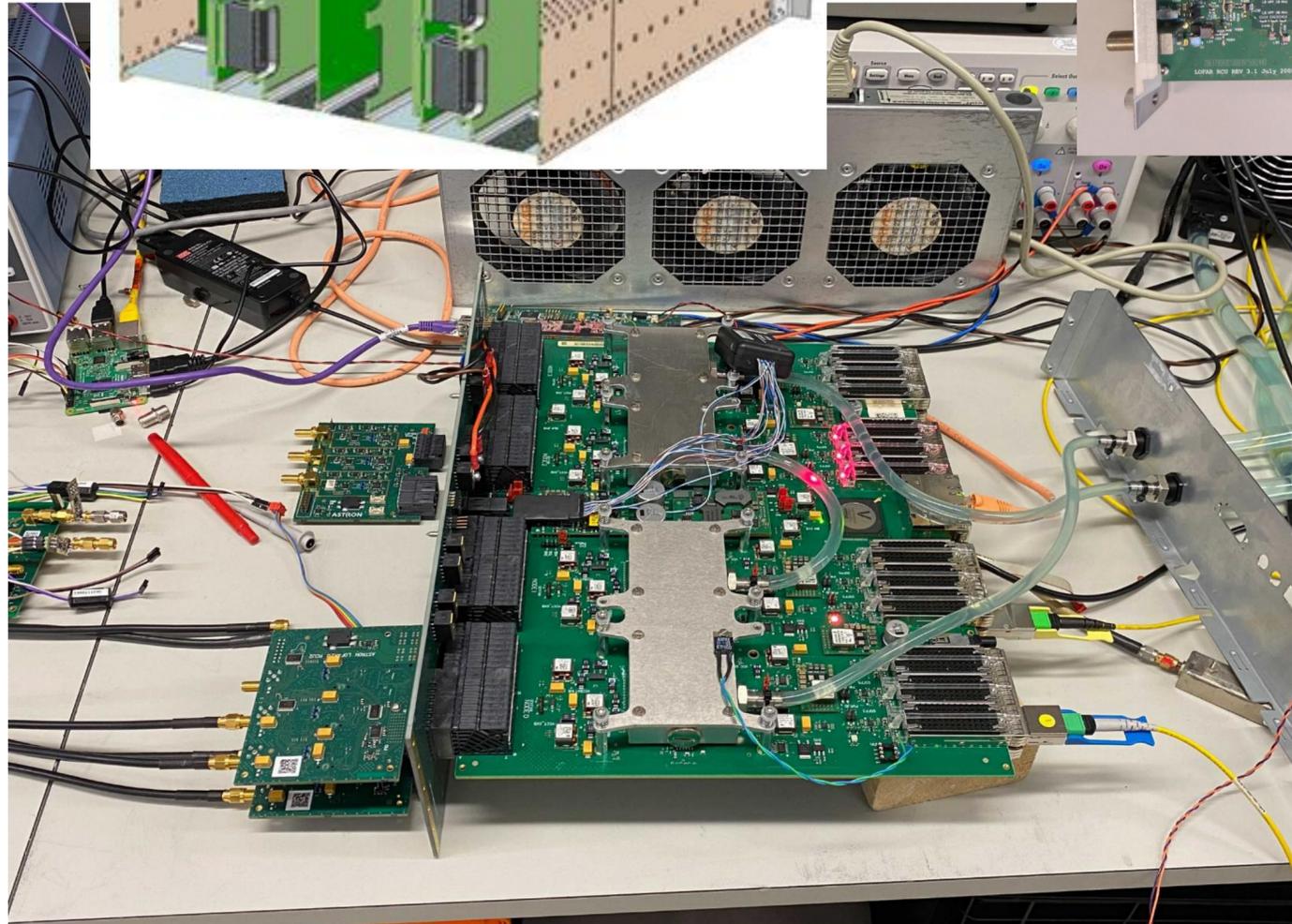
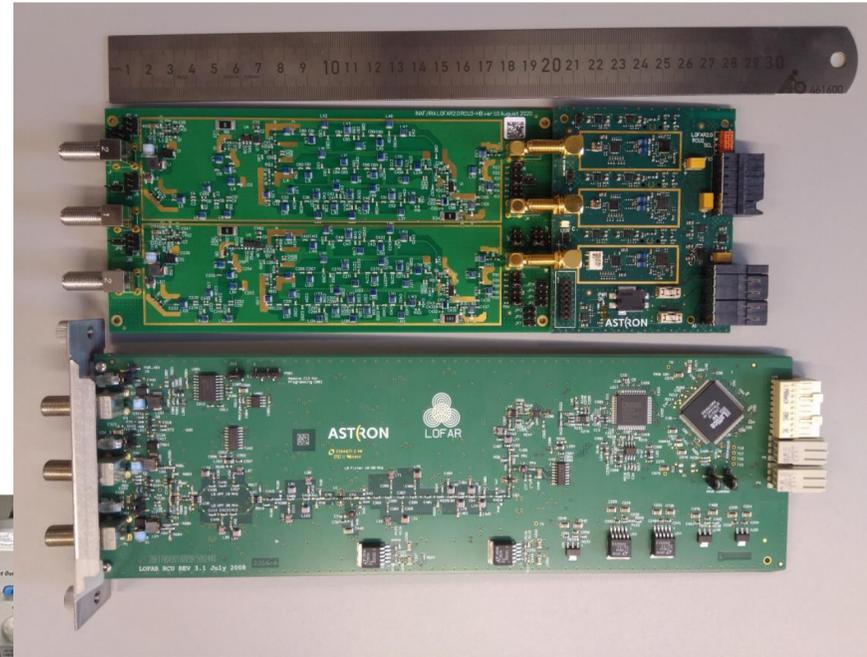
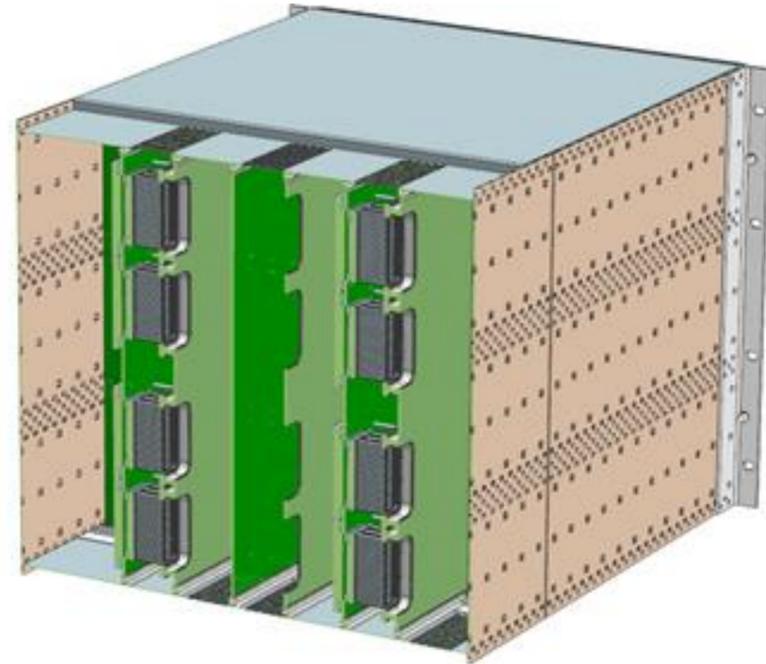
LOFAR2.0 capabilities

- More receivers and processing capacity at the stations, enabling
 - Simultaneous LBA-HBA observing, or
 - Double the LBA or HBA beams* bandwidth

Station capability	LOFAR1	LOFAR2.0
NL	48 LBA or 48 HBA	96 LBA and 48 HBA
International	96 LBA or 96 HBA	96 LBA and 96 HBA

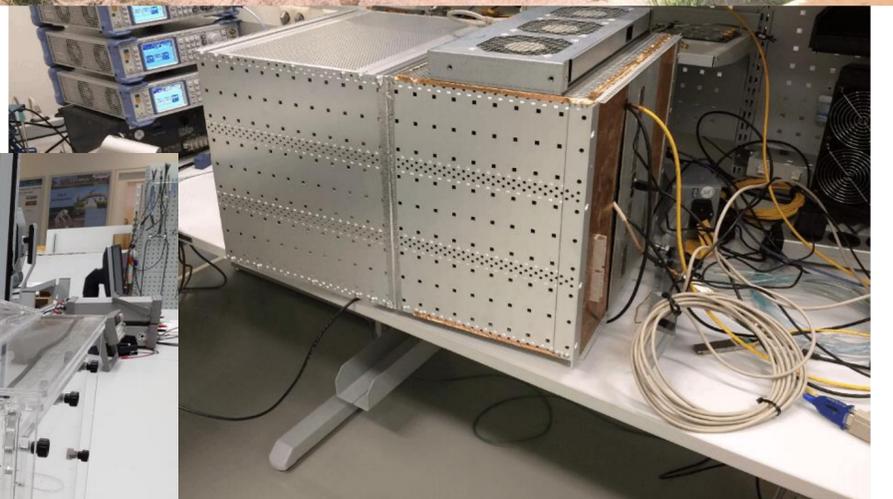
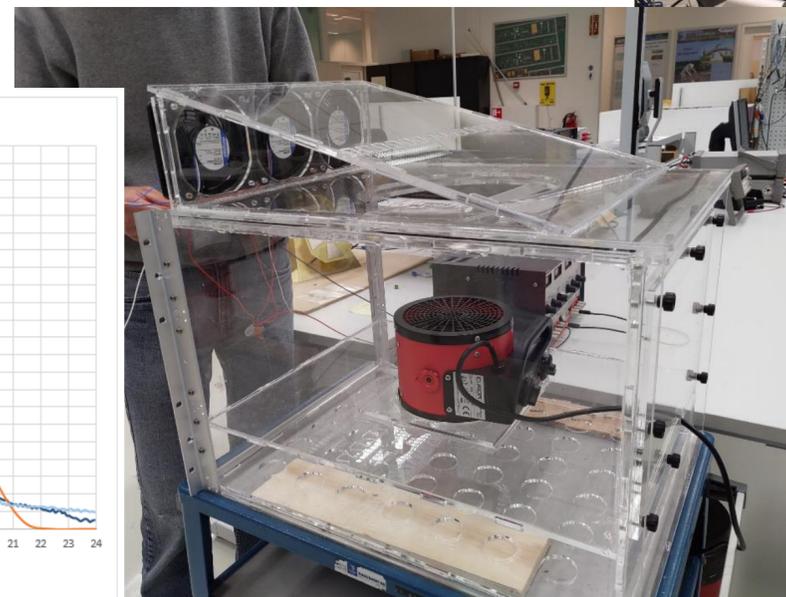
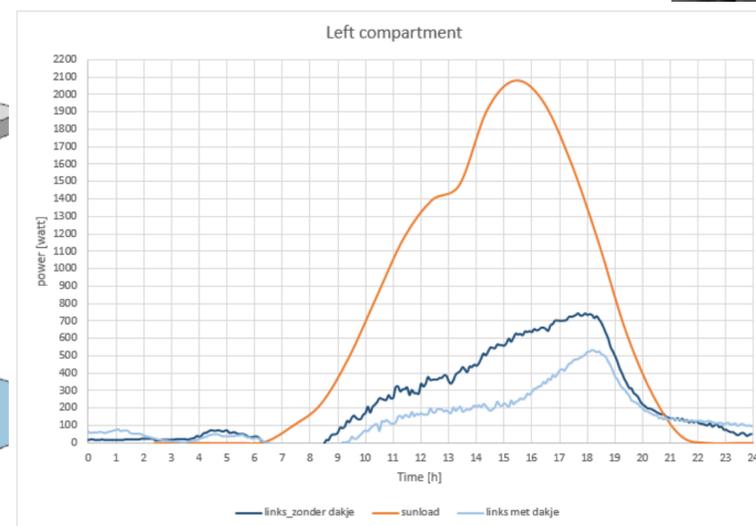
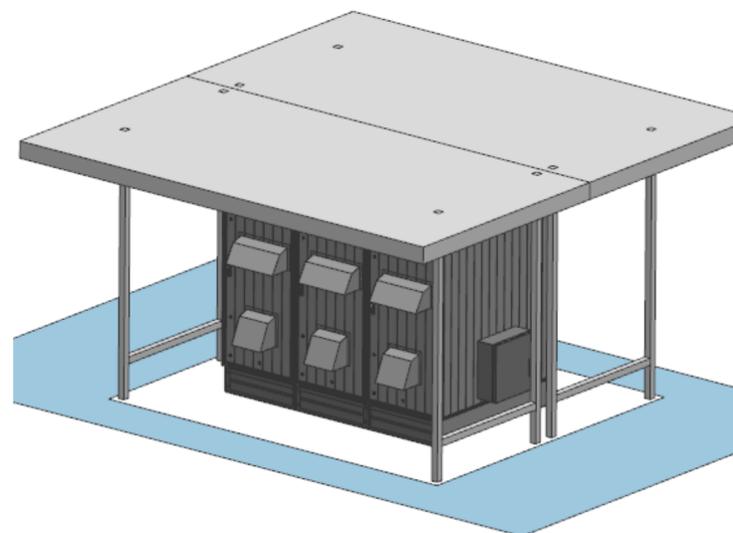
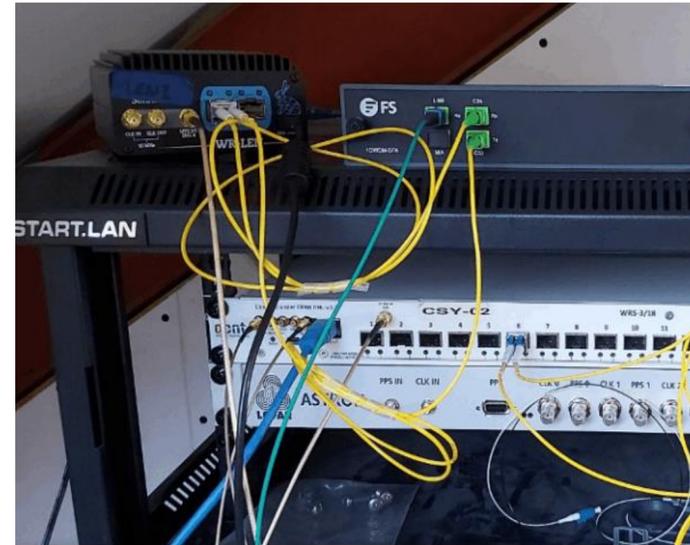
- Distribution of a central clock to all NL stations (White Rabbit)
- COBALT2.0 LOFAR Mega Mode

Receivers and processing

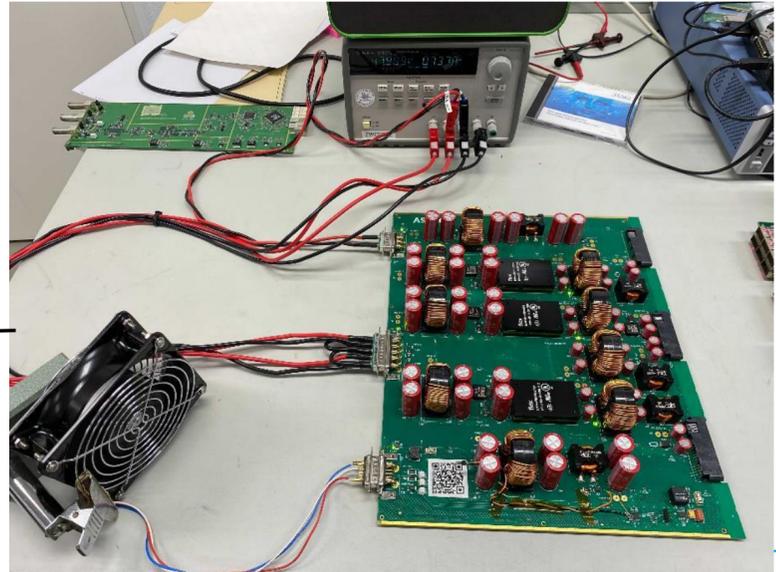
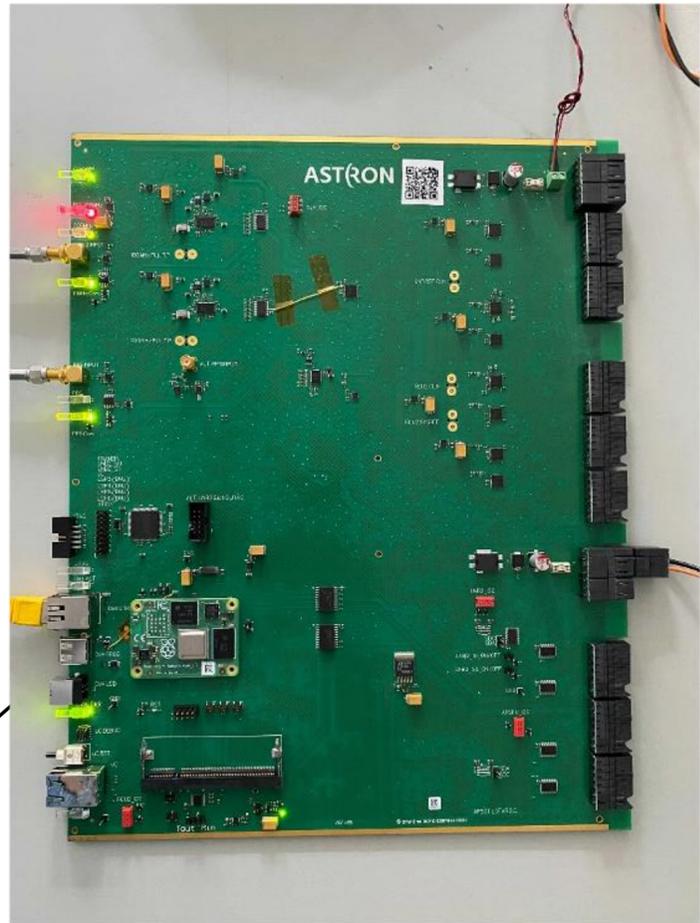
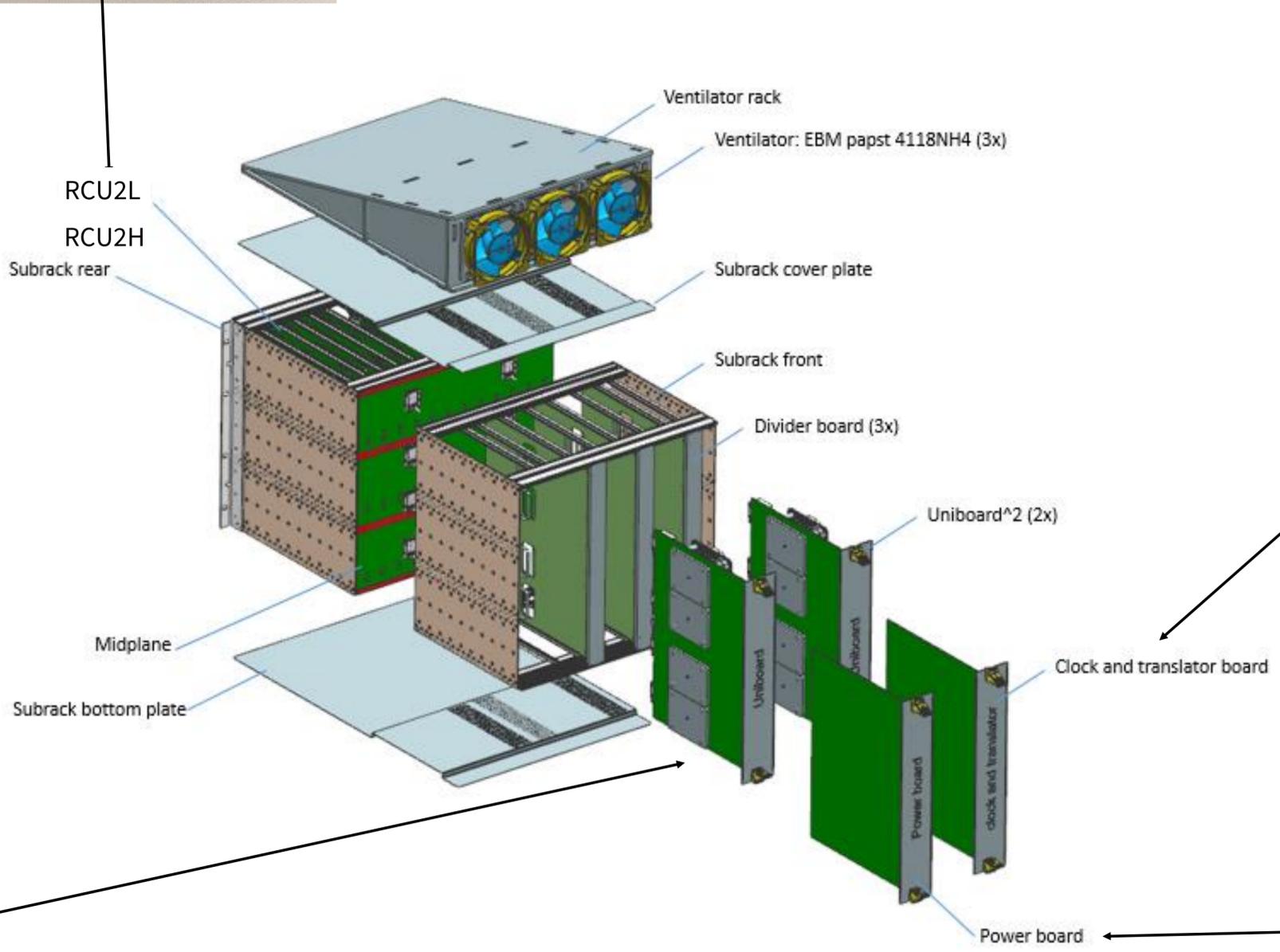
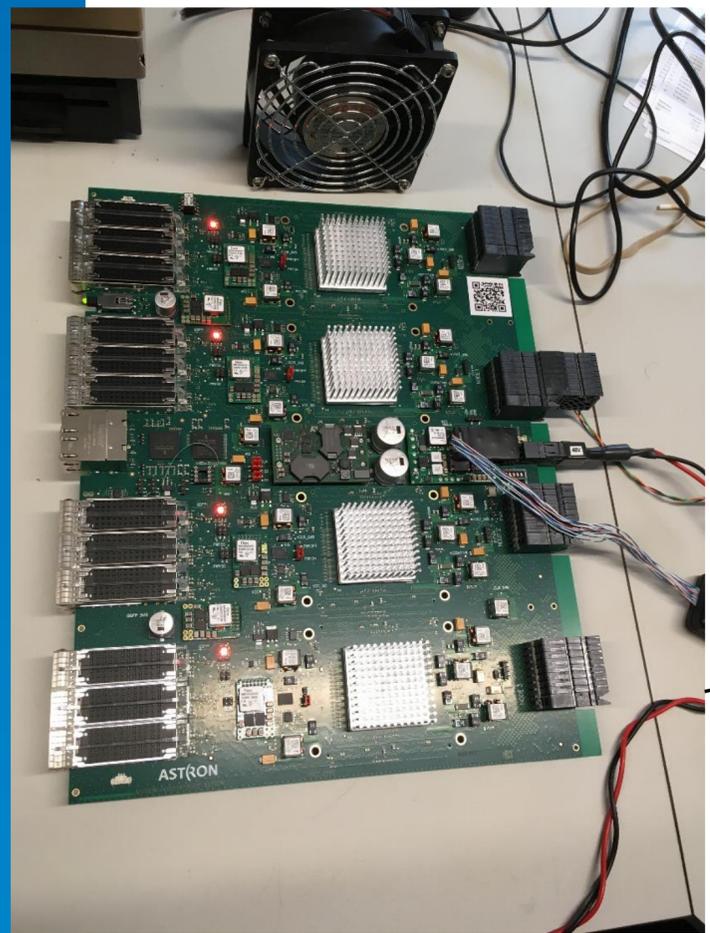
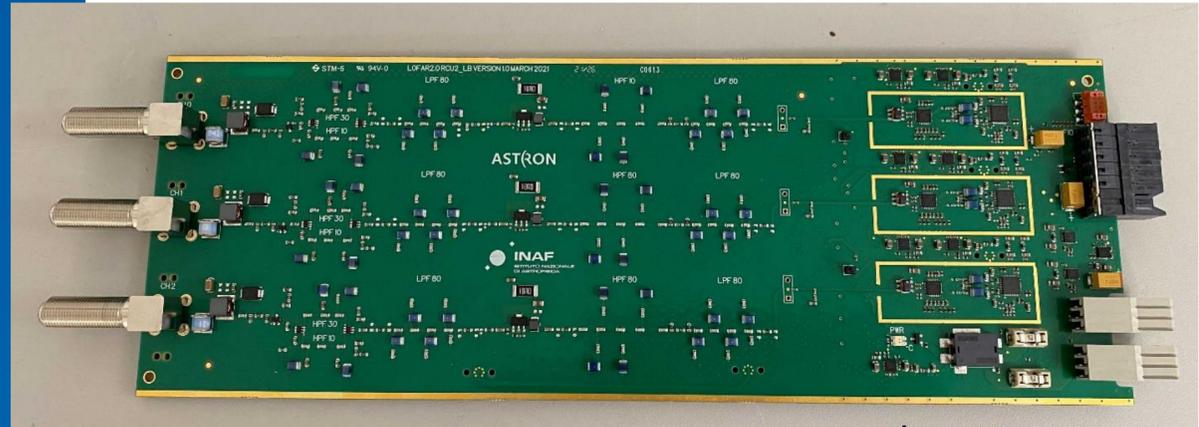


Dwingeloo Test Station

- Fully operational in 2021
- Early integration
- Complete signal chain + monitoring / control



LOFAR2.0 subrack



Timeline

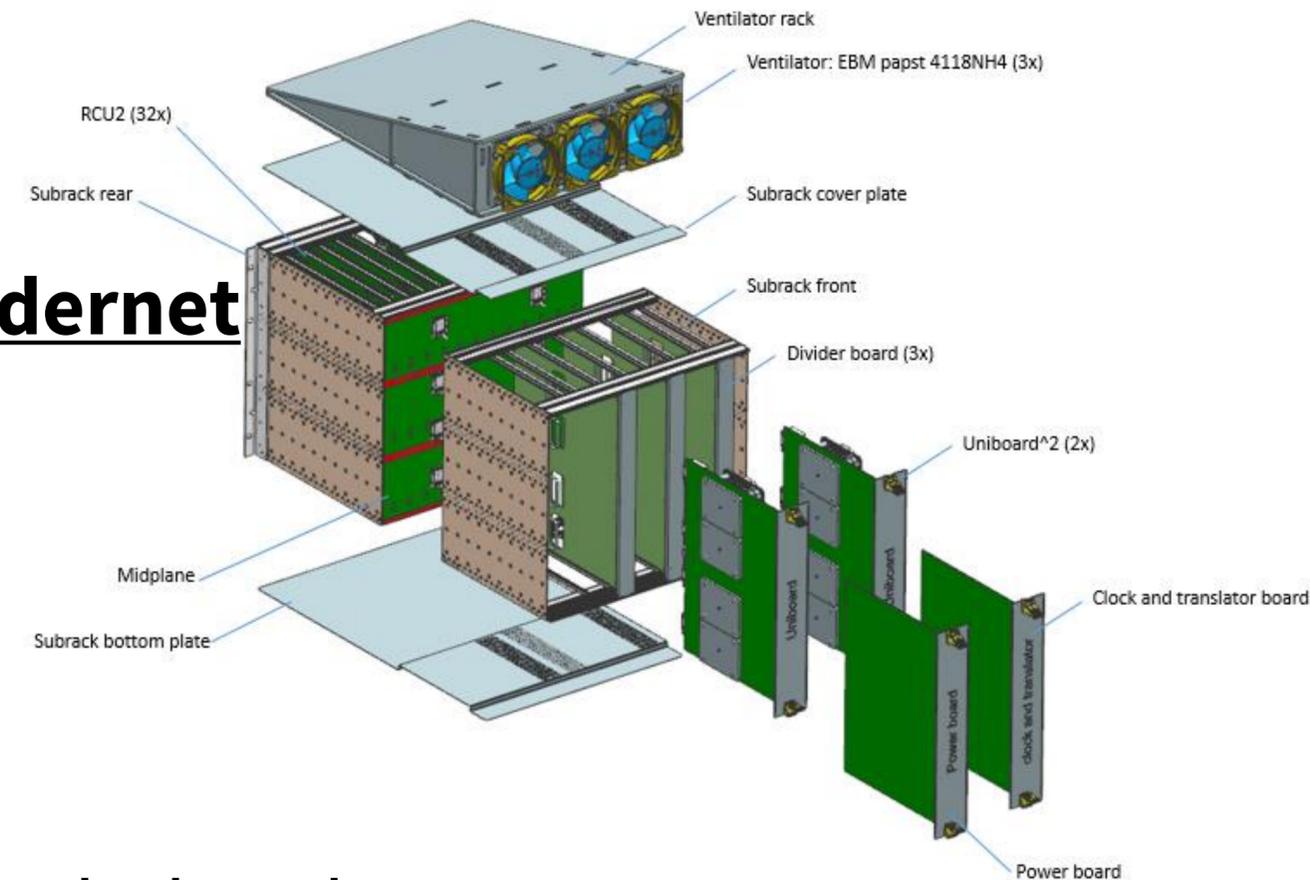
- ✓ 2021 LOFAR Mega Mode (COBALT2.0)
- 2022 Timing Distributor rollout (remote stations)
- 2021-2022 Dwingeloo Test Station
- 2022 Prototype Test Station
- 2023 – 2024 Rollout LOFAR2.0 stations + Timing Distributor rollout (core stations)
- 2025 Operational, with risks (cycle 0)
- 2026+ Full science production

← 2022 Tendering (@ TenderNet)

Tendering LOFAR2.0

Subracks + Content:

- 2022 mei: PCB assemblies: **Publicatie(s) op Tendersnet**
 - Gunning: $T_{\text{publ.}} + 6 \text{ mnd}$
 - (VtO PCB-A Uniboard2 reeds gegund, 2020)
- Build to Print (designs zijn gereed)
- Mechanics (subracks , ventilators) : meervoudig onderhands
- Volume: Alle NL stations + 10 INT stations (ballpark, t.b.c.)
- Eventueel: nieuwe INT stations (IT + BG) (t.b.c.)

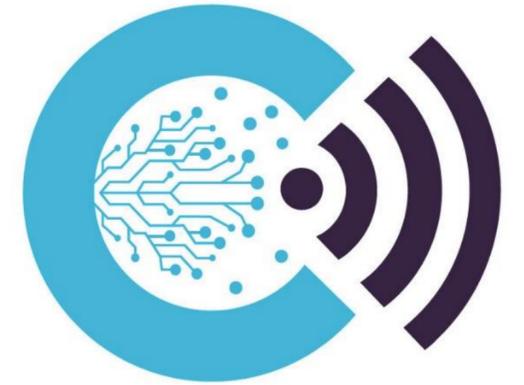


	Per Subrack:	ballpark totals:
RCU2 (L-XY + H-XY)	32	4928
Divider board	3	462
Uniboard^2	2	308
Clock boards	1	154
Power board	1	154
Ventilator rack	1	154
Midplane	1	154
Subrack assy	1	154



Outline

1. LOFAR 2.0 Technology and Procurement opportunities
2. About Wireless Communication
- 3. The Wireless Data Lab**
4. Q & A

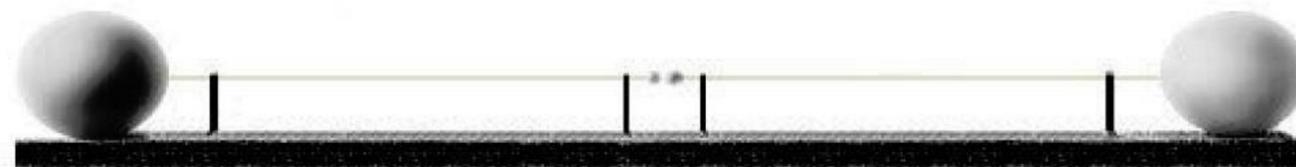


WIRELESS
DATA LAB

Heinrich Rudolf Hertz

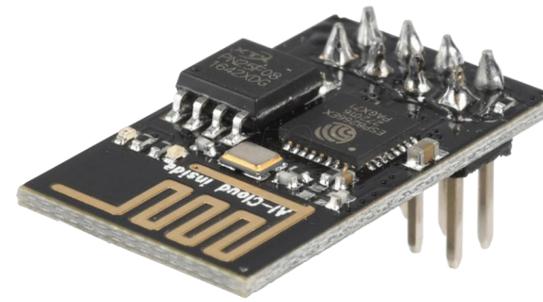


"I do not think
that the wireless waves
I have discovered will
have any practical
application."



Wireless?

Who will make this



Wireless IoT Network Protocols



Netherlands Institute for Radio Astronomy

Wireless Data Lab (WDL)

providing access to R&D Infrastructure of ASTRON to *support SME (=MKB) in product development*



➤ Sharing test and measurement facilities:

- EMC test facility
- Antenna test range
- Laboratories (equipment)

➤ Knowledge sharing by:

- RF Courses
- Technical support during product development
- Experts Brainstorm

<https://www.astron.nl/wireless-data-lab/>

International LOFAR Telescope



Thank you.
Q ?

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