

Connecting science and industry
in astronomical research

AST(RO)N

Netherlands Institute for Radio Astronomy

Marco de Vos

Big Science Symposium
SRON, 2023/11/14

Making discoveries in radio-astronomy happen...



Our driving passion:

Pushing the edge of our knowledge of the universe



Our challenge:

Pushing the edge of what is technologically possible



Our impact:

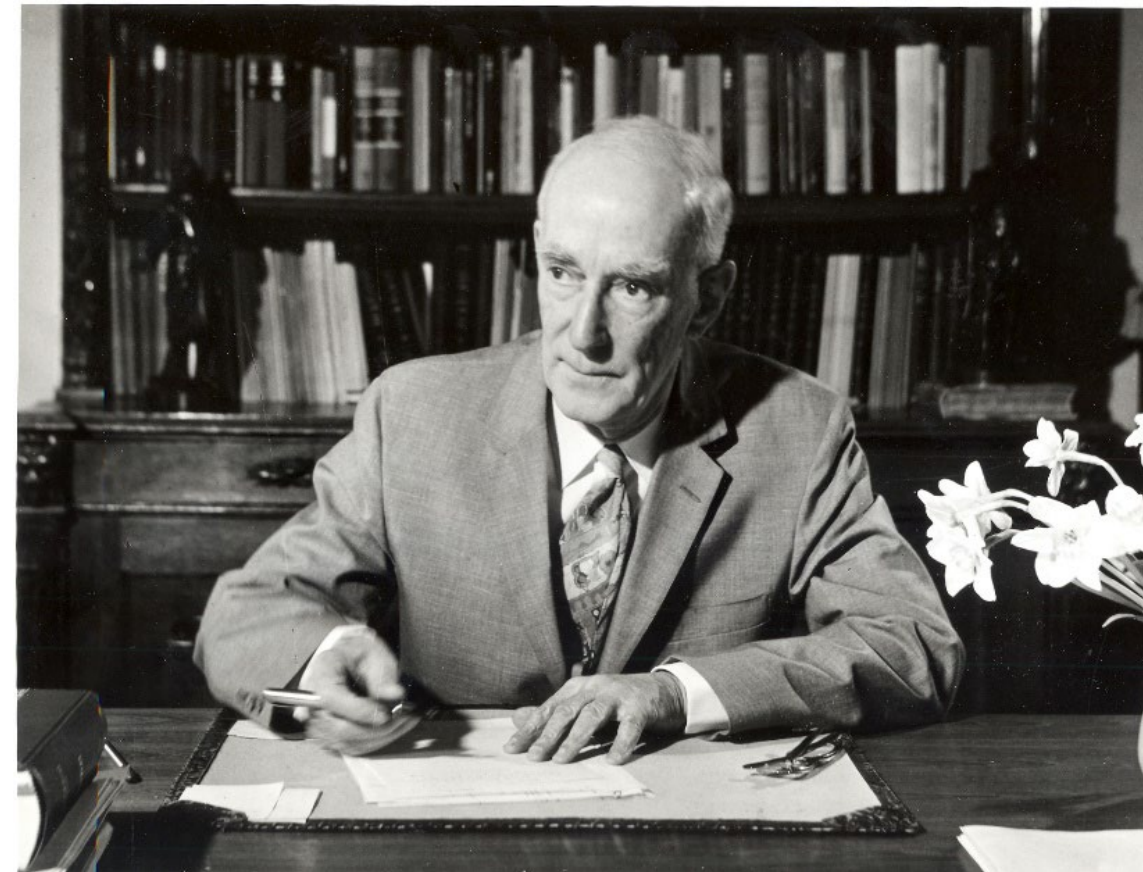
(Regional) industry pushing the edge of their capabilities

Approaching societal challenges in different ways



<1995 – The Ivory Tower

- Early collaboration with industry
- Disconnect once on equal footing
- Influx of academic/technical staff in the region



Starting 1995 – Courting partnerships

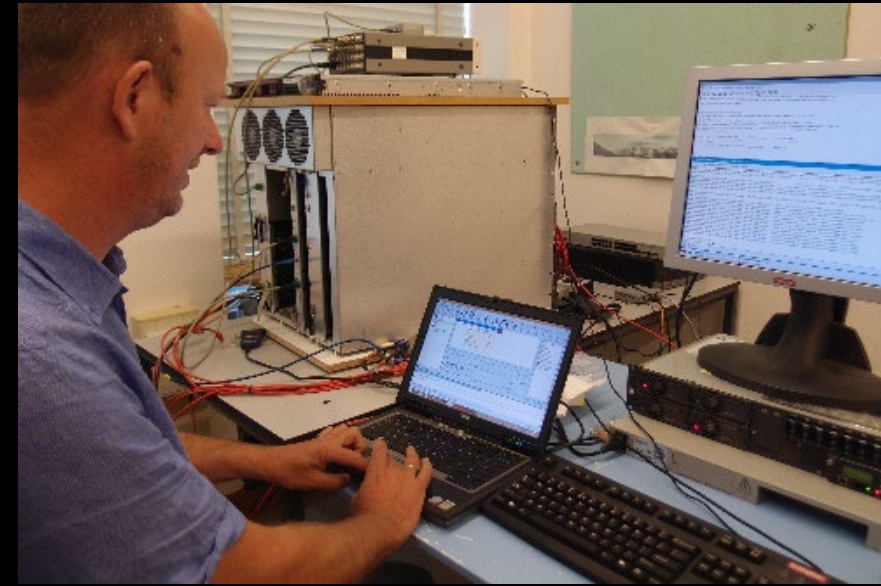
- Specification based subcontracting
- Fighting the “not invented here” syndrome
- Enlightened expectations



From 2003 – Big Science collaborations

- Partnerships based on shared goals, political dimension
- The LOFAR approach:
 - Challenge innovative start-ups
 - Impulse for production industry
 - Joint research programs





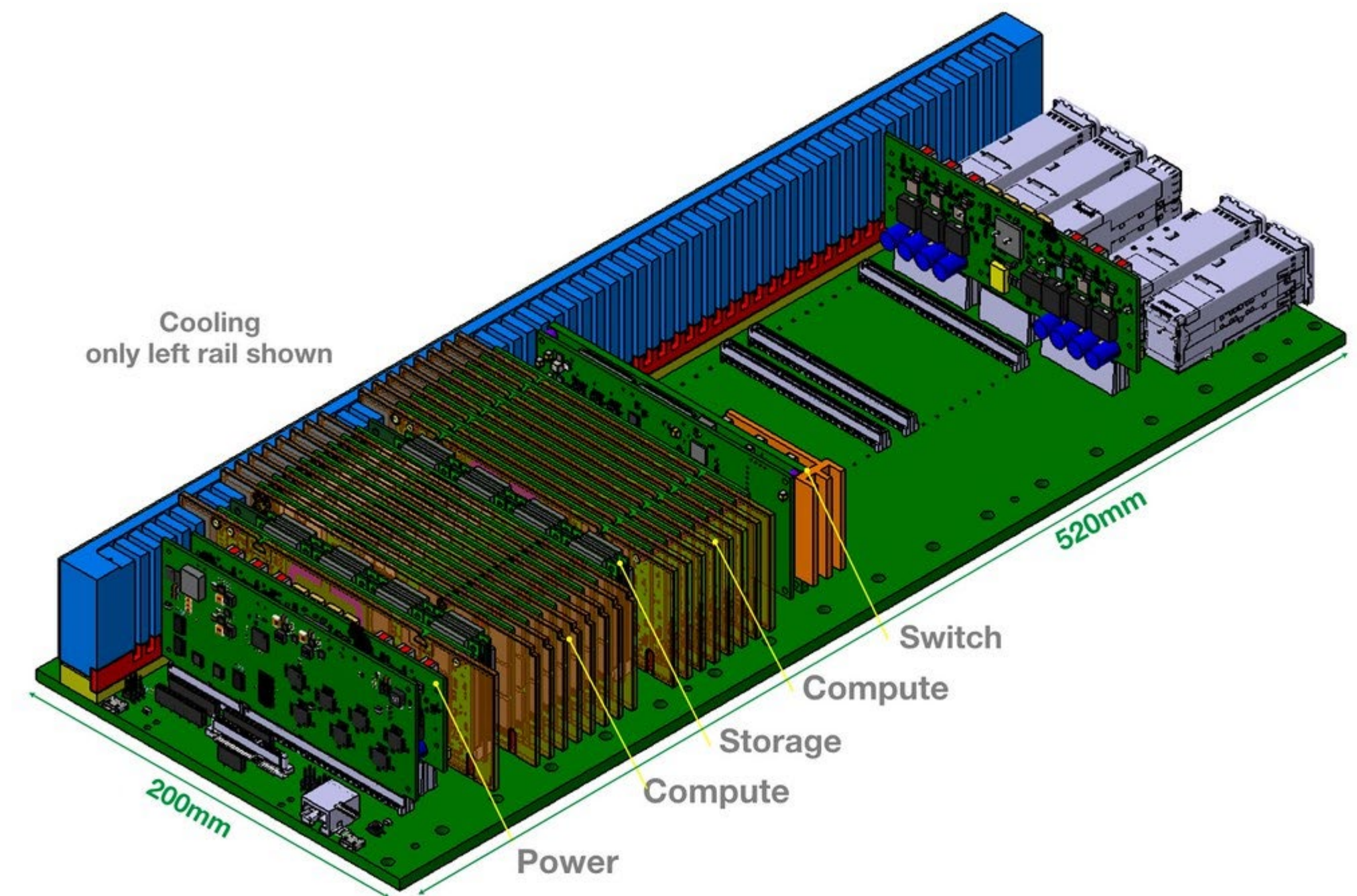
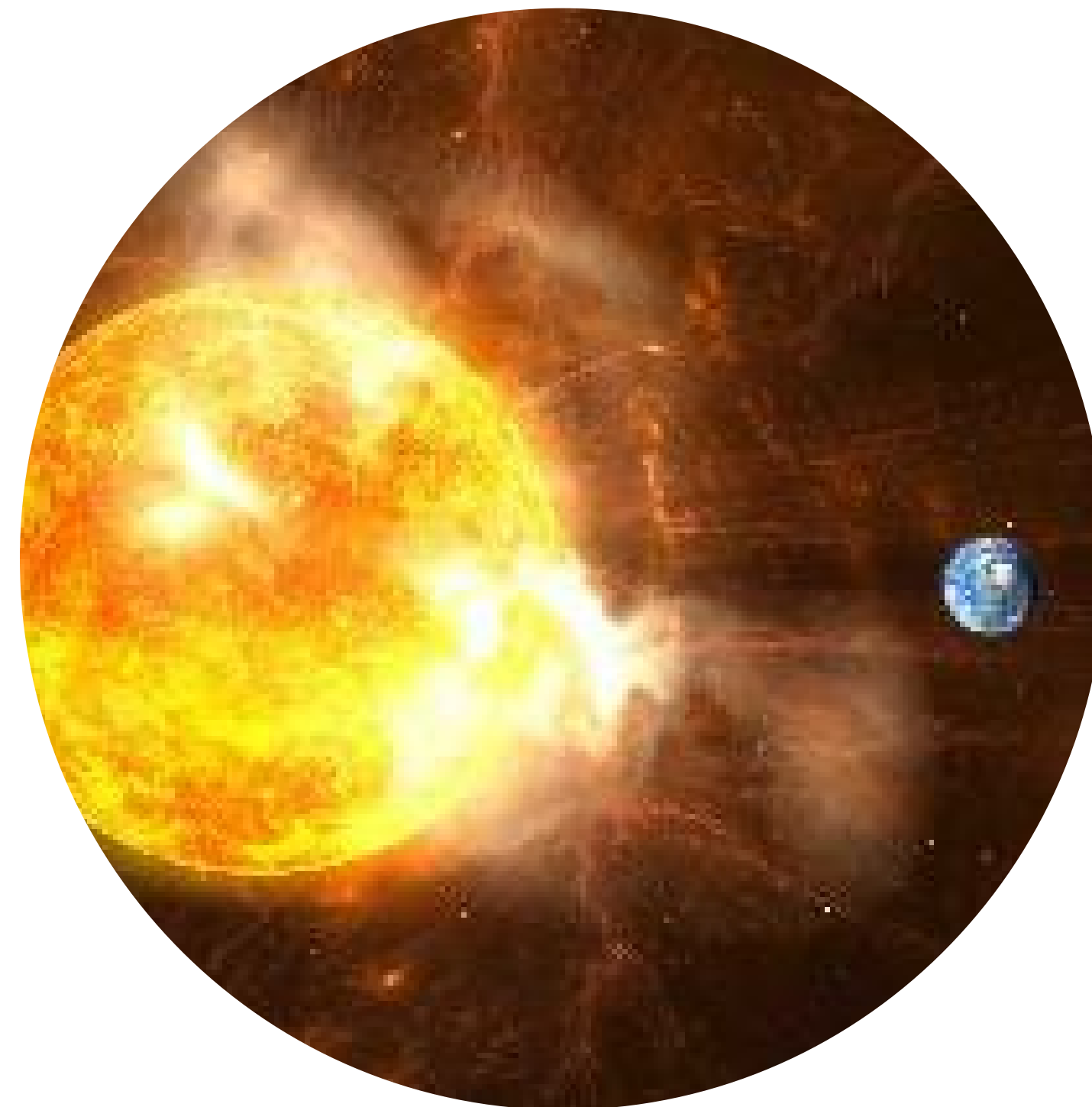
- > 50 km of coaxial cable assemblies!
- 192 Receiver units
- 1 ILT container with EMI shielding
- 800 m³ of structural parts for the High Band Antennas
- 24 Transient Buffer Boards
- 12 Remote Signal Processing boards
- 1536 High band dual-polarized amplifiers
- ... and much more..

- ... to transport from The Netherlands to Latvia
(Viraki, near Ventspils)
- **(Approx 15 trailers !)**



From 2015 – Large societal challenges

- Mixture of felt responsibility and funding necessity...
- Space Weather, Green Supercomputing, Data Practitioners



Making innovation happen through radio astronomy!

Sharing Technology

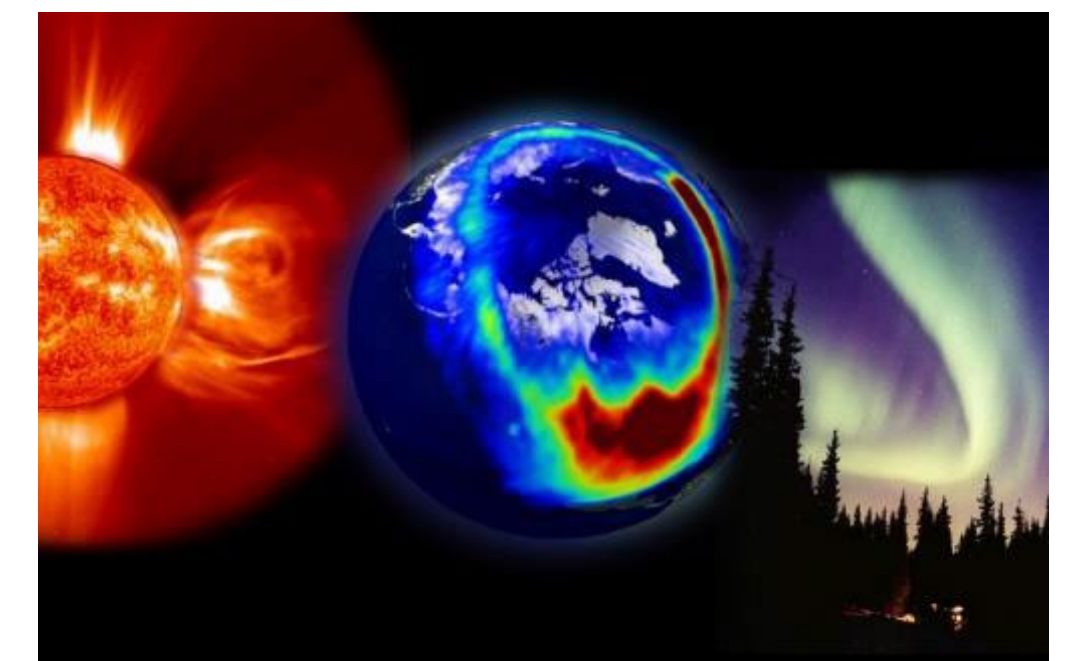
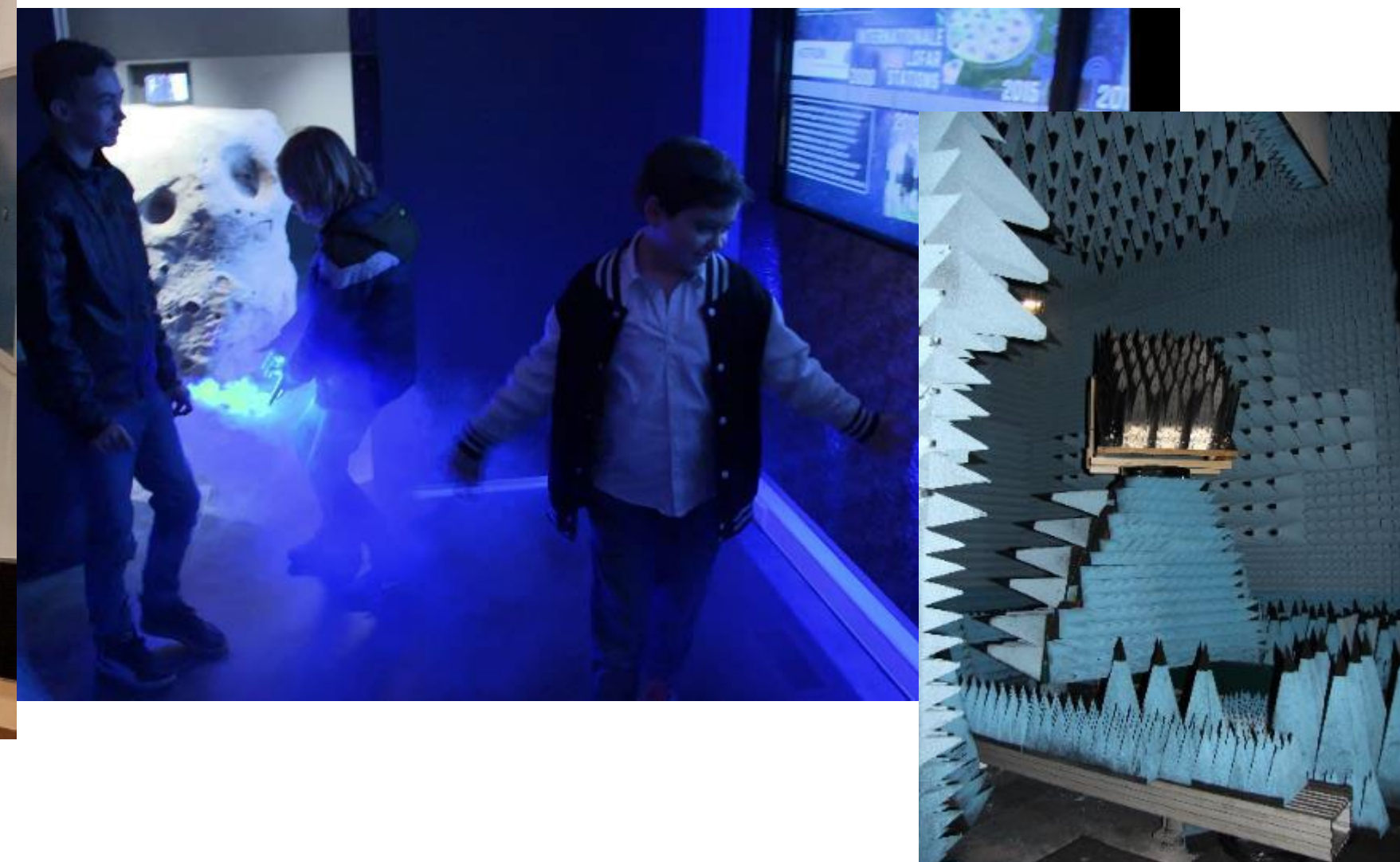
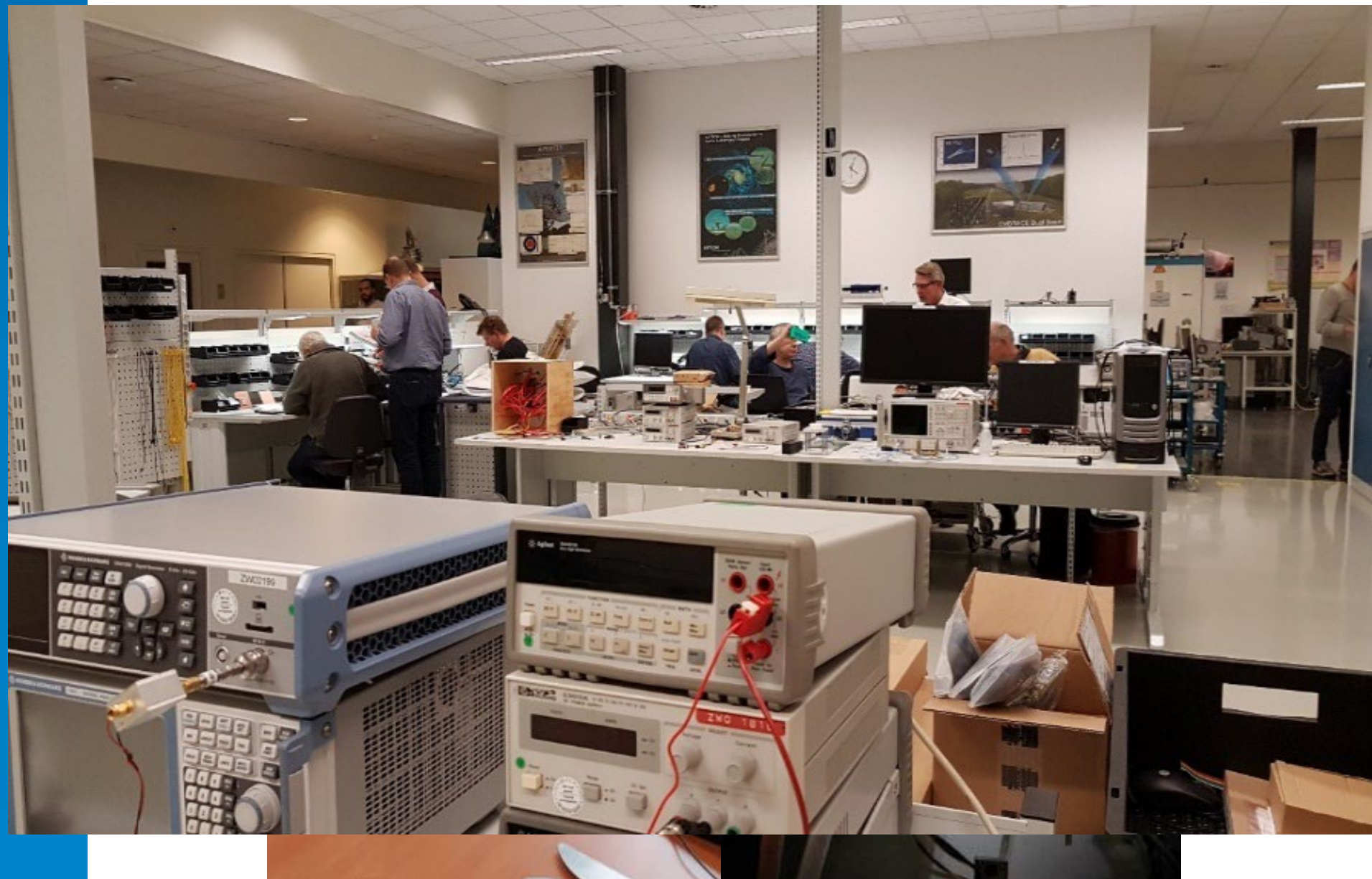
- Technology Transfer
- Joint development
- Business development

Sharing Science

- Outreach / STEM
- Open Science Hubs
- Data Schools

Sharing Facilities

- Wireless Data Lab
- Galileo monitoring @ WSRT
- Space Weather @ LOFAR

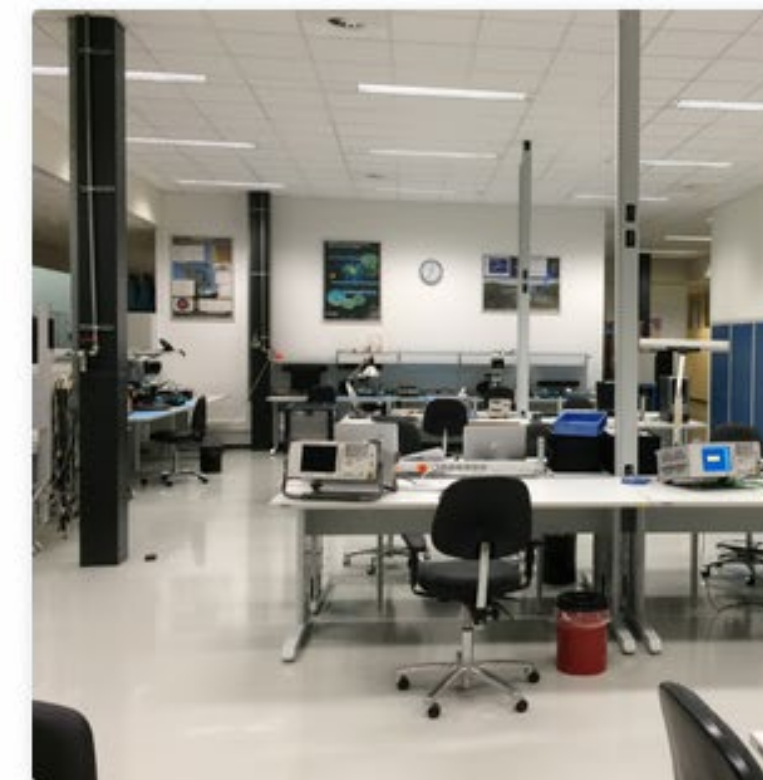


ASTRON

Netherlands Institute for Radio Astronomy

Around 2020 – Participating in the region

- Using science to inspire young people
- Helping to develop an attractive region
- Stimulation local initiatives and regional job market



📅 24 maart 2022

ASTRON lanceert proeftuin voor ondernemers

Om onze kennis over het heelal te vergroten, verlegt ASTRON voortdurend de grenzen van de technologie in haar radiotelescopieën. Deze expertise stellen wij nu ter beschikking om de innovatieve kracht van ondernemers te vergroten. Hiertoe lanceren we het Wireless Data Lab (WDL), een proeftuin waarmee ASTRON haar kennis en faciliteiten op het gebied van draadloze...



📅 22 maart 2022

High-tech Safari's voor bètastudies populair

High-tech Safari's voor bètastudies populair



Wireless Data Lab (WDL)

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



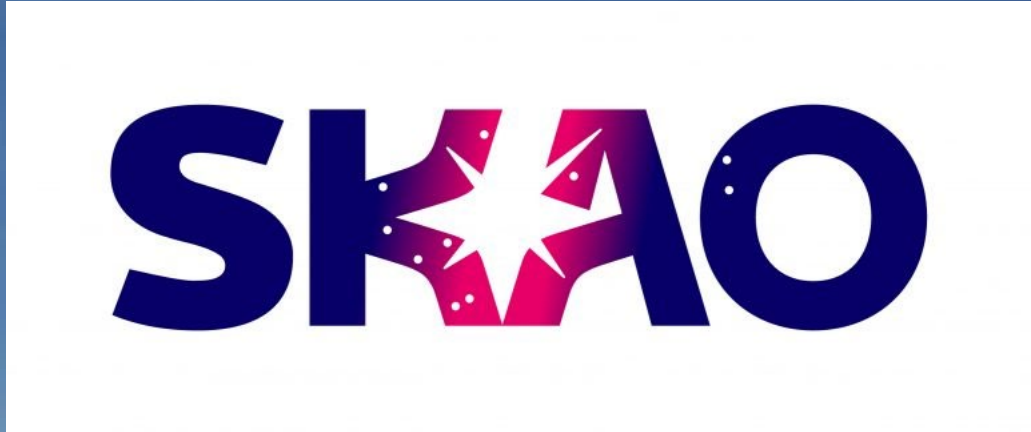
➤ **Sharing test and measurement facilities:**

- 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/>



Lessons learned...

- **Inherent opportunities and risks in each phase**
- **Different phases in science-industry engagement**
 - State phases rather than historical development
 - Context dependent
 - Cannot enforce them without energy!
- **Question:** aren't we kidding ourselves if we focus on the construction phase?
 - Dutch science system has very limited means for operations...

Looking closer at the Big Science phase

- **Excellent opportunities for SMEs**
 - Covers a broad variety of TRL levels (including the higher levels)
 - Covers a broad variety timescopes (including the shorter ones)

Question: which phase is most optimized for SME collaborations?