

Image: Hercules A

Credit: R. Timmerman; LOFAR & Hubble Space Telescope

GLOW COUNCIL MEETING,
NOVEMBER 2021

LOFAR 2.0 & LOFAR WG

DOMINIK J SCHWARZ (BIELEFELD)

LOFAR WG — ORGANISATION

- ▶ Governance issues: Regular video conferences of LOFAR Station & LTA Owners
- ▶ GLOW representative at ILT Board: Dominik Schwarz
- ▶ Time Allocation Committee (allocate GLOW consortium time twice per year)
Chair: Matthias Hoeft; LOFAR Station Owners + Stefan Wagner as RdS representative
- ▶ Science Working Group (presentation by Marcus Brüggén) –
includes science from any radio facility of GLOW interest
- ▶ Technical Working Group (presentation by Jörn Kümsemöller) –
focus on LOFAR only, covers hard- and software aspects
- ▶ BMBF ErUM-Pro: D-LOFAR2.0 (coordinator Marcus Brüggén)
U Hamburg, U Bielefeld, RU Bochum, TLS Tautenburg,
Associated Partner: FZ Jülich

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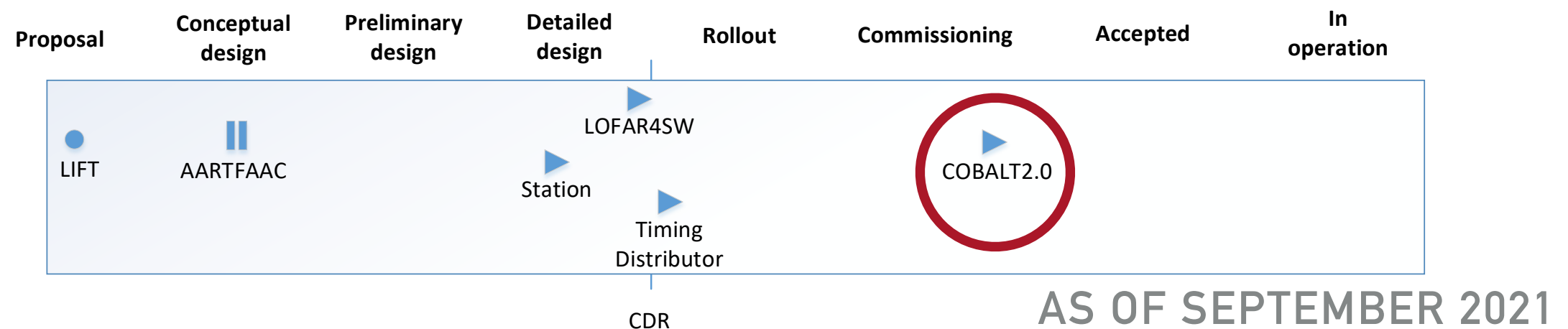
LOFAR FAMILY MEETING 2022 — PREANNOUNCEMENT

- ▶ Save the date: June 13 - 17, 2022
- ▶ Venue: Cologne or Düsseldorf
- ▶ Still needs to be confirmed by ILT

LOFAR 2.0

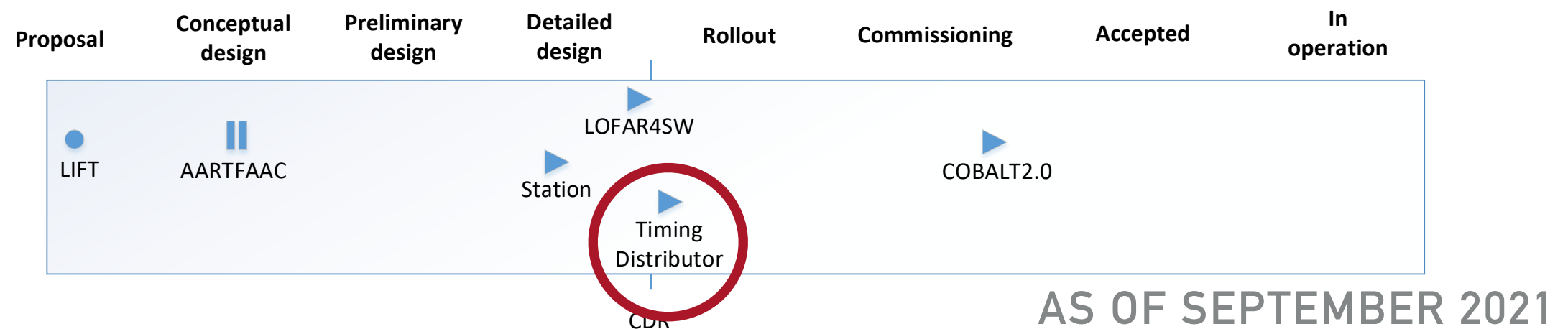
- ▶ **Coordinated set of staged upgrades** that will keep LOFAR cutting-edge for the 2020s
- ▶ LOFAR will be unique and complementary to other facilities beyond 2030 as
 - its angular resolution is 10 x better than SKA-LOW
 - it includes frequencies below 50 MHz
 - it observes in the Northern hemisphere

LOFAR 2.0 — ONGOING DEVELOPMENTS



- ▶ **New correlator (COBALT2.0)**
 - increased flexibility of observational modes
 - allows for simultaneous beam-formed and interferometric observations
 - allows sub-arrays and multiple beams on sky
- ▶ **New Telescope Manager (TMSS)**
 - must support all observing modes, most common ones are already implemented, more to come this and next year

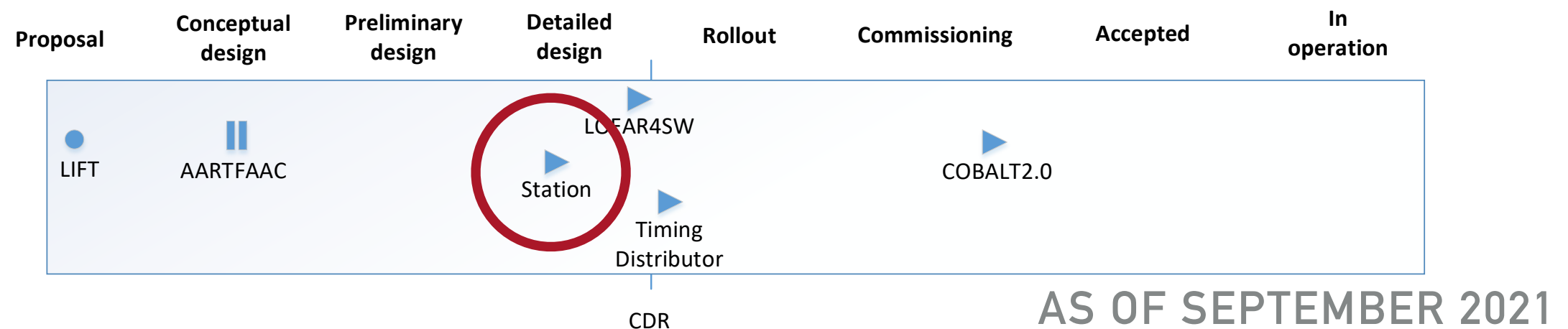
LOFAR 2.0 — ONGOING DEVELOPMENTS



► Timing Distributor

- White Rabbit clock distributor was developed at CERN for LHC beam control (sub-ns timing across 27 km)
- All core and remote stations will be put on the same clock
- First investigations if that could also be done for international baselines by SURFNet (recent development)

LOFAR 2.0 — ONGOING DEVELOPMENTS



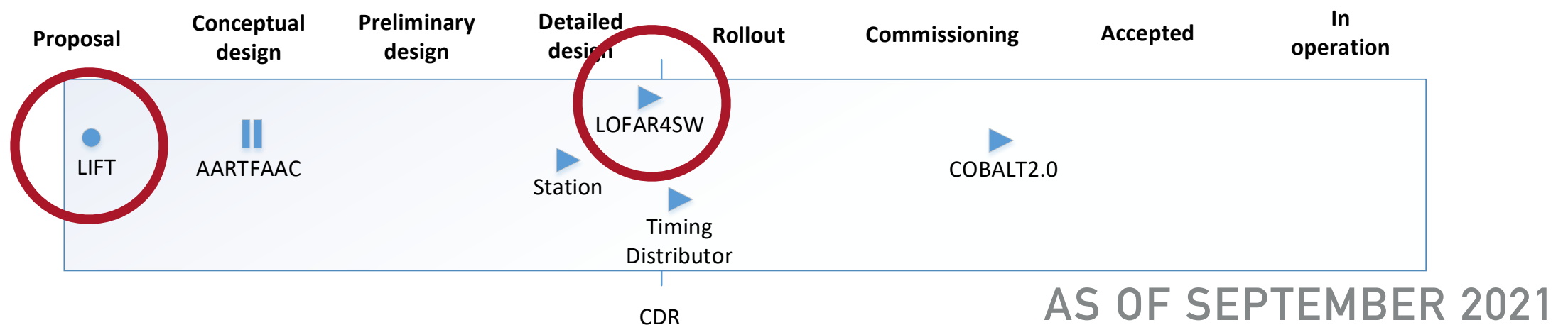
▶ **New station electronics**

- simultaneous LBA + HBA observations (all stations)
- all 96 LBAs at core & remote stations (double sensitivity)
- better RFI mitigation (increased dynamic range, filters and switch)

▶ Test station at Dwingeloo

▶ Better thermal control at Dutch stations (hot summers stress electronics)

LOFAR 2.0 — ONGOING DEVELOPMENTS



► Dual Beam in HBA

- design study completed by LOFAR4SW (EU project)
- requires further development and funding
- optional programme

► Transient and Cosmic Ray Science with **Buffer Boards** (LIFT)

- hardware will be rolled out with new station electronics
- BUT requires extra funding for firm- and software development

LOFAR 2.0 — ONGOING DEVELOPMENTS

▶ **LOFAR Data Valorisation Project**

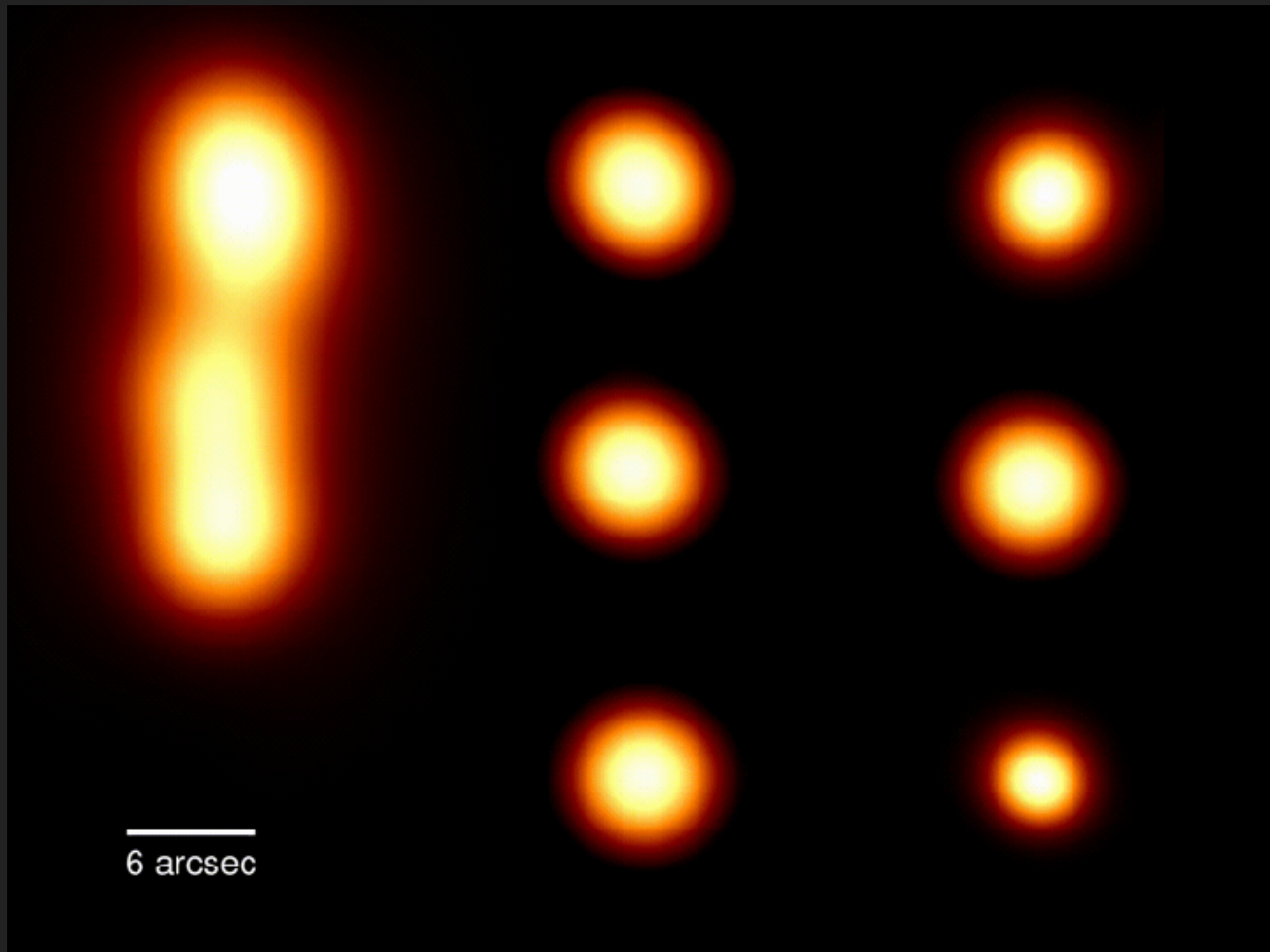
- curate and compress old observations at all 3 LTAs
- provide pre-analysed data (prefactor)
- provide image data via Rapthor pipeline (under development)

Goal: turn all beam formed and interferometric data in LTA (up to cycle 14) into science ready form

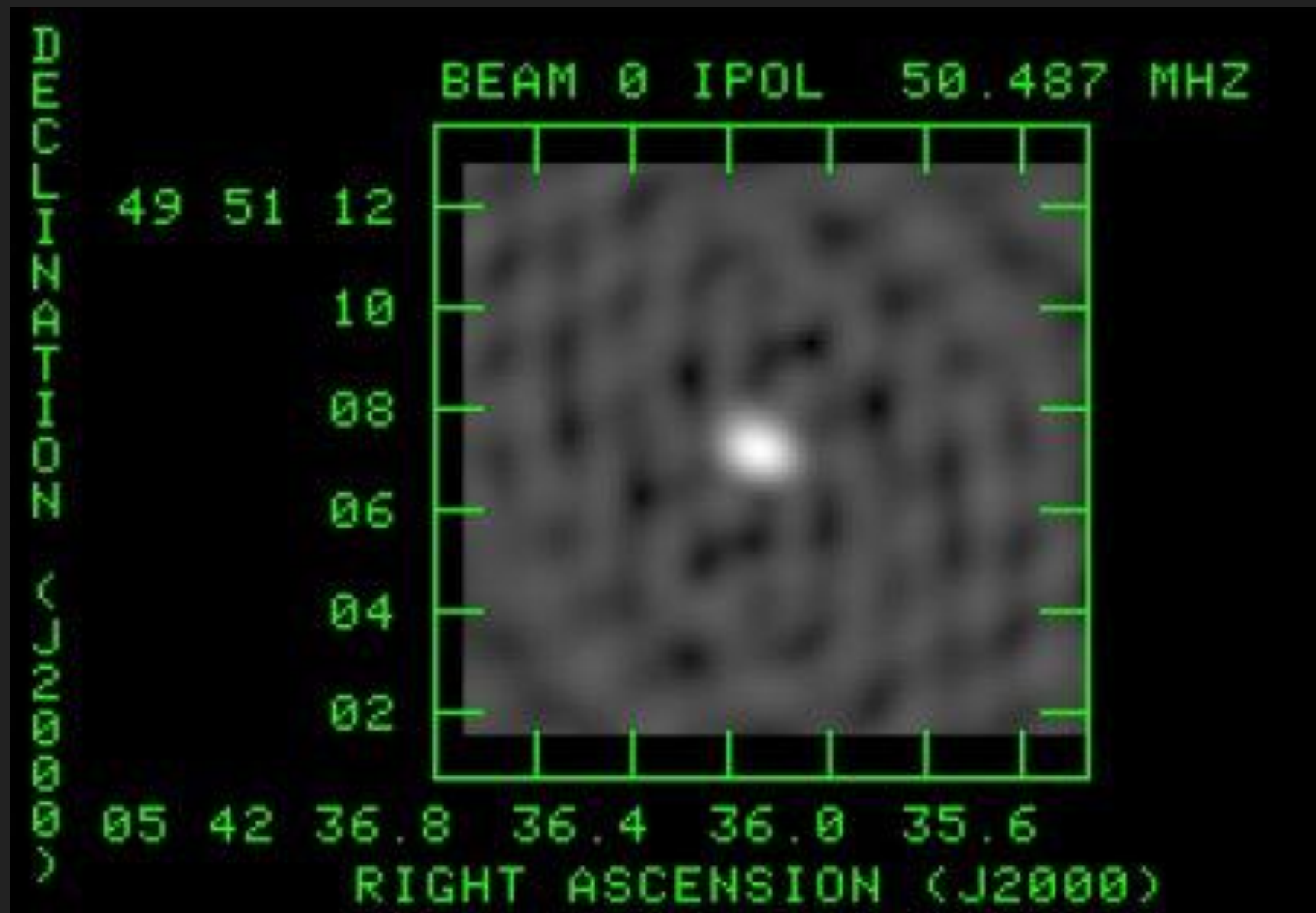
▶ Further pipeline development driven by KSPs

- Most importantly: **LOFAR VLBI development**
- Paper splash in 2021

LOFAR VLBI ($6'' \rightarrow 0.2''$)



LOFAR 2.0 — FIRST ILT-NENUFAR IMAGE (3C147)



2 MHz bandwidth @ 50.5 MHz

Beam: 0.91" x 0.76", position angle 85 deg, source is resolved (!)

LOFAR 2.0 — LARGE PROGRAMMS

- ▶ LOFAR 1.0 science programme will run until 2023
- ▶ 2023 & 2024 roll-out of new station electronics and commissioning (largest uncertainty on time line is the current shortage of critical electronics components on market)
- ▶ LOFAR 2.0 Large Programmes will commence in 2025
- ▶ Call for **Expressions of Interest** (deadline **December 3, 2021**)
- ▶ **Workshop** to maximise science impact of large programmes in 2022
Process steered by LOFAR2.0 Science Advisory Committee
- ▶ **Full proposals** in early summer 2022, selection by end of 2022
- ▶ Proposals will be evaluated by LOFAR Programme Committee
Decisions will be taken by (Interim) LOFAR ERIC Council

GLOW COUNCIL MEETING,
NOVEMBER 2021

ILT BOARD & LOFAR ERIC

DOMINIK J SCHWARZ (BIELEFELD)

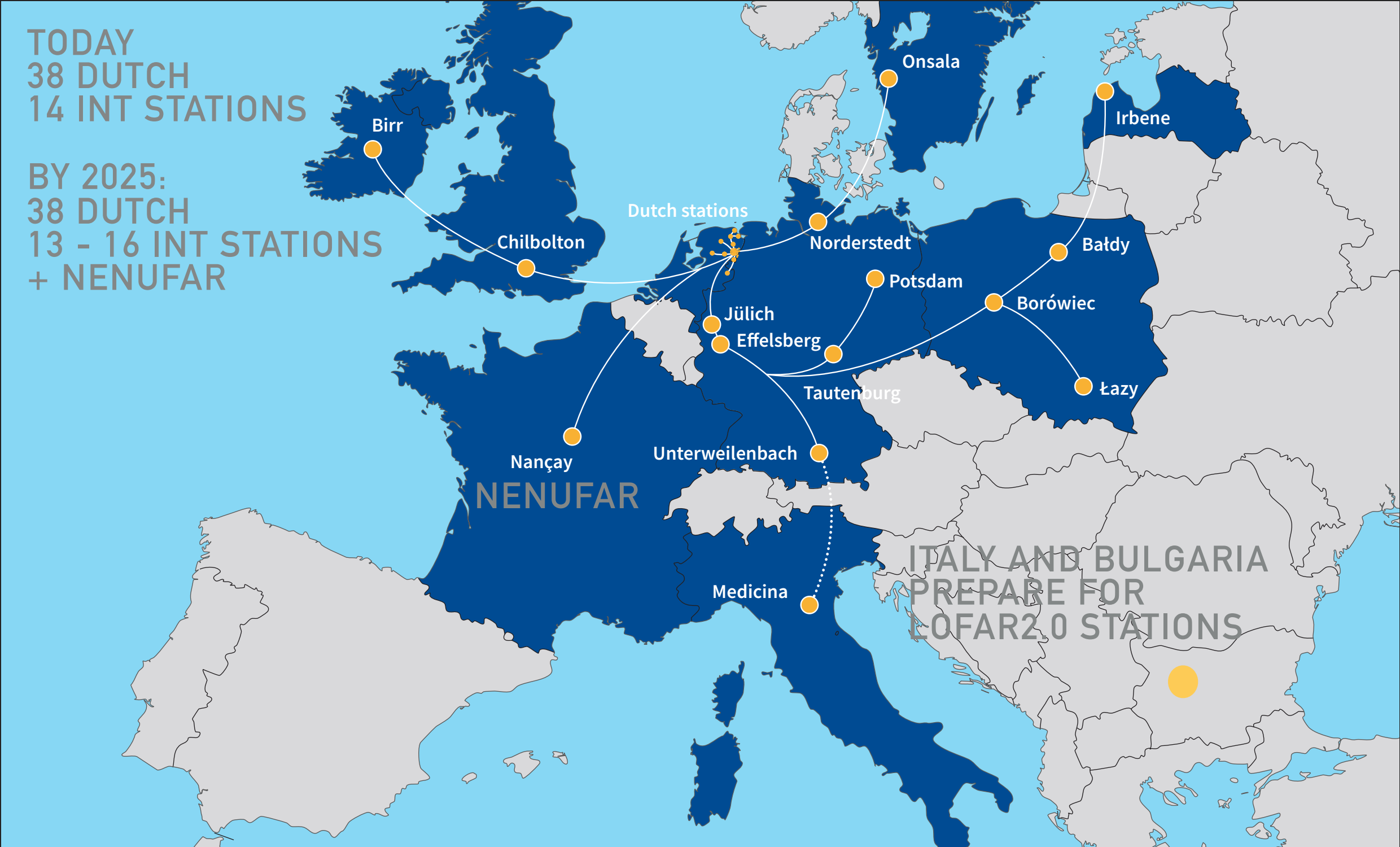
A VERY BUSY YEAR

- ▶ **ILT Board:**
14 Dec 20, 21 Jan 21, 31 Mar 21, 16 Jun 21, 29 Sep 21, 14 Dec 21
- ▶ **LOFAR ERIC Working Group (Kroseberg BMBF, Schott PT DLR, me):**
15 Nov 20, 28 Jan 21, 18 Mar 21, 19 Apr 21, 21 Jun 21
- ▶ **ILT-ERIC Working Group:**
23 Nov 20, 19 Feb 21, 14 Apr 21, 27 May 21, 19 Oct 21, 17 Nov 21
- ▶ **Interim LOFAR ERIC Council (Kroseberg BMBF, Schott PT DLR, me):**
8 Sep 21, 3 Nov 21, 16 Dec 21
- ▶ **Plus other preparatory meetings plus GLOW internal coordination**

INTERNATIONAL LOFAR TELESCOPE

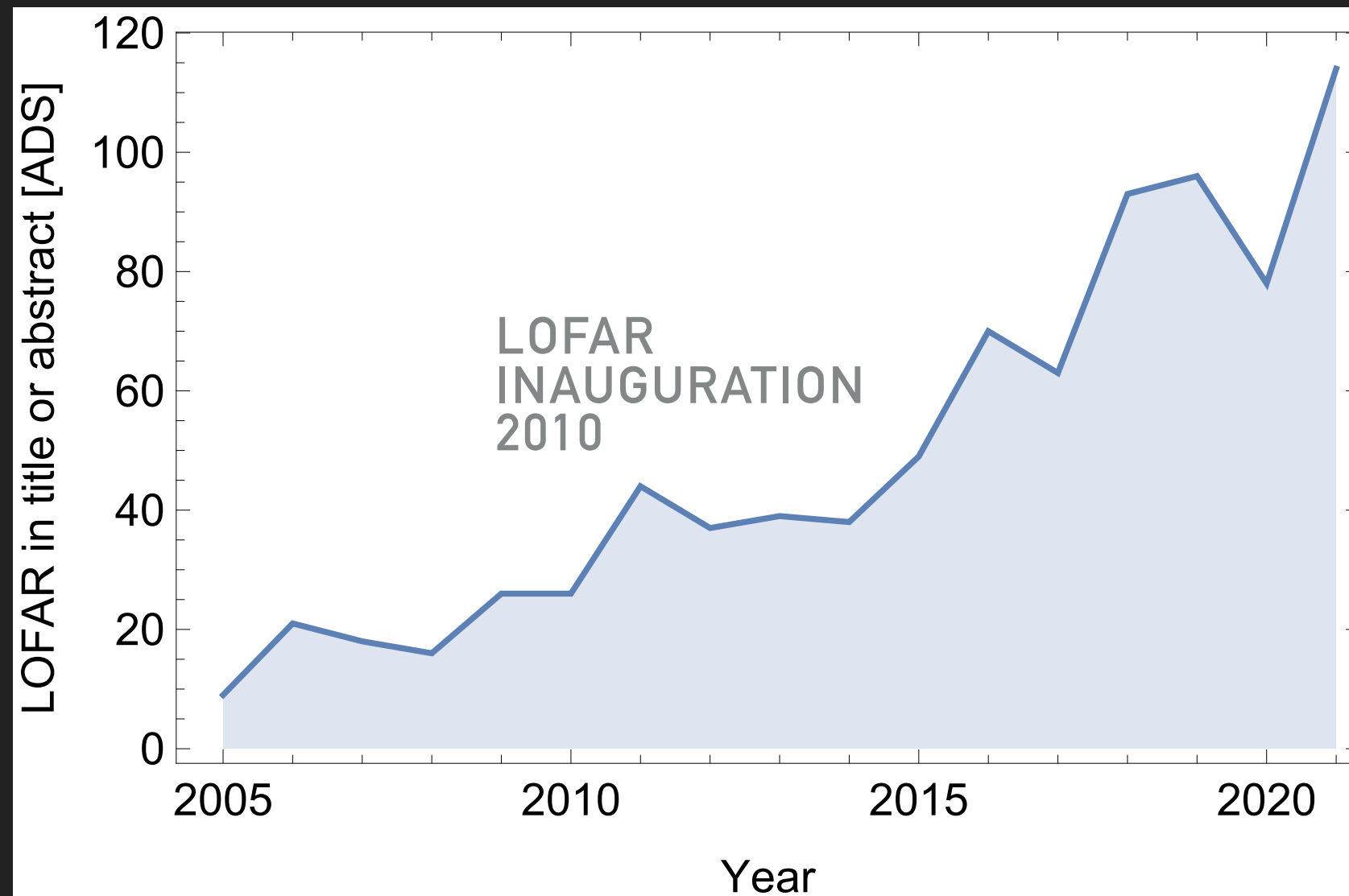
- ▶ ILT is a Stichting under Dutch law (board members are personally liable)
- ▶ Bulgaria joined as an observer
- ▶ Stable budget (mix of cash and in-kind from various parties)
- ▶ Operations:
In general efficient and stable operations, BUT
a bug introduced in the upgrade of COBALT resulted in a loss of about 1400 h of observations in 2021
Strategy to recover as most of the lost science as possible in cycle 17 and beyond
- ▶ Focus of ILT activities in last year:
LOFAR2.0, LOFAR Data Valorisation Project, LOFAR ERIC

INTERNATIONAL LOFAR TELESCOPE



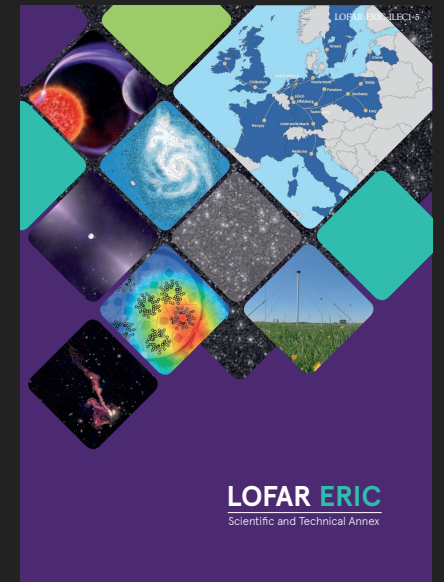
INTERNATIONAL LOFAR TELESCOPE

- Scientific output of LOFAR: refereed publications



TOWARDS LOFAR ERIC

- ▶ **ERIC = European Research Infrastructure Consortium**
- ▶ **Members and Observers are states or IGOs**
- ▶ **European Commission must agree** to the formation of a new ERIC
- ▶ Status of ERIC recognises the research area of the infrastructure as a priority in the EU
- ▶ Benefits in terms of limited liabilities, procurement & employment policy and taxation
- ▶ Application is a 2 step process
- ▶ Step 1 application for LOFAR ERIC has been submitted in September 2021
- ▶ Expect feedback by European Commission till end of this year
- ▶ Prepare for step 2 application in Feb/Mar 2022



TOWARDS LOFAR ERIC — TIMELINE & OPEN TASKS

Policies and agreements - Plan until step 2

Completed/In review

In progress

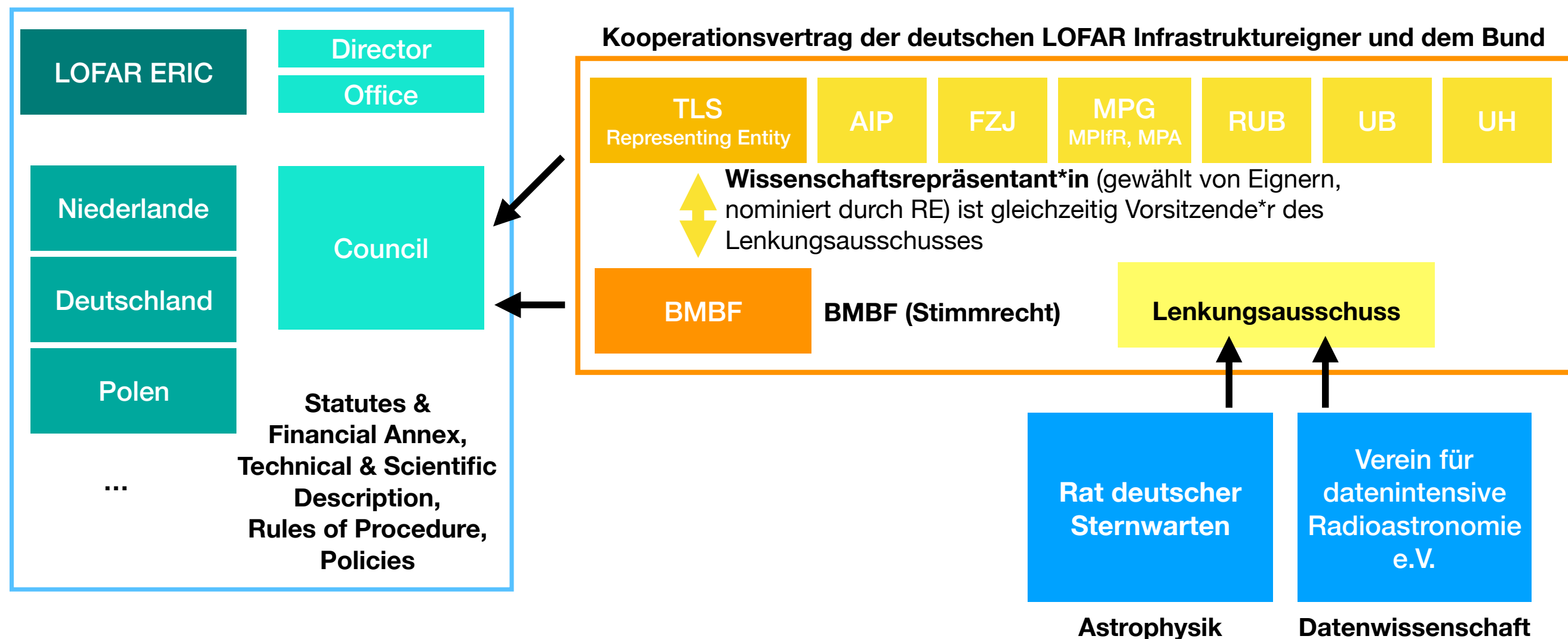
To be started

	By step 1 (September 2021)	By step 2 (February 2022)	After step 2 (by September 2022)
	(Current) format	Desired format	Desired format
step 1 documents			
Statutes	Full document	Revised document	
Scientific & technical annex	Full document	Revised document	
Financial plan and model	Full document	Revised document	
Agreements			
Collaboration Agreements	-	Full document	
Station uniform conditions	-	Full document	
LTA uniform conditions	-	Full document	
SLA with ASTRON	-	Full document	
Policies			
User Access policy	Nearly finalised document	Full document	
Transition from ILT to LOFAR ERIC	Bullets & general structure	Full document	
Decommissioning plan	Bullets & general structure	Full document	
Council Terms of Reference	ILEC Terms of Reference	Full document	
Procurement policy	-	Full document	
Intellectual Property Rights policy	-	Bullets & general structure	Full document
Data policy	-	Bullets & general structure	Full document
Scientific Evaluation policy	-	-	Full document
Committee policies	-	-	Full document
Employment policy	-	-	Full document
Dissemination policy	-	-	Full document
Ethical, Legal, and Social Implications policy	-	-	Full document

TOWARDS LOFAR ERIC — NATIONAL PERSPECTIVE

PROPOSED CONSTRUCTION

Organisation der deutschen Mitgliedschaft im LOFAR ERIC





**THANK YOU FOR YOUR
SUPPORT**