

# SDC Operations: Status and Plans

R. F. Pizzo

Head Science Data Centre Operations

**ASTRON**

Netherlands Institute for Radio Astronomy

Olsztyn, June 12<sup>th</sup> 2023



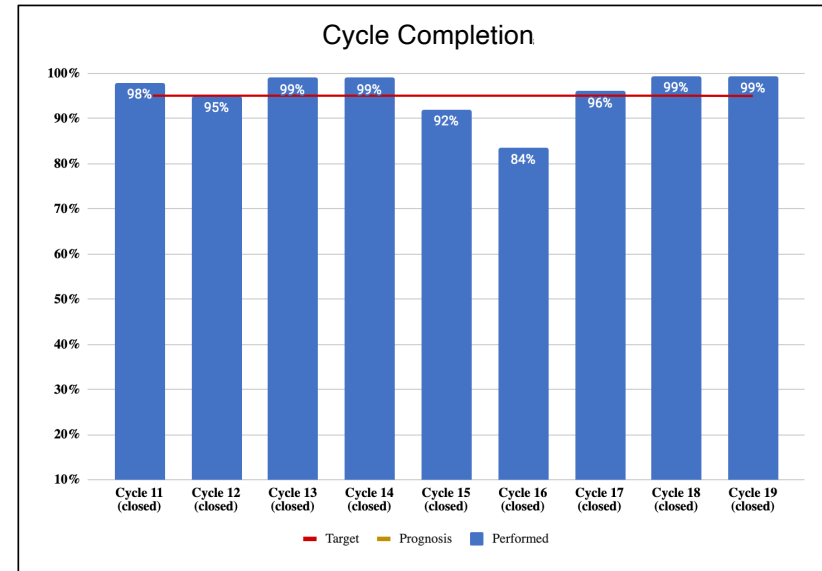
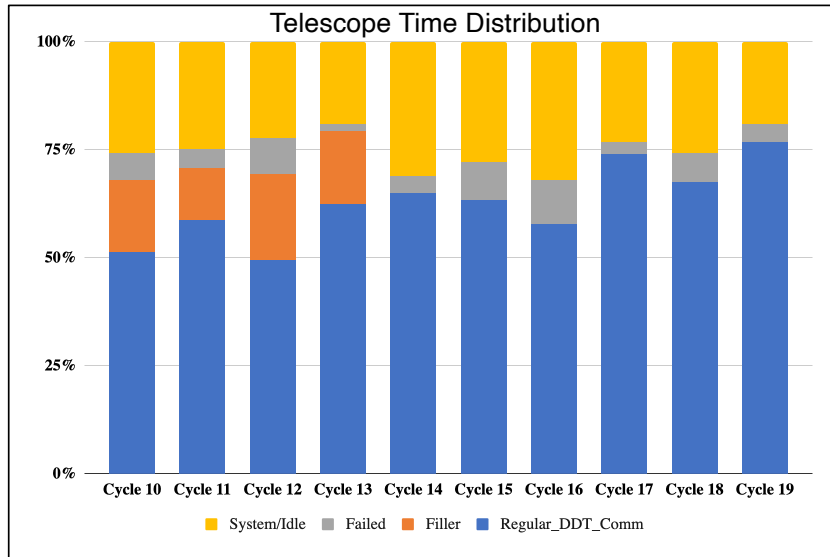
**LOFAR**

# THE INTERNATIONAL LOFAR TELESCOPE

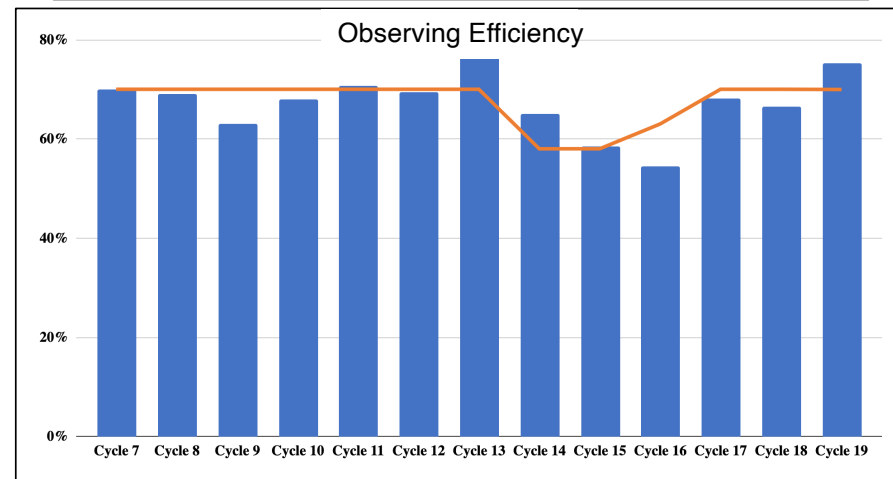


- 38 Dutch stations
- 14 International Stations
- 2 more stations coming in 2025:
  - Italy
  - Bulgaria

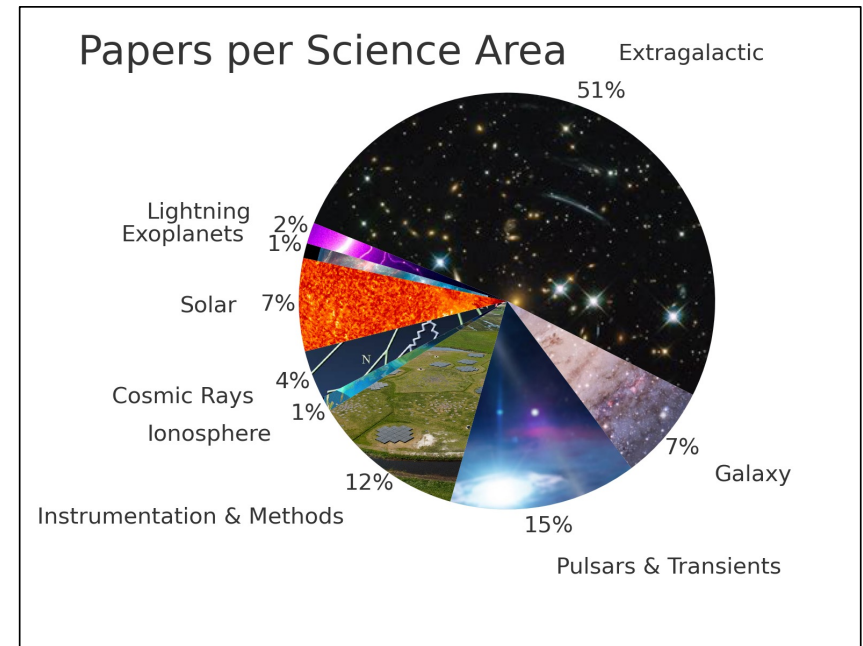
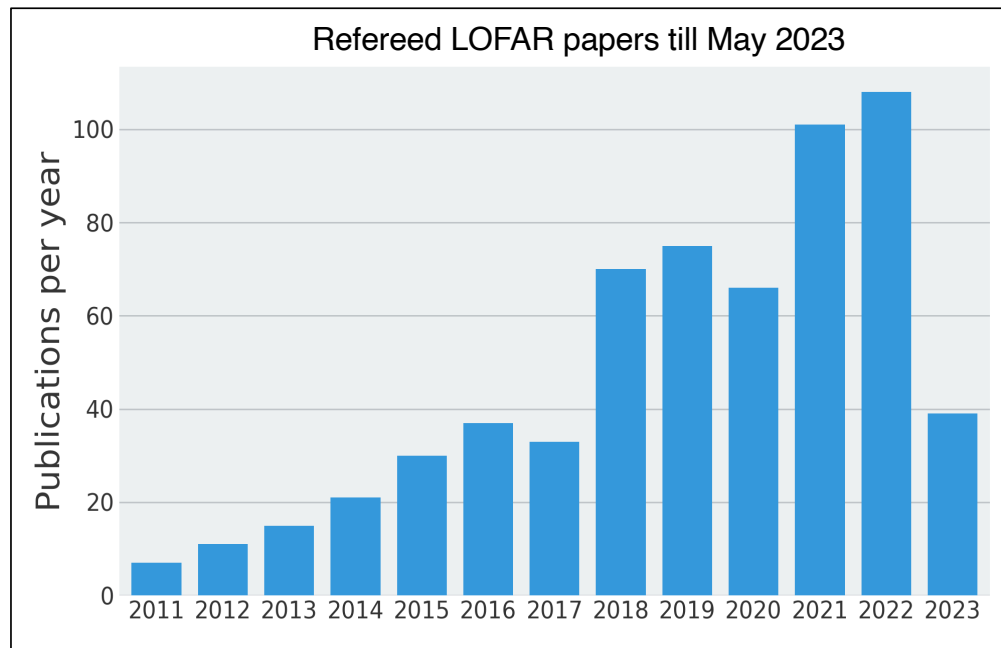
# LOFAR CYCLES AND OBSERVING EFFICIENCY



- Target efficiency: 70%
- Target completion: 95%
- Cycle 19: 99% completed - 75% efficiency



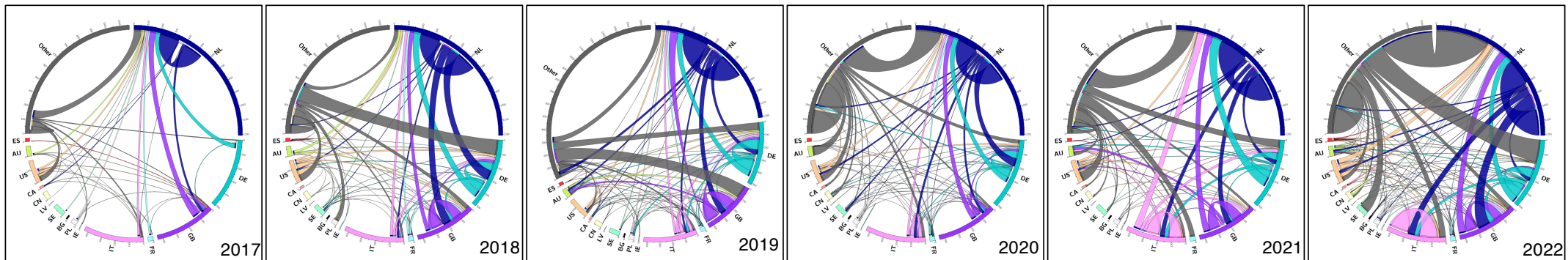
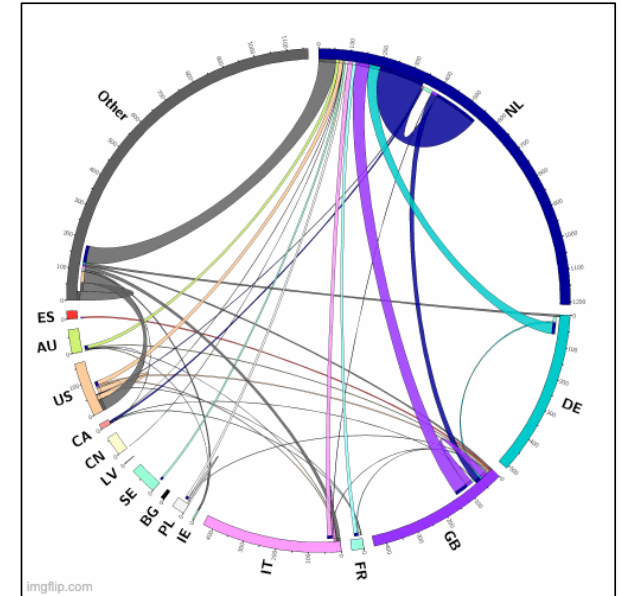
# LOFAR SCIENCE OUTPUT



- 613 refereed publications
- Publication rate: **2 papers per week – top 10% of all astronomical facilities**

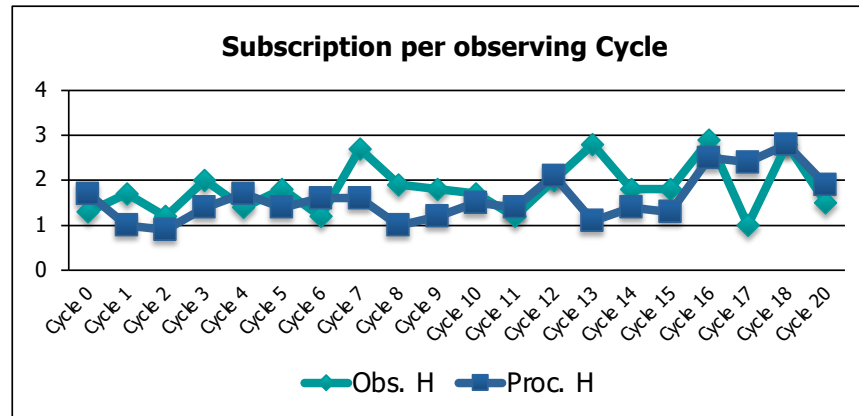
# COMMUNITY EVOLUTION

- Measuring the success of LOFAR: shape of the LOFAR community and evolution of international collaborations.
- LOFAR's community spans the entire World and expanded by over a factor of 3 in the period 2017-2022.
- Evolution of collaborations: chord plots obtained by analysing the LOFAR publications over the period 2017-2022.
- Between 2017 and 2022 there was a **factor of 7 increase in collaborations**.

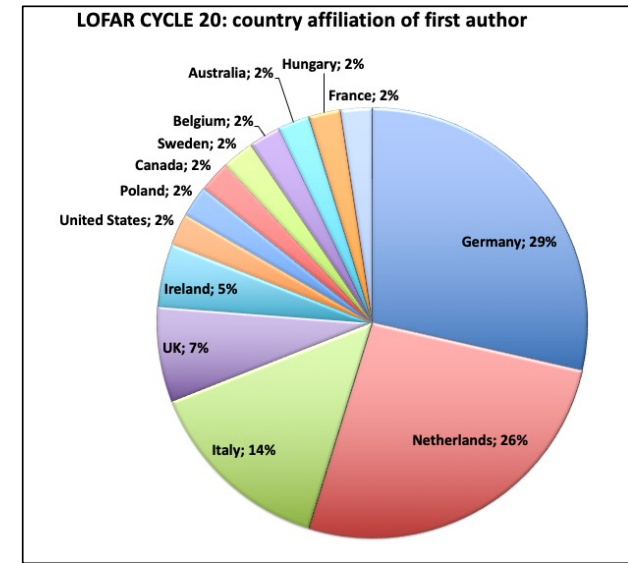
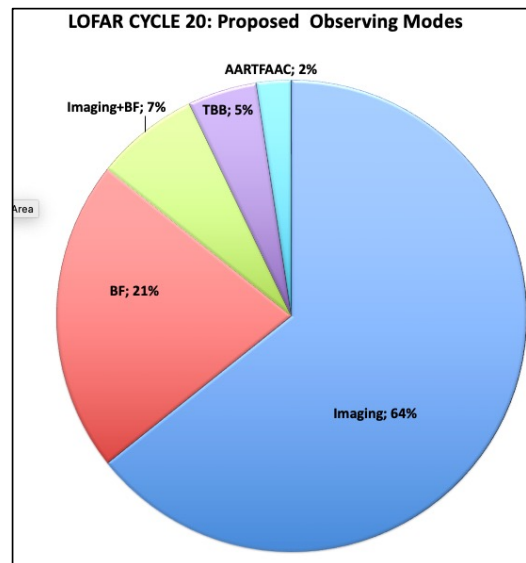
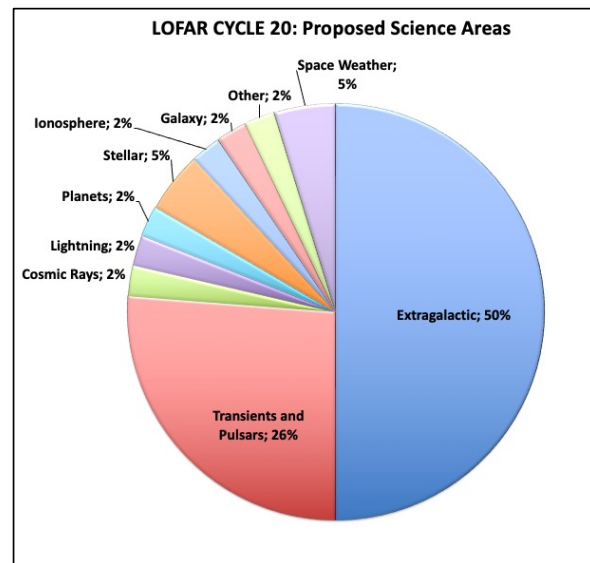


Courtesy of J. Dempsey

# THE LAST LOFAR1 CYCLE



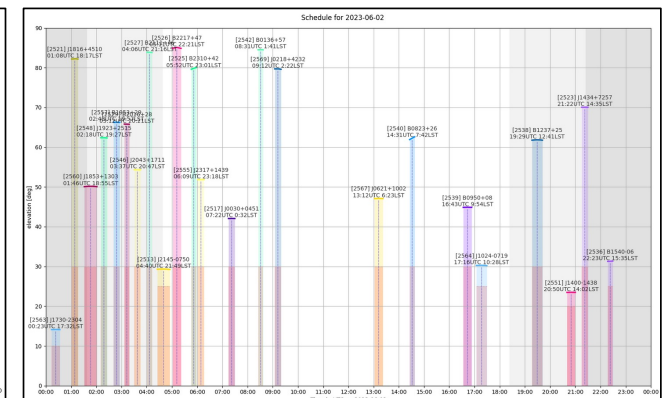
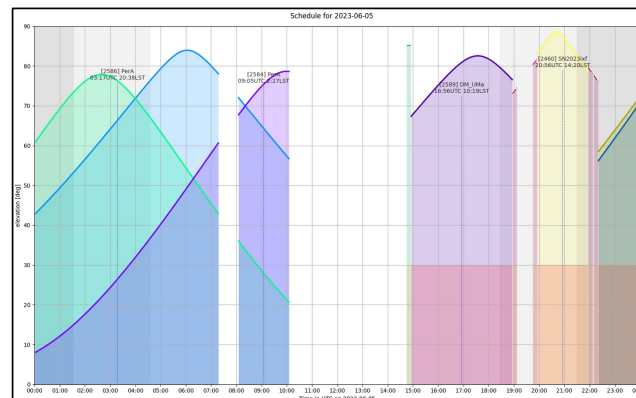
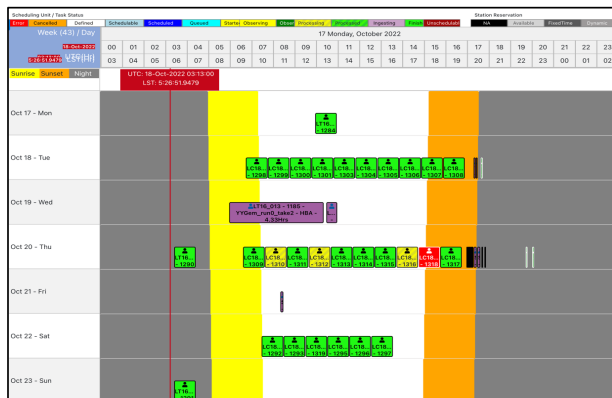
- LOFAR1 functionality still in high demand!
- Cycle 20 – **last LOFAR1 Cycle**
- 6000+ observing hours allocated
- **Downtime expected after 1 June 2024 till 2025 for the upgrade to LOFAR2**



# EVOLUTION: TMSS RUNS THE SHOW

## Benefits

- More **efficient** LOFAR operations
- **Dynamic scheduling**
- **Improved** adaptability and maintainability of software
- **TMSS running the full Cycle 20 observing program**
- Dynamic scheduler is live – [see today's ASTRON daily image!](#)
  - Schedule observations automatically based on constraints
  - Allows for responsive telescope interruptions



Images courtesy of the TMSS team 7

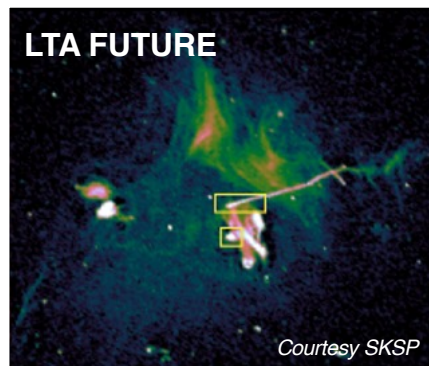
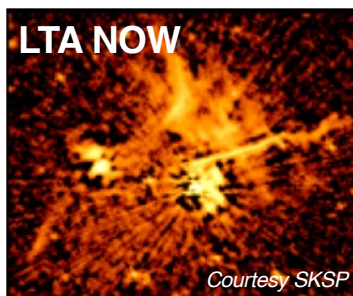
# EVOLUTION: NEW PROPOSAL MANAGEMENT TOOL

- NorthStar successor needed for LOFAR2
  - Timeline: ready in ~ 1 year
- Analyzed tools adopted at other major astronomical facilities
- Conclusion: adopt & adapt Edwig (East Asian Observatory)
- It will:
  - Support proposal creation and experiment specification
  - Support review process
  - Transfer technical specs of allocated projects automatically to facility management systems (LOFAR & SDC)
  - Integrate with FAAl

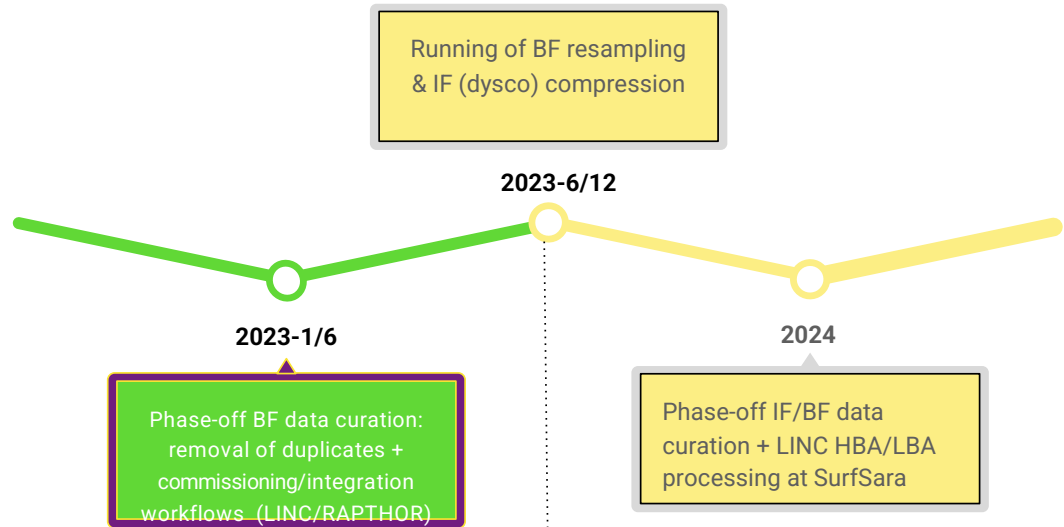


# EVOLUTION of LTA and LTA OPS THROUGH LDV

LOFAR Data Valorization: make **LTA data science-ready**



- Plus:
  - Reduce data volume at the LTA to reduce operational costs
  - Streamline data processing operations at the LTA
  - Prepare ASTRON for LOFAR2 surveys
- LDV Operations started early 2023 after development of necessary execution systems
- Current focus: BF data processing (re-quantization) – IF data compression following this year



goal: reduce storage occupancy @ Surf

# EVOLUTION of LTA and LTA OPS THROUGH LDV

LOFAR Long Term Archive

HOME SEARCH DATA BROWSE PROJECTS HELP

LC1\_027

Observation 1 to 100 (showing 100 of total 387) -

Averaging Pipeline (total 0) -

Calibration Pipeline (total 0) -

Imaging Pipeline (total 0) -

Long Baseline Pipeline (total 0) -

Pulsar Pipeline 1 to 100 (showing 100 of total 387) -

edit columns

first previous 1 2 3 4 next last

#	Project	Release Date	Pipeline Name	Pipeline Version	SAS Id	Pulsar Selection	doSinglePulseAnalysis	Strategy Name	convertRawTo8bit [s]	subintegrationLength	Source DataProduct	All DataProducts	Quality	Pulsars
1	LC1_027	2015-05-15	J1544+4937/PULP	n/a	1027091	Pulsars in observation specs, file or SAP	0	Pulsar Pipeline	0	-1.0	show	show	Good	0
2	LC1_027	2015-05-15	B1237+25/PULP	n/a	1027069	Pulsars in observation specs, file or SAP	0	Pulsar Pipeline	0	-1.0	show	show	Good	0
3	LC1_027	2015-05-15	B1133+16/PULP	n/a	1027047	Pulsars in observation specs, file or SAP	0	Pulsar Pipeline	0	-1.0	show	show	Good	0
4	LC1_027	2015-05-15	J1024-0719/PULP	n/a	1027025	Pulsars in observation specs, file or SAP	0	Pulsar Pipeline	0	-1.0	show	show	Moderate	0

## ➤ Plus:

- Reduce data volume at the LTA to reduce operational costs
- Streamline data processing operations at the LTA
- Prepare ASTRON for LOFAR2 surveys
- LDV Operations started early 2023 after development of necessary execution systems
- Current focus: BF data processing (re-quantization) – IF data compression following this year

Running of BF resampling & IF (dysco) compression

2023-6/12

2023-1/6

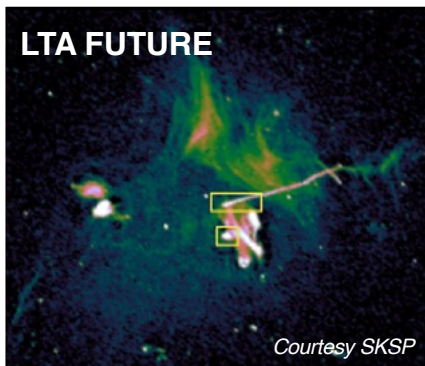
Phase-off BF data curation: removal of duplicates + commissioning/integration workflows (LINC/RAPTHOR)

2024

Phase-off IF/BF data curation + LINC HBA/LBA processing at SurfSara

goal: reduce storage occupancy @ Surf

LTA FUTURE



Courtesy SKSP

LTA FUTURE



Courtesy SKSP

# NEXT STEPS

- Continued **support to SDC & LOFAR2 Programs** to define & operationalize services:

- NorthStar successor
- SDC Focus Project
- LOFAR2 system

- **Commissioning:**

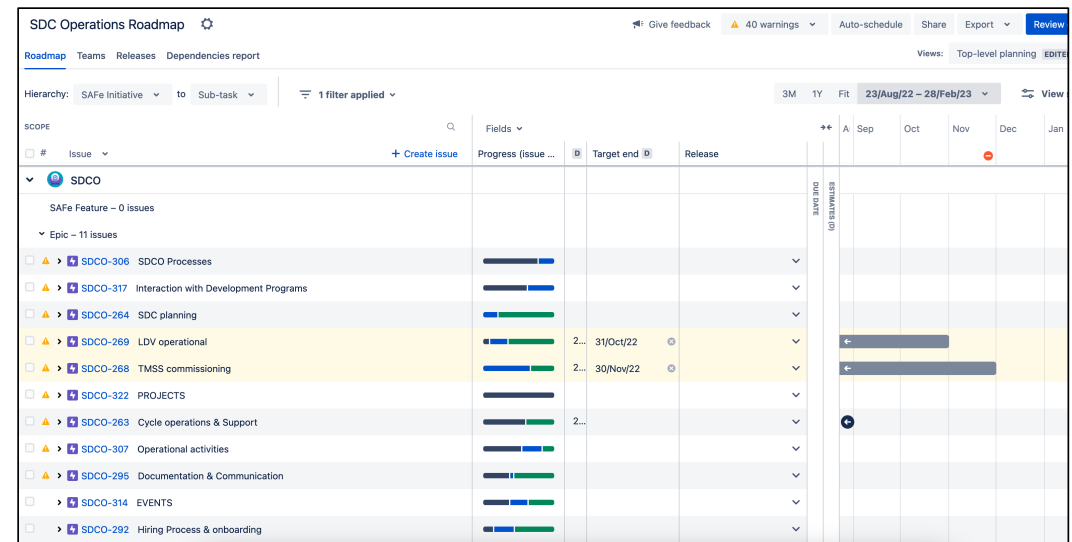
- Pipelines (LINC, Rapthor)
- TMSS
- Dynamic scheduler

- **Operations:**

- Cycle 20
- LOFAR2 Large Program proposals
- LDV

- **Community Engagement & Training:**

- **Coordination of the Large Programs exploitation**
- **LOFAR Data School – April 2024**




# SDCO GROUP EVOLUTION



- Securing necessary resources and expertise
- Strengthen the Instrument Scientist component in 2023/2024 to handle the future LOFAR2 and SDC challenges
- Seeking for Scientific Data Analysts ('SDCO operators')





Thanks – questions?