# SKA SWG Update

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# SKA Science Update

***Start Recording***

- Construction Update
- SKA Science Meetings
- Science Data Challenges
- SWG Collaboration Facilitation
- AOB

# Construction Strategy

- **Target**: build the SKA Baseline Design (197 Mid dishes; 512 Low stations: AA4)
- Not all funding yet secured, therefore following Staged Delivery Plan (AA*)
- Develop the earliest possible working demonstration of the architecture and supply chain (AA0.5).
- Then maintain a continuously working and expanding facility that demonstrates the full performance capabilities of the SKA Design.

AA = Array Assembly

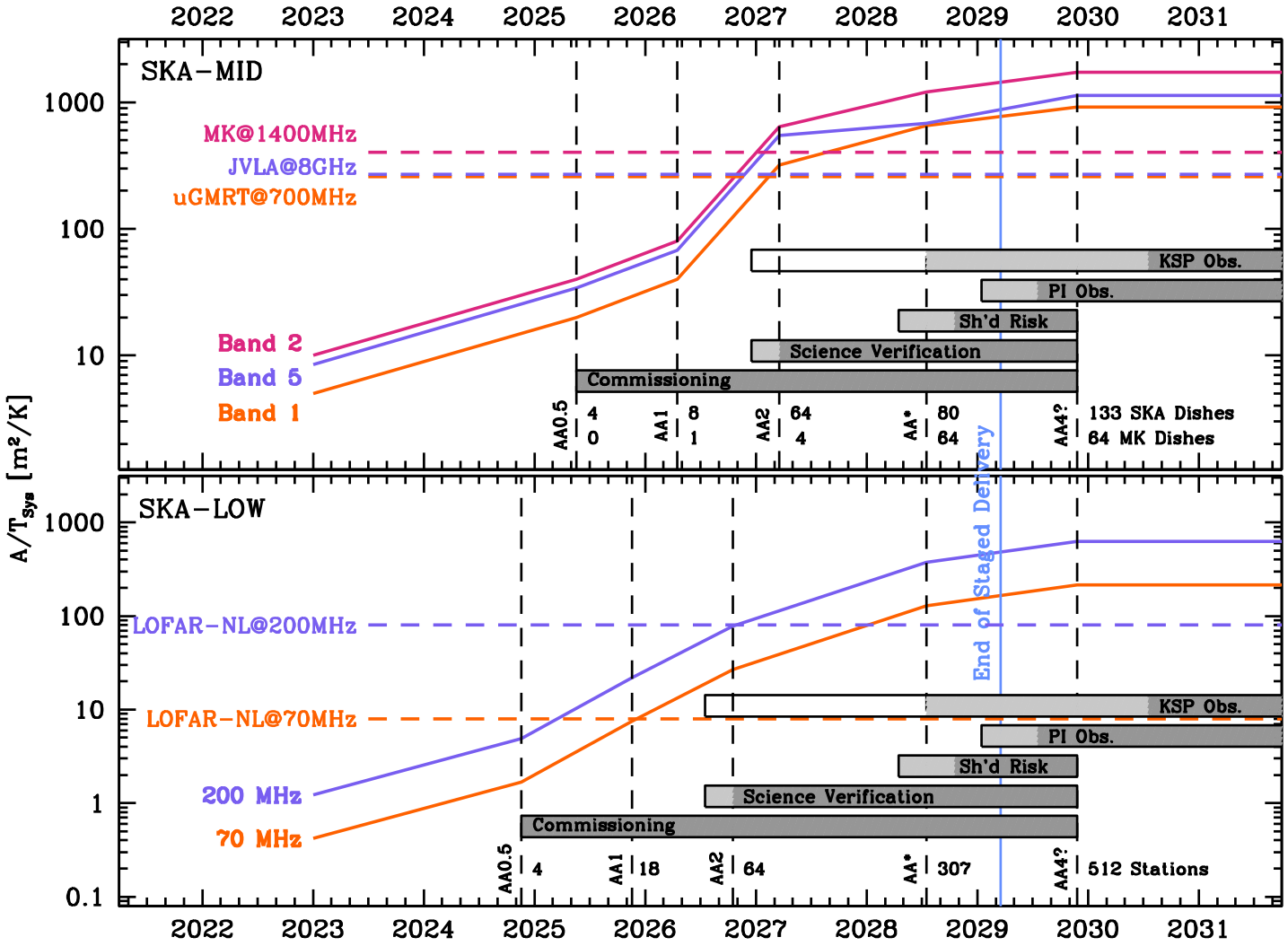
| Milestone Event (earliest) | | SKA-Mid | SKA-Low |
|---|---|---|---|
| Construction Approval | | 2021 Jul | 2021 Jul |
| AA0.5 AIV start | 4(3) dishes 4 stations | 2024 Nov | 2024 Jul |
| AA0.5 end | 4(3) dishes 4 stations | 2025 May | 2024 Nov |
| AA1 end | 8 dishes 18 stations | 2026 Apr | 2025 Nov |
| AA2 end | 64 dishes 64 stations | 2027 Mar | 2026 Oct |
| AA* end | 144 dishes 307 stations | 2027 Dec | 2028 Jan |
| Operations Readiness Review | | 2028 Apr | 2028 Apr |
| End of Staged Delivery programme | | March 2029 Formal end of Construction Including Schedule Contingency | |
| AA4 | 197 dishes 512 stations | TBD | TBD |

Dates from Jan 2024 Construction Report (not including contingency)

First data release to the community expected in 2026/27 (for science verification)

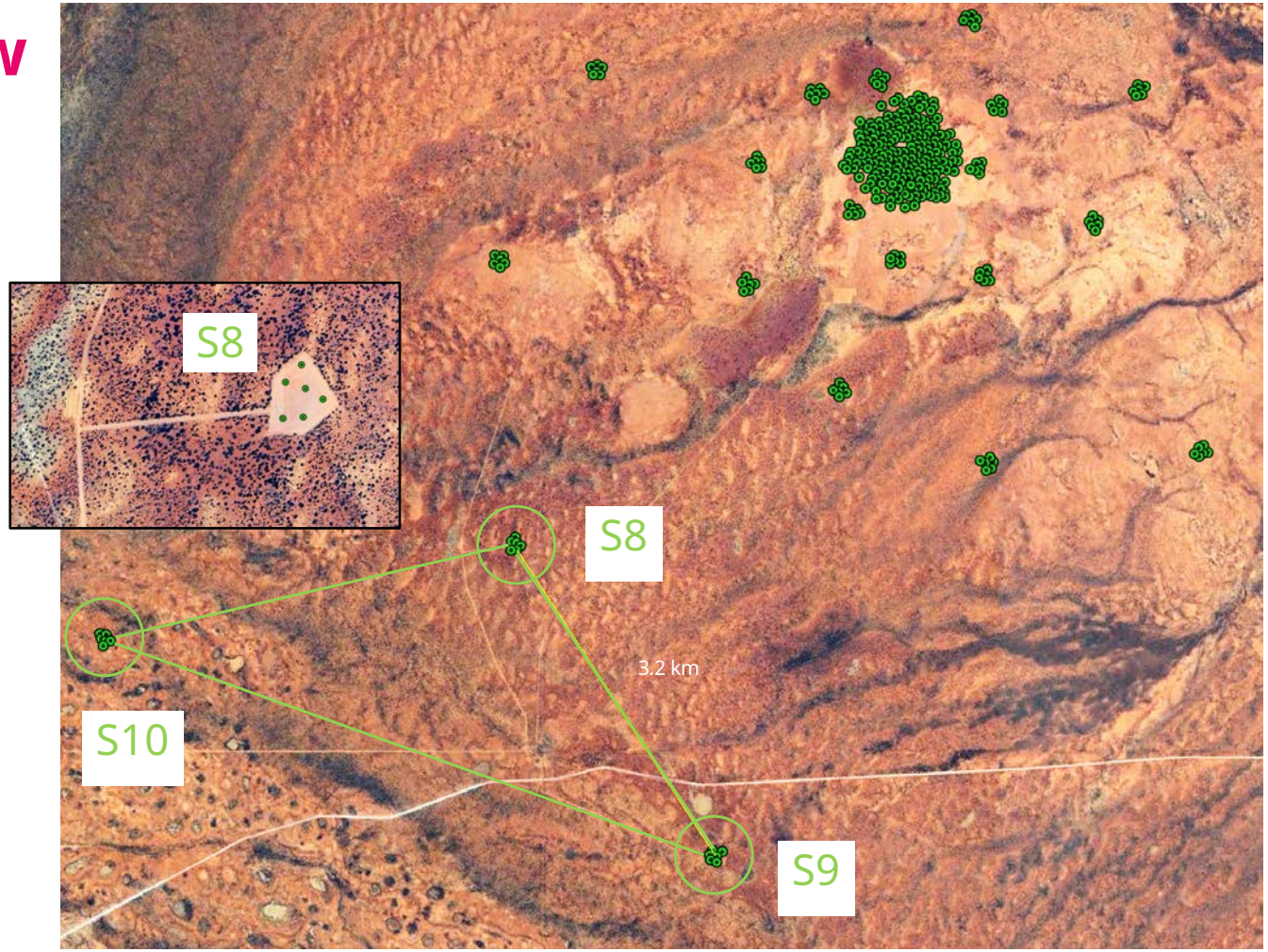
# SKAO Commissioning Timeline

- AA0.5
  - Basic imaging and Tied-Array Beams
  - Off-line reduction
  - Limited BW/$N_{Chan}$
- AA1
  - Plus multiple beams/sub-stations
- AA2
  - Plus pipeline reduction, more BW/ $N_{Chan}$
  - Science verification!
- AA*
  - Full BW, $N_{CHan}$, zooms
  - Shared Risk Cycle 0
  - PI and KSP Proposals!



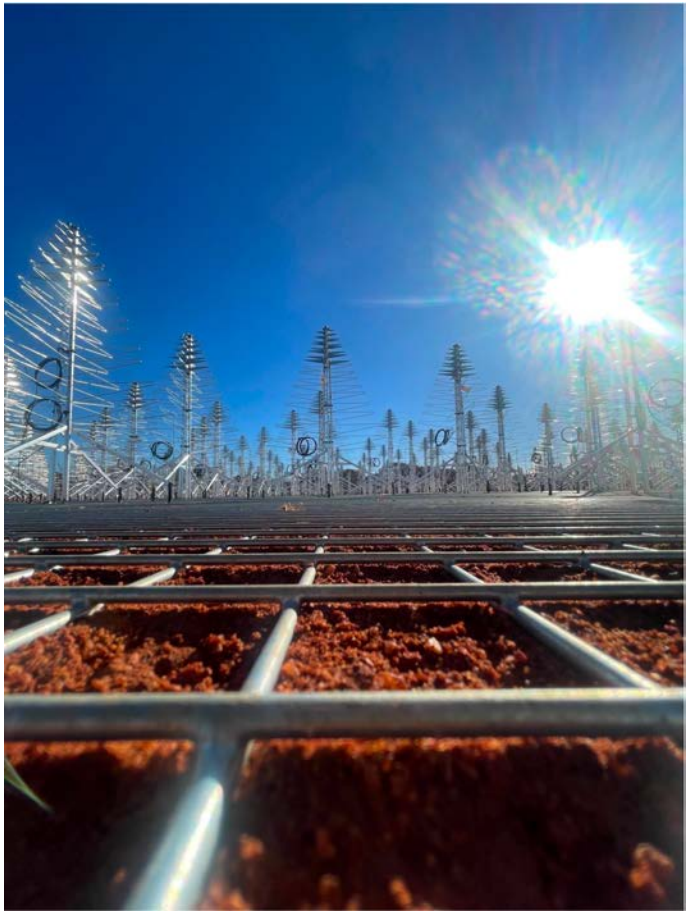
# Construction Update – AA 0.5

**SKA-Low**
**AA0.5**
**4 Stations**
**2 x S8**
**1 x S9, S10**




- AA0.5
  - First four SKA stations now being erected on-site!

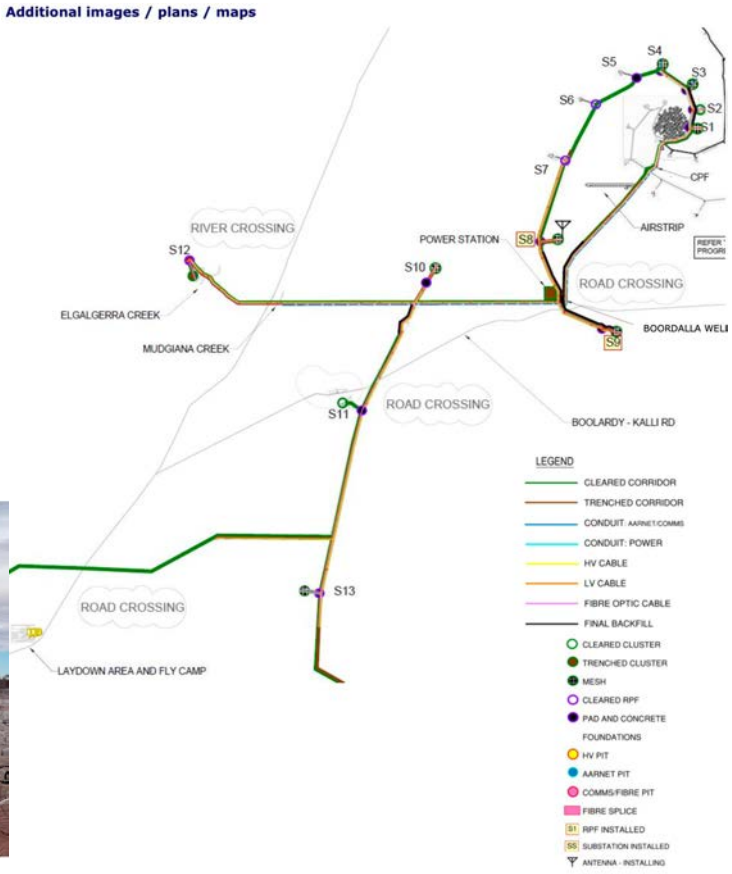
# Construction Update – AA 0.5



Completed Station 8_1


Temporary Central Processing Facility (E16)
Remote Processing Facility E8

Completed Station 8_6




Visual interpretation of progress to 30 March on the southern spiral arm, S1 to S13

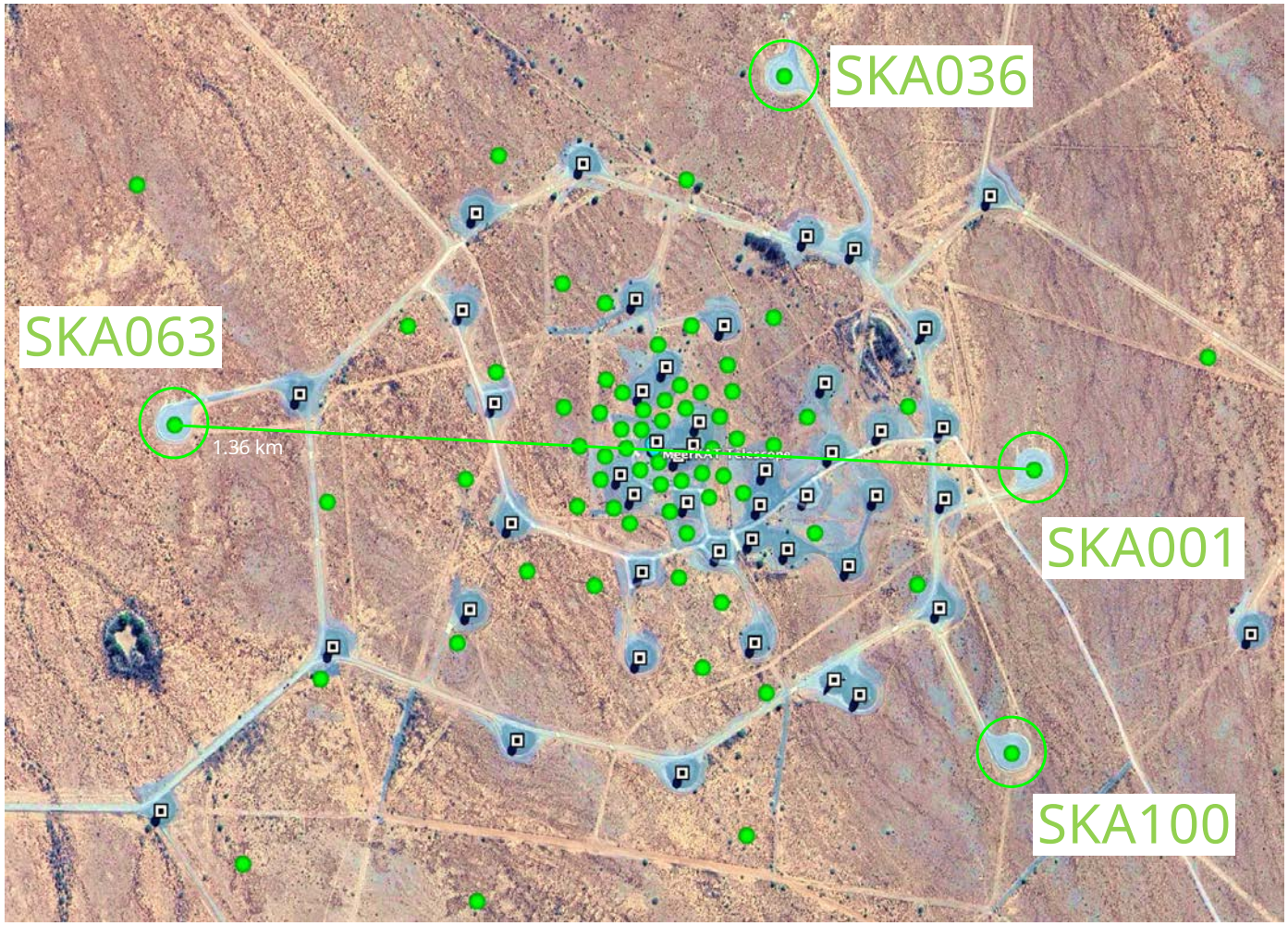
# Construction Update – AA0.5

## SKA-Mid AA0.5

▣ MeerKAT

● SKA dish locations

- AA0.5
  - First four SKA dishes now being erected on-site!



# Construction Update – AA0.5


1st Pedestal lift
(SKA063)
7 March 2024
1st Dish lift
any day now!


# Science Meetings

- African Astronomical Society Conference, 15 – 20 April 2024, Marrakech
- Discovery of Life Beyond Earth – IAUS 387, 15-19 April, Durham, UK
- Raising the veil on star formation: conference in honour of Richard Hills, 22-28 April, Cambridge UK
- SPARCS XII: Pushing toward the final frontier, 6-10 May, Bologna, IT
- New Telescopes and major upgrades to existing telescopes: URSI AT-RASC, 19-24 May, Gran Canaria, ES
- Cosmic Magnetism in the pre-SKA Era: 27-31 May, Kagoshima JP
- EAS SS31: The SKAO: pathway to science operations, 1-5 July, Padova, IT
- IAU GA: 6-15 August, Cape Town.  SKAO Session 9 August, and various SKA-related Symposia
- East Asia SKA Workshop, week of November 18, Thailand
- SKA Science Conference, June 2025, Gorlitz, see next slides

# SKAO General Science Meeting 2025

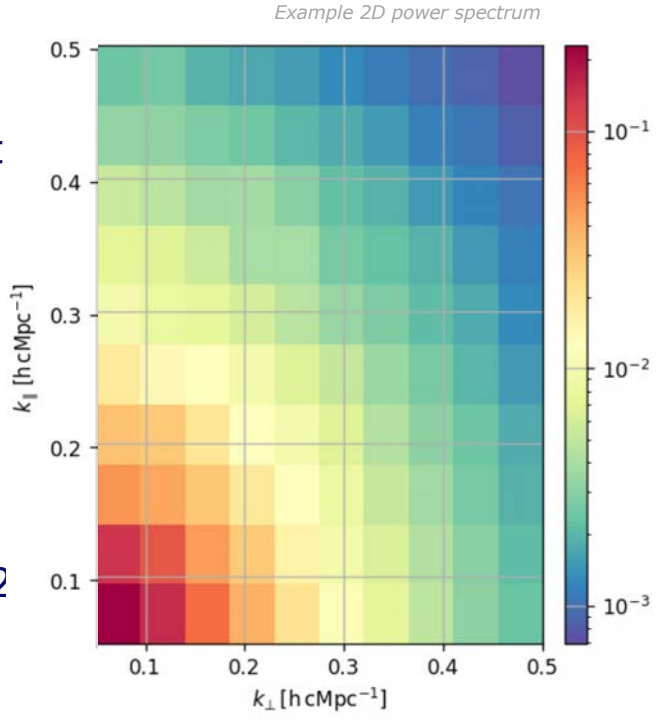
- Dates: 16th-22nd June 2025 (note change from previous provisional date).
- Location:
  - Görlitz, on the Polish border in Germany.
  - Görlitz will be the location for the German Center for Astrophysics (Deutsches Zentrum für Astrophysik, DZA), a brand new large-scale research centre that will enable top-level astronomical research, the processing of gigantic data streams from next-generation telescopes such as the SKAO, and the development of novel technology.
- Themes:
  - Focusing on the transition from SKAO commissioning to science verification and observing.
  - Look out for our Save the Date announcement and more information soon!

# SKAO General Science Meeting 2025

- Planning to make general update of SKA Science Book (last done in 2014!) part of the 2025 meeting process
- Will invite draft chapter submissions (with 5-month advanced warning) from which the talks for the meeting program will be assembled
  - Can be updated chapters from 2014 or brand new, although fresh lead authors will be encouraged throughout!
- Two days of plenary talks, followed by two days of science-themed parallel sessions (including time for KSP planning discussions) and then an SKA Operations session
- Final chapter submissions and peer review will take place in the second half of 2025

# Science Data Challenge 3b: EoR Inference

- The datasets:
  - The data for the SDC3 Inference challenge will consist of two datasets, for two different EoR reionization models EoR1 and EoR2:
  - Power spectra of EoR1 + noise + SKA-Low telescope simulation for 3 (TBC) frequencies ranges, each corresponding to a redshift interval within the possible reionization history.
  - Power spectra of EoR2 + noise + foreground residuals + SKA-Low telescope simulation for 3 (TBC) frequencies, each corresponding to a redshift interval within the possible reionization history.
  - Power spectra will be cylindrical (2D) power spectra. Dataset 1 will allow testing of the intrinsic performance of the EoR inference codes in the absence of any bias in the data. Dataset 2 will investigate the robustness of the approaches against foreground residuals.
  - Option of a further, image-based, power spectrum is being considered



# Science Data Challenge 3b: EoR Inference

- The challenge:
  - Infer the reionization properties of the Universe from power spectra of the hydrogen-21cm signal from the Epoch of Reionisation corresponding to different redshift ranges.
  - Submission will consist of inferred reionization fraction of the Universe for all the redshifts for which power spectra have been provided, and the associated uncertainty.
- Computational support
  - SDC3 receives generous support from our international HPC partner facilities, who will provide computational resources to teams for processing the challenge data.

# Science Data Challenge 3b: EoR Inference

- Challenge simulations
  - Following some queries we received, we would like to confirm that the challenge will involve more than one code to simulate the EoR signal, thus allowing us to start investigating the intrinsic differences in the physical modelling of the EoR.
- Registrations
  - Registration closed on Friday (12th April).
  - Over 40 teams registered
- Timeline
  - Challenge processing to begin mid-May
  - Challenge ends January 2025

# SWG Collaboration Facilitation

- Confluence
  - Provides a ‘wiki’ style solution to support information storage and sharing for multiple groups under one umbrella
  - Proof of concept tests by SKAO IT team
  - Next steps to define structure for usage, with feedback from SWGs
- Slack provision
  - Also in discussion with IT team to look at options for an SKAO SWG slack space

# Any Other Business

- News from SWG Chairs?
- …

*We recognise and acknowledge the Indigenous peoples and cultures that have traditionally lived on the lands on which our facilities are located.*


www.skao.int