SKA SWG Update

Robert Braun, SKAO Science Director

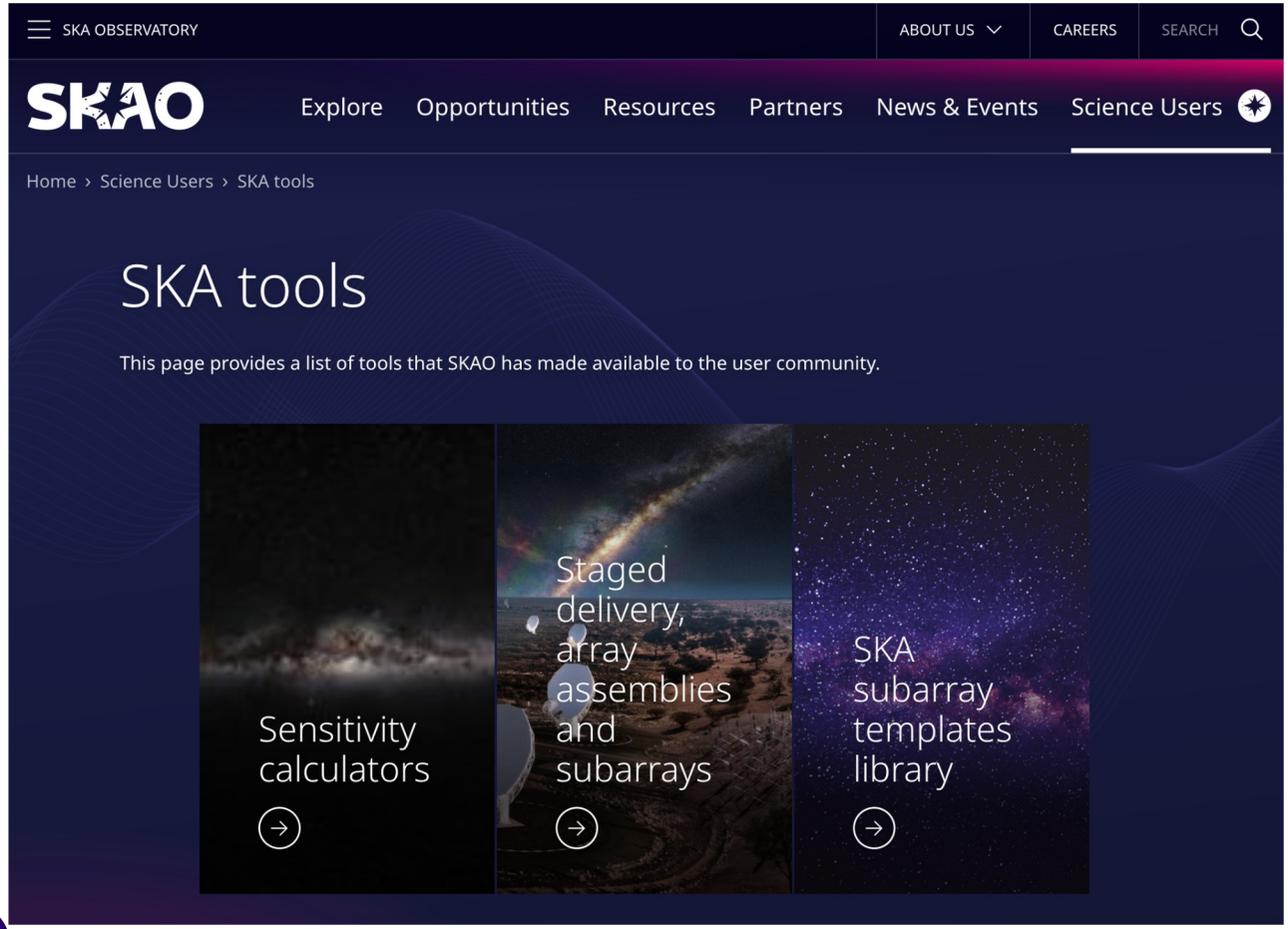
18 June 2024

SKA Science Update

- Sensitivity Calculators, Array Simulator, Subarray templates (Sarrvesh Sridhar, Science-Operations)
- SKA-Low AA* Roll-out Optimisation
- Construction Update
- SKA Science Meetings
- Science Data Challenges
- SWG Collaboration Facilitation (Philippa)
- Reminders & Information
- AOB

AA = Array Assembly

SKA user tools - https://www.skao.int/en/science-users/ska-tools



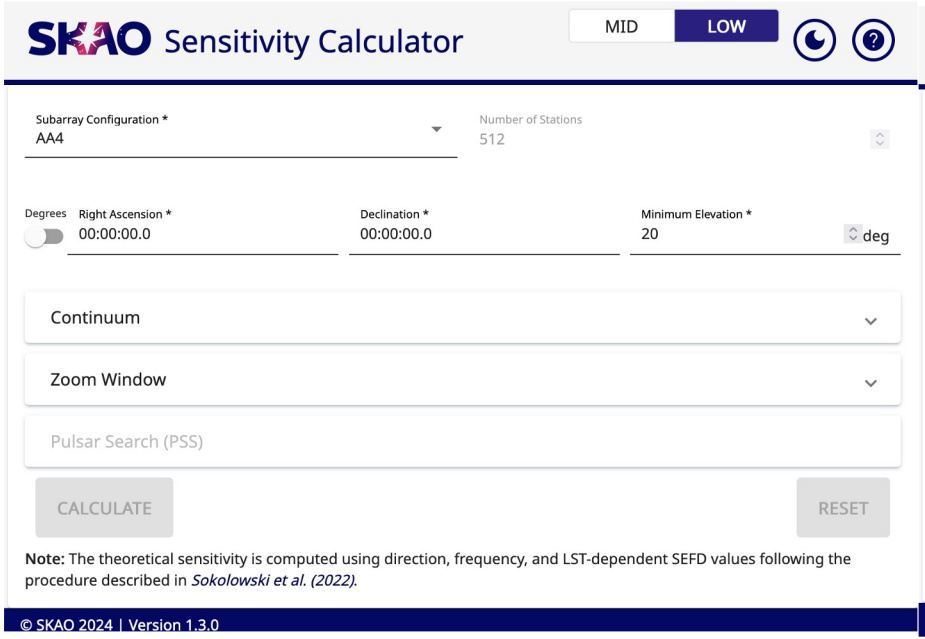
1. Sensitivity calculators
2. Array layout simulator
3. Subarray templates library

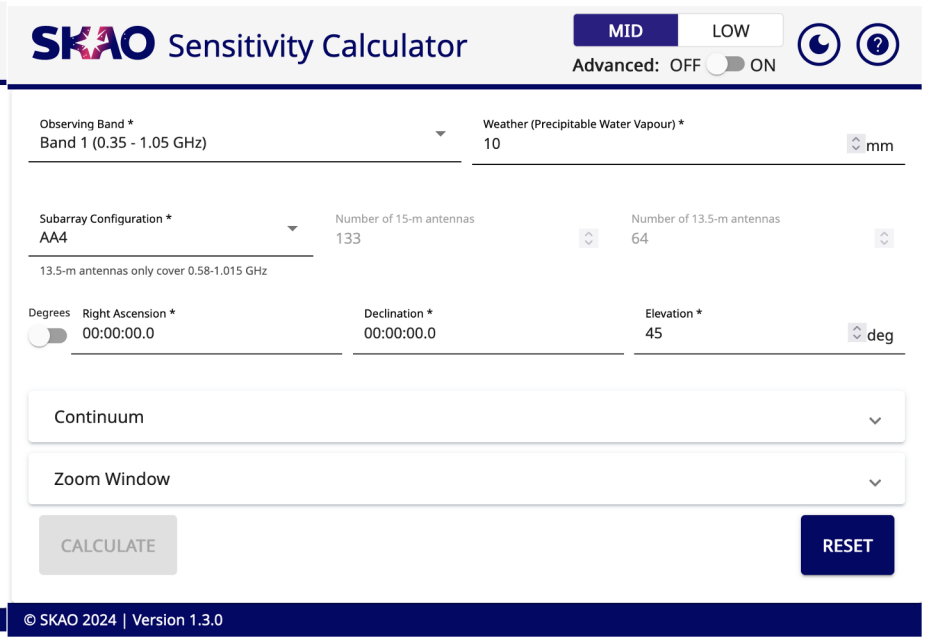
SKAO user tools:
I. SKA Mid and Low sensitivity calculators

https://www.skao.int/en/science-users/ska-tools/493/ska-sensitivity-calculators

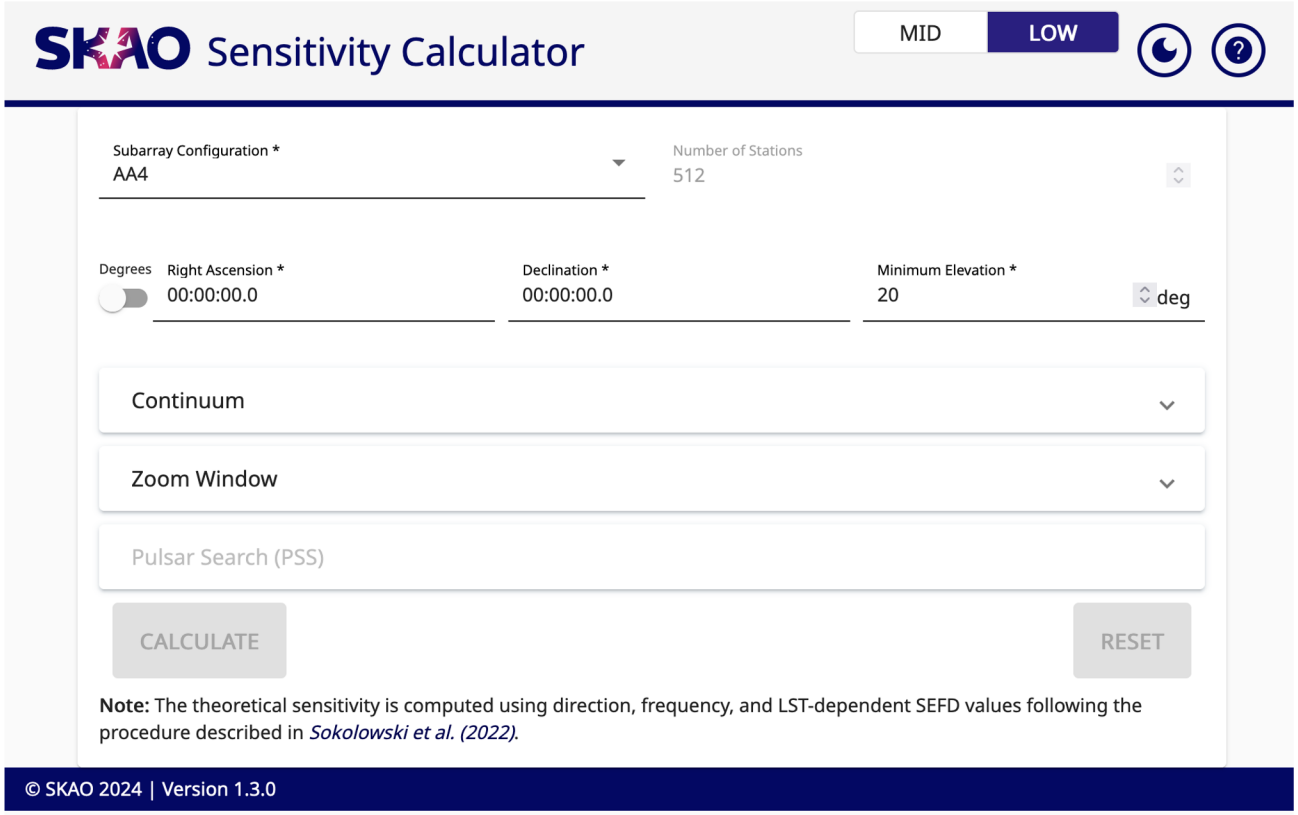
Sensitivity calculators – https://www.skao.int/en/science-users/ska-tools/ska-sensitivity-calculators https://sensitivity-calculator.skao.int

- Accessibility is important for SKAO to ensure our tools can be used by the broadest possible user base.
- Web interface is Web Content Accessibility Guidelines (WCAG) compliant

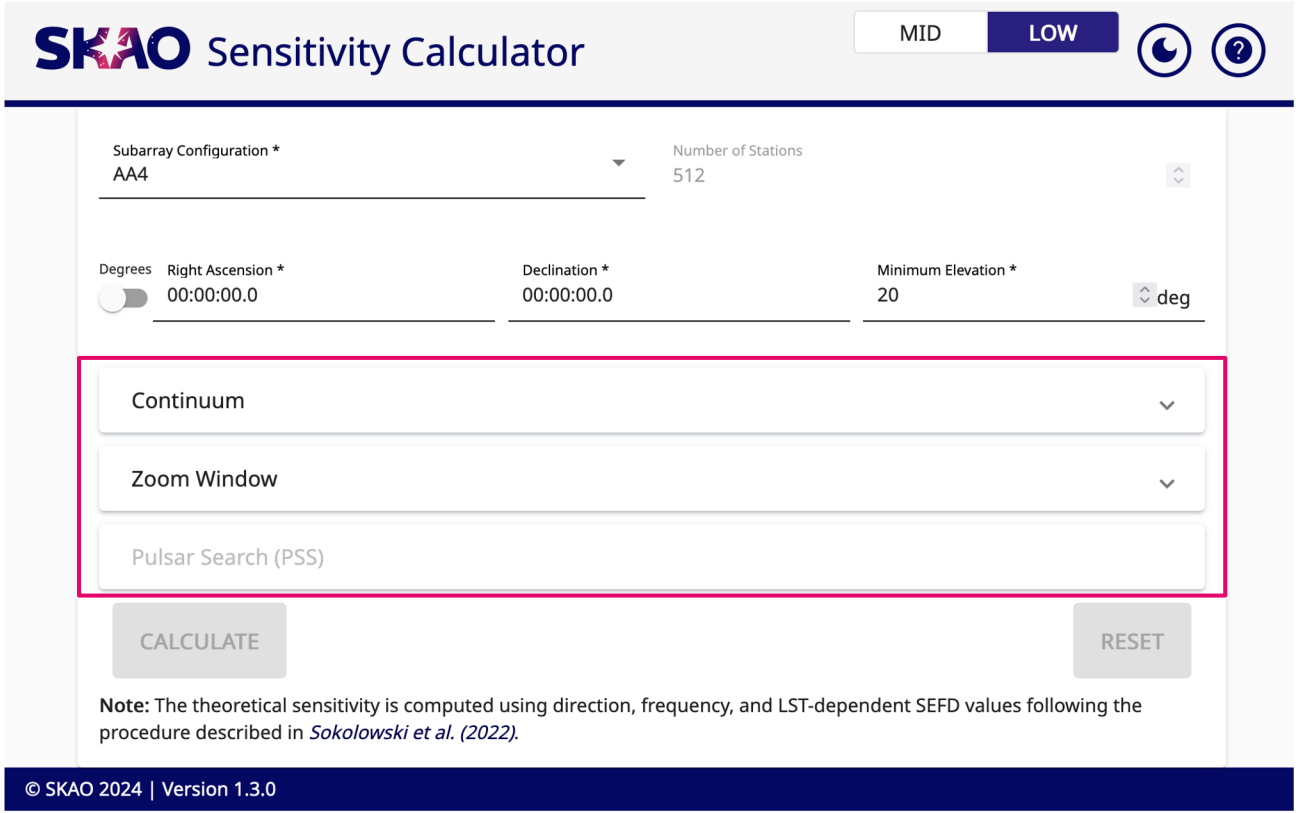




SKA-Low sensitivity calculator



SKA-Low sensitivity calculator

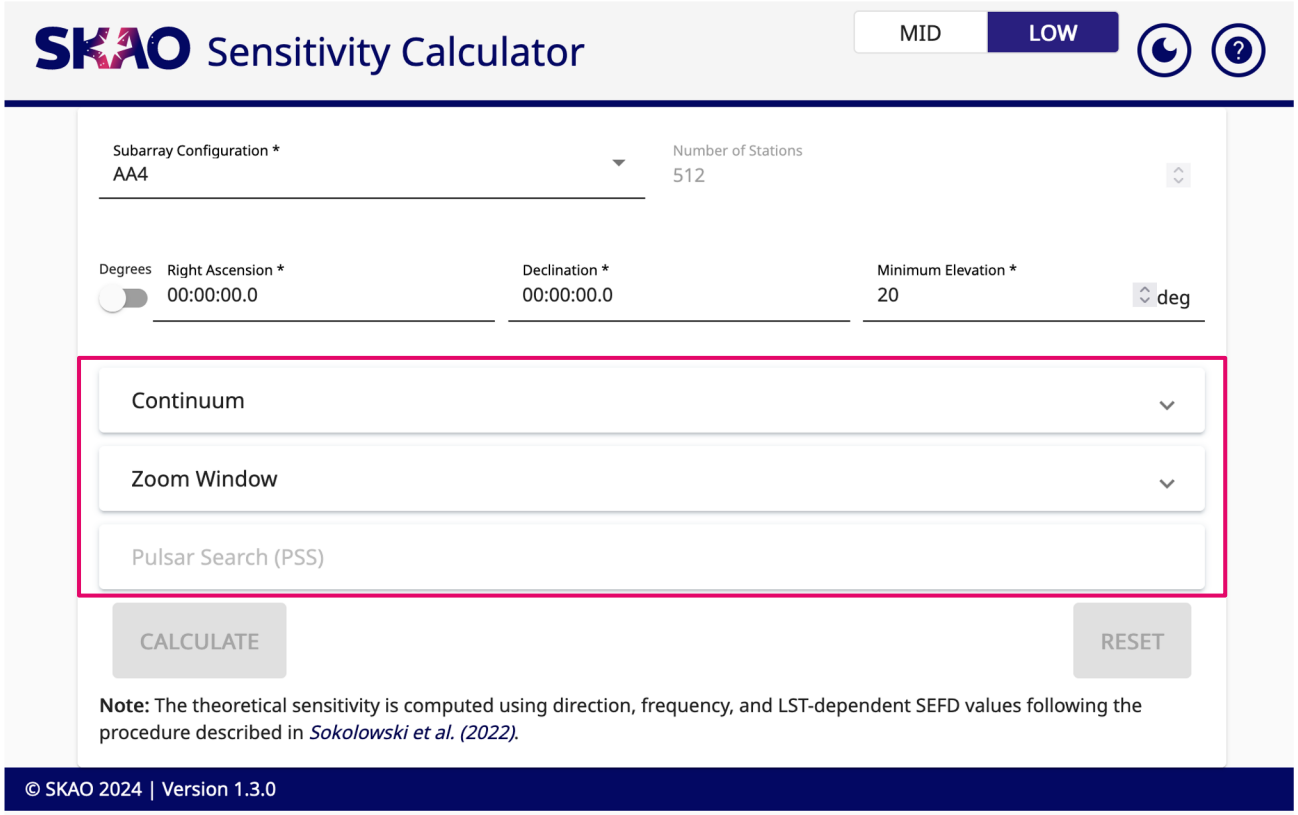


The first release of the sensitivity calculator supports the two imaging modes: **continuum** and **zoom window**

Folded pulse sensitivity was recently added to Low

More observing modes will be added in future releases.

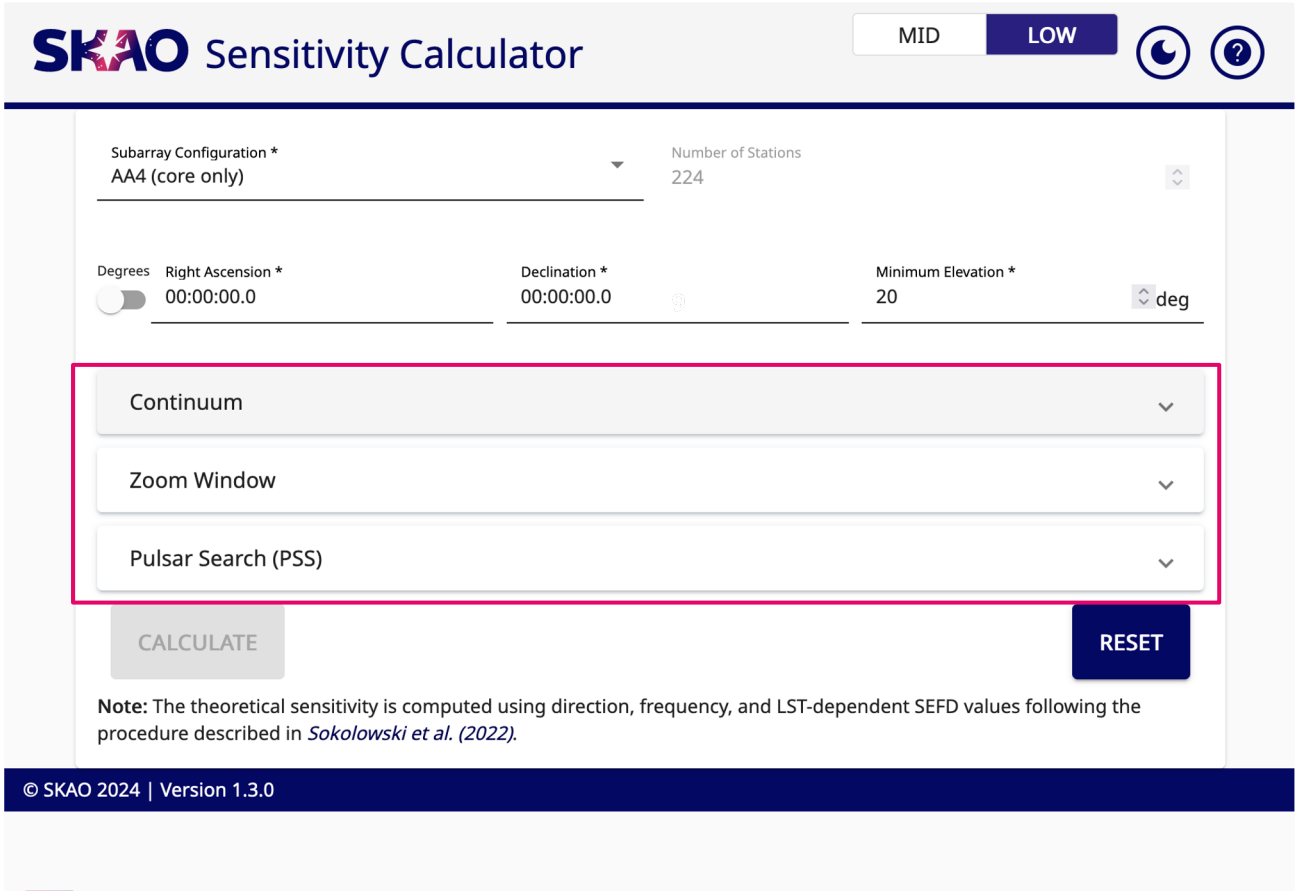
SKA-Low sensitivity calculator



Note that the pulsar mode is not available in all subarray configurations.

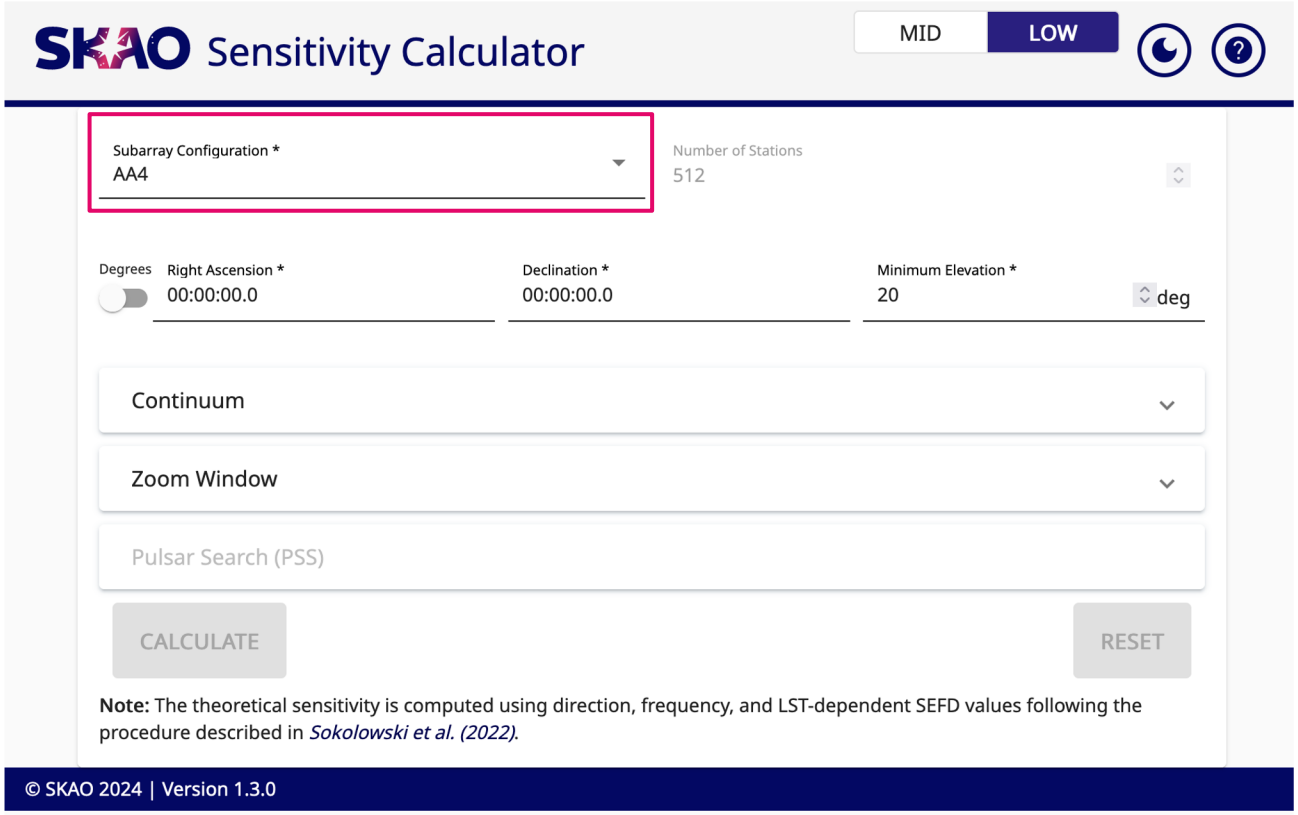
SKA telescopes can only form tied-array beams on arrays with a maximum baseline length of 20 km.

SKA-Low sensitivity calculator



Pulsar mode becomes enabled depending on the choice of the subarray configuration

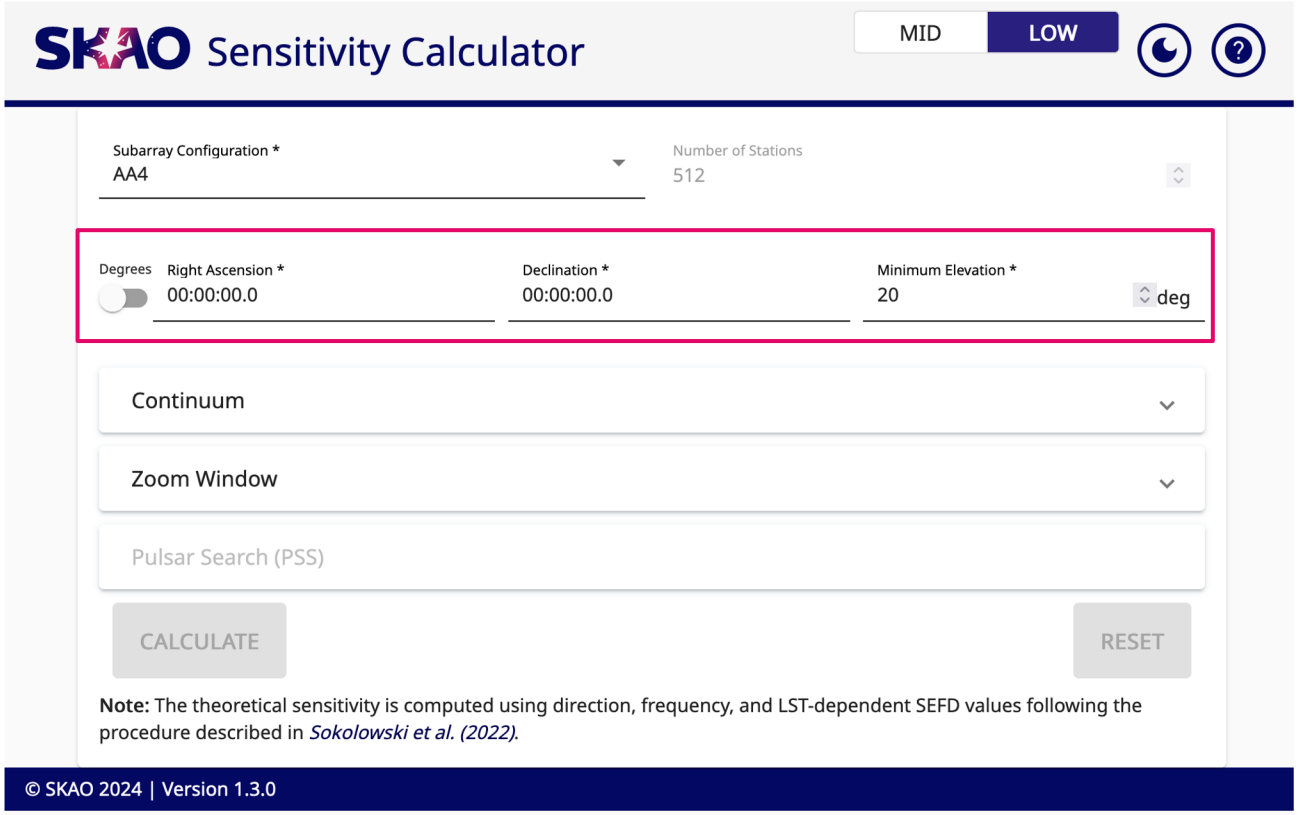
SKA-Low sensitivity calculator



At present, all array assemblies are represented.

More subarrays will be added as we come up with subarray templates (more on this later in this talk)

SKA-Low sensitivity calculator



Direction-, LST-, and frequency-dependent SEFD as the source moves across the station beam response

SKA-Low sensitivity calculator: Continuum mode

Continuum

Integration Time *
1 hours

Central Frequency *
200 MHz

Continuum Bandwidth *
300 MHz

Spectral Resolution
5.43 kHz (8.1 km/s)

Spectral Averaging *
2

Effective resolution
10.86 kHz (16.3 km/s)

Image Weighting *
Briggs

Robust Value
-1

Results

Weighted continuum sensitivity
14.71 uJy/beam (2.71)†
Continuum confusion noise
2.69 uJy/beam
Total continuum sensitivity
14.96 uJy/beam
Continuum synthesized beam-size
5.5" x 4.3"
Continuum surface-brightness sensitivity
19.29 K

Weighted spectral sensitivity
1.99 mJy/beam (2.61)‡
Spectral confusion noise
4.35 uJy/beam
Total spectral sensitivity
1.99 mJy/beam
Spectral synthesized beam-size
6.3" x 5.5"
Spectral surface-brightness sensitivity
1743.11 K

† Weighting correction factor (30% bandwidth)
‡ Weighting correction factor (single channel)

SKA-Low sensitivity calculator: Zoom mode

Zoom Window

Integration Time *
1 hours

Central Frequency *
200 MHz

Bandwidth, Spectral Resolution *
24.4 kHz (36.6 km/s), 14.1 Hz (21.2 m/s)

Spectral Averaging *
1

Effective Resolution
14.1 Hz (21.2 m/s)

Image Weighting *
Briggs

Robust Value *
-1

Results

Weighted spectral sensitivity
55.02 mJy/beam (2.61)‡

Spectral confusion noise
4.35 uJy/beam

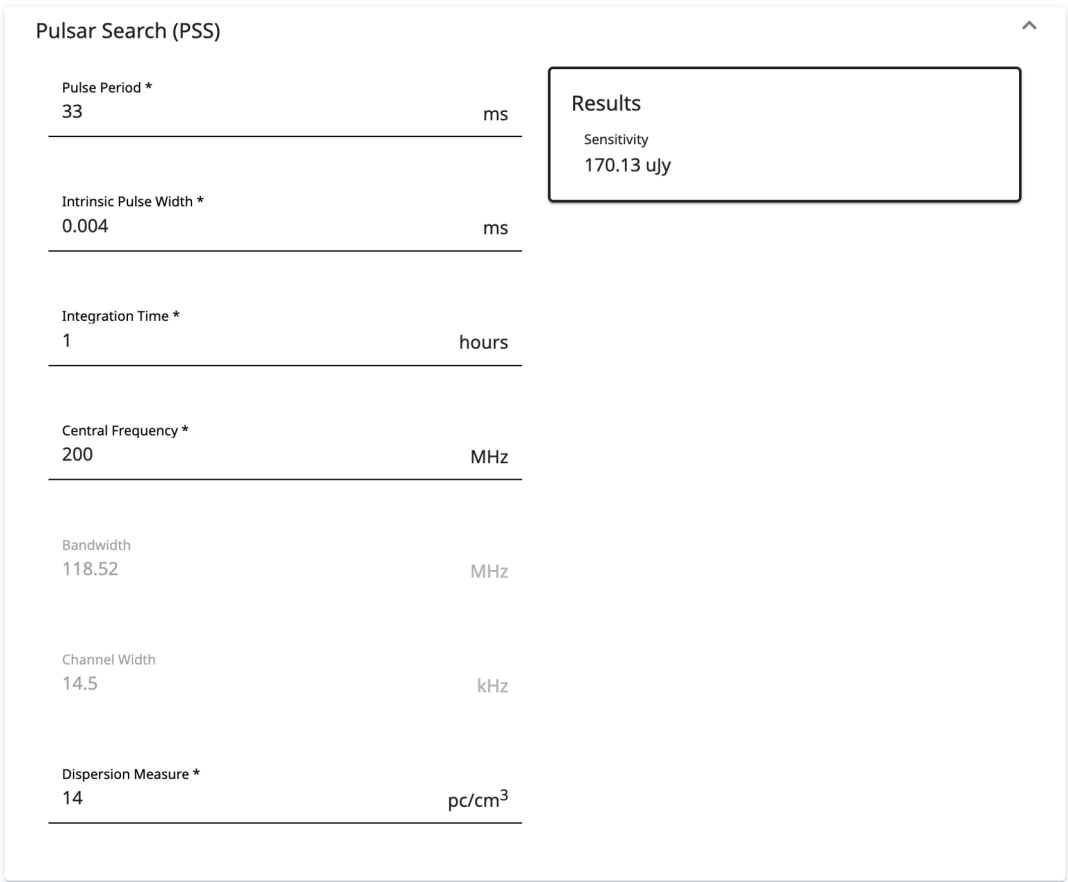
Total spectral sensitivity
55.02 mJy/beam

Spectral synthesized beam-size
6.3" x 5.5"

Spectral surface-brightness sensitivity
48306.22 K

‡ Weighting correction factor (single channel)

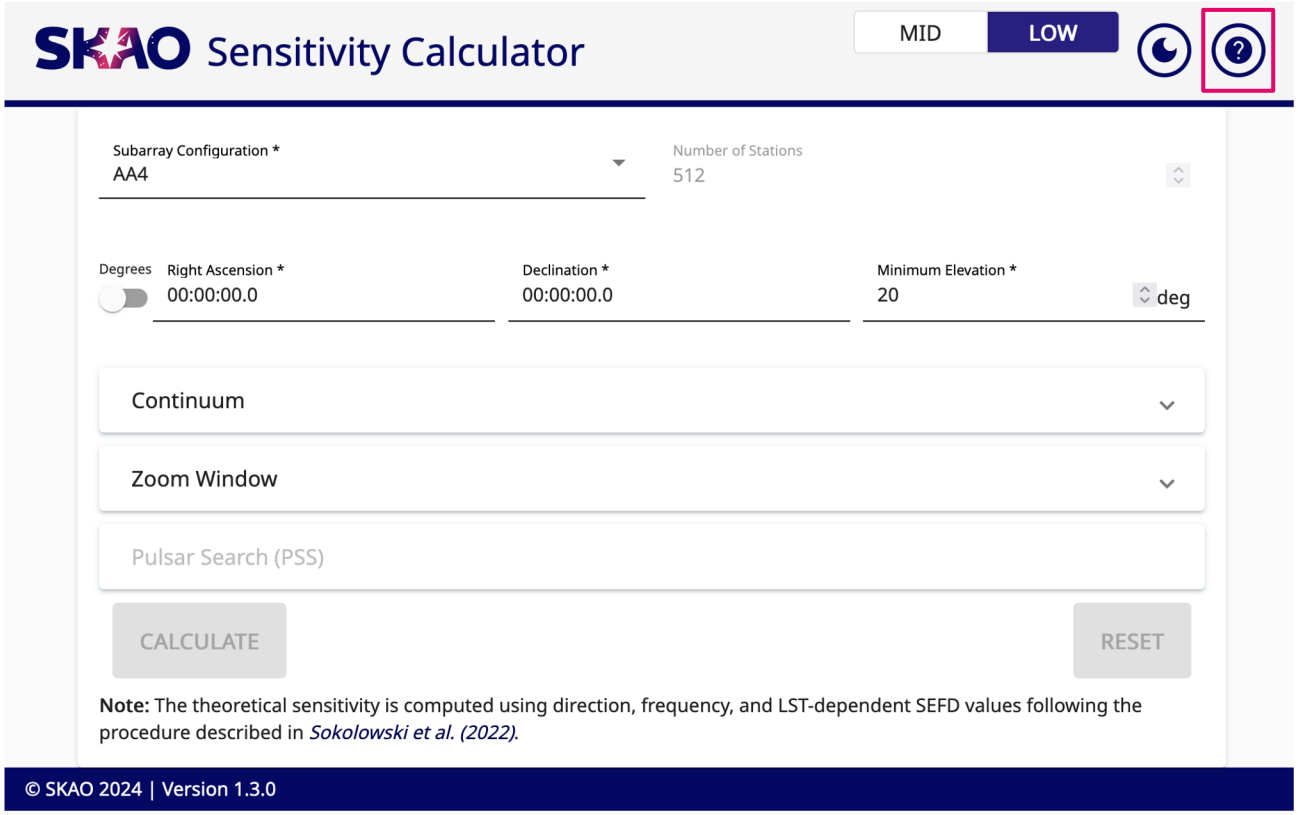
SKA-Low sensitivity calculator: Folded-pulse sensitivity



This mode is available only in the Low calculator. Will be added to Mid in the next release.

We will also be adding single-pulse sensitivity estimates soon.

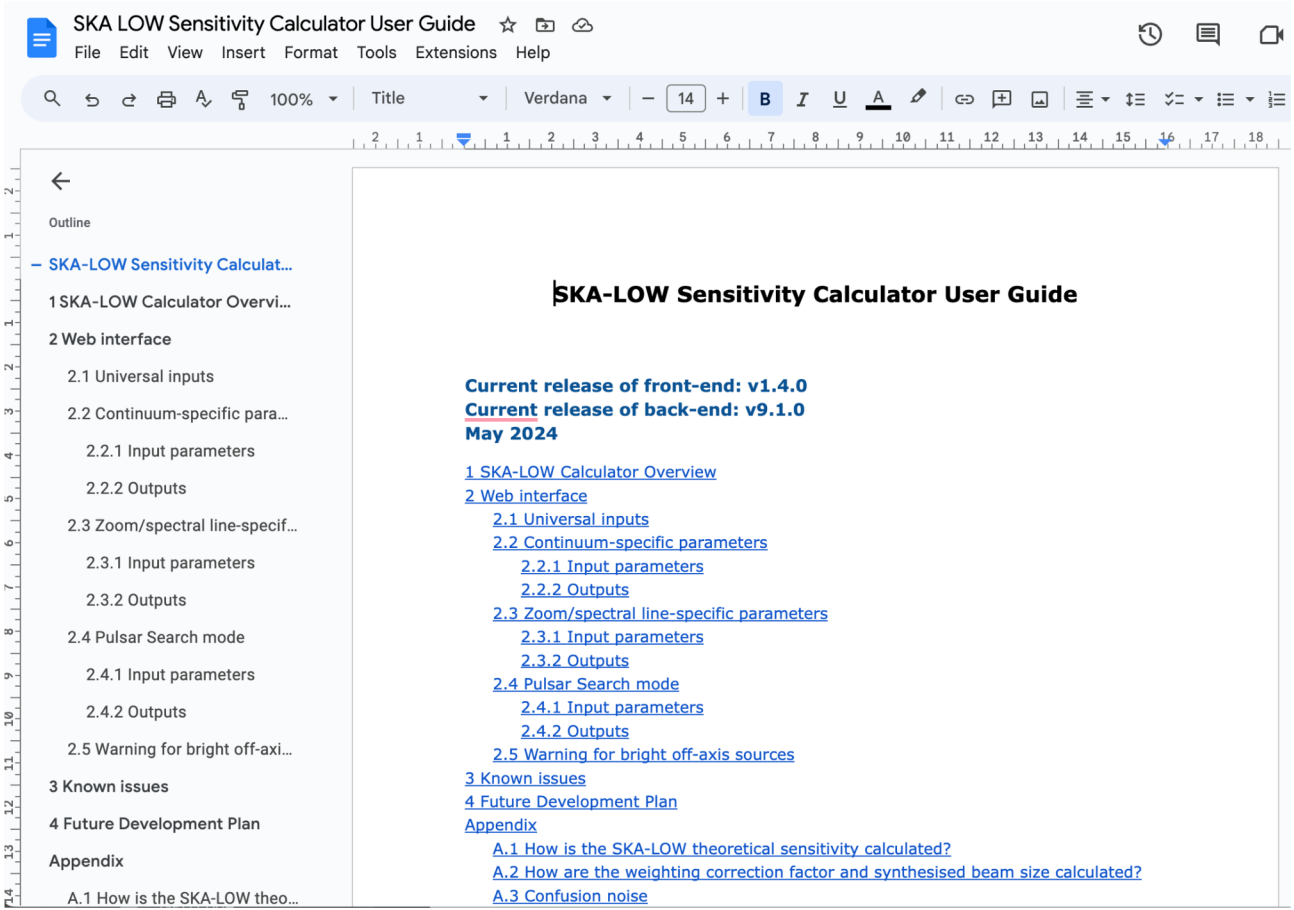
SKA-Low sensitivity calculator user guide



User documentation as a Google Document

Please leave comments on the document if something is unclear

SKA-Low sensitivity calculator user guide



User documentation as a Google Document

… so that the community can provide feedback directly.

Please leave comments on the document if something is unclear

Sensitivity calculators - plans for the next release

- **Make the calculators RFI-aware**
  - In the current implementation, no bandwidth is lost to RFI
- **Single-pulse sensitivity**
- **Queryable API for ease of use in simulations**
- **Support other observing modes (ex. EoR)**

- Are there functionalities the community would like us to add?

SKAO user tools:
II. Staged delivery and array simulator

https://www.skao.int/en/science-users/ska-tools/494/ska-subarrays

Staged delivery and array assemblies

- Interferometers lend themselves to expansion
  - Build small,
    test/verify all the functionalities, and
    then scale

- Construction phase divided into five milestones or **array assemblies (AA)**
  - **AA4** - design baseline
  - **AA* (staged delivery plan)** corresponds to the funding that has been secured

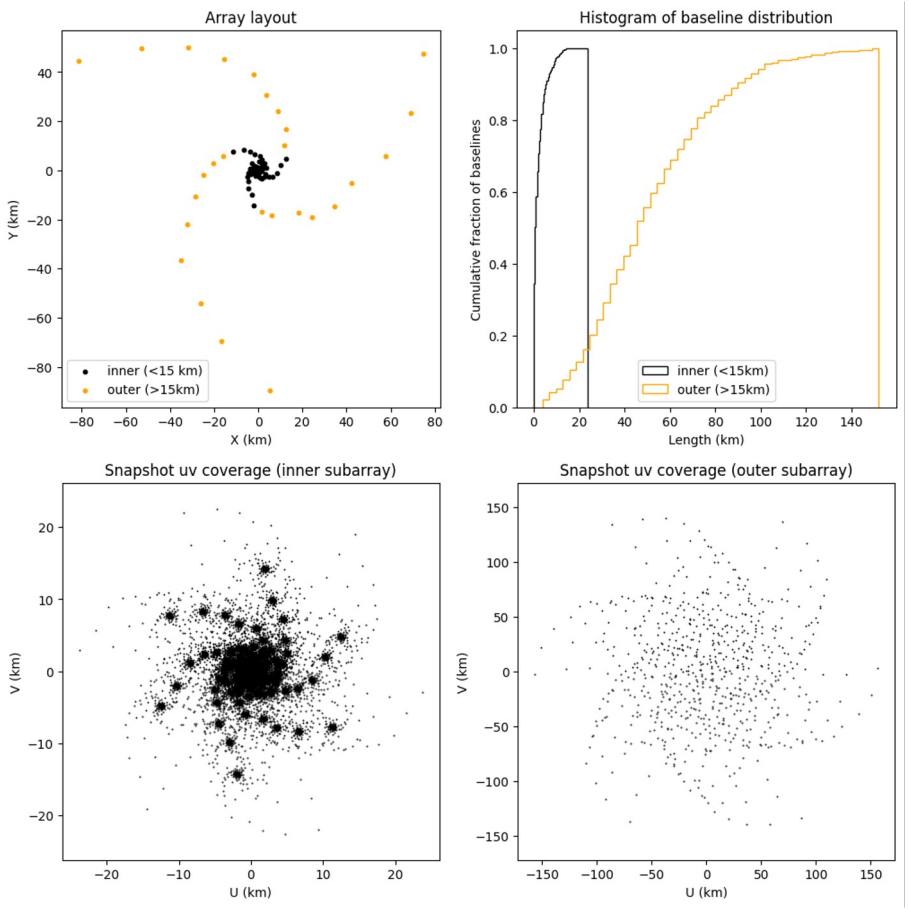
Available to science community through Science Verification

Milestones	Mid	Low
AA0.5 4 Mid dishes 4 Low stations	2025 Oct	2024 Dec
AA1 8 Mid dishes 18 Low stations	2026 Sep	2025 Nov
AA2 68 Mid dishes 64 Low stations	2027 Sep	2026 Oct
AA* (staged delivery) 144 Mid dishes 307 Low stations	2028 Jun	2028 Jan
AA4 (design baseline) 197 Mid dishes 512 Low stations	TBD	TBD

Based on 2024 April Construction report

Memo and Software package

- Memo released late last year (link)
- Software interface to the antenna coordinates
- SKAO repository: ska_ost_array_config
  - Detailed documentation in a Jupyter notebook
- Allows you to
  - Configure a custom subarray
  - Simulate interferometric observations
  - Plot array layout and uv coverage
  - Export the layout to CASA for more comprehensive simulations
- Figure on the right plots baseline distribution and uv coverage of two Mid subarrays



Software package: defining subarrays

```
from ska_ost_array_config.array_config import (
        LowSubArray,
        MidSubArray
)

low_aa2 = LowSubArray(subarray_type="AA2")
mid_aa2 = MidSubArray(subarray_type="AA2")

low_aastar = LowSubArray(subarray_type="AA*")
mid_aastar = MidSubArray(subarray_type="AA*")

low_aa4 = LowSubArray(subarray_type="AA4")
mid_aa4 = MidSubArray(subarray_type="AA4")
```

Creates Low and Mid subarrays in AA2 configuration

Creates Low and Mid subarrays in AA* configuration

Creates Low and Mid subarrays in AA4 configuration

Software package: defining subarrays

```
from ska_ost_array_config.array_config import (
        LowSubArray,
        MidSubArray
)

low_aa2 = LowSubArray(subarray_type="AA2")
mid_aa2 = MidSubArray(subarray_type="AA2")

low_aastar = LowSubArray(subarray_type="AA*")
mid_aastar = MidSubArray(subarray_type="AA*")

low_aa4 = LowSubArray(subarray_type="AA4")
mid_aa4 = MidSubArray(subarray_type="AA4")

low_custom = LowSubArray(
        subarray_type="custom",
        custom_stations="C*,E1-*"
)
mid_custom = MidSubArray(
        subarray_type="custom",
        custom_stations="M*,SKA017"
)
```

Creates custom subarrays

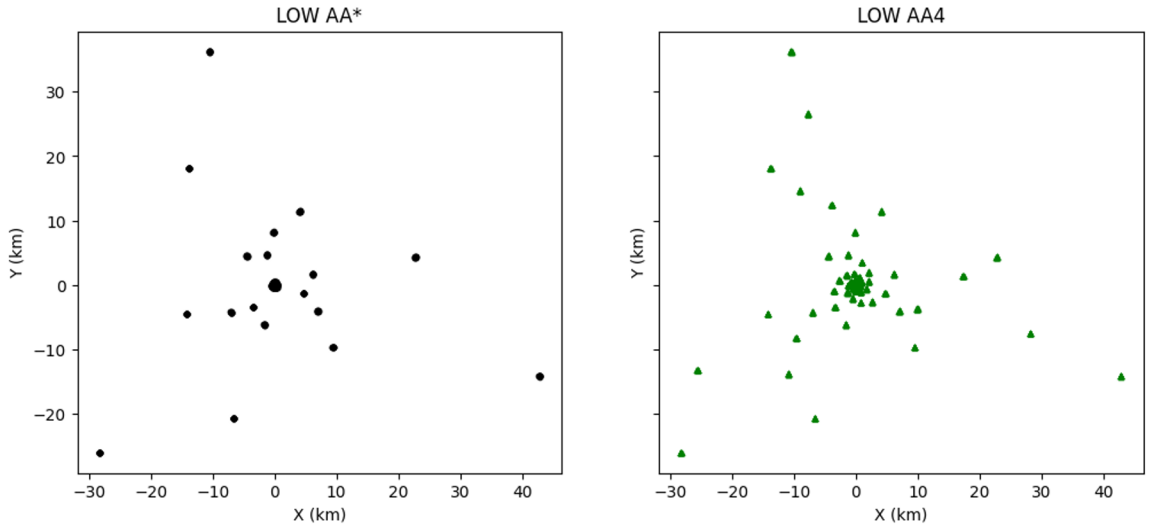
Low: all core stations + stations in the E1 cluster

Mid: all 13.5m MeerKAT dishes + one 15m dish (SKA017)

Software package: plot array layout

```
import matplotlib.pyplot as plt
fig, axes = plt.subplots(1, 2, figsize=(12, 5), sharey=True)

low_aastar.plot_array_layout(axes[0], s=10)
axes[0].set_title("LOW AA*")

low_aa4.plot_array_layout(axes[1], s=10, c="green", marker="^")
axes[1].set_title("LOW AA4")
```

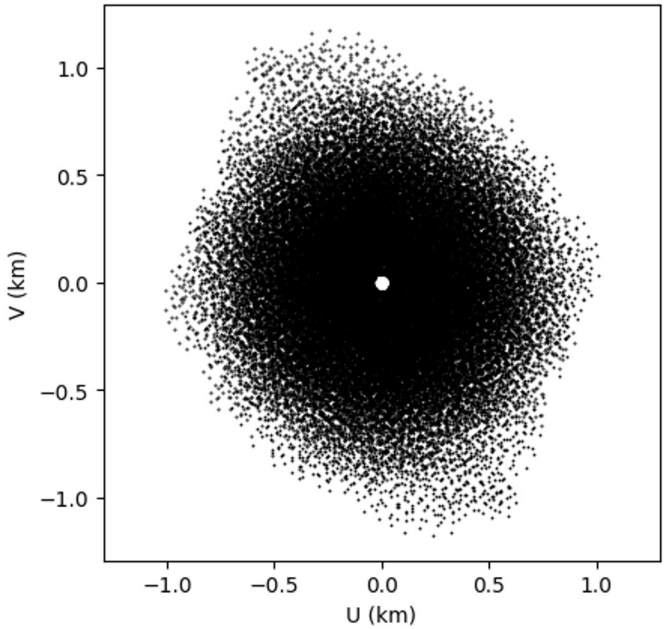
Note: You can pass any valid matplotlib scatter() parameters



Software package: plot snapshot (u,v) coverage

```
low_custom.plot_snapshot_zenith_uvcov(
    ref_freq=150e6,
    chan_width=5.4e3,
    n_chan=1,
    method="metre",
    scale="kilo",
    plot_conj=True,
)
```

Note: You can pass any valid matplotlib scatter() parameters

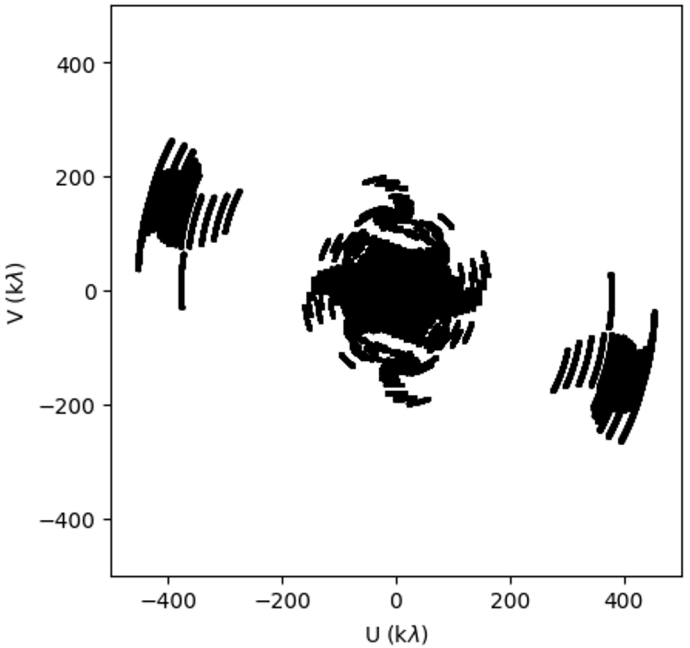


Software package: simulating an interferometric observation

```
from ska_ost_array_config.simulation_utils import simulate_observation
from astropy.coordinates import SkyCoord
from astropy import units
from astropy.time import Time
from ska_ost_array_config.UVW import UVW

phase_centre = SkyCoord("04:00:00 -75:00:00", unit=(units.hourangle, units.deg))
observation = simulate_observation(
   array_config=MidSubArray(subarray_type="AA*").array_config,          # Simulate an observation with SKA Mid in AA*
   phase_centre=phase_centre,
   start_time=Time.now(),
   duration=3600.0, integration_time=1,                                 # 1-hour scan with 1s time resolution
   ref_freq=1420e6, chan_width=13.4e3, n_chan=1000,                     # Frequency setup
   horizon=20,                                                          # Flagged if source is below the horizon (in deg)
   freq_undersample=100, time_undersample=10)
uvw = UVW(observation, ignore_autocorr=True)
```

Software package: simulating an interferometric observation

```
from ska_ost_array_config.simulation_utils import simulate_observation
from astropy.coordinates import SkyCoord
from astropy import units
from astropy.time import Time
from ska_ost_array_config.UVW import UVW

phase_centre = SkyCoord("04:00:00 -75:00:00", unit=(units.hourangle, units.deg))
observation = simulate_observation(
   array_config=MidSubArray(subarray_type="AA*").array_config,          # Simulate a
   phase_centre=phase_centre,
   start_time=Time.now(),
   duration=3600.0, integration_time=1,                                 # 1-hour sca
   ref_freq=1420e6, chan_width=13.4e3, n_chan=1000,                     # Frequency
   horizon=20,                                                          # Flagged if
   freq_undersample=100, time_undersample=10)                           # Undersam
uvw = UVW(observation, ignore_autocorr=True)

from ska_ost_array_config.UVW import plot_uv_coverage
fig, axes = plot_uv_coverage(uvw)
```



Software package: simulations with CASA

low_custom.**generate_casa_antenna_list**("low.txt")

Generates a CASA-compatible antenna file

- The exported file is compatible with NRAO CASA simutils module
- We provide some CASA examples in a Jupyter notebook
- More detailed examples on CASA documentation

SKAO user tools:
III. Subarray templates library

https://www.skao.int/en/science-users/ska-tools/543/ska-subarray-templates

Subarray templates library

- SKA telescopes can create up to 16 independent subarrays
- During the proposal submission stage, astronomers will pick the appropriate subarray from a template library
- First version of the subarray templates memo (+ simulation tool) was released last week
  - Based on a first round of consultation with the SWGs in 2023
  - This is just the first version.
  - Ample opportunities for more input from the community

SKAO

SKA Low and Mid subarray templates

SKAO-TEL-0002380	Revision 01
Classification:	UNRESTRICTED
Document type:	REP
Date:	2024-06-12
Status:	DRAFT

Role	Name	Designation	Affiliation	Signature	Date
Author	Sarrvesh Sridhar	Operations Scientist	SKAO		
Author	Wendy Williams	Scientist	SKAO		
Author	Shari Breen	Head of Science Operations	SKAO		

Subarray templates library

- Three types of subarrays in this version
  - Distance-based subarrays,
  - Similar/equal subarrays for concurrent large-area monitoring, and
  - Science-specific subarrays (e.g. for EoR, solar monitoring, …)
- ~26 templates defined for Low and Mid
  - For both AA* and AA4
- All subarray templates have been incorporated into the array simulation tool mentioned earlier (ska_ost_array_config).

SKAO

SKA Low and Mid subarray templates

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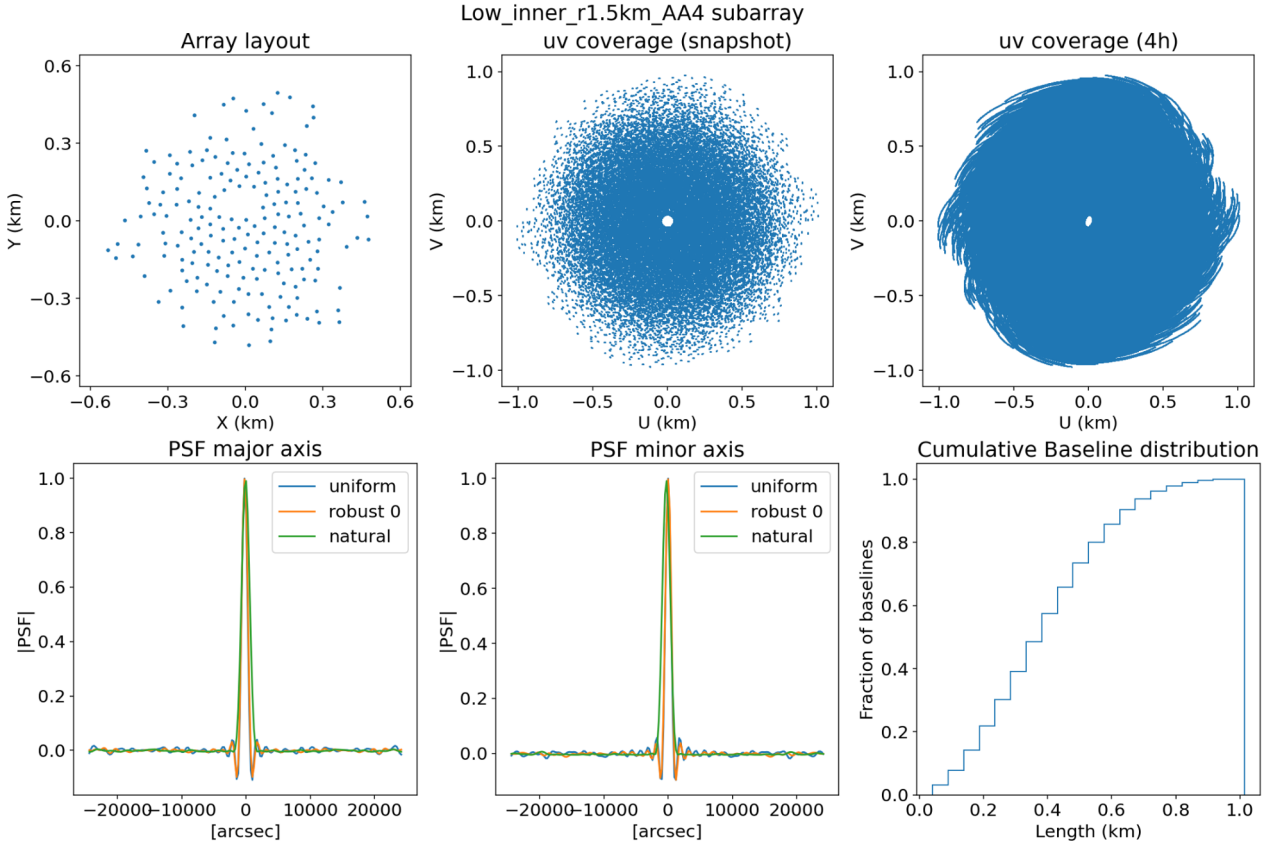
Status:	DRAFT

Role	*Name*	*Designation*	*Affiliation*	*Signature*	*Date*
Author	Sarrvesh Sridhar	Operations Scientist	SKAO		
Author	Wendy Williams	Scientist	SKAO		
Author	Shari Breen	Head of Science Operations	SKAO		

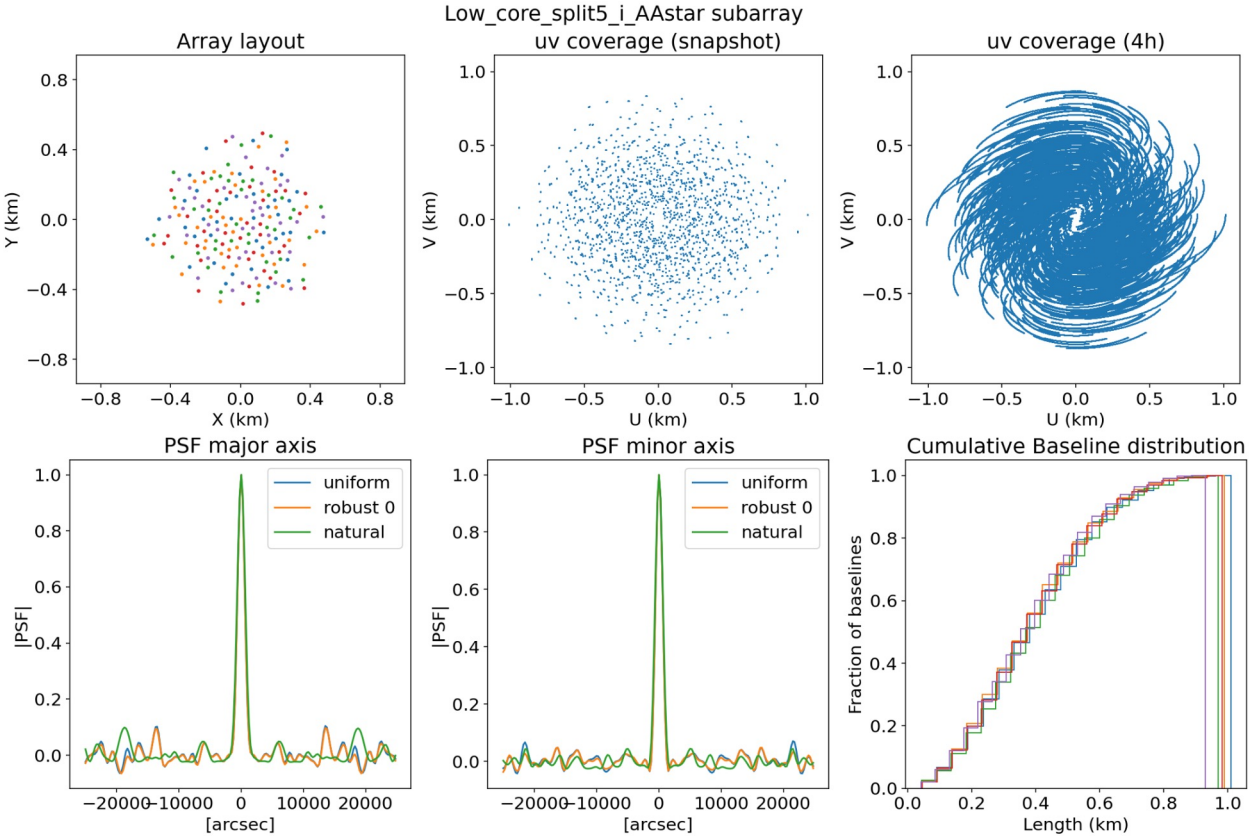
Distance-based subarrays

- All SKA Low stations within a radius of 1.5 km from the array centre



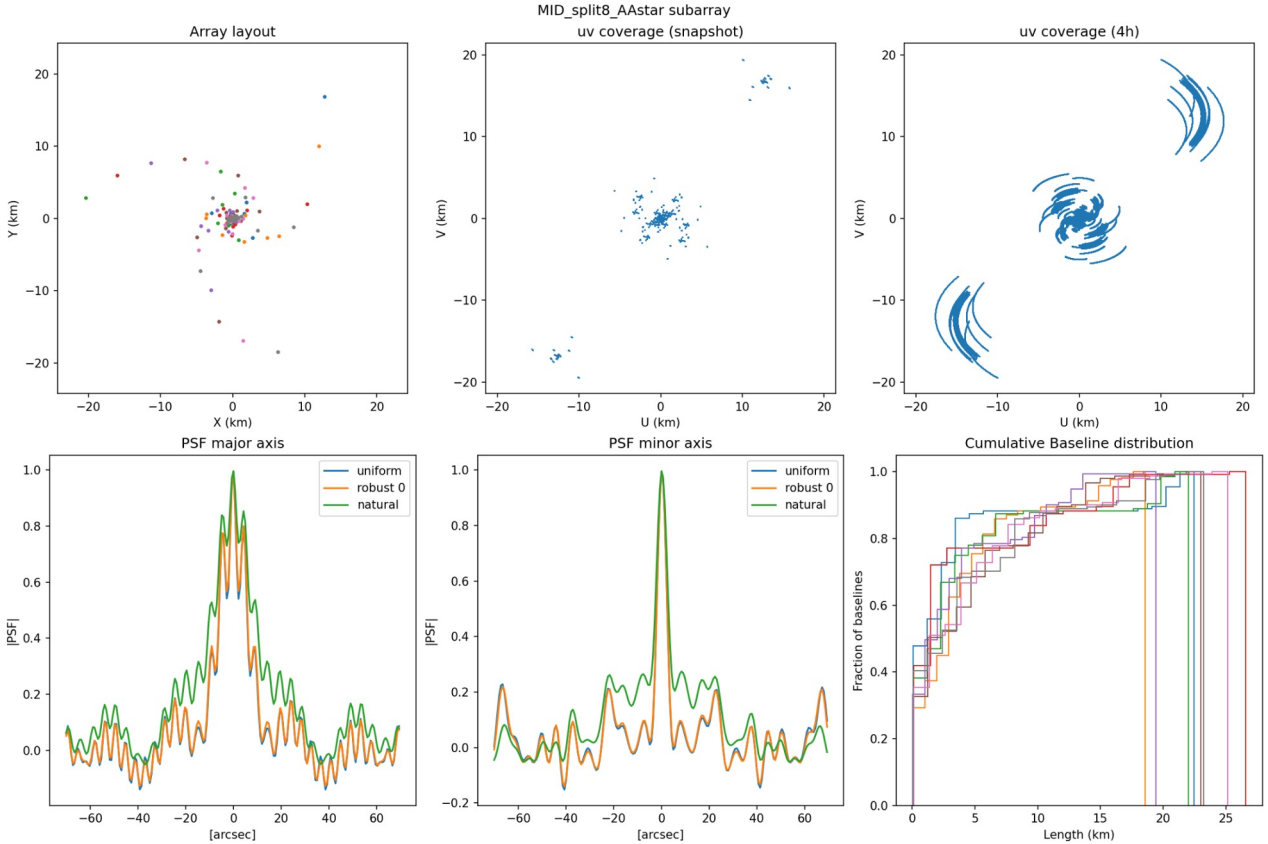
Equal/similar subarrays

- Split the entire array into N-equal/similar subarrays



Some requested subarray templates don’t look good

- Needs further refinement. We have nevertheless included them to guide further conversation



Subarray templates library: feedback from the community

- Based on a first round of consultation with the SWGs
- First version out and we want to use it to drive the conversation with the community
- We have created a simple questionnaire link or scan the QR code below
  - Six open-ended questions
  - Feedback will help refine the templates (or add new ones)

Feedback on SKA subarray templates library

Links to the SKA subarray templates memo and the simulation software package.

sarrvesh.sridhar@skao.int Switch accounts

Not shared

Email ID (in case we need to contact your for further clarification)

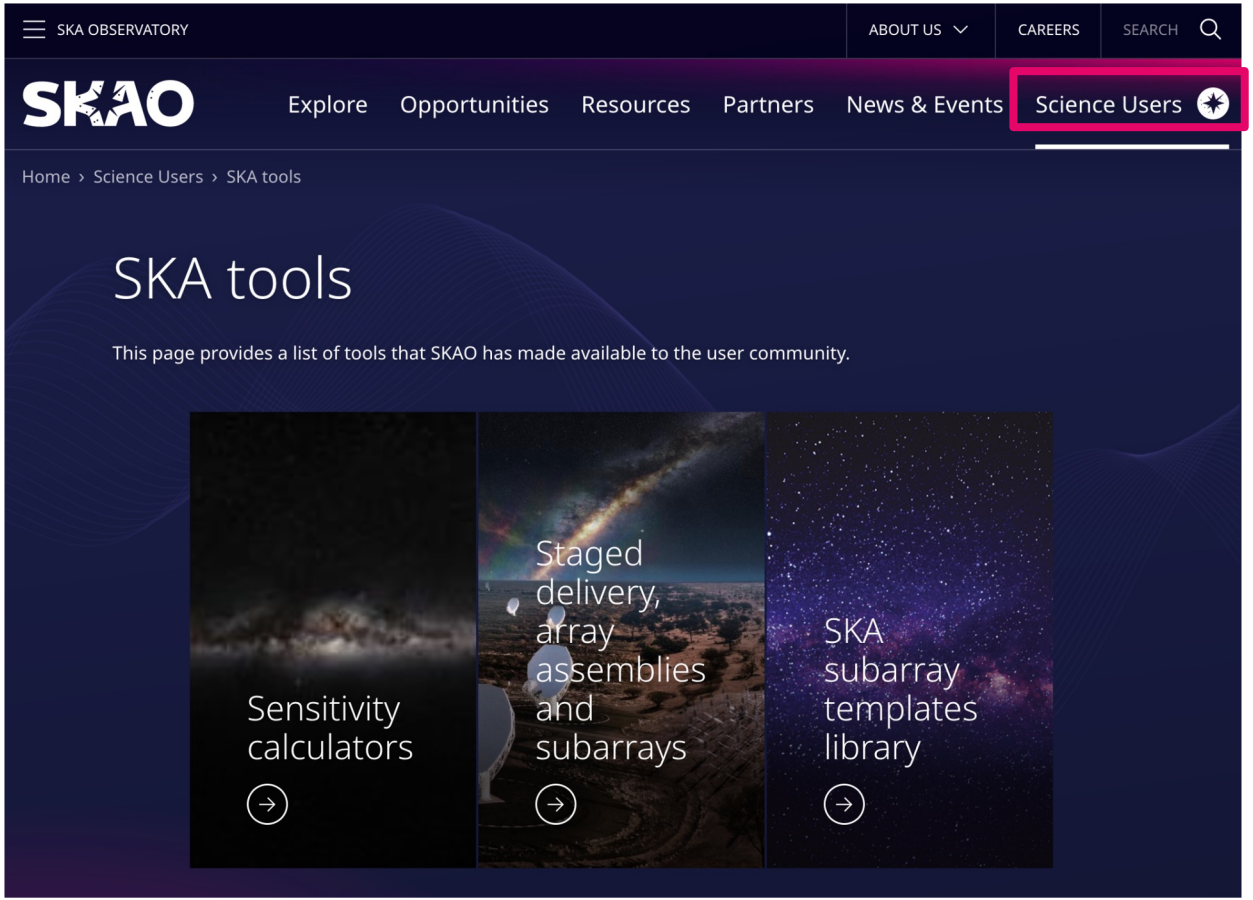
Your answer

Do you imagine using any of the subarrays from the template list? If so, what are they and what is the science area?

Your answer

What further information might you need to better understand what subarray might fulfil your science needs?

SKA user tools - https://www.skao.int/en/ska-tools



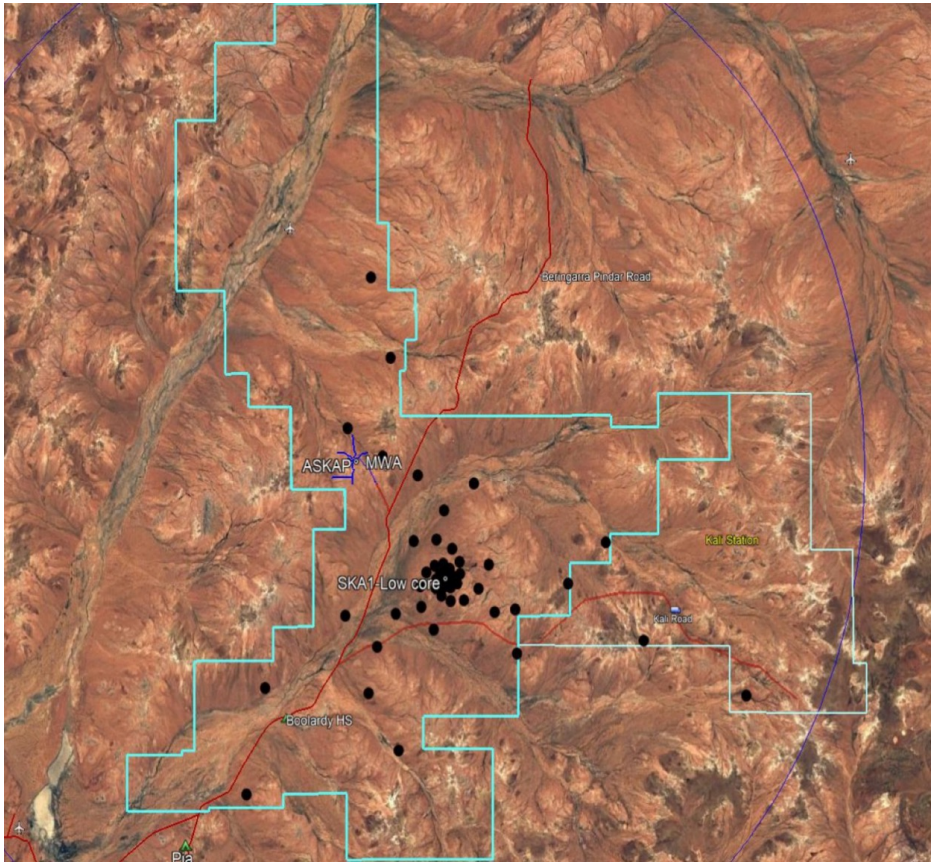
- Extensive documentation (see links on respective slides)
- More user tools being developed.

Feedback/feature request to SKAO Science Operations: **sciops@skao.int**

- Would a similar/longer demo to a wider audience be useful?
  - We recently did one for members of the CoL SWG

SKA-Low AA* Roll-out Optimisation

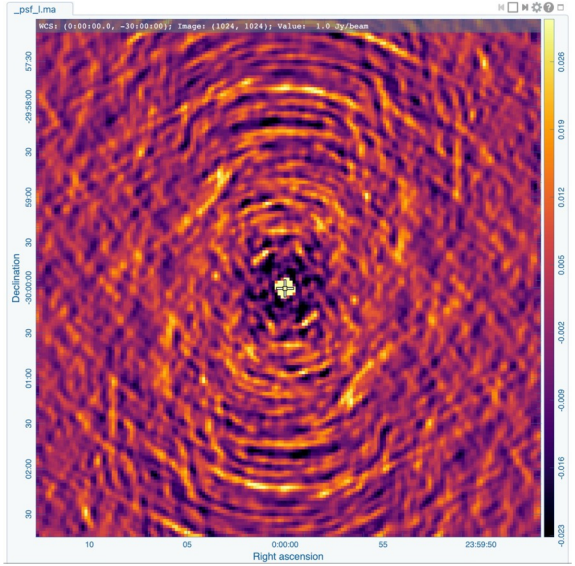
- AA4 configuration consists of dense core (224 stations) plus 18 station clusters on each of three ”spiral” arms
- AA4 station cluster is populated with 6 stations (total of 288)
- AA4 Station Processing:
  - Core Processing Facility (CPF) that can serve core plus remote clusters 1 – 4 on each arm
  - 36 Remote Processing Facilities (RPFs) that each serves one cluster 5 – 16 on each arm
- Only 18 RPFs (~700k€ each) in AA* budget

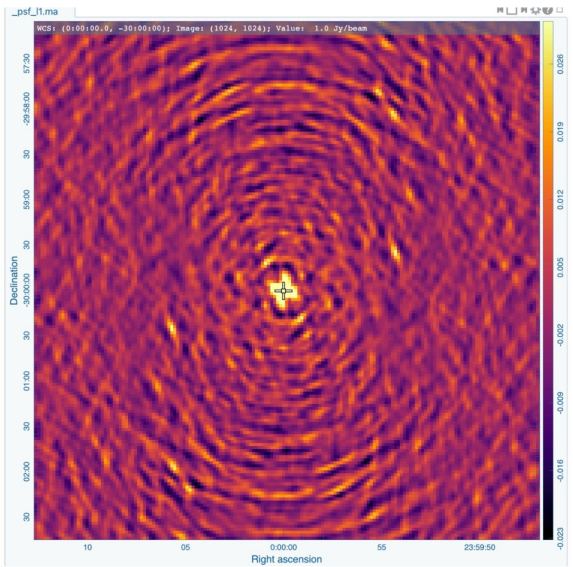


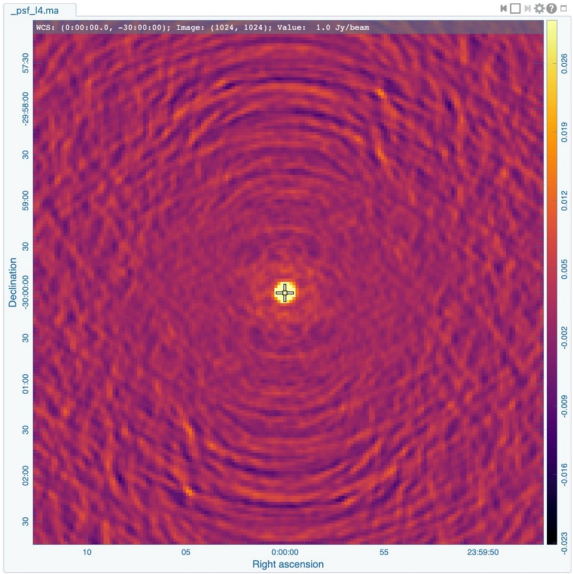
AA = Array Assembly

SKA-Low AA* Roll-out Optimisation

- PSF quality of SKA-Low is strongly impacted by not populating each of the cluster locations: this will impact SKA-Low AA* science capability!
- Images below demonstrate A) Current roll-out, B) Current plus move 2 stations to clusters 1 – 4 (no extra RPFs) and C) Move 2 stations to each cluster 1 – 16 (requires 18 extra RPFs)
- RMS sidelobe levels decline from 0.0086, to 0.0058 and 0.0024
- Engineering Change Proposal now approved for option B, since budget impact of option C too extreme to accommodate







SKA-Low AA* Roll-out Optimisation

- Engineering Change Proposal now approved for new AA* definition
  - Core station numbers and locations unchanged
  - Remote cluster station number preserved, but locations changed as below

AA* - BASELINE			
	# Sta. per Clust.		# Sta. per Clust.
S1		N/E1	
S2		N/E2	
S3		N/E3	
S4		N/E4	
S5		N/E5	
S6		N/E6	
S7		N/E7	
S8	6	N/E8	6
S9	6	N/E9	6
S10	6	N/E10	6
S11		N/E11	6
S12	6	N/E12	
S13		N/E13	
S14	6	N/E14	6
S15		N/E15	
S16	6	N/E16	6

AA* – Improved coverage			
	#Sta. per Clust.		#Sta. per Clust.
S1	2	N/E1	2
S2	3	N/E2	3
S3	2	N/E3	3
S4	3	N/E4	3
S5		N/E5	
S6		N/E6	
S7		N/E7	
S8	6	N/E8	4
S9	4	N/E9	4
S10	6	N/E10	4
S11		N/E11	
S12		N/E12	
S13	4	N/E13	4
S14		N/E14	
S15	4	N/E15	4
S16	4	N/E16	4

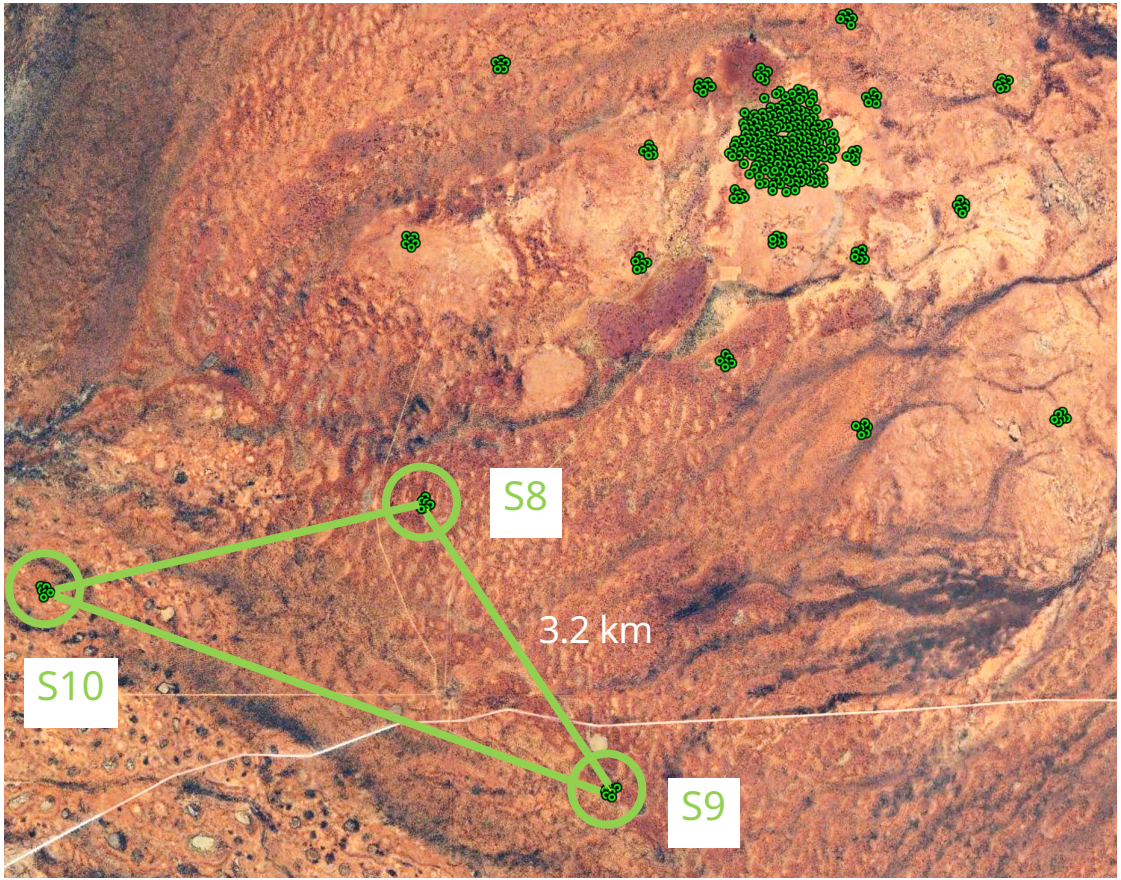
Construction Update – AA0.5

SKA-Low AA0.5

4 Stations
2 x S8
1 x S9, S10

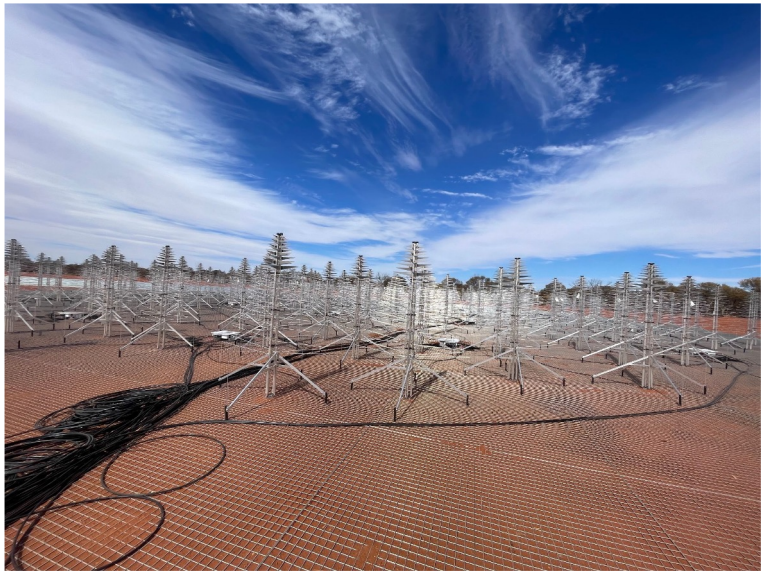
Antennas fully deployed on S8-1, S8-6, S9-2. Started on S10-3.

Data received by first two stations on S8

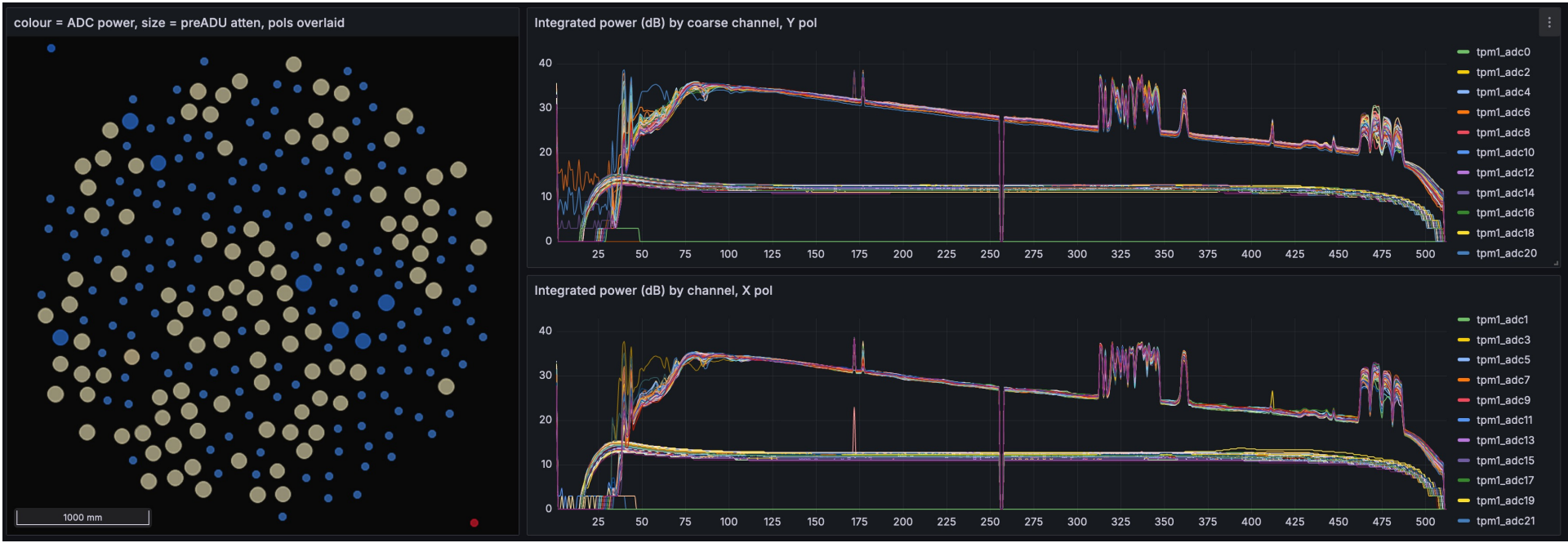


AA0.5 S8-1, S8-6

Slide credit: Angela Teale



AA0.5 S8-1, S8-6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Integrated power (dB) by channel, X pol
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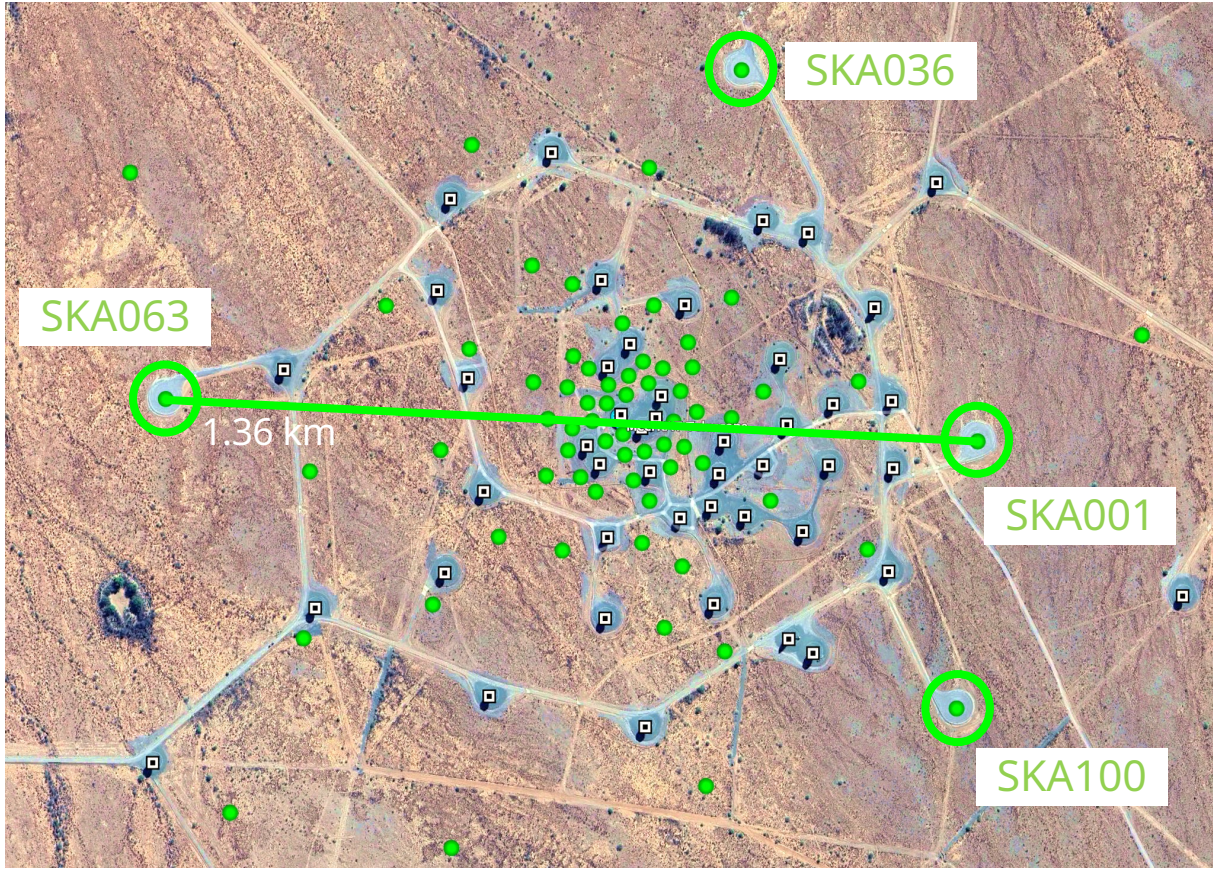
tpm1_adc13
tpm1_adc15
tpm1_adc17
tpm1_adc19
tpm1_adc21

Construction Update – AA0.5

SKA-Mid AA0.5

- MeerKAT
- SKA dish locations

First three SKA dishes now being erected on-site!



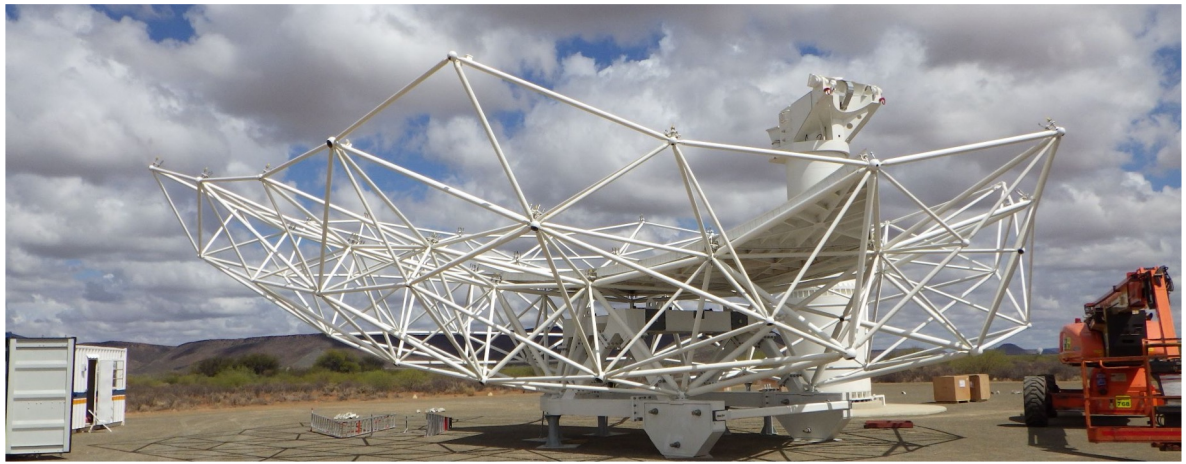
Dish Structure Construction

Slide credit: Mark Harman

- Dishes #1 to #3 on site, Dish #1 30% complete. Dish #4 fully assembled in China, used as a test bed.
- Huge RFI testing efforts by SKAO and Contractors. Compliant design meeting MeerKAT specs. Qualification testing to SKA specification will follow.
- All AA0.5 Dishes being RFI tested, ensuring RFI integrity.

Dish #4 CETC54 in China

Dish #1 Construction in Karoo



Science Meetings

- *New Telescopes and major upgrades to existing telescopes: URSI AT-RASC, 19-24 May, Gran Canaria, ES [RECENT]*
- *Cosmic Magnetism in the pre-SKA Era: 27-31 May, Kagoshima JP [RECENT]*
- European Astronomical Society (EAS) 1-5 July Padova.
  - EAS SS31: The SKAO: pathway to science operations, 5 July
- 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
- Cosmic Ecosystems in Radio & Optical – ESO-SKA, 9-13 Dec, near Perth, AU (abstract deadline June 20)
- **SKA Science Conference, June 2025**, Gorlitz Germany, see next slides

Presentations from most past SKAO-(co)led science meetings are available online

2025 SKAO Science Meeting

2025 Science Meeting overview

- **Dates:**
  - 16th-22nd June 2025
- **Location:**
  - Görlitz, soon to be the home of the brand new German Center for Astrophysics (Deutsches Zentrum für Astrophysik, DZA)
- **Numbers:**
  - In person: ~300
  - Virtual attendance to be supported for all sessions
- **Themes:**
  - Updates to the SKA Science Book
  - Noting the transition from SKAO commissioning to science verification and observing: “Observing with the SKAO” sessions

SOC members

SOC co-chairs

Philippa Hartley	Project Scientist, SKAO
Viola Tegethoff	MPIfR

SWG representatives

Marta Spinelli	Cosmology
Joe Lazio	Cradle of Life
Cath Trott	Epoch of Reionisation
Fatemeh Tabatabaei	Extragalactic Continuum
Eva Schinnerer	Extragalactic Line
Nicola Bellomo	Gravitational Waves
Neeraj Gupta	HI Galaxy
Katie Mulrey	High Energy Cosmic Particles
Tessa Vernstrom	Magnetism
Ke Wang	Our Galaxy
Bhal Chandra Joshi	Pulsars
Rohit Sharma	Solar, Heliospheric and Ionospheric Physics
Patrick Woudt	Transients
Jack Radcliffe	VLBI

DZA, MPIfR and SKAO

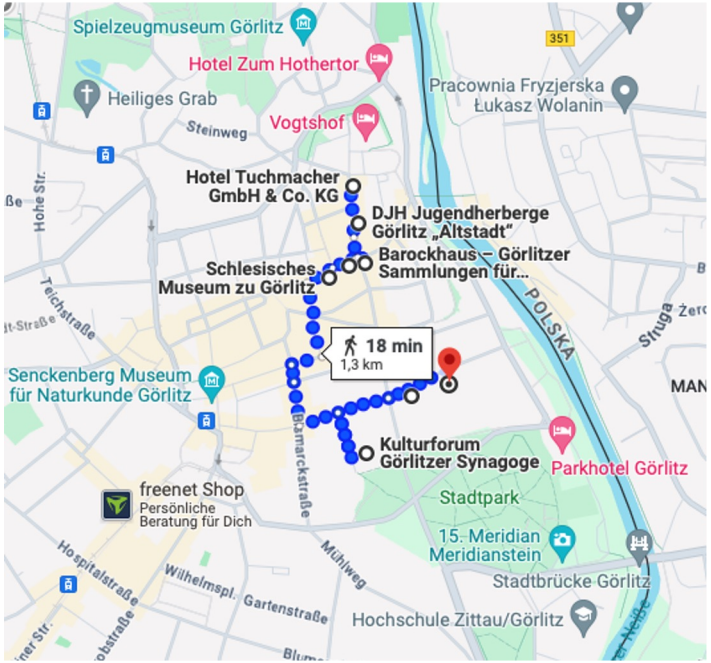
Stefan Wagner	Head of Astronomy, DZA
Michael Kramer	Director, MPIfR
Shari Breen	Head of Science Operations, SKAO
Wendy Williams	Project Scientist, SKAO

Venue: theatre now reserved

- 256 seats downstairs, plus 1st gallery row good view: ~300 in total
- Tiered (and comfortable!) seating
- Good acoustics
- Not set up for audio/visual by default: will be supported by SKAO IT team

Venues: parallel sessions

- Not possible to locate all parallel sessions in the same venue
  - Individual venues can accommodate up to four sessions in parallel
- Several other venues are located close together
- Eight rooms to be booked for parallel sessions
- All rooms to support virtual attendance



Science meeting programme

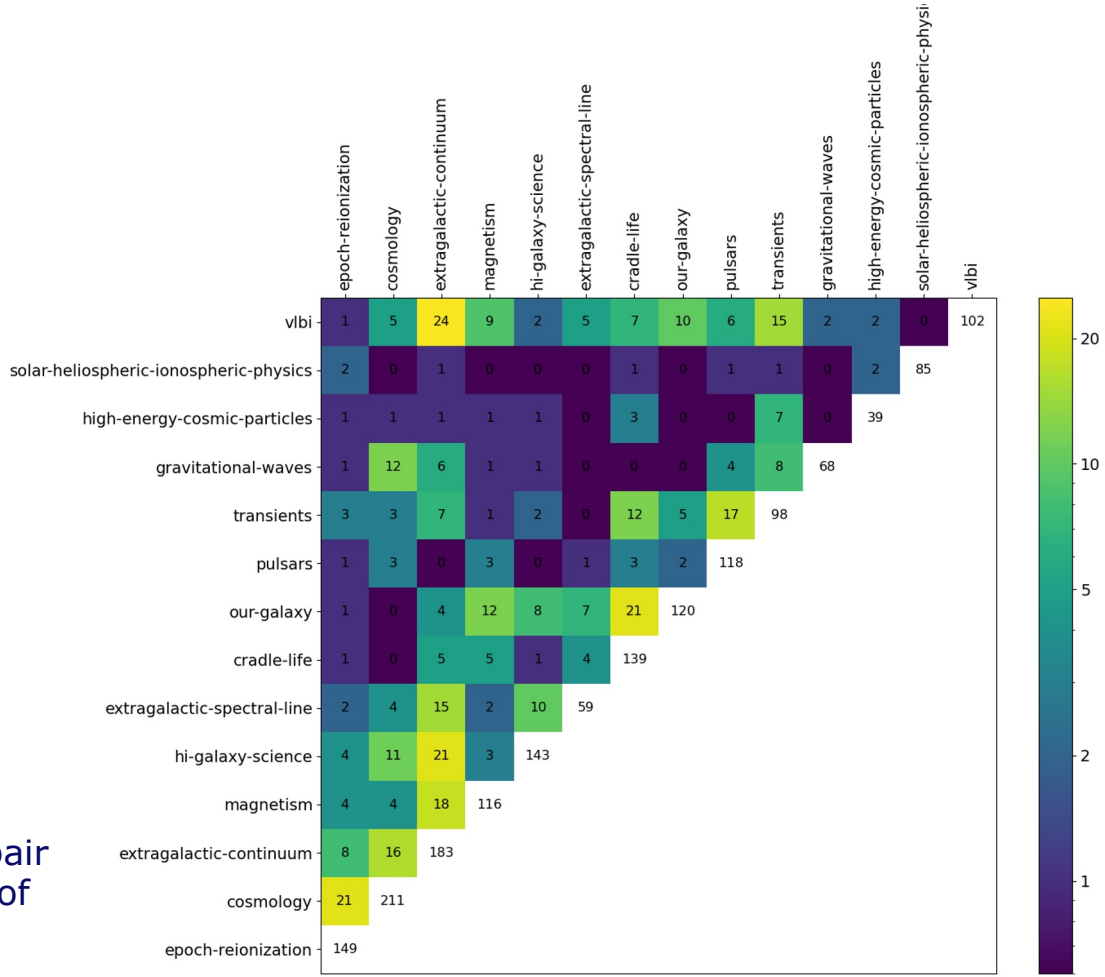
- Plenary sessions
  - Organised by broad Science theme
  - Plus “Observing with SKAO” special plenary session
- Parallel sessions
  - In order to facilitate SWG interaction and collaborations, organise by SWGs
    - Will also enable Operations to be able to tailor talks for different technical requirements
  - See Wendy’s corner plot illustrating SWG overlaps - will use this information to identity which sessions to run at the same time
  - Participants will be asked at registration to indicate priority of (up to three?) parallel sessions, in order to assign rooms (of differing sizes) to sessions
- Posters
  - 'Lightning’ talks: aim to organise relatively early in the week in order to promote speakers’ posters for viewing

SKAO Operations: Observing with SKAO

- Half day of plenary sessions dedicated to “Observing with the SKAO”
  - Detailed telescope capabilities
  - Operational policies
  - The user experience (tools, SRCNet etc)
  - Timeline to science (SV, cycle 0)
- SKAO Operations team will also hold interactive sessions with each SWG
  - Tailored capability presentations and Q&A sessions

Parallel sessions

- We have 14 SKAO Science Working Groups
  - Overlapping members between SWGs should help to group SWGs for parallel sessions



Number of members in common between each pair SWGs and total number of members in each SWG

2025 SKAO Science Book updates

Science Book: overview

- This will be an updated version of the existing SKAO Science Book
- Some chapters may not have changed much; some will have evolved; some brand-new chapters based on new science cases
- Aim is two-fold:
  - Facilitate SWG-coordinated chapter updates
  - Opportunity for researchers to connect with and join the SWGs
- Provisional title: “Advancing Astrophysics II: Preparing for Science with the SKAO”
  - Aiming to convey the work to update the science book, and where we are in the project

Science Book: coordination of the call for chapters

- We will encourage chapter submission from all members of the scientific community
- Call for chapters can be advertised both within and outside SWGs
  - Within SWG: SWG chairs to invite proposals for intended contributions, in order to facilitate coordination
  - Outside SWG: the call for chapters will request authors to submit proposal to relevant working group chairs
- Draft chapter submissions will then be coordinated by SWG chairs: chairs can invite draft submissions based on internally-identified chapter updates and on proposals received
  - LaTeX template will be made available
  - Draft chapters submission will open from September, until end of January.
  - Oxford Abstracts for submissions
    - Free month-long trial available
- 2025 Science Meeting SOC will select draft chapters for presentation at the meeting
  - Talks (both plenary and parallel sessions) and posters
- Final chapter versions will be submitted for review *after* the meeting

Science Book: content

Book Sections:

- One section per broad science theme e.g. galaxy evolution, etc
  - Themes to be fully inclusive
  - Authors would be requested to tag their submission with the relevant SWG name(s)
- Overview chapter at the beginning of each section
- Synergies with other instruments to be highlighted within individual chapters

Goal of individual chapters:

- Self-contained description of a science application including background and motivation
  - Main focus of a chapter:
    - Demonstrate the science outcomes that are enabled by the capabilities of a particular component of the SKA design baseline, Array Assembly 4 (AA4)
  - Supplementary focus:
    - Document the extent to which scientific outcomes might be achieved by the end of staged delivery (AA*)
    - Document the types of enhancements to the design baseline that could further support the science goals
  - Also consider:
    - Highlight synergies with other instruments

Science Book: final submissions and publishing

- SWG chairs to suggest reviewers for individual chapters
- Editing by SWG chairs and SKAO Science Team
- Publish both hard copy and online versions
- Hard copy versions: could be printed as individual sections
  - Mindful of the environmental impact of physical books
- Online version: facility to update over time (as is possible on ArXiv, for example)

Timeline

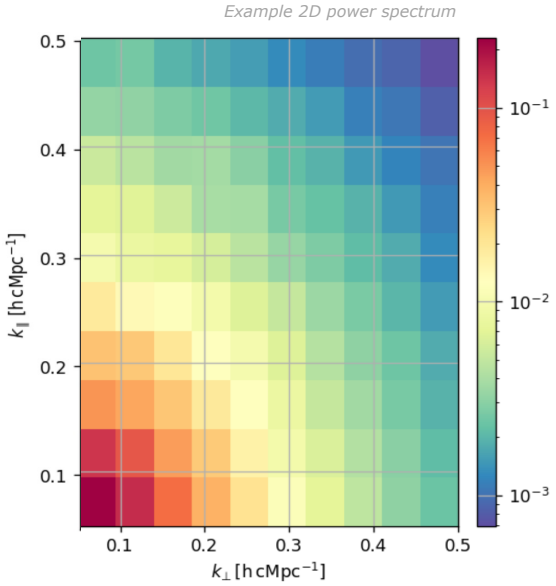
- June 2024: Save the Date announcement and chapter proposals sought
- September 2024: paper drafts invited and submission platform open
- End January 2025: paper draft submission close
- January to mid-March: talk selection
- Mid March 2025: speaker notification
- Mid/late January 2025: registration open
- March 2025: early bird registration close
- May 2025: registration close
- June 16th 2025: meeting begins
- Second half of 2025: final book chapter reviews and publication

Next steps

- Based on feedback from SWG chairs, finalise plans for the call for book chapters
- Save the Date announcement (later this week) to include first official announcement of 2025 Science Meeting and Science Book update

Science Data Challenge 3b: EoR Inference

- Status:
  - All teams who have requested HPC resources have either received allocations or have joined waiting list in case additional resources become available
    - Teams who have received allocations are being set up
  - Final SDC3b datasets in production
    - Slight delay as we finalise the simulations
  - SDC3b ‘data description document’ will be shared soon



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 completed by SKAO IT team
  - All co-chairs should now have access to this area. Please feel welcome to test and set up SWG areas
    - Once happy, we will roll out to all SWG members
    - Propose to give edit access to core SWG members only
      - Core group set-up/refresh might be required
      - Also looking at edit access for profile page for all members

Reminders & Information

Outreach & Engagement

- **CONTACT** is the SKAO magazine aimed at the entire SKA community
- Ideas for articles for CONTACT are always welcome (email Tyler). These include:
  - Let's Talk About (Feature length … science focussed)
  - Pathfinders & precursors. Short pieces on recent results
  - SKA-related events (e.g. SPARCS, etc)
  - any other news of SKA relevance (award/honours, job openings, …)
- Encourage your SWG members to sign up

SKA Positions

- SKAO positions (HQ Manchester UK, Australia-Low, South Africa-Mid) LINK
- SARAO employee SKA positions (Cape Town, Canarvon) LINK
- CSIRO employee SKA positions (Perth, Geraldton) LINK

SKAO Speaker Series

- SKAO Speaker Series
  - series of interesting talks, accessible to all within the broader SKA community, covering a wide range of topics, from astronomy to physics, engineering, big data and computing, EDI, and more.
  - Encourage your SWG members to sign up to give a talk (and consider giving a talk yourself).
  - Talks recorded – all available for reviewing via the Speaker Series page (2020+)

Construction Timeline

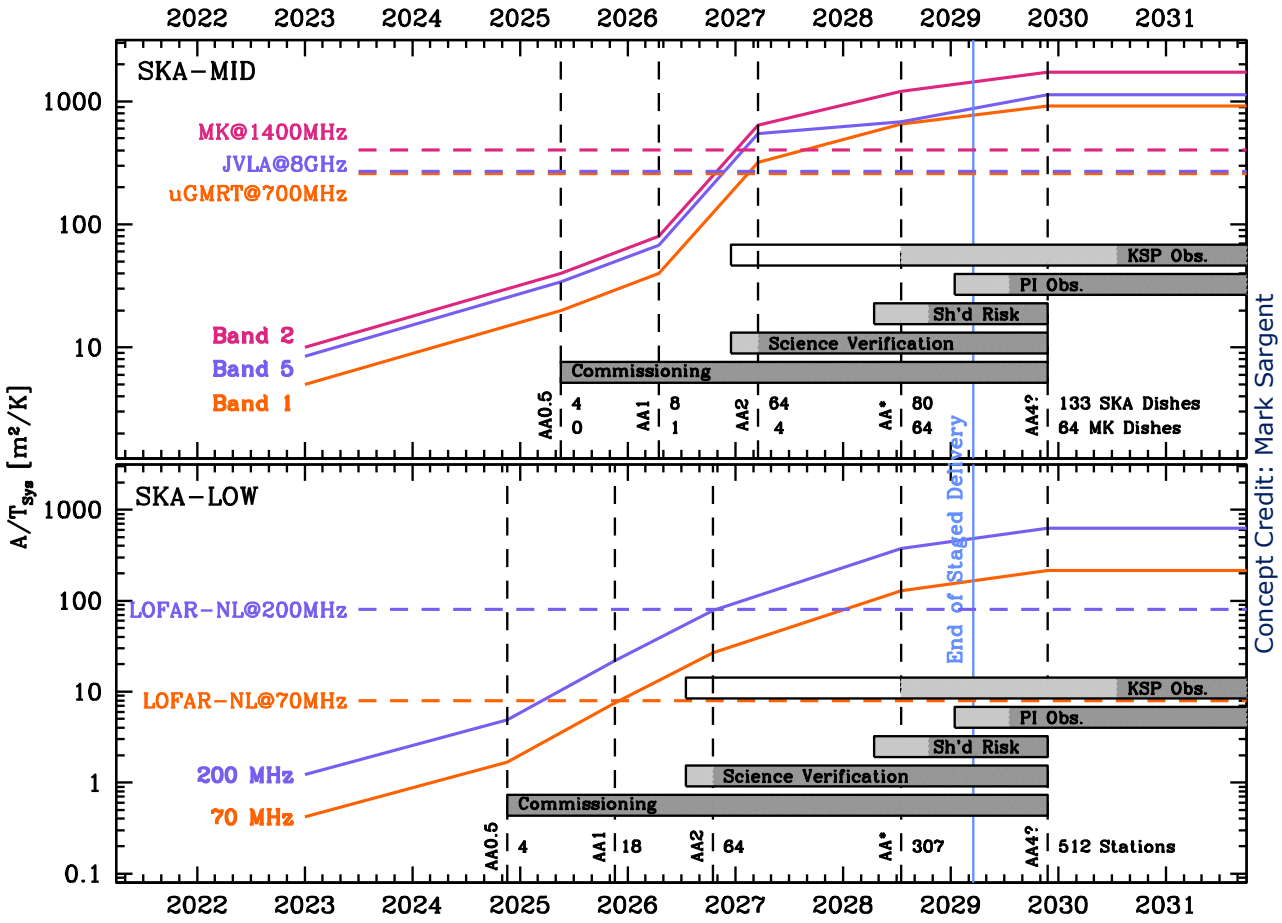
- **Target**: build the SKA Baseline Design (197 Mid dishes; 512 Low stations: AA4)
- Not all funding yet secured, therefore following Staged Delivery Plan (AA*)
- Develop the earliest possible working demonstration of the architecture and supply chain (AA0.5).
- Then maintain a continuously working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

Milestone Event (earliest)		SKA-Mid	SKA-Low
AA0.5	4 dishes 4 stations	2025 Q4	2024 Q4
AA1	8 dishes 18 stations	2026 Q3	2025 Q4
AA2	64 dishes 64 stations	2027 Q3	2026 Q4
Science Verification begins		**2027+**	**2027+**
AA*	144 dishes 307 stations	2028 Q2	2028 Q1
Operations Readiness Review		2028 Q3	2028 Q2
End of Staged Delivery Programme		2029 Q1	2029 Q1
Early Operations (Shared Risk)		**2029+**	**2029+**
AA4 (Design Baseline)	197 dishes 512 stations	TBD d April 2024 (Construction Report)	TBD

First Science Verification data release to the community expected in 2027

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!



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.

SKAO

www.skao.int

www.skao.int/en/science-users