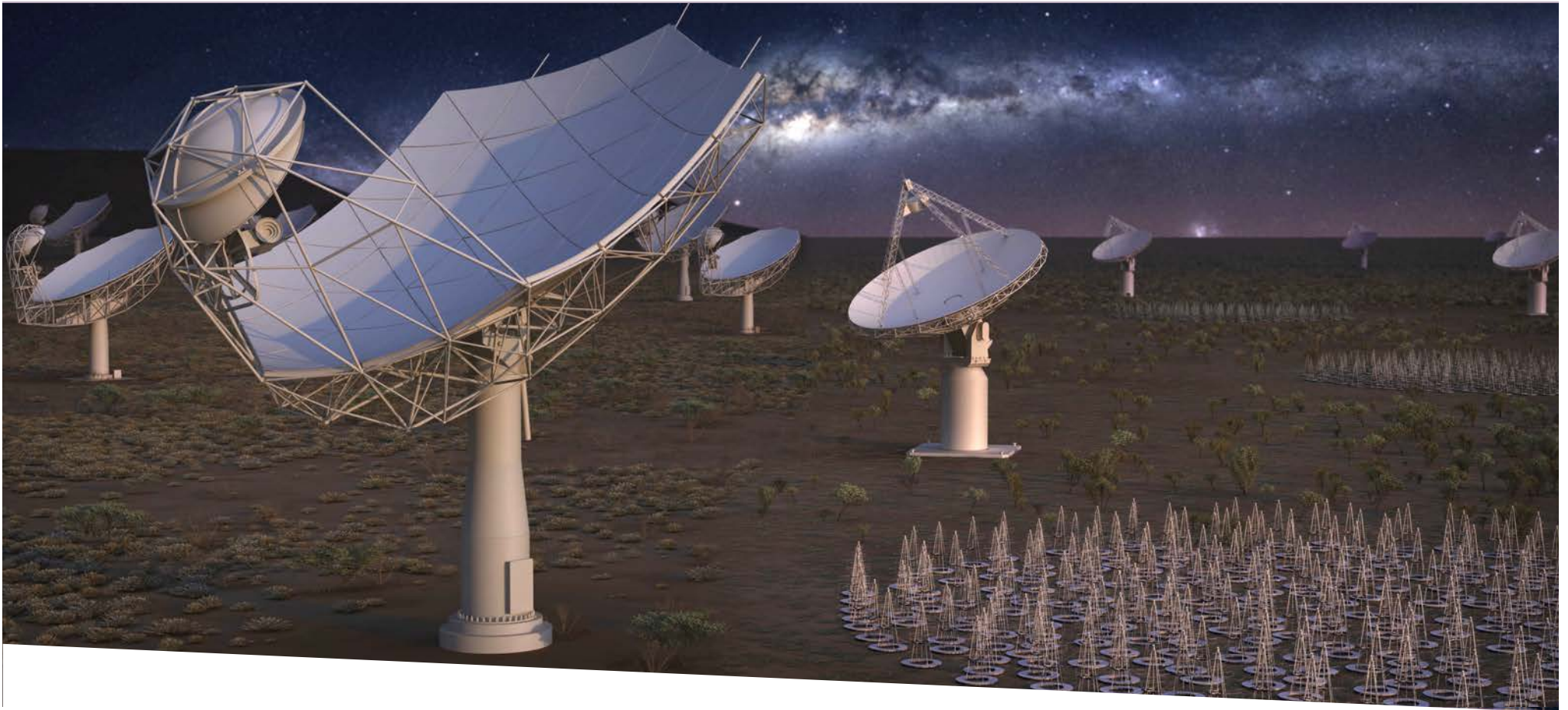


SKA SWG Update



SQUARE KILOMETRE ARRAY

Exploring the Universe with the world's largest radio telescope

Robert Braun, Science Director

16 July 2019

Science Activity Updates

- High Frequency Science Case (Jeff)
- Science Data Challenges (Anna)
- SRC Users Forum (Rosie)
- Update on LFAA design work (Jeff)
- Round table SWG updates (All)
- SKA related meetings
- AOB

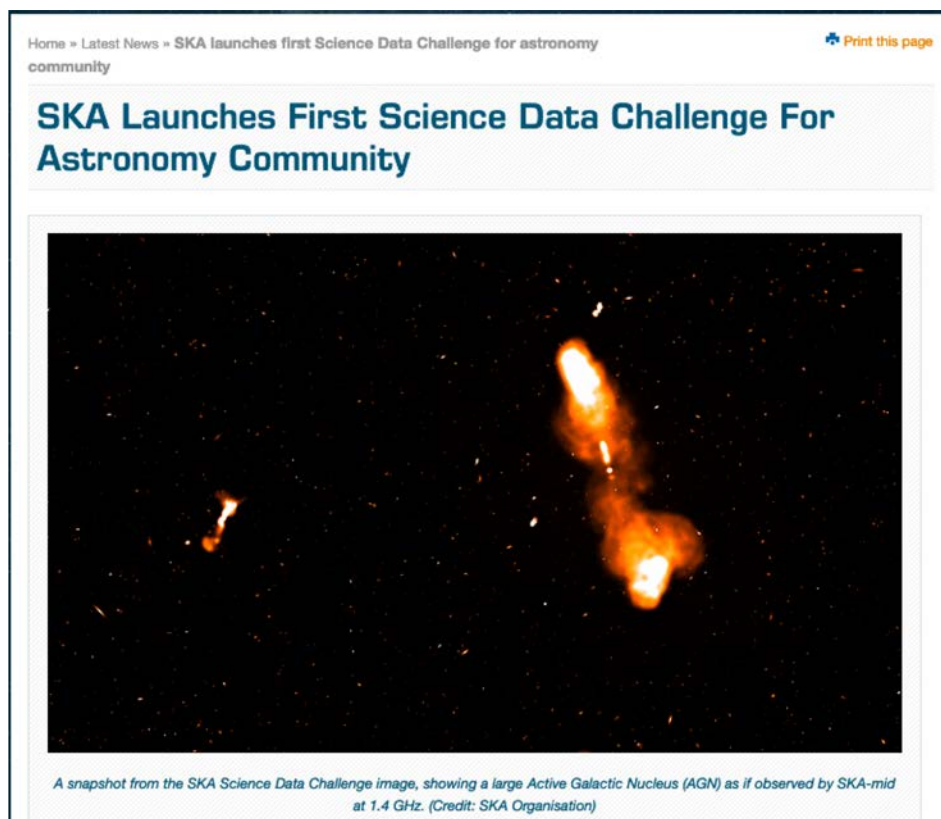
Update to the high frequency science case

- The high frequency science case update is proceeding, with about 60 SWG members contributing:

<http://beyondb5.pbworks.com/w/page/133133820/SKA1%20Beyond%20Band%205>

- Aim is to support the design work of the advanced single pixel feeds and receivers (ASPFR) group, who are designing receivers for MID above 15 GHz
- This work does not detract from SKA1 design work or construction funding. Data from dish prototypes to be available next year
- Aim is to have advanced drafts of chapters by the end of September

Science Data Challenge 1 (SDC1)



SDC1 Leaderboard

Ox-ICRAR
UK / Australia

ICRAR
Australia

EngageSKA
Portugal

ARCit-CACAO
Italy

hs
Germany

IITK
India

IPM
Iran

JLRAT
China

Shanghai
China

- Announcement of SDC1 winner, 15 July 2019!
<https://astronomers.skatelescope.org/ska-science-data-challenge-1-results/>



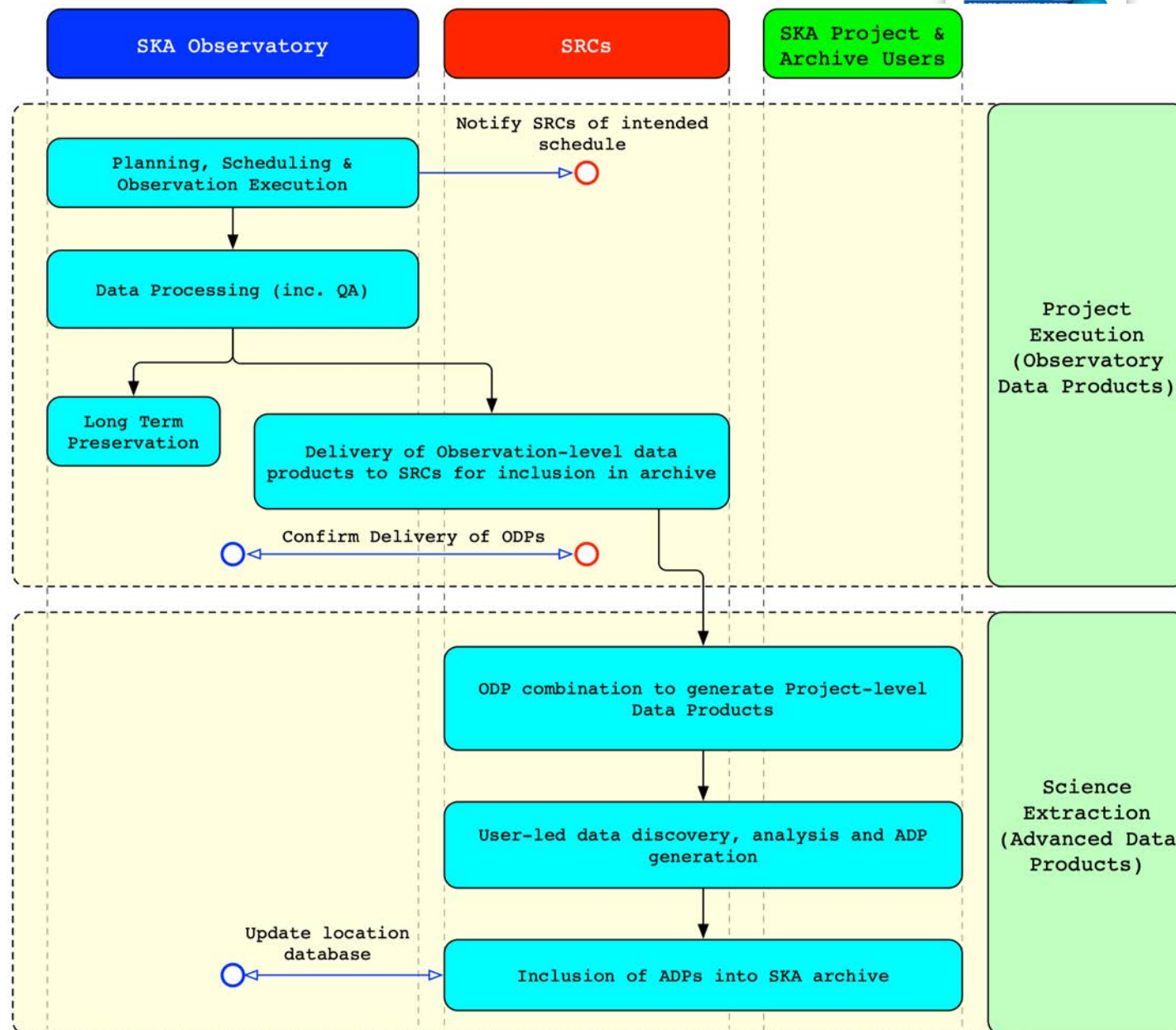
Data Challenges, Moving forward.....

- Suggestions for SDC2 –
please provide feed-back on scientific interest/timeliness
 - Transients
 - One sub-band image: Low (200 MHz) and Mid (1.4 GHz), cadence of once(?) per day for entire calendar year(?)
 - Various populations with time constants of days to months
 - HI Emission/Absorption
 - Red-shift / Sky coverage: $z = 0(?) - 6(?) / N(?) \text{ deg}^2$
 - Resolved plus unresolved targets
 - Polarisation
 - Introduce plausible Q,U signatures into continuum sky model and generate (I,Q,U) cubes $N(?) \text{ deg}^2$ with suitable frequency sampling (Freq_Max, Freq_Min, Delta_Freq)?
 - Foregrounds
 - Explore foreground removal effectiveness for EoR and Intensity Mapping applications

SKA Regional Centres



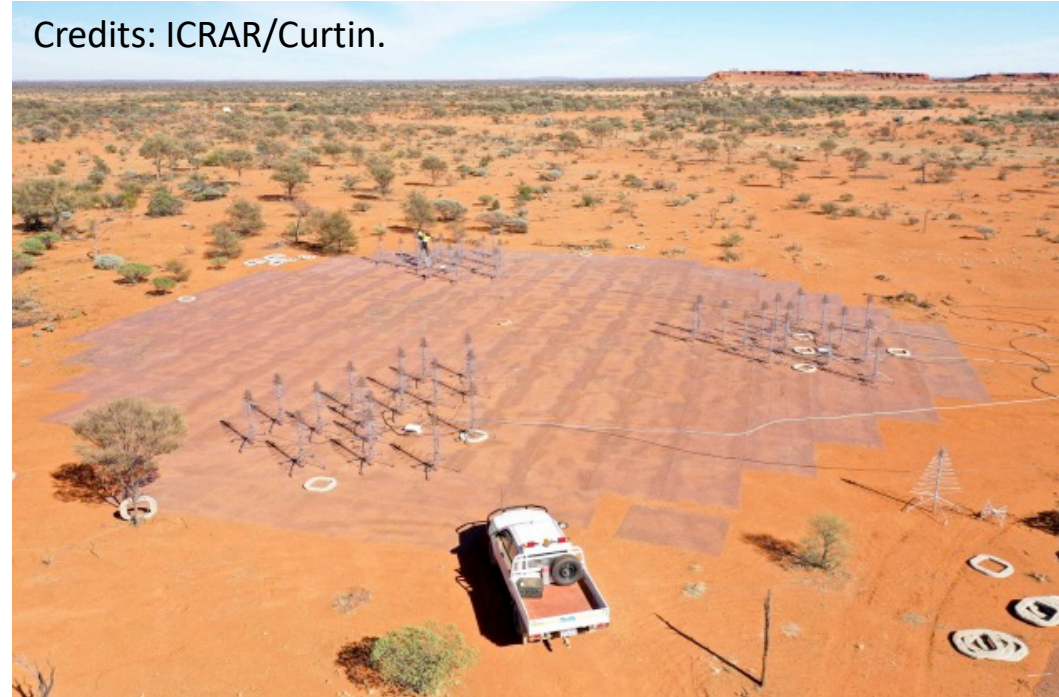
- SKA Regional Centre Steering Committee desires SWG contacts to serve as **Users Forum**
- Advise on:
 - User Needs
 - Data Products
- **Please send in your self-nominations**



LFAA design update



- Face-to-face meeting in Florence held this month to present an update on LFAA bridging work (antenna design, station calibration)
- Objectives: risk reduction for construction and inform system CDR whether SKALA4 antennas can meet calibration requirements
- Deployment of AAVS1.5 at the MRO site using 48 SKALA4.1-AL antennas – similar embedded element patterns as full station



LFAA design update

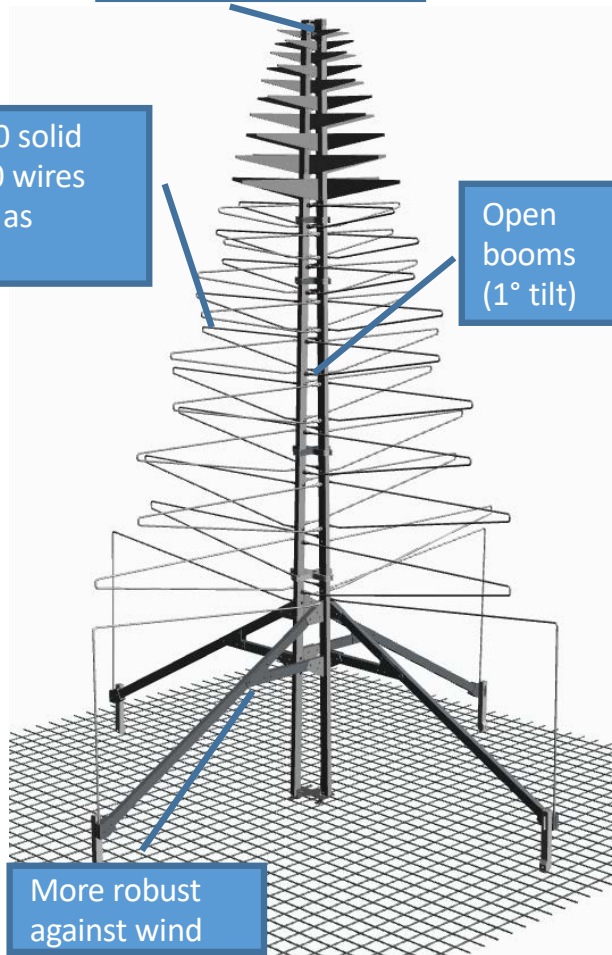


New LNA connection to the antenna feed

20 dipoles: 10 solid dipole and 10 wires (same height as SKALA4-AL)

Open booms (1° tilt)

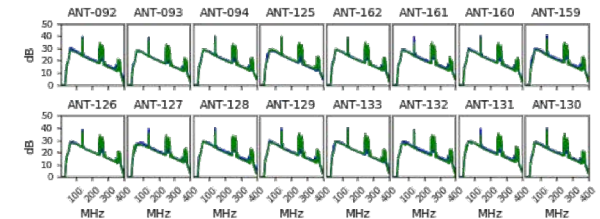
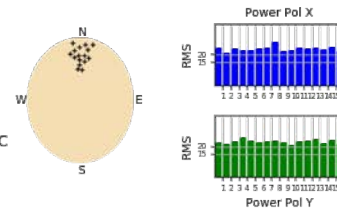
More robust against wind



SKA-Low Bridging Phase 1 SKALA-4 Spectra

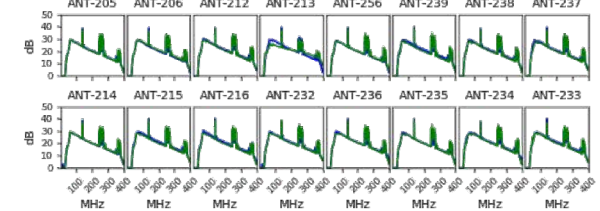
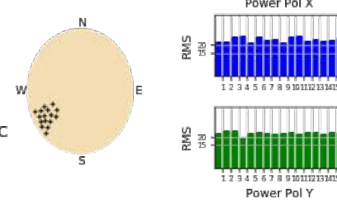
Tile 17

Acquisition Time (UTC)
2019-06-25 09:33:49 UTC



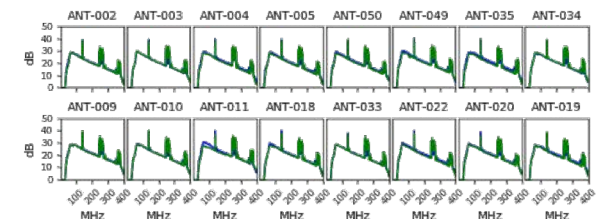
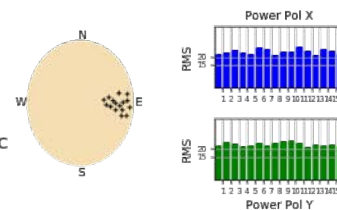
Tile 18

Acquisition Time (UTC)
2019-06-25 09:33:49 UTC



Tile 19

Acquisition Time (UTC)
2019-06-25 09:33:49 UTC



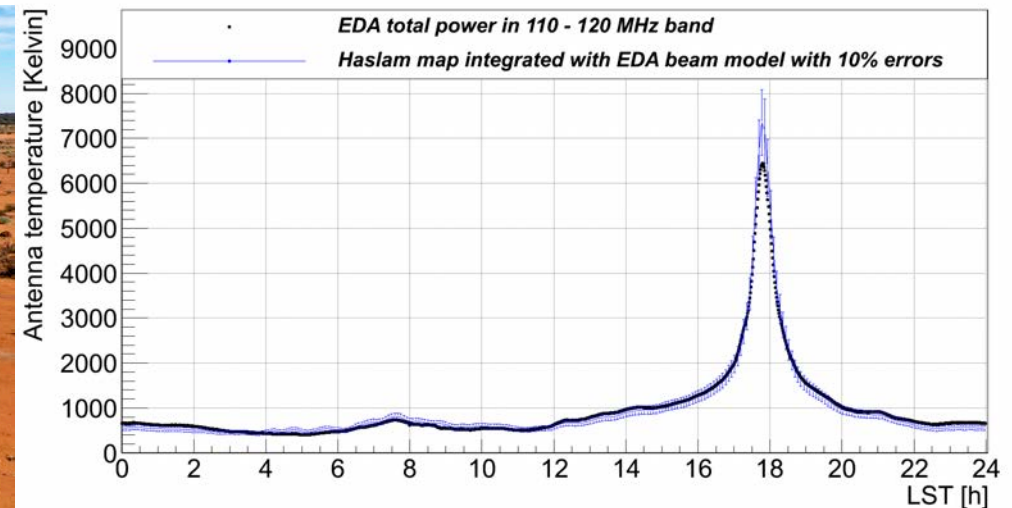
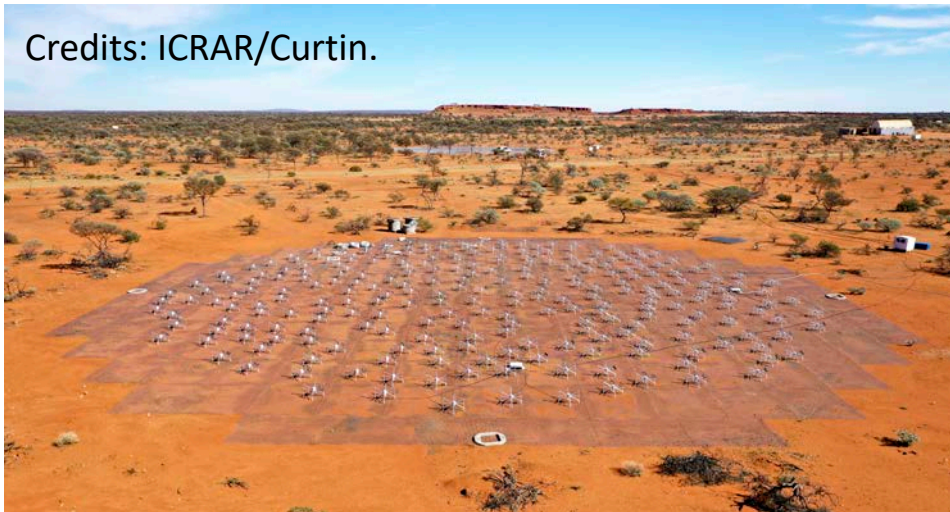
Spectra picture updates every 2 minutes

- Real-time remote monitoring of all deployed antennas
- Flat band-pass, high stability

LFAA design update

- Embedded element patterns for AAVS1.5 are being simulated for multiple frequencies across the LOW band – confirming models using UAV (drone) flights at spot frequencies
- EDA2 station of bowtie dipoles used as reference for calibration performance
- Demonstration of prototype beamformers (Alessio Magro et al.)

Credits: ICRAR/Curtin.



Recent / Upcoming SKA-related Meetings

- SKA in Spain, June 10 – 11, Grenada
- New Perspectives on Galactic Magnetism, June 10-14
<https://conferences.ncl.ac.uk/galacticmagnetism/>
- SKA Swiss Days, 19-20 June
<https://ska.epfl.ch/swiss-ska-meetings/swiss-ska-days-2019>
- EWASS SS11: New Inputs, prospects Milky Way Magnetic Fields
<https://eas.unige.ch/EWASS2019/session.jsp?id=SS11>
- EWASS FRBs Special Session, 24 June, Lyon
<https://eas.unige.ch/EWASS/session.jsp?id=SS24>
- EWASS SKA Special Session, 26 June, Lyon, about 50 participants
<https://eas.unige.ch/EWASS2019/session.jsp?id=SS29>
- CESRA Workshop, 8 – 12 July, Potsdam
<https://meetings.aip.de/cesra2019/cms/>
- VLBI Workshop, 14 – 18 October, SKA HQ
<https://indico.skatelescope.org/event/539/>
- SKA Eng. and Ops. Meeting, 25 – 28 Nov Shanghai
<https://indico.skatelescope.org/event/551/>

SQUARE KILOMETRE ARRAY

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Credits: Jader Monari and INAF team