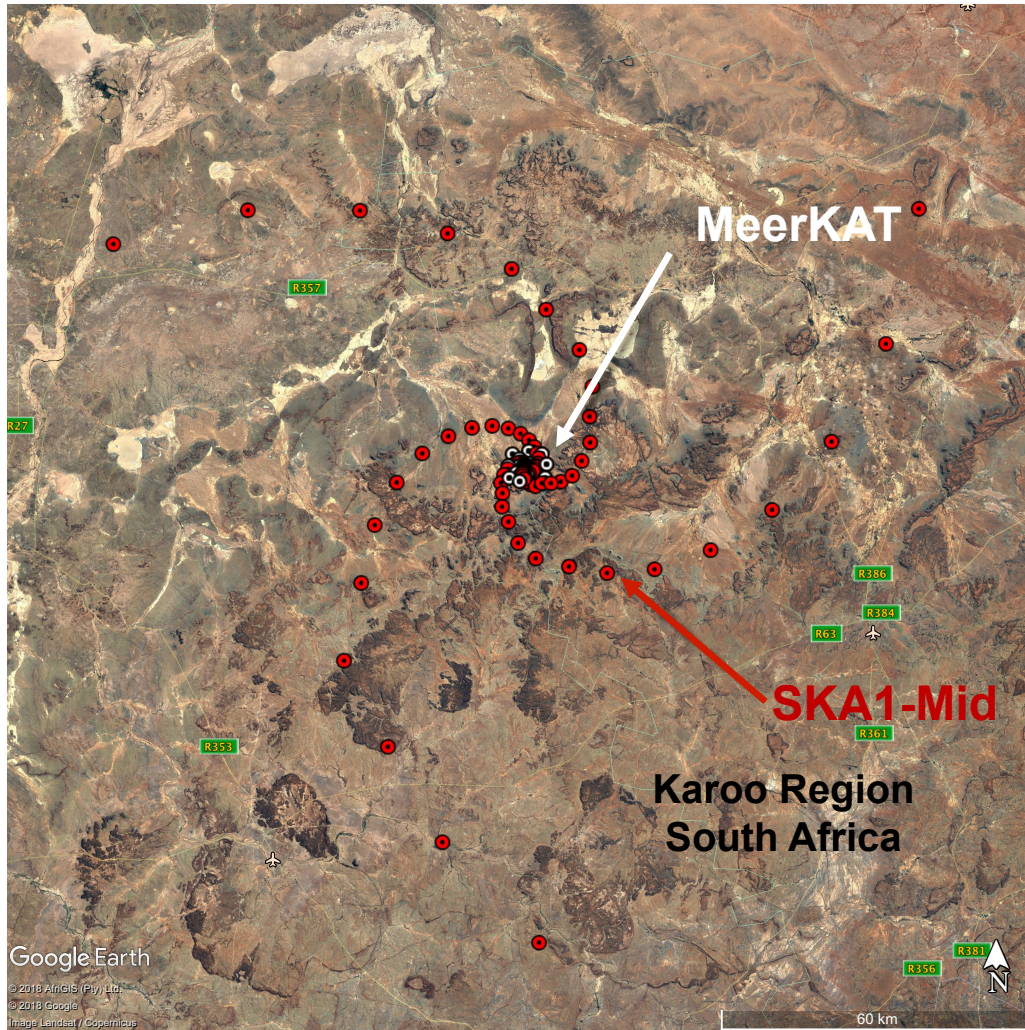
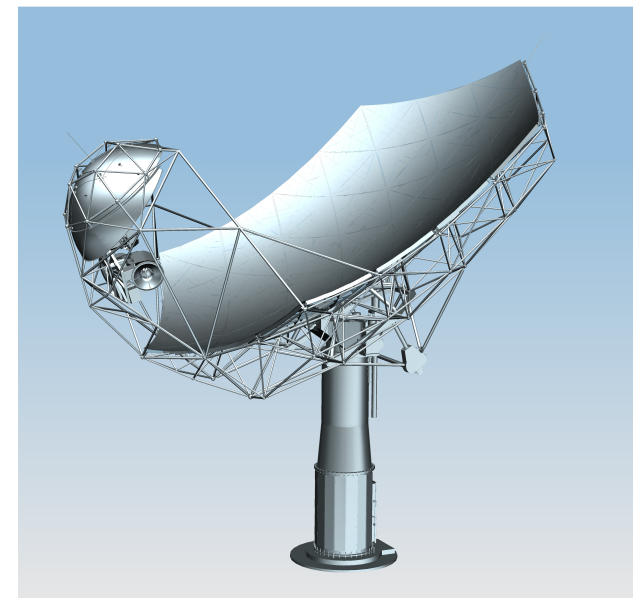


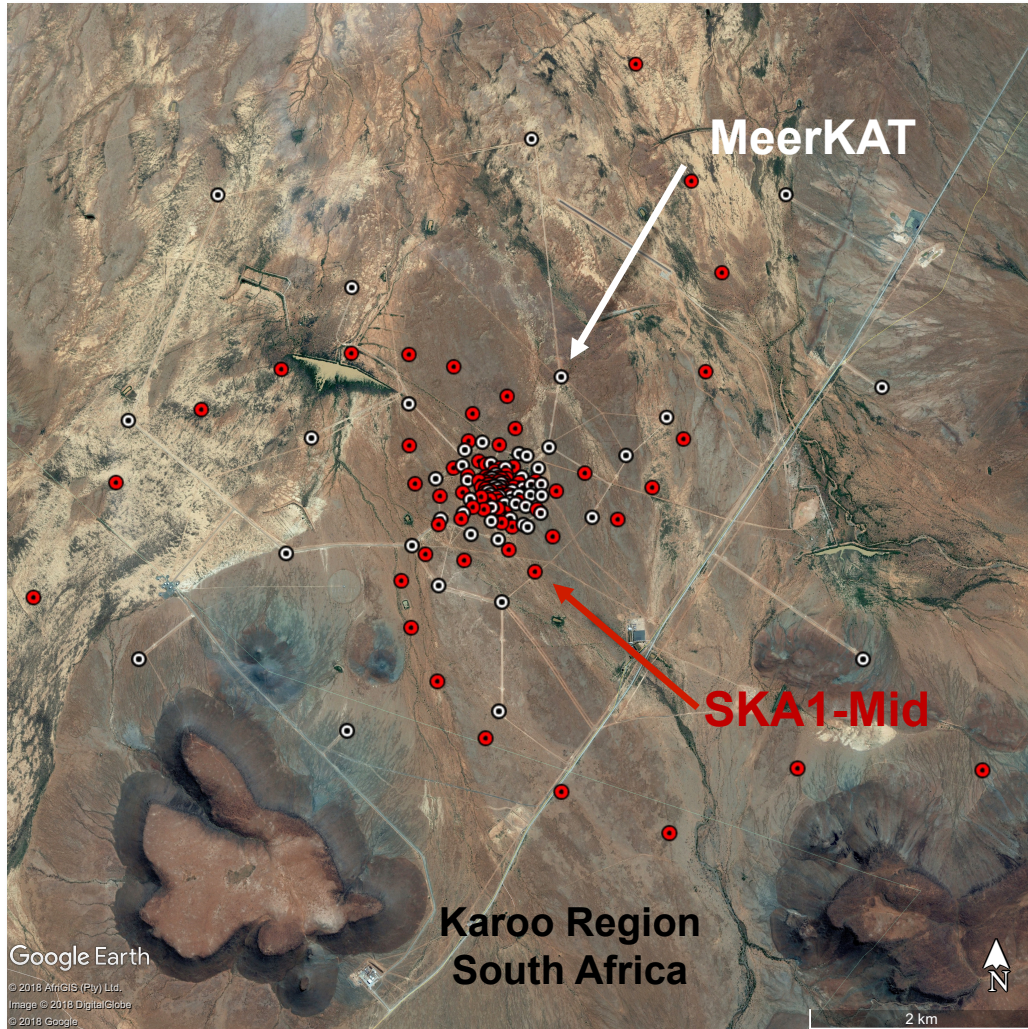
SKA1 –Mid: Layout



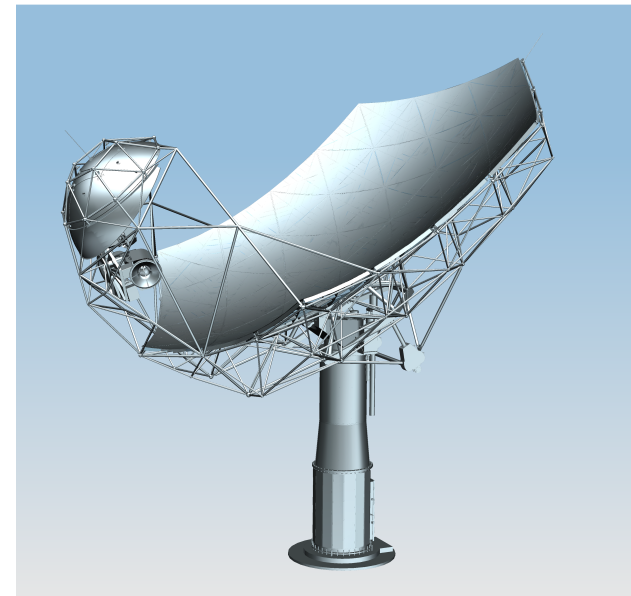
- 133 SKA 15m dishes
- 64 MeerKAT 13.5m dishes
- Maximum baseline 150 km
- 3 logarithmic spiral arms



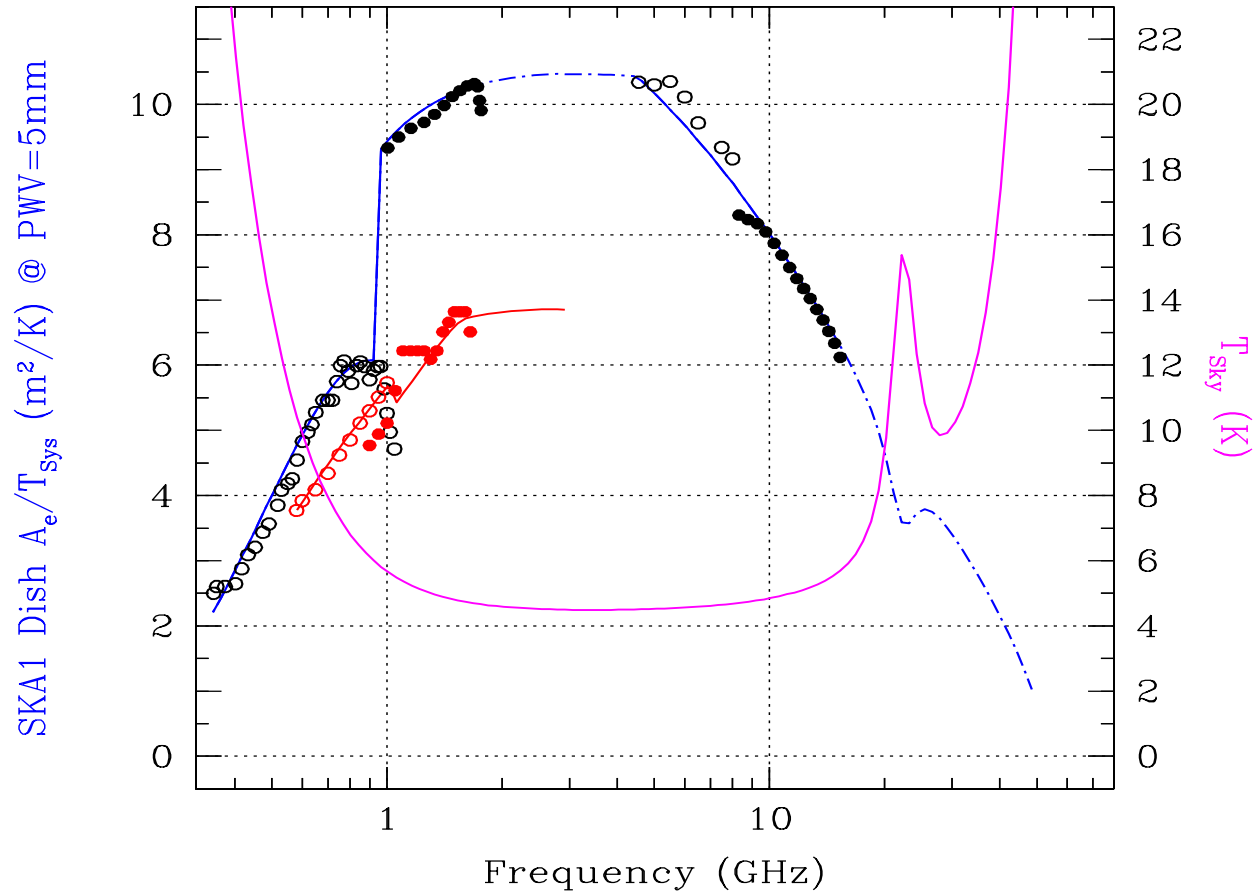
SKA1 –Mid: Layout



- 133 SKA 15m dishes
- 64 MeerKAT 13.5m dishes
- Maximum baseline 150 km
- 3 logarithmic spiral arms
- ~ 50% within ~2 km randomly distributed

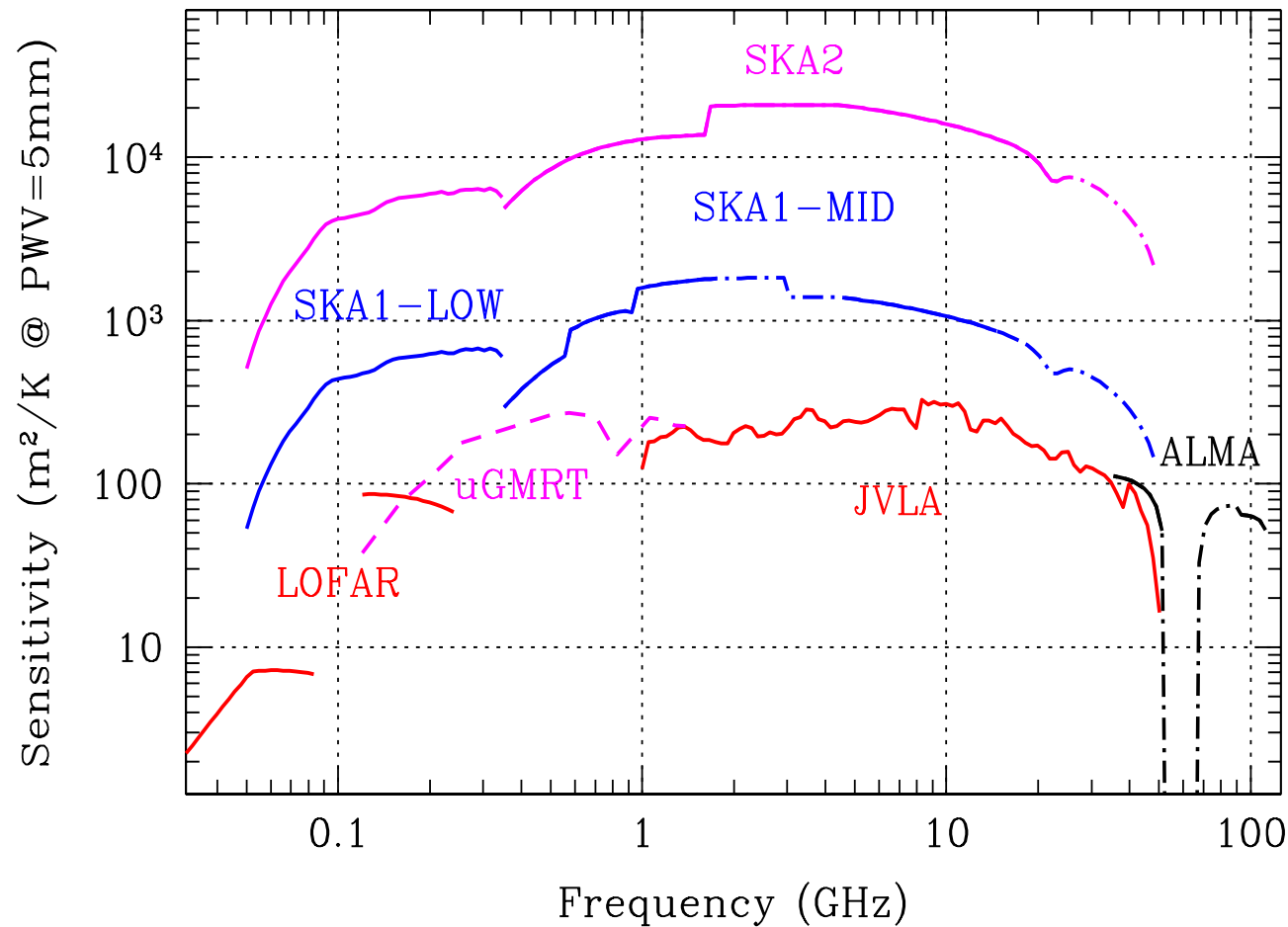


SKA1-Mid Anticipated Performance



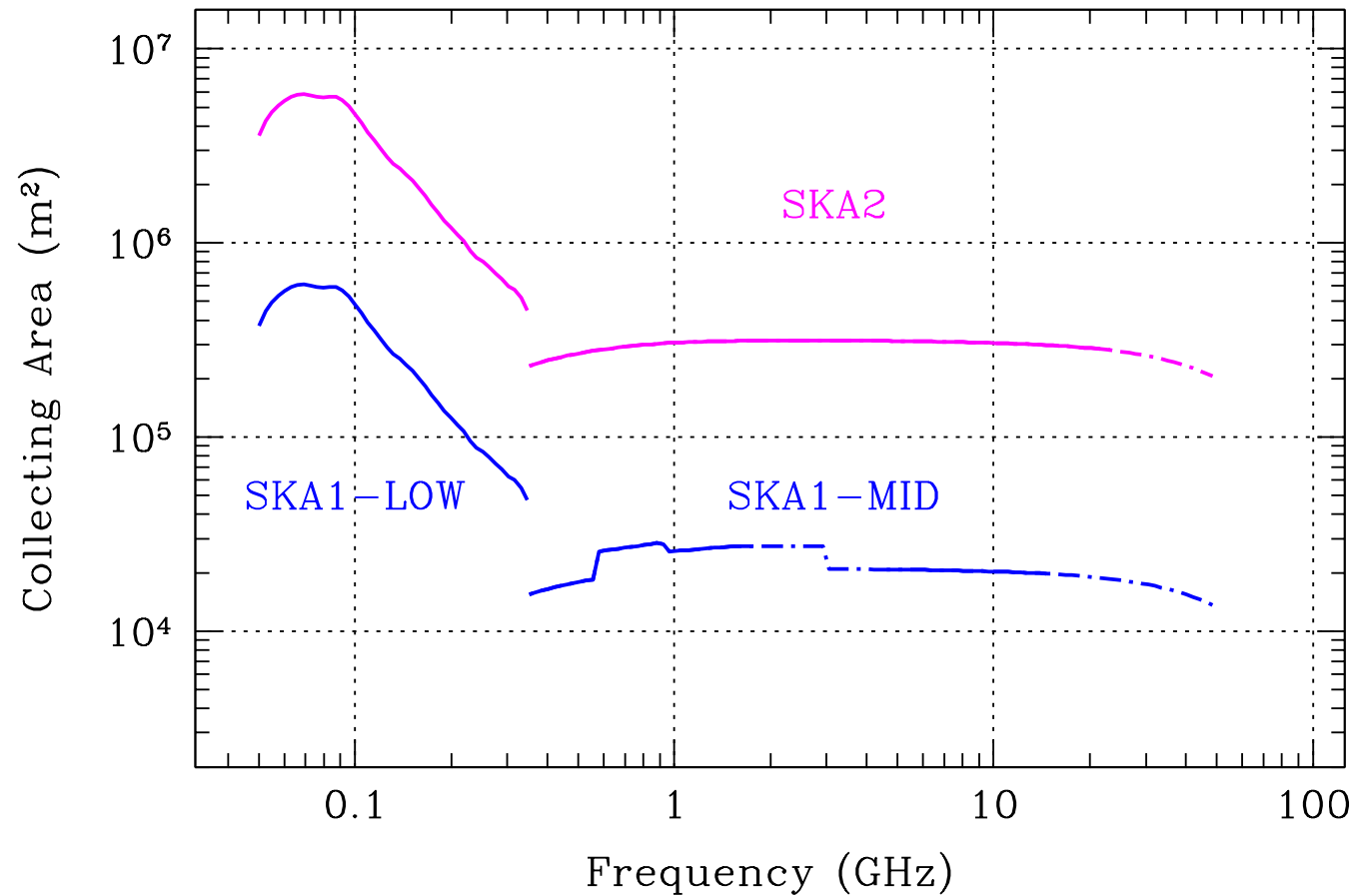
- SKA1-Mid and **MeerKAT** dish performance at **Karoo** site
 - SKA surface RMS < 350 μm , relative pointing RMS < 1.3 arcsec

SKA1 Anticipated Sensitivity



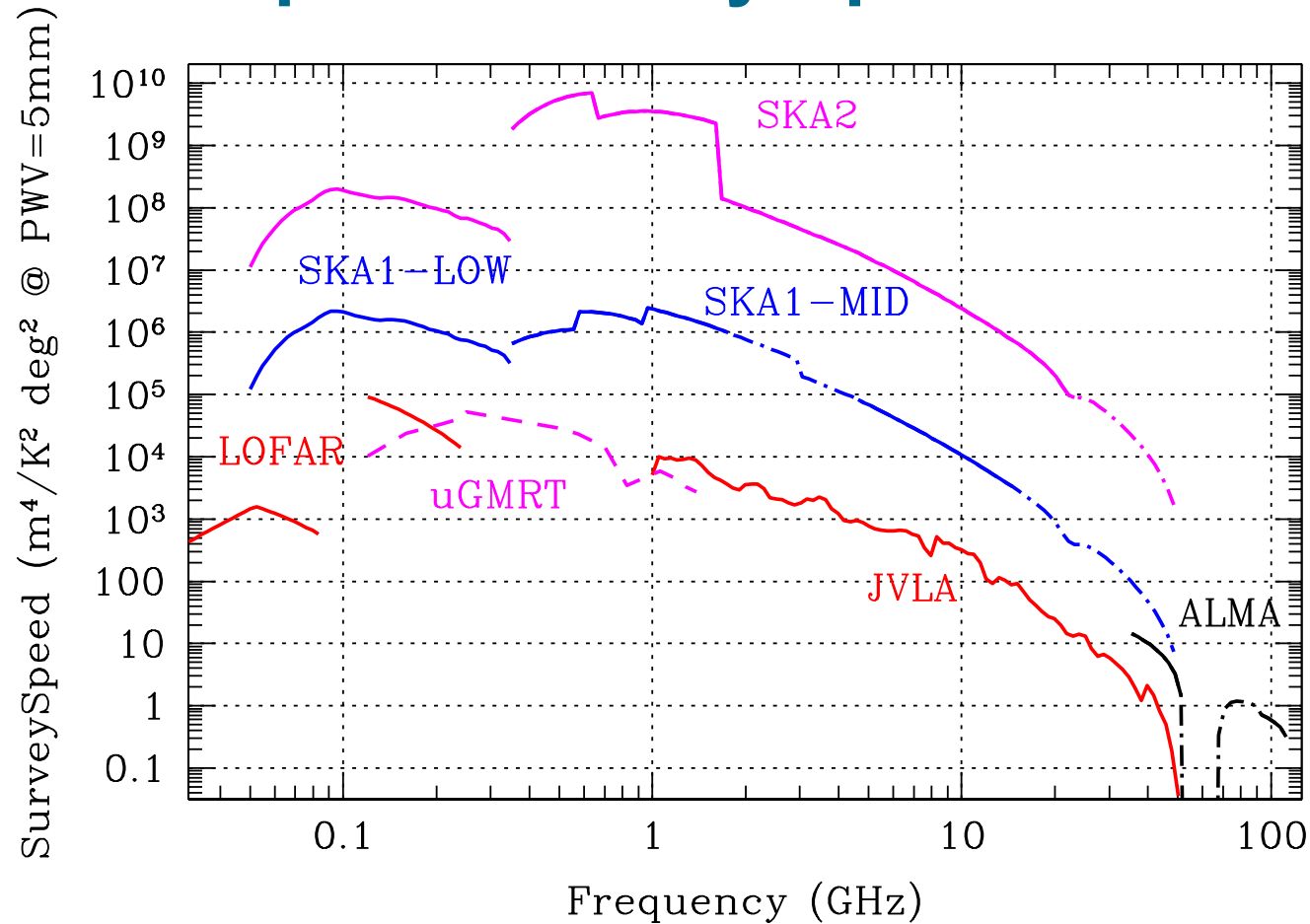
- Improved performance predictions now available at all frequencies
- Opportunity for seamless interface of SKA to ALMA capabilities

SKA1 Anticipated Sensitivity



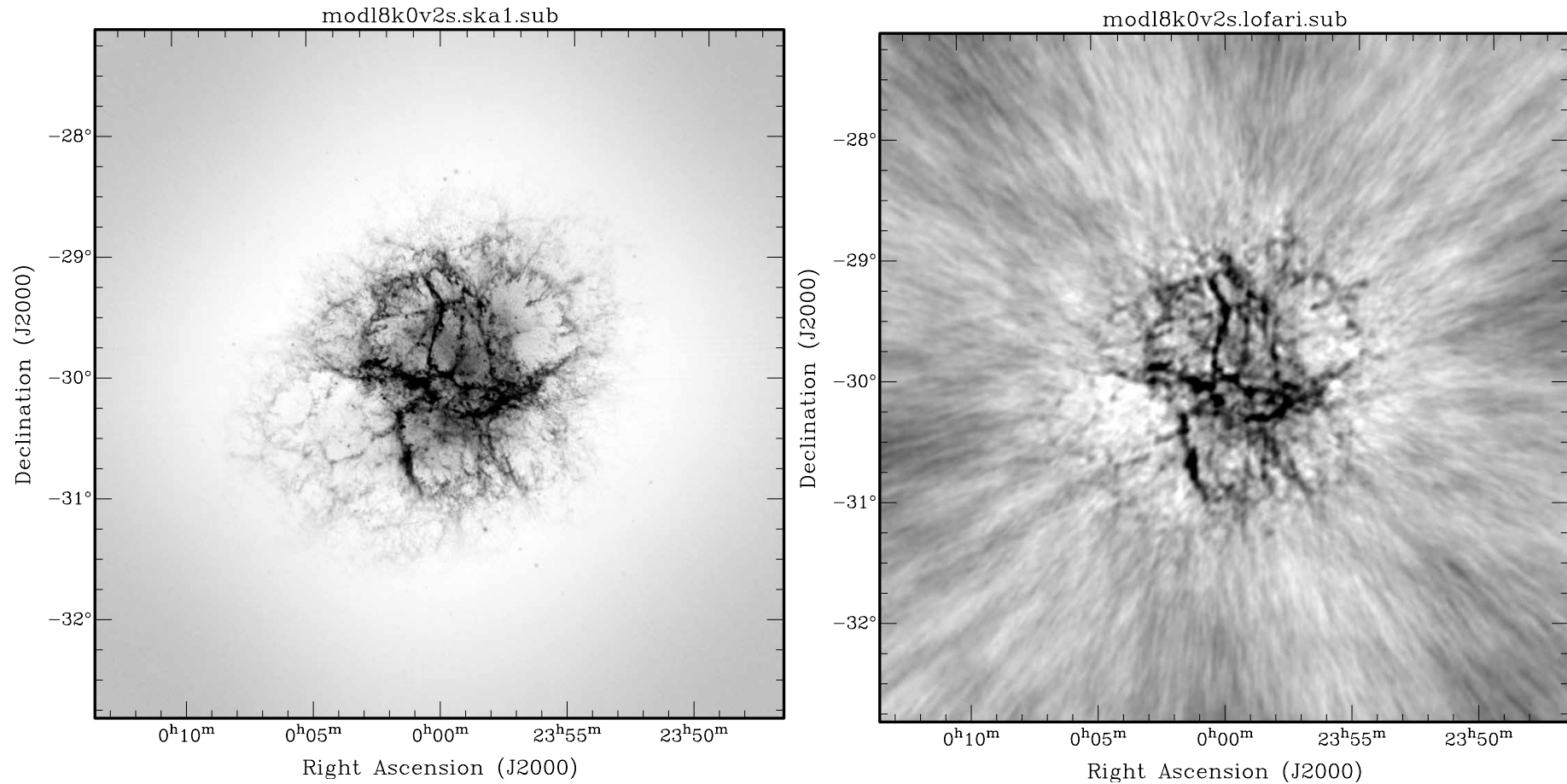
- Improved performance predictions now available at all frequencies
- Opportunity for seamless interface of SKA to ALMA capabilities

SKA1 Anticipated Survey Speed



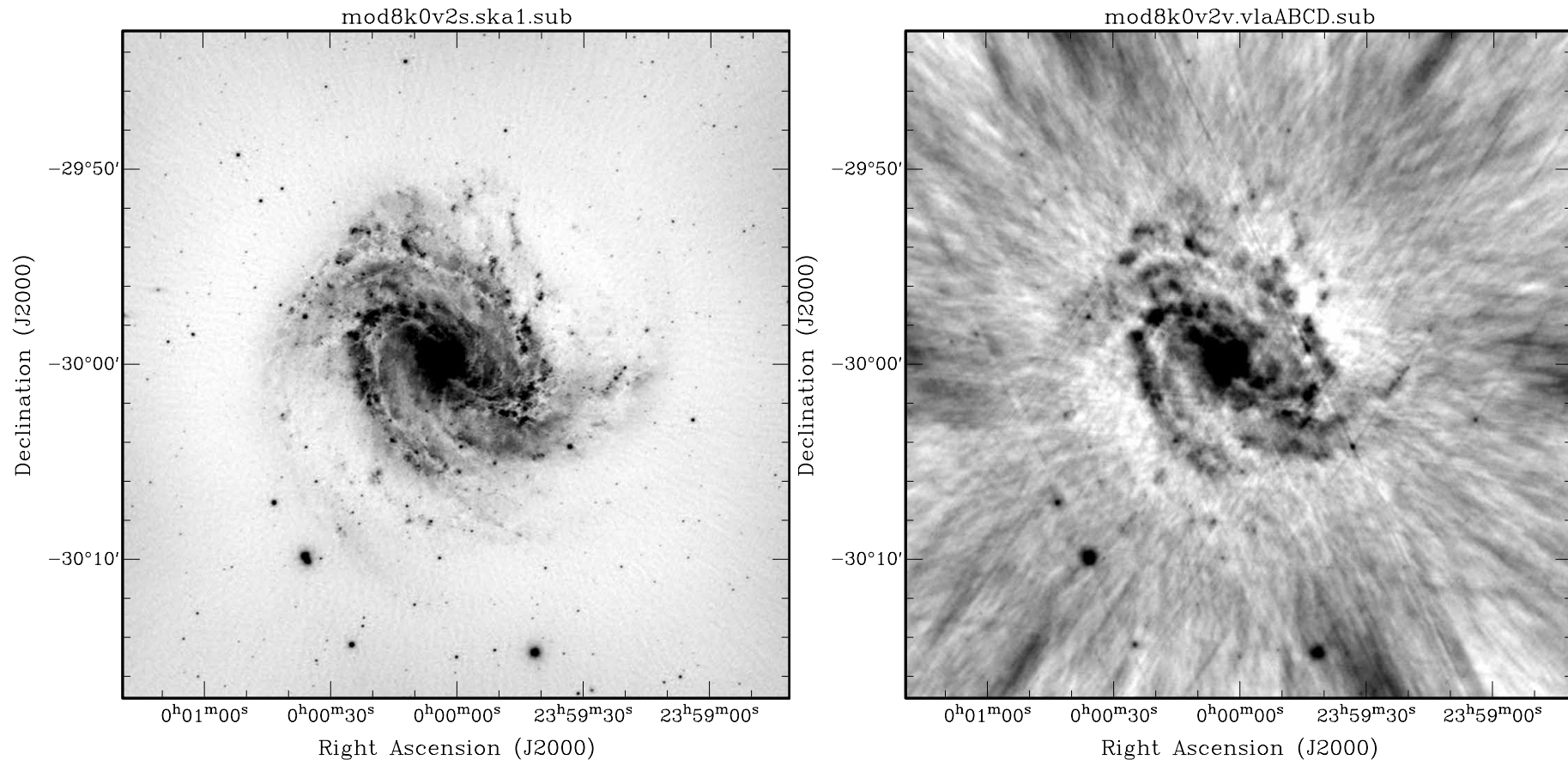
- Improved performance predictions now available at all frequencies
- Opportunity for seamless interface of SKA to ALMA capabilities

SKA1 Image Quality Comparison



- Between 10 and 100 times the image quality of current facilities
- Single SKA1-Low “dirty” snap-shot compared to LOFAR “dirty” snap-shot

SKA1 Image Quality Comparison



- Between 10 and 100 times the image quality of current facilities
- Single “dirty” SKA1-Mid snap-shot compared to combination of four “dirty” snap-shots, one in each of VLA A+B+C+D



Current status



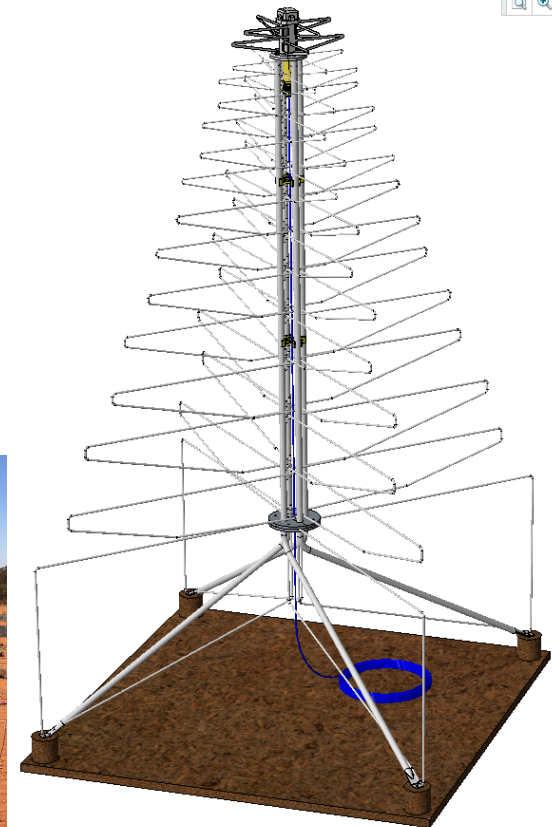
Exploring the Universe with the world's largest radio telescope

CDR Activity – Update Nov 2018



Element	RRN Submission	CDR Submission	CDR Meeting
TM	29 January 2018	28 February 2018	17-20 April 2018
SaDT & SAT	17 January 2018	28 February 2018	15-18 May 2018
INAU	19 March 2018	30 April 2018	27-29 June 2018
INSA	19 March 2018	30 April 2018	2-4 July 2018
CSP	18 May 2018 - PSS, PST, CBF-Low, CBF-Mid Sub-Element CDRs	30 June 2018	25 – 28 September 2018 !!
MeerKAT Integration			22 October 2018
SDP Pre-CDR SDP CDR	9 March 2018 17 September 2018	25 April 2018 31 October 2018	20 – 22 June 2018 <u>15 – 18 January 2019</u>
LFAA	15 October 2018	5 November 2018	<u>11 – 13 December 2018</u>
AIV	29 October 2018	<u>30 November 2018</u>	<u>4 March 2019</u>
DSH Pre-CDR DSH CDR	17 September 2018 <u>1 Apr 2019</u> - Band 1, LMC Sub-CDR 20 Sept 2018 - <u>DSH Struct Sub-CDR 1 Apr 2019</u> - <u>Band 2 Sub-CDR 1 Apr 2019</u> - <u>Band 5 Sub-CDR 27 Aug 2019</u>	28 September 2018 <u>13 September 2019 (B2)</u>	<u>26 – 27 November 2018</u> <u>Aug 2019 (DSH, B2)</u> <u>Oct 2019 (B1, B5)</u>
System			Q2/3 2019

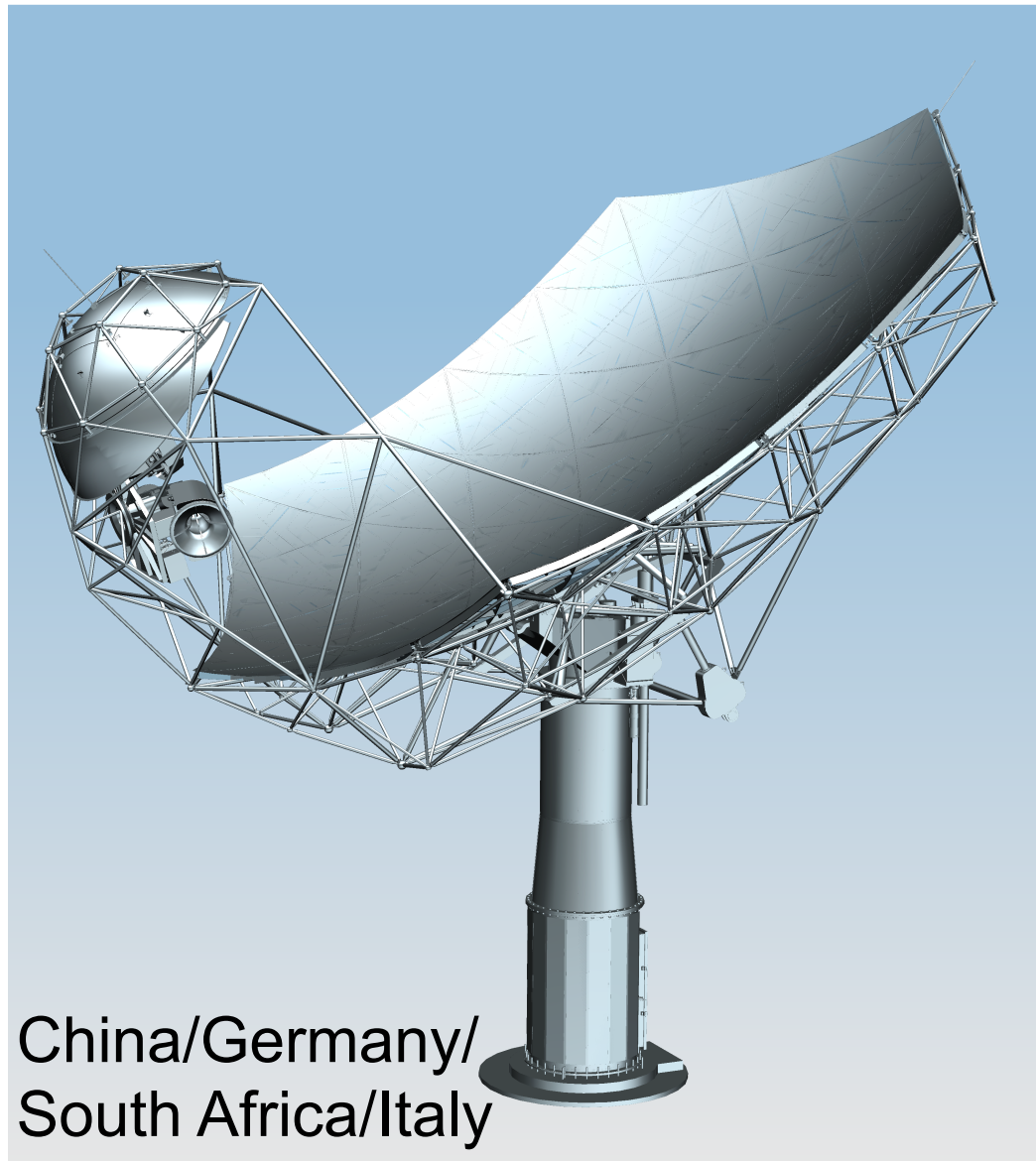
Testing of SKALA4 Prototypes



- Two different implementations of new optimised EM design tested at MRO during 2018

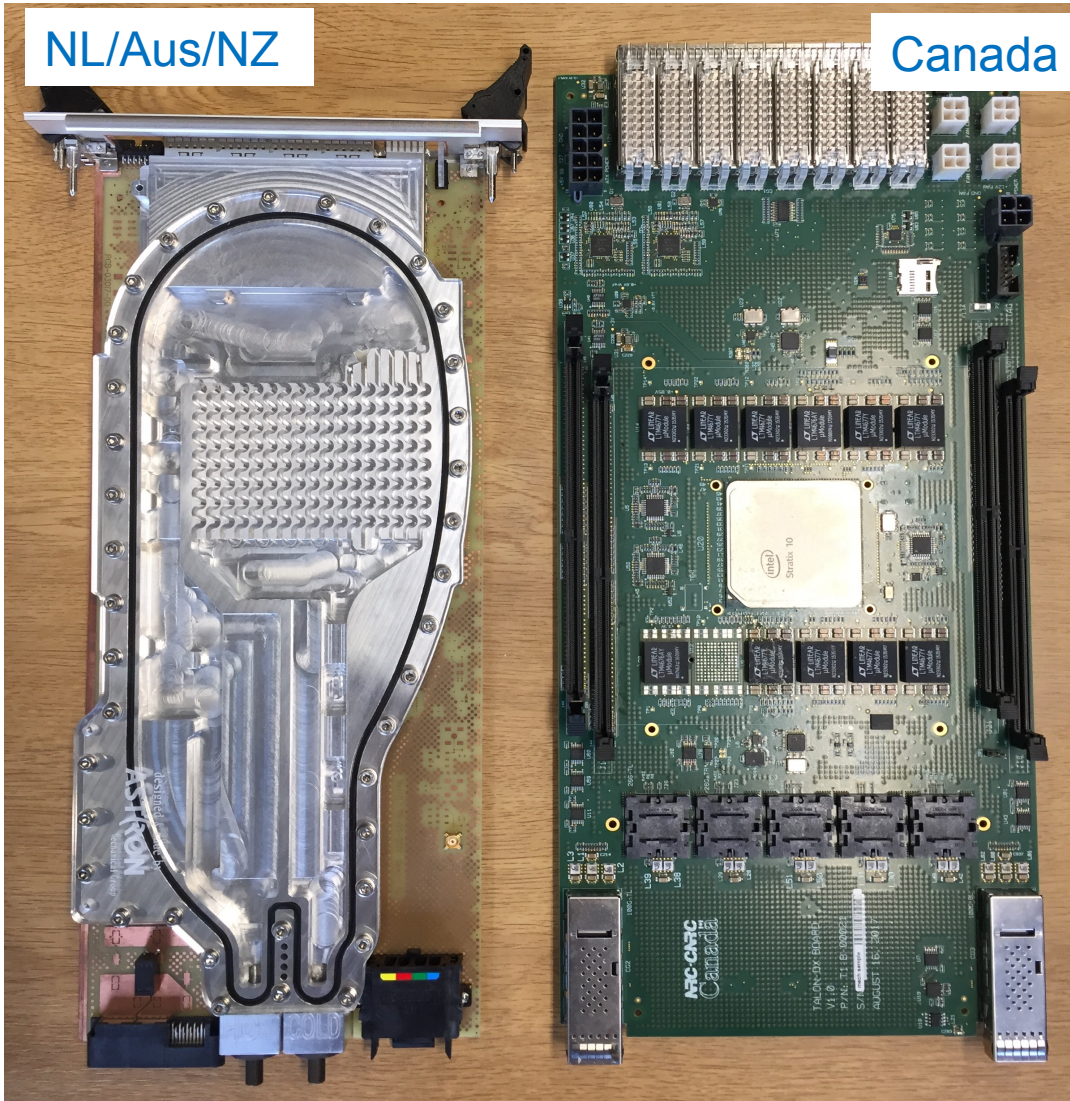


Building SKA : dishes



Building SKA: prototypes

NL/Aus/NZ



Canada

protoNIP-01
a GPU/FPGA based PSS prototype at the SKA1-
Time Domain Team
Manchester - Oxford - Bonn

UK/Aus



RSA/UK/India/NZ/Aus



Building SKA: prototypes

Band 1 receiver, leaving Sweden...

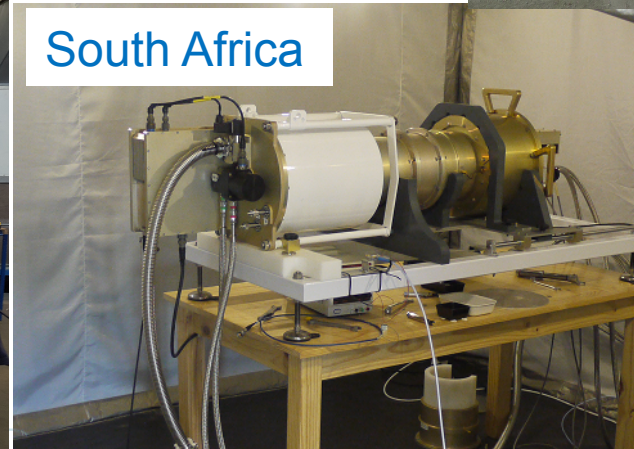


...being tested at MeerKAT.



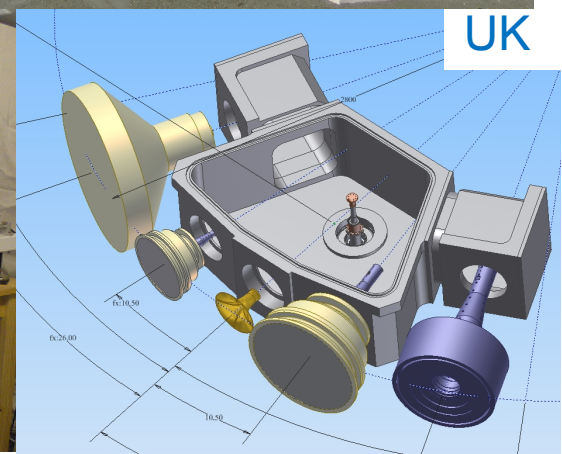
Italy

South Africa



telescope

UK





The Science



Exploring the Universe with the world's largest radio telescope

SKA Big Questions



- **The Cradle of Life & Astrobiology**
 - *How do planets form? Are we alone?*
- **Strong-field Tests of Gravity with Pulsars and Black Holes**
 - *Was Einstein right with General Relativity?*
- **The Origin and Evolution of Cosmic Magnetism**
 - *What is the role of magnetism in galaxy evolution and the structure of the cosmic web?*
- **Galaxy Evolution probed by Neutral Hydrogen**
 - *How do normal galaxies form and grow?*
- **The Transient Radio Sky**
 - *What are Fast Radio Bursts? What haven't we discovered?*
- **Galaxy Evolution probed in the Radio Continuum**
 - *What is the star-formation history of normal galaxies?*
- **Cosmology & Dark Energy**
 - *What is dark matter? What is the large-scale structure of the Universe?*
- **Cosmic Dawn and the Epoch of Reionization**
 - *How and when did the first stars and galaxies form?*

