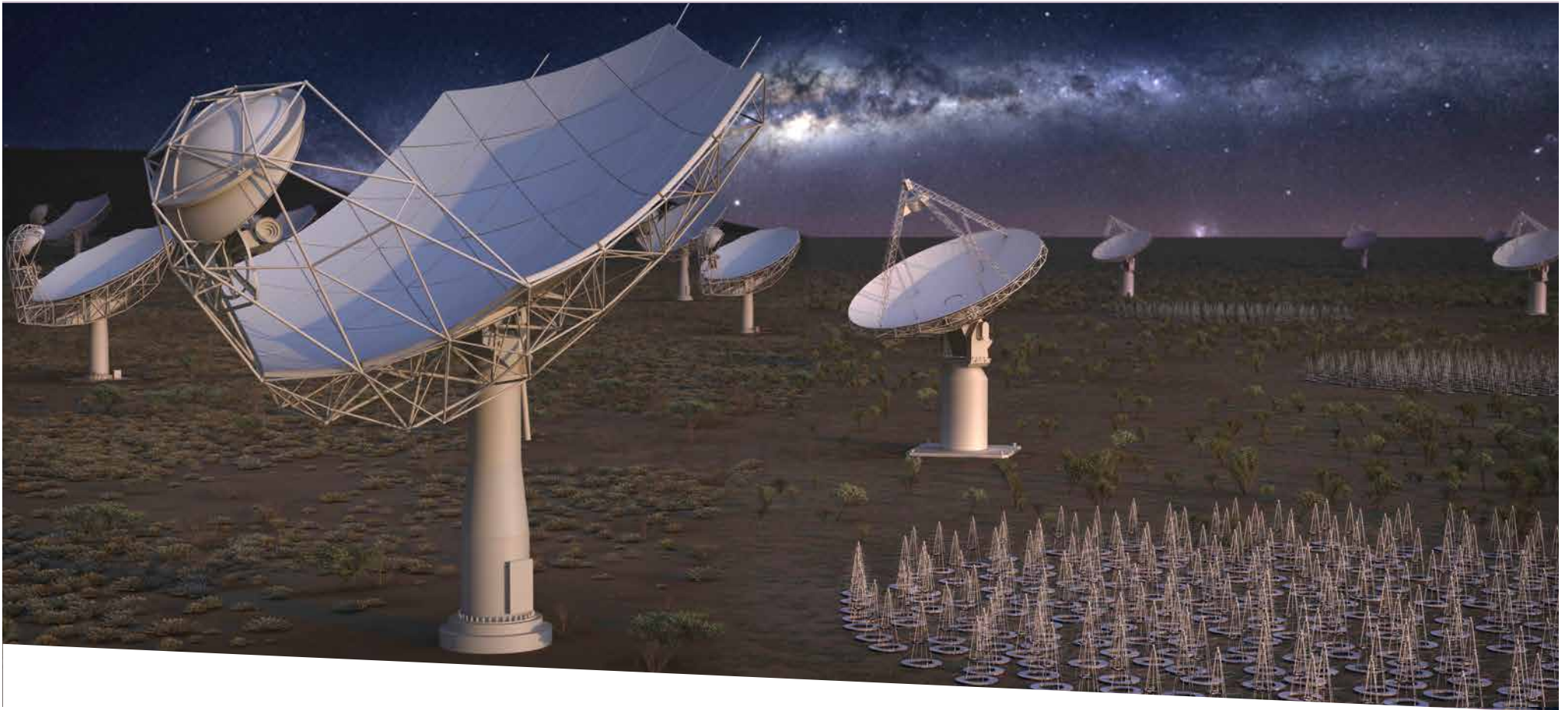


# SKA SWG Update



**SQUARE KILOMETRE ARRAY**

Exploring the Universe with the world's largest radio telescope

**Robert Braun, Science Director**

8 August 2017

# SKA Science Working Groups and Focus Groups



SWGs and FGs	Co-Chairs
Extragalactic (non-HI) Spectral Line	Rob Beswick (04/15), <b>Francoise Combes (03/17)</b>
Our Galaxy	Mark Thompson (03/15), Grazia Umana (03/15)
Solar, Heliospheric & Ionospheric Physics	Eduard Kontar (08/15), Divya Oberoi (08/15)
Epoch of Reionization	Jonathan Pritchard (08/15), Garrelt Mellema (08/15)
Cosmology	Mario Santos (03/15), Xuelel Chen (03/15)
Extragalactic Continuum	Rosella Cassano (06/15), Minh Huynh (06/15)
Cradle of Life	Andrew Siemion (08/15), Di Li (08/15)
HI galaxy science	Erwin de Blok (04/15), Martin Meyer (04/15)
Magnetism	Ann Mao (12/15), Russ Taylor (03/15)
Pulsars	Andrea Possenti (10/15), Ingrid Stairs (02/16)
Transients	Michael Rupen (08/15), <b>Jason Hessels (08/17)</b>
VLBI	Zsolt Paragi (08/15), Cormac Reynolds (08/15)
High Energy Cosmic Particles	Justin Bray (08/15), Clancy James (08/15)

- Refresh of SWG Co-Chairs every ~two years, many reaching term, **appointments underway**

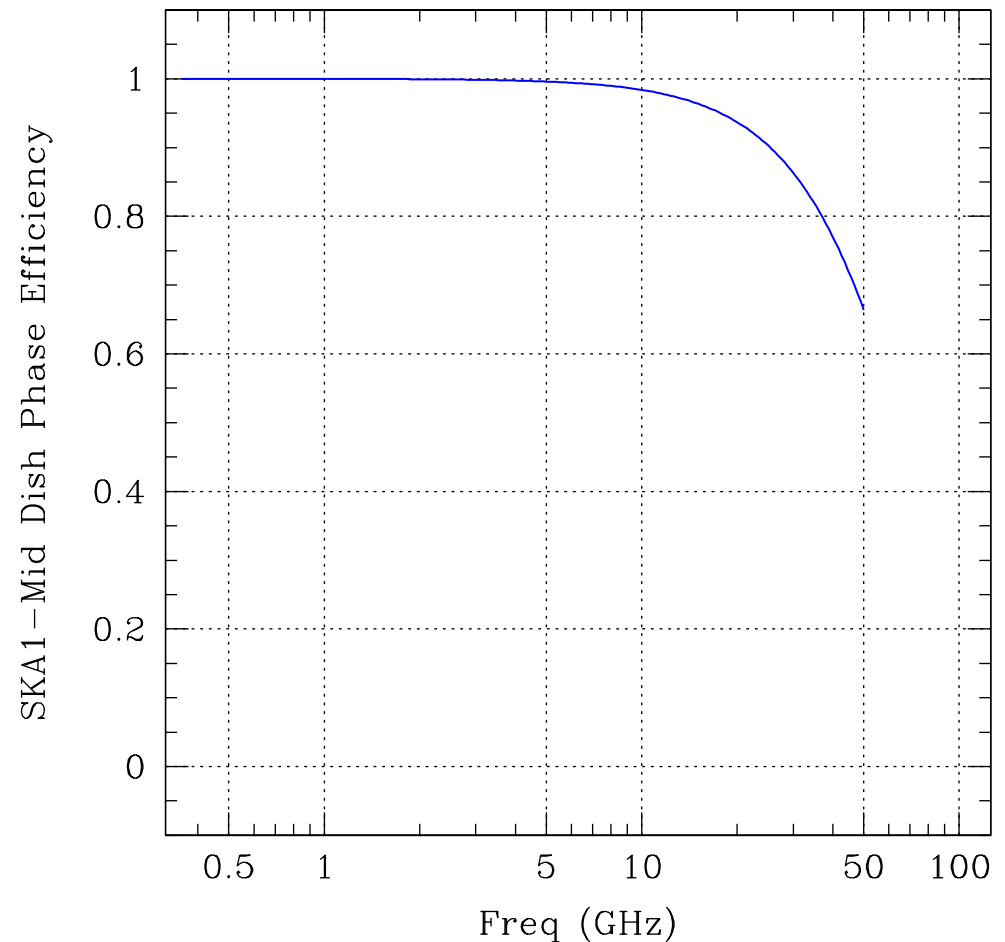
# Design Baseline / Deployment Baseline

	Design Baseline	Deployment Baseline	Re-instatement '+' means add to system
<b>SKA1-Mid</b>			
No. dishes	133	130	+3 dishes at 150 km
Max. Baseline	150 km	120 km	+ infra to 150 km
Band 1 Feeds	133	130	+3 Band 1 Feeds for 3 dishes
Band 2 Feeds	133	130	+3 Band 2 Feeds for 3 dishes
Band 5 Feeds	133	67	+66 Band 5 feeds
Pulsar Search (PSS)	500 nodes	375 nodes	+125 nodes
<b>SKA1-Low</b>			
No. stations	512	476	+36 stations (18 stns at 49 & 65 km)
Max. Baseline	65 km	40 km	+infra to 65km
Pulsar Search	167 nodes	125 nodes	+42 nodes
<b>Common</b>			
Compute Power	260 PFLOPs	50 PFLOPs	+210 PFLOPs

- Outcome of July SKA Board Meeting
  - Design Baseline for which CDRs will be undertaken is unchanged
  - Deployment Baseline is scoped for cost-capped Construction budget
  - Further analysis of Low  $B_{\text{Max}}$  underway
  - Re-instatement of HPC and PSS already part of Operational budget
  - Re-instatement of all other items as soon as funding permits



# Dish Update

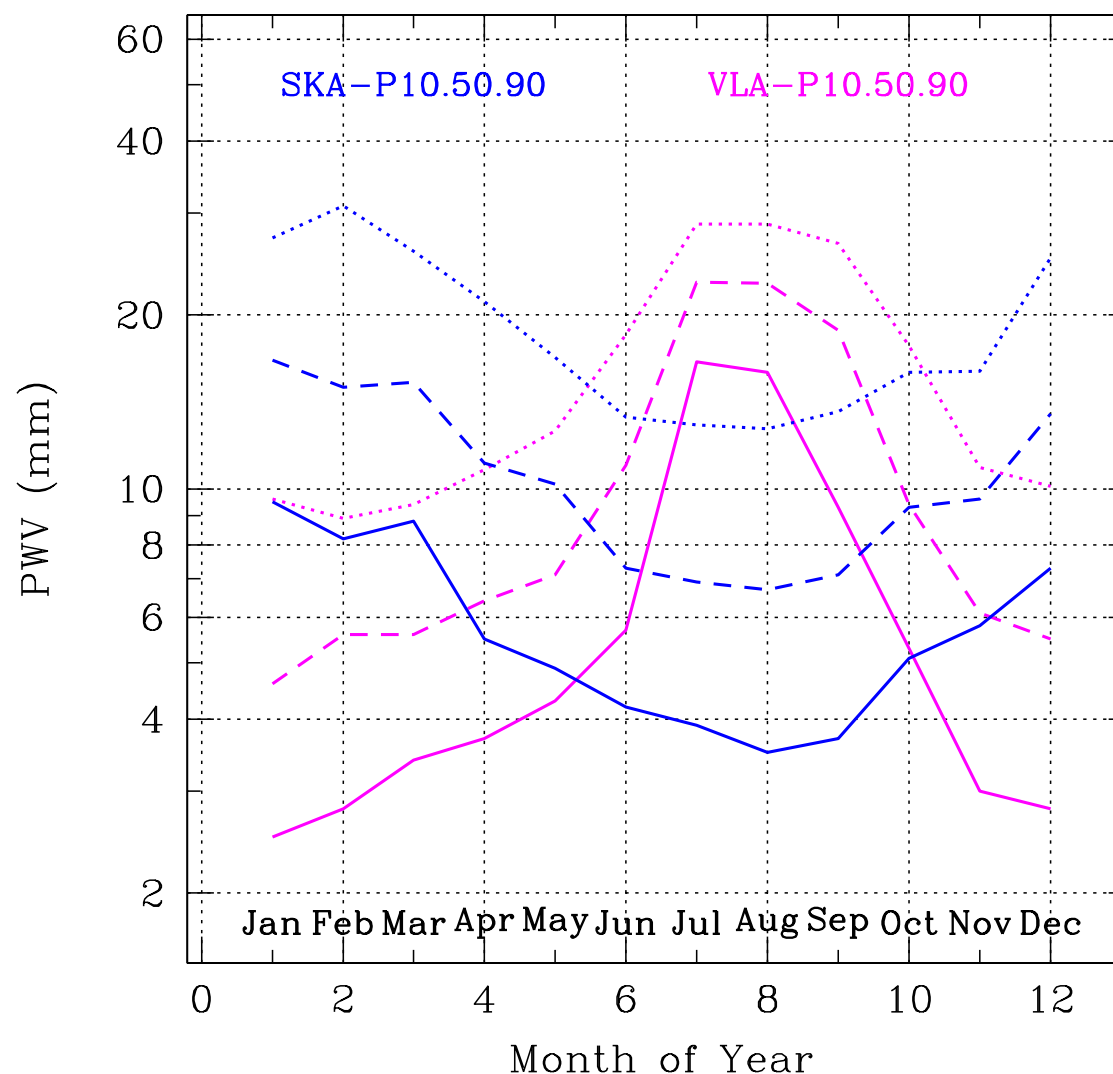


- Two prototypes to be ready by Sept/Oct, one in CN, other on SKA site
- Total surface RMS < 350  $\mu\text{m}$ , relative pointing RMS < 1.3 arcsec
- Good performance anticipated to ~50 GHz (cf. VLA has ~500  $\mu\text{m}$  RMS)

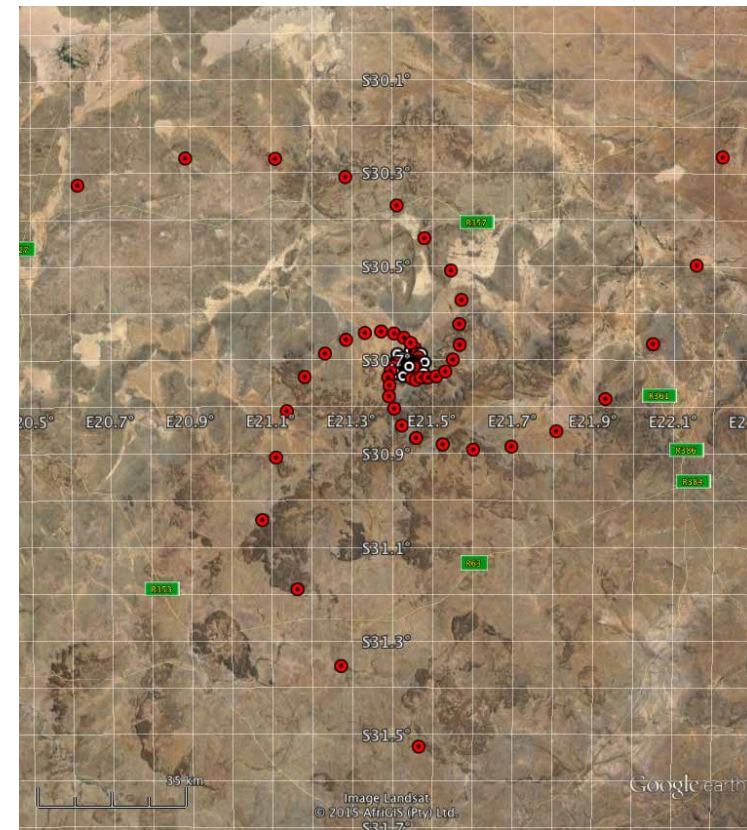
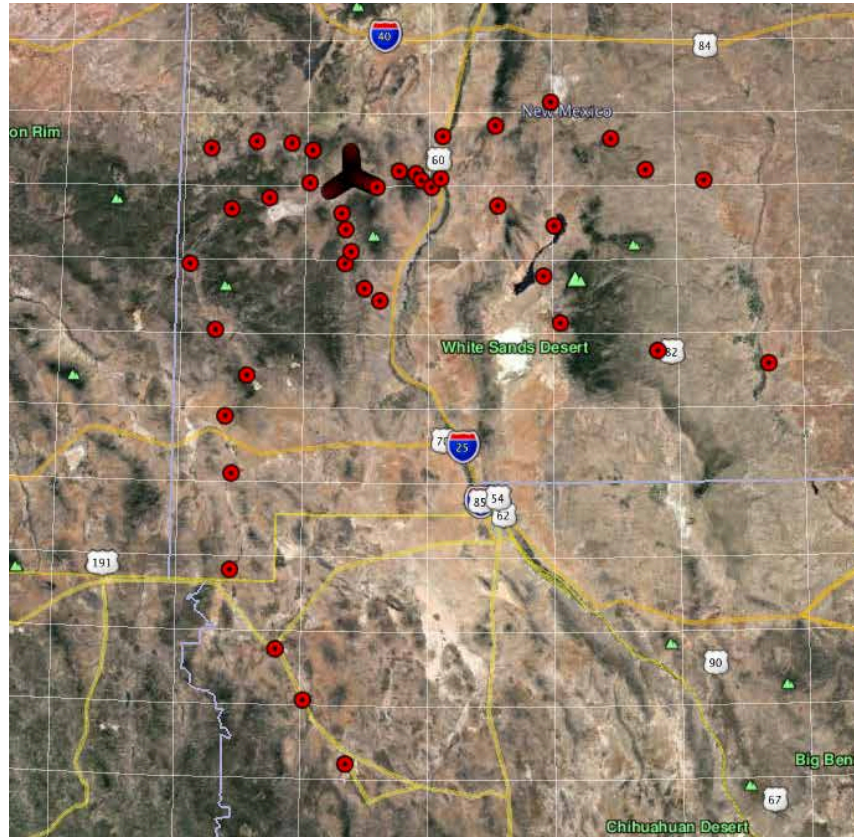


# SKA1 – VLA PWV comparison

- High frequency performance of SKA1-Mid site (2010 – 2015) compared to VLA site (Forkman & Conway 2017)



# Configuration Comparison



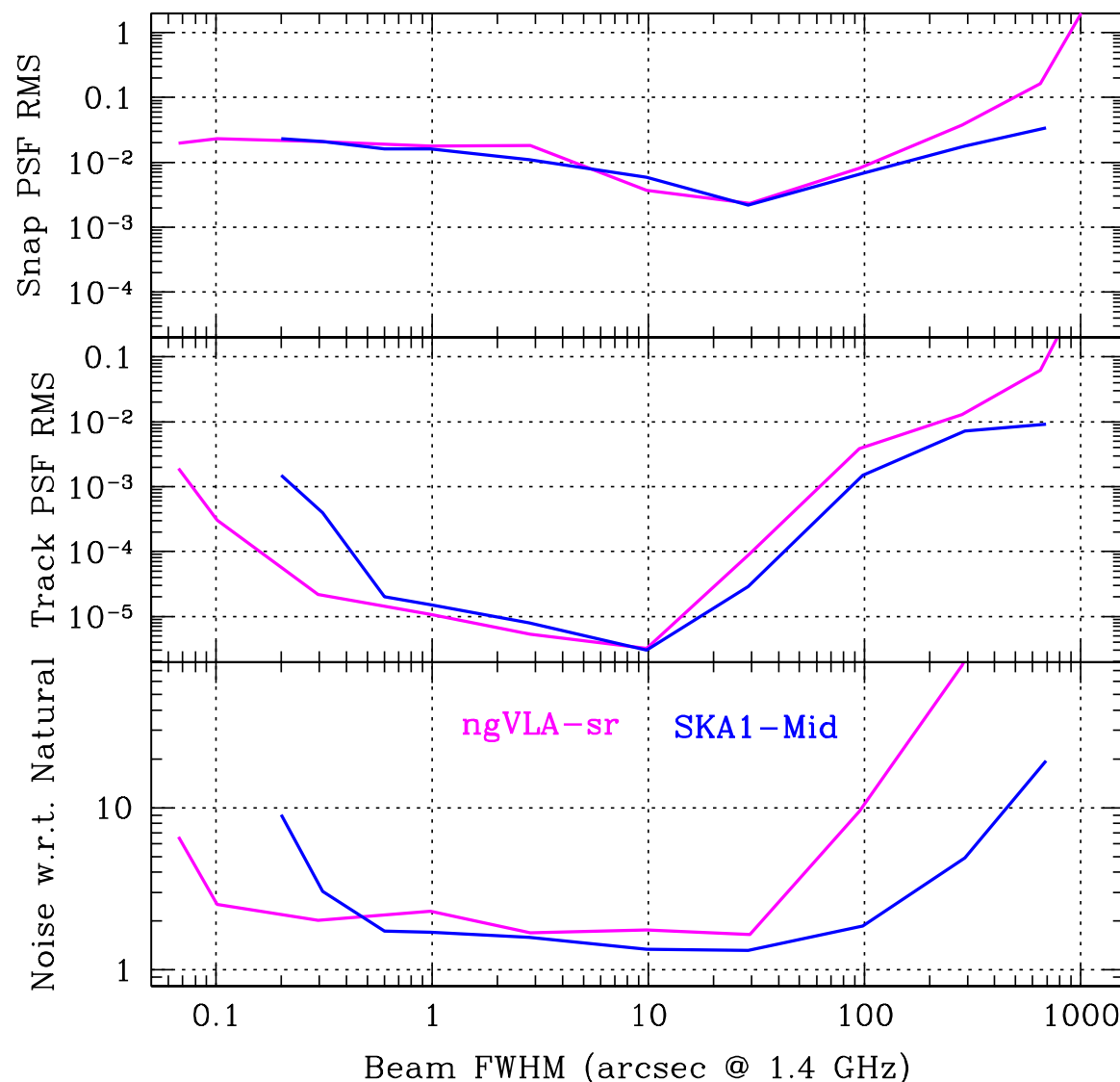
- SKA1-Mid, 197 dishes,  $B_{\text{Max}} = 150 \text{ km}$ ,
- ngVLA, 214(?) dishes,  $B_{\text{Max}} = 450 \text{ km}(?)$



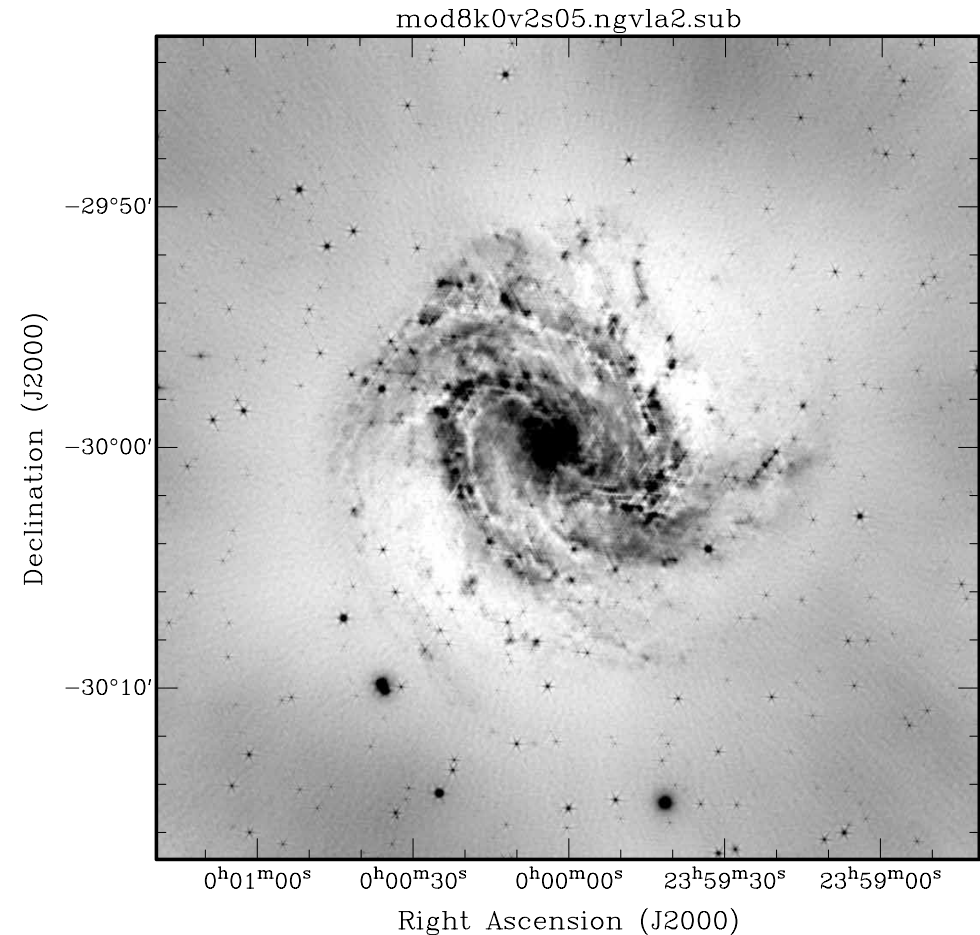
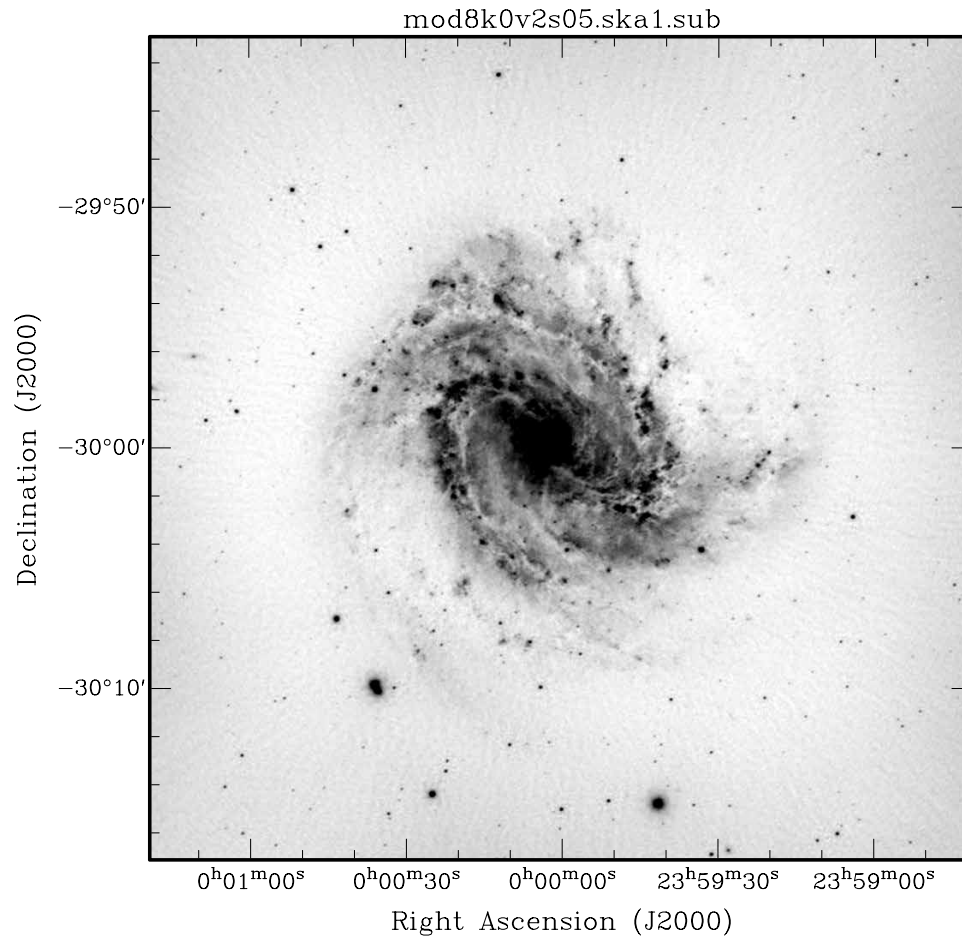
# Image Quality Comparison

Continuum ( $\Delta\nu/\nu=0.3$ ) Imaging Performance

- Single SKA1-Mid track and zenith snapshot relative to 214 dish ngVLA



# Image Quality Comparison



- Single SKA1-Mid dirty snap-shot compared to ngVLA dirty snap-shot (target PSF in both cases 0.5" FWHM Gaussian at 1.4 GHz)



# Upcoming Meetings

- URSI-GA-2017, Montreal, 25 & 26 August
  - “The SKA and its pre-cursors”
- EWASS-2018, Liverpool, 3 – 6 April, 2018 proposal
  - “Radio Connections to the Transient Universe”, suggested invited speakers for the six sessions:
    1. Fast Radio Bursts: Vicky Kaspi (CA), L. Spitler (DE)
    2. Tidal Disruption Events: Stefanie Komossa (DE), Donnarumma Imma (IT)
    3. The active Sun: N. Vilmer (FR), A. Kuznetsov (RU)
    4. Exo-planets/Stars: Philippe Zarka (FR), Gregg Hallinan (US)
    5. Neutron star transients: A. Patruno (NL), N. Degenaar (NL)
    6. Cosmic particles: Stijn Buitink (BE), J. Bray (UK)

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[www.skatelescope.org](http://www.skatelescope.org)