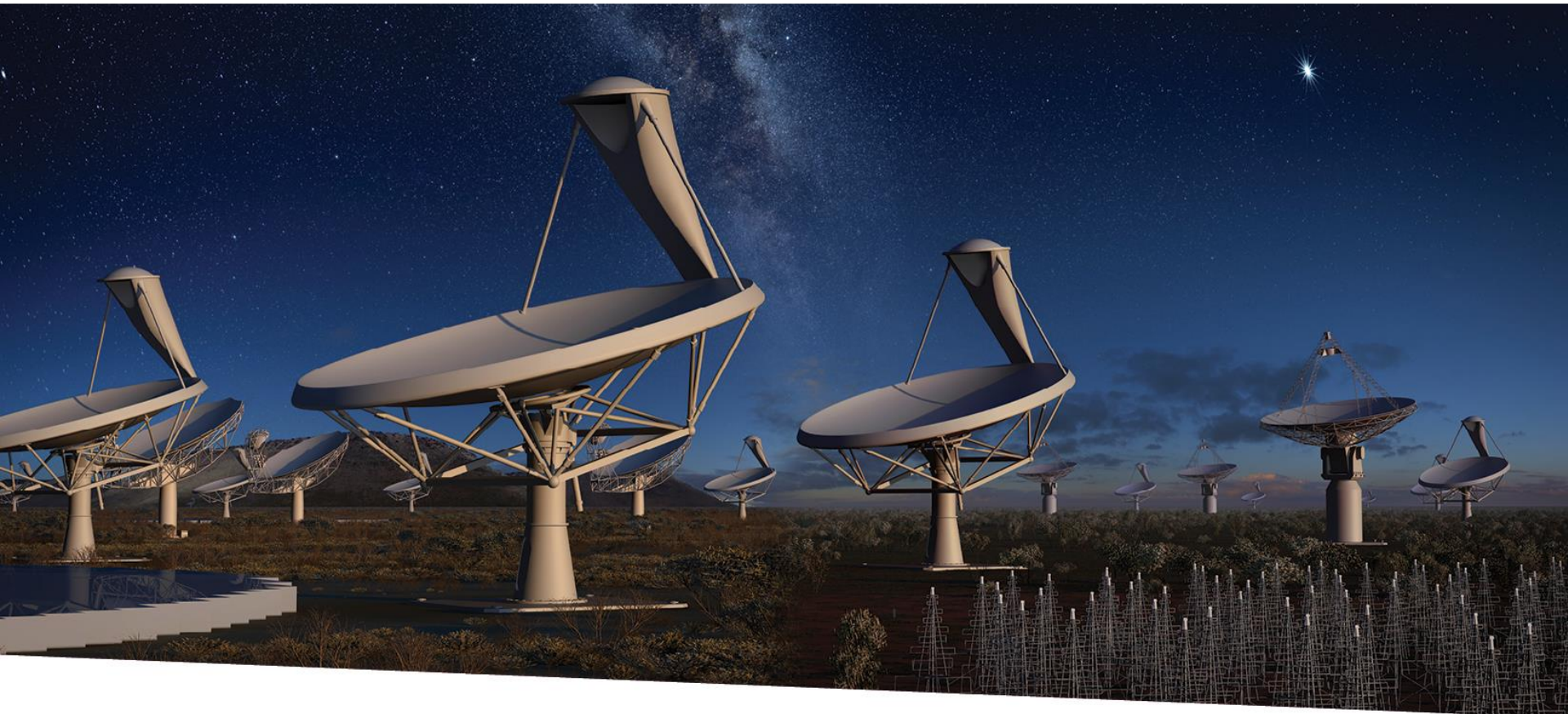


# C4SKA



## SQUARE KILOMETRE ARRAY

Exploring the Universe with the world's largest radio telescope

Marco Caiazzo  
February 2015



# International Design Team

- Project Management and System Engineering Team based at Jodrell Bank Observatory, Manchester, UK
- ~500 scientists & engineers in institutes and industry in 11 Member countries of the SKA




WIDE BAND SINGLE PIXEL FEEDS




TELESCOPE MANAGER




CENTRAL SIGNAL PROCESSOR




SIGNAL AND DATA TRANSPORT




SCIENCE DATA PROCESSOR




DISH




MID-FREQUENCY APERTURE ARRAY




LOW-FREQUENCY APERTURE ARRAY




ASSEMBLY, INTEGRATION & VERIFICATION




INFRASTRUCTURE AUSTRALIA




INFRASTRUCTURE SOUTH AFRICA



# SKA Phase 1



2 sites (South Africa, Australia);

## SKA Phase 2

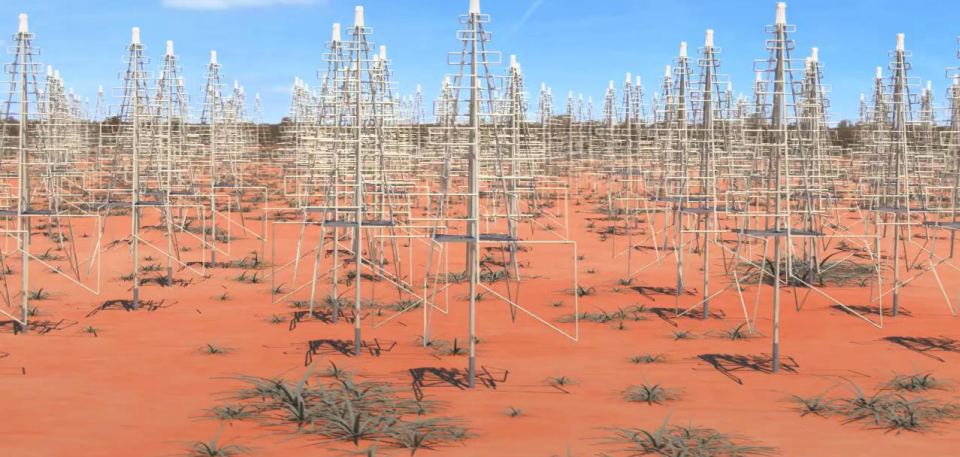
~2500 dishes, baseline lengths up to 3500km  
~ $10^6$  dipoles, baseline lengths ~few hundred km  
~250 dense aperture array stations

Construction: 2023 – 2030  
~ LHC scale

SKA-Mid: ~ 190 15m dishes + MeerKAT, RSA



SKA-Low: ~ 250,000 low-freq dipoles, AUS



SKA-Survey: ~ 60 15m dishes + ASKAP, AUS





# SKA Precursor: MeerKAT

64 x 13.5m offset Gregorian antennas

8km maximum baseline length

First receivers:

0.9 – 1.67 GHz (L-band)

0.58 – 1 GHz (UHF)

770 MHz bandwidth

Early operations 2016/7





# SKA Precursor: MeerKAT



Infrastructure: dish assembly shed; bunkered and RFI shielded data processor room and power system + .....



# Murchison Radio Astronomy Observatory



## Shire of Murchison:

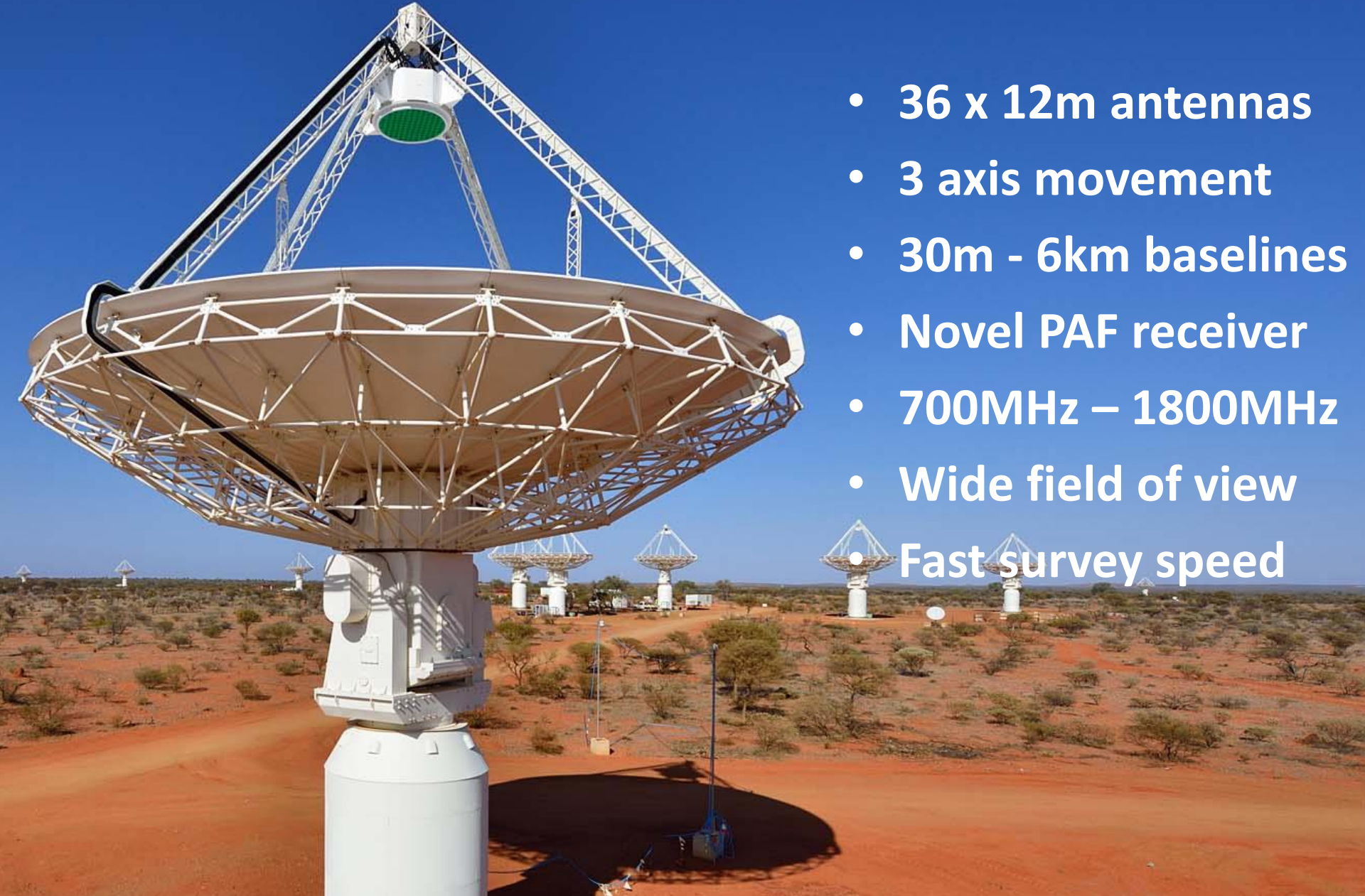
- 50,000 km<sup>2</sup> ; size of the Netherlands
- 0 gazetted towns
- 29 sheep/cattle stations
- 110 population





# ASKAP – a new-technology survey telescope

- 36 x 12m antennas
- 3 axis movement
- 30m - 6km baselines
- Novel PAF receiver
- 700MHz – 1800MHz
- Wide field of view
- Fast survey speed





# ASKAP commissioning

- 6 antennas equipped with Mk1 PAFs; extensive commissioning programme
- Science being done
- ASKAP early open science expected mid-2015

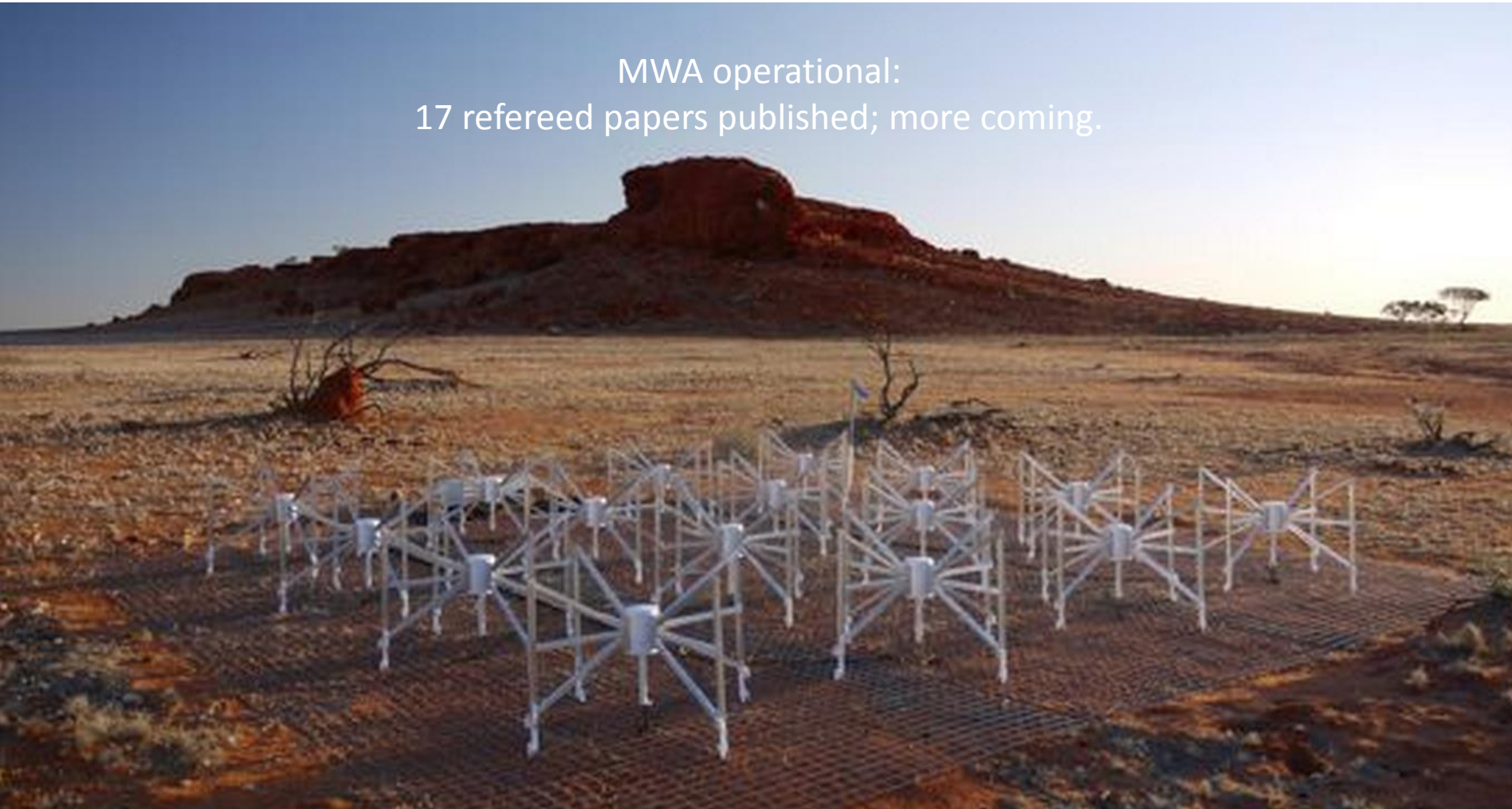




# SKA Precursor: Murchison Widefield Array



MWA operational:  
17 refereed papers published; more coming.

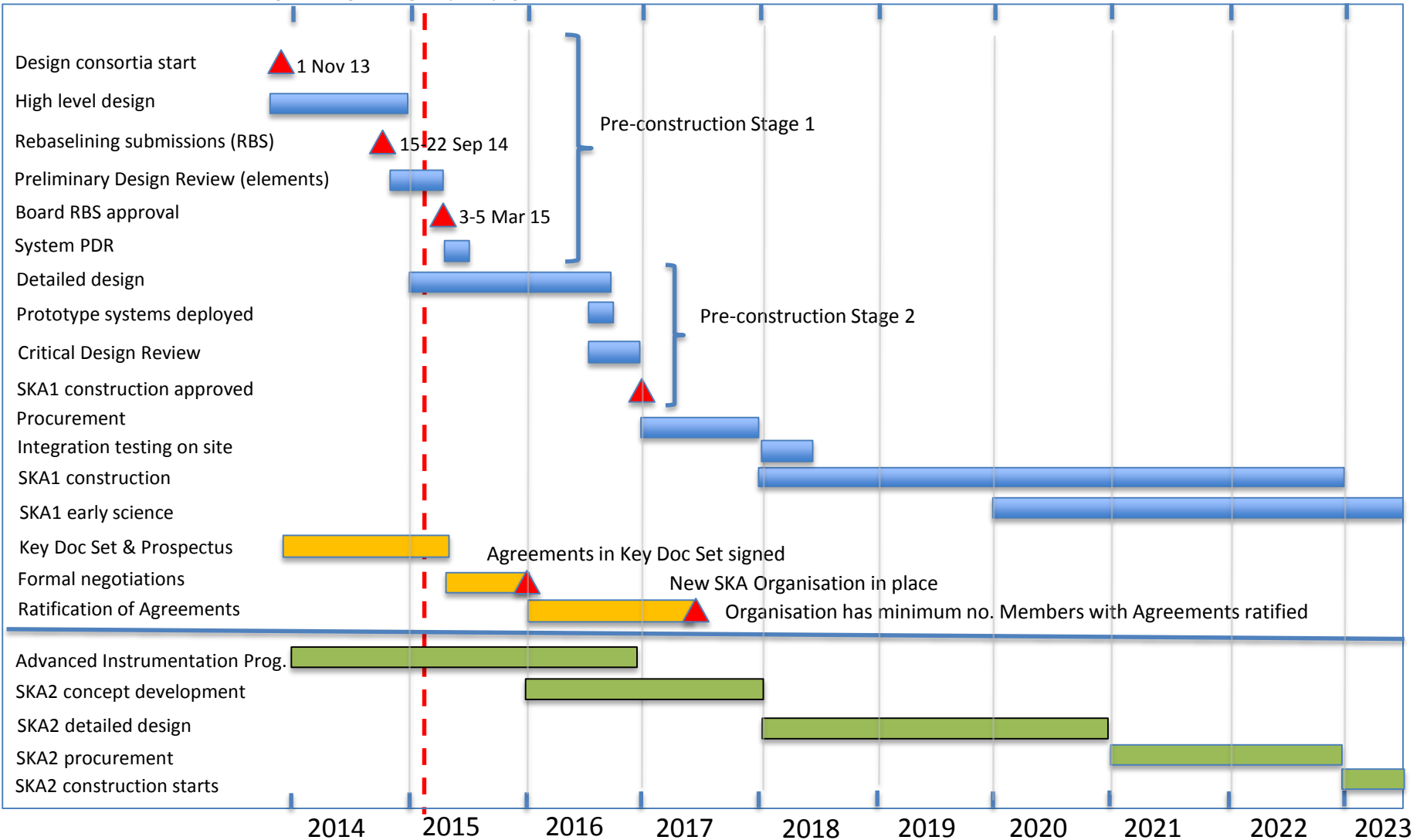




# High-level SKA1 Schedule



KEY: Blue = SKA1 science & engineering; orange = policy; green = SKA2





# SKA: Driving development

- Dishes, feeds, receivers ( $N=250 \rightarrow 2500$ )
- Low and mid aperture arrays ( $n=250k \rightarrow 1000k$ )
- Signal transport ( $\approx 1 \text{ Pb/s} \rightarrow 10 \text{ Pb/s}$ )
- Signal processing (exa-MACs)
- Software engineering and algorithm development
- High performance computing (exa-flop capability)
- Data storage (exa-byte capacity)
- (Distributed) power requirements ( $10 \rightarrow 50\text{MW}$ )



# SQUARE KILOMETRE ARRAY

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## Thank-you

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