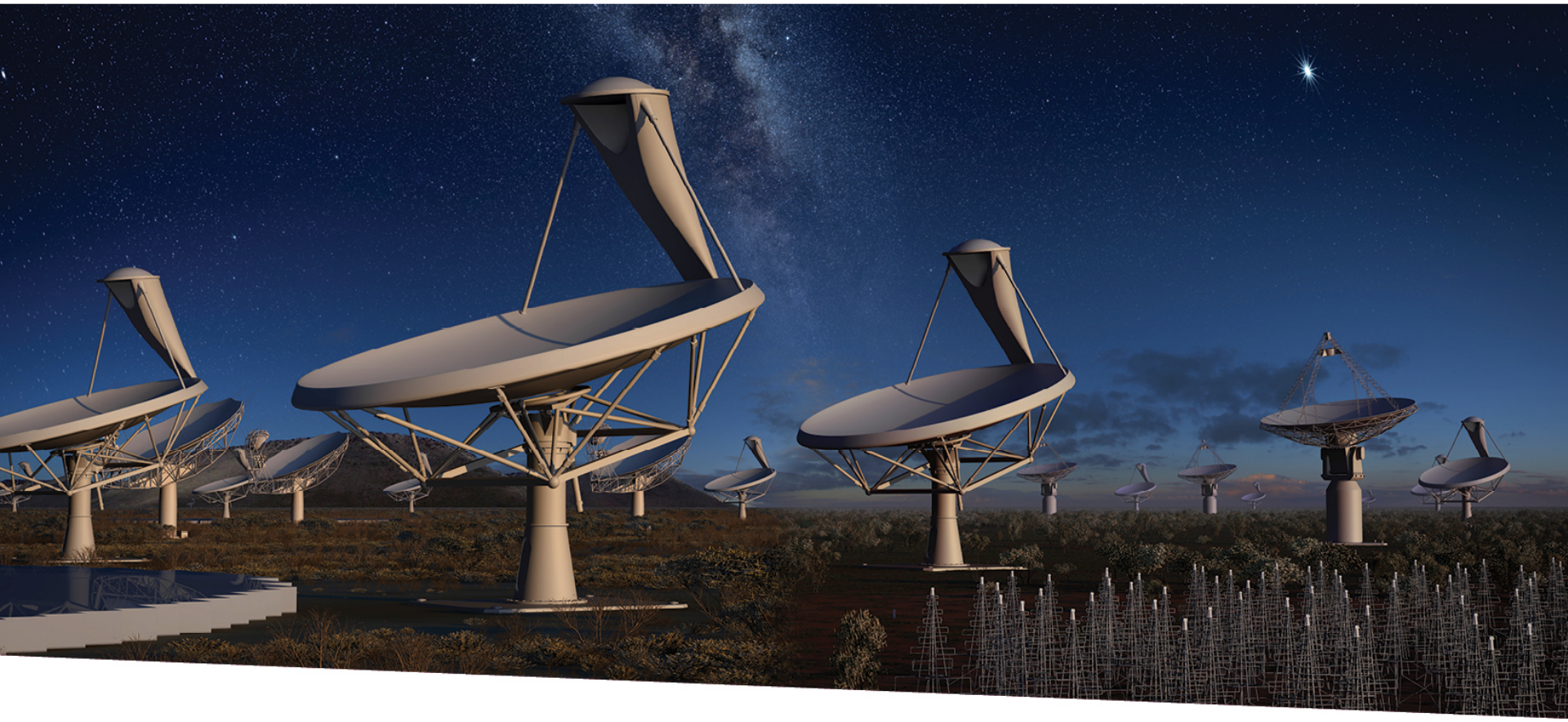
Welcome and SKA Update



SQUARE KILOMETRE ARRAY

Exploring the Universe with the world's largest radio telescope

Philip Diamond, Director-General

9 June 2014

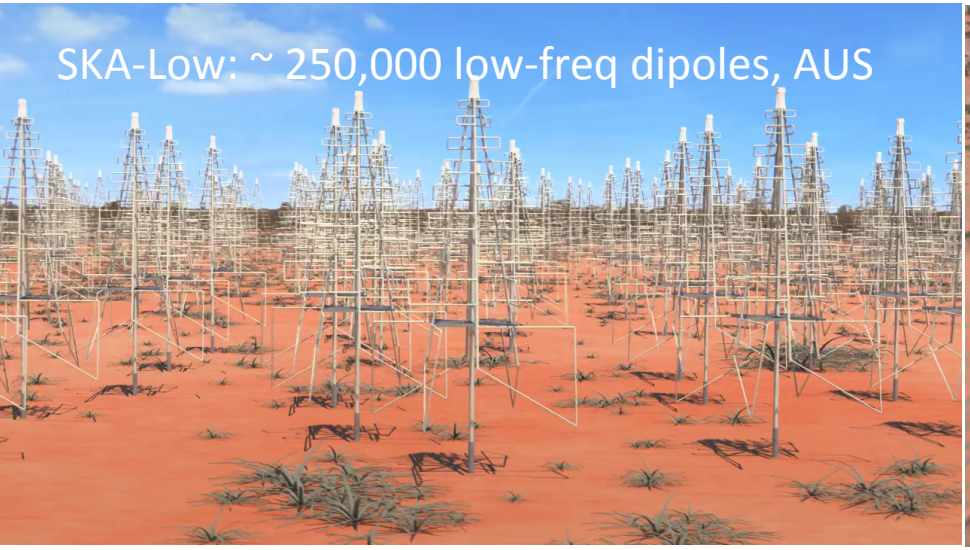
Welcome to #skascicon14

- Aim is to refresh the SKA Science Case
  - Current science case, embodied in Carilli & Rawlings is 11 years old.
  - Science moves on
  - Do we have the correct key science projects?
  - What is new in last 11 years?
    - Exoplanets? Transients? DE? HI Intensity mapping? ~~Inflation?~~
    - What impact will SKA have in these areas? SKA1? SKA2?
- Meeting is **not** a prioritisation exercise – separate process for that.

SKA Phase 1

2 sites (South Africa, Australia);
3 telescopes; one Observatory
Frequency range SKA1: 50 MHz – 3 GHz

Cost-cap: €650M
Construction: 2017 – 2023
Early science: 2020
Phase 2 SKA: 2023 - 2030



SKA Members and Governance

Australia (DoI)
China (MOST)
Italy (INAF)
New Zealand (MED)
Sweden (Chalmers)
India (Tata/DAE)

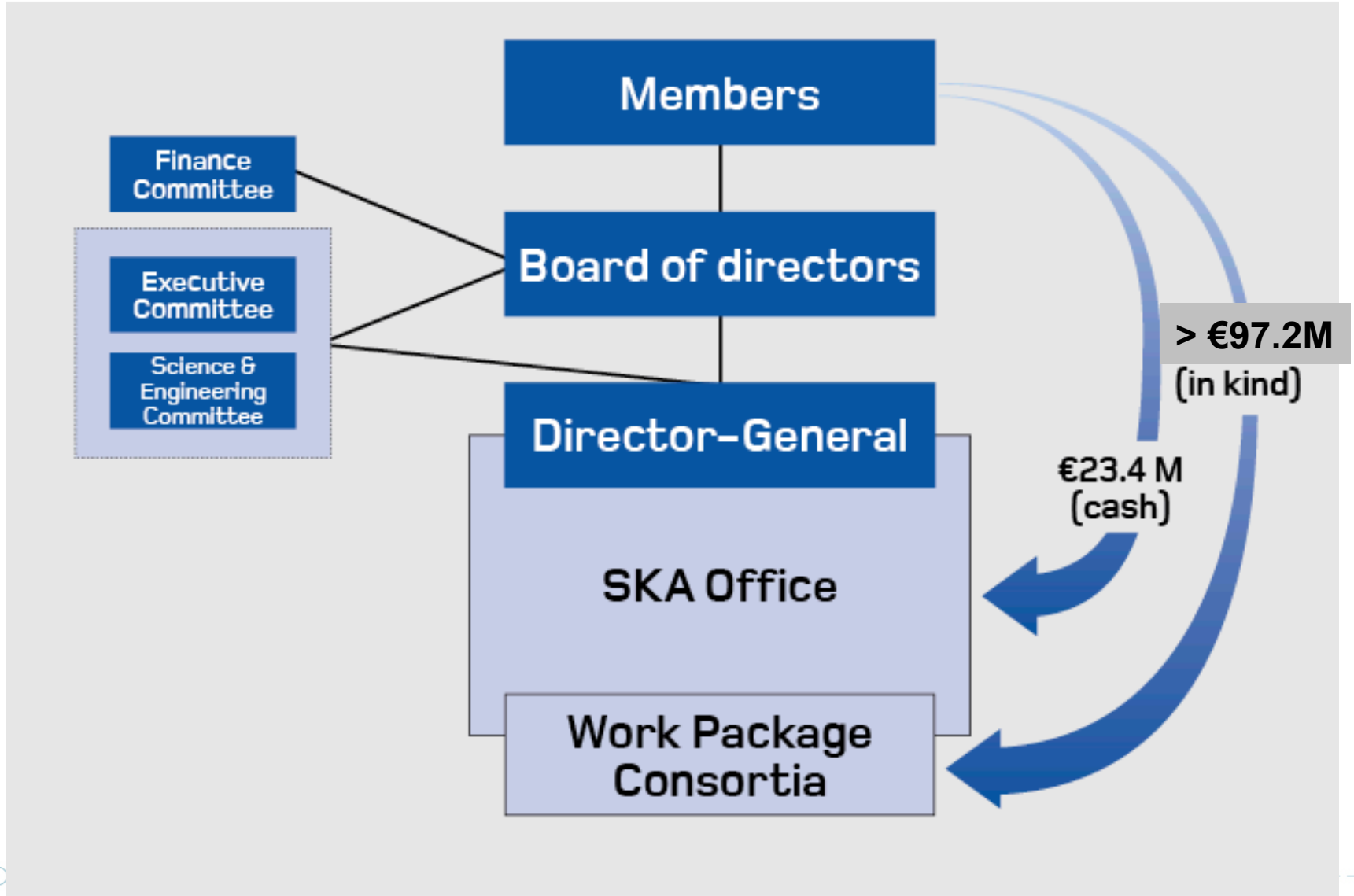
Canada (NRC-Herzberg)
Germany (BMBF)
Netherlands (NWO)
South Africa (DST)
UK (STFC)

- UK Company Limited by Guarantee
- Expedient solution to enable SKA project to proceed; long-term governance structure under review – studying establishing a treaty organisation.

Situation regarding Germany

- BMBF has given 12 months notice of intent to withdraw from SKAO;
- Decision taken without consultation with German astronomy community;
- No immediate impact;
- Germany prominent in several science areas
- German financial contribution currently ~2.5% of design phase.
- Strong role in time domain processing (SDP, CSP) and wide band single pixel feed development.
- German industry involved in DISH consortium +……

SKA Members and Governance



International Design Team

- Project Management and System Engineering Team based at Jodrell Bank Observatory, Manchester, UK
- ~500 engineers in institutes and industry in the 11 Member countries of the SKA
- > €120M committed for 4-year design programme; underway right now.

- But, SKA will be built by industry
- Too large a project to be handled just by universities and research institutes.

Global design consortia

Details at: http://www.skatelescope.org/skadesign/wp/

Excellent start to 2014

£100M commitment from UK

- 15% contribution to construction and early operations

Recent Activities

SKA1 LEVEL 0 SCIENCE REQUIREMENTS

Document number ..... SK[illegible] 1
Revision 1
Author ..... [illegible]. Braun
Date 2014-02-26
Status ..... Released

Name	Designation	Affiliation	Signature/Date
R. Braun	Science Direc[illegible]		
Owned by:			
R. Braun		SKA Office	
Approved by:			
A. [illegible]	Head of Project	SKA Office	
Released by:			
P. Diamond	Director-General	SKA Office	

New draft on SKA website

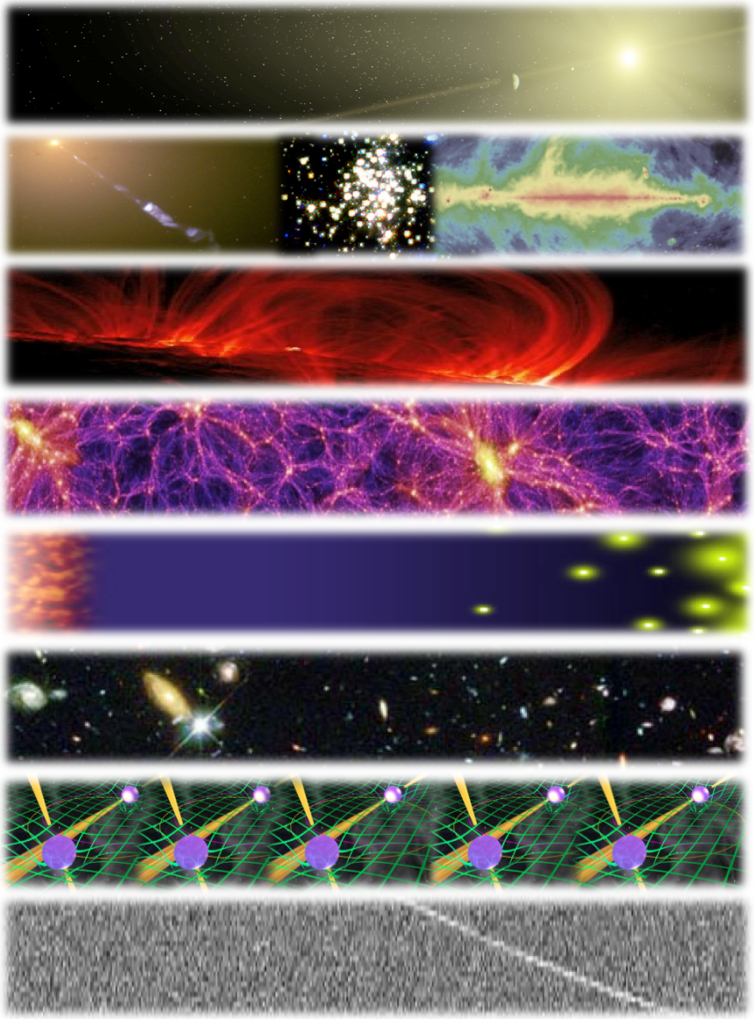
SKA PHASE 1 SYSTEM (LEVEL 1) REQUIREMENTS SPECIFICATION

Document number ..... SKA-OFF.SE.ARC-SKO-SRS-001_3
Revision 3
Date 2014-02-20
Status ..... Approved

Name	Designation	Affiliation	Signature/Date
Owned by:			
T. Cornwell	SKA Architect	SKA Office	Tim Cornwell (Feb 24, 2014)
Approved by:			
A. McPherson	Head of Project	SKA Office	
Released by:			
P. Diamond	SKA Director General	SKA Office	

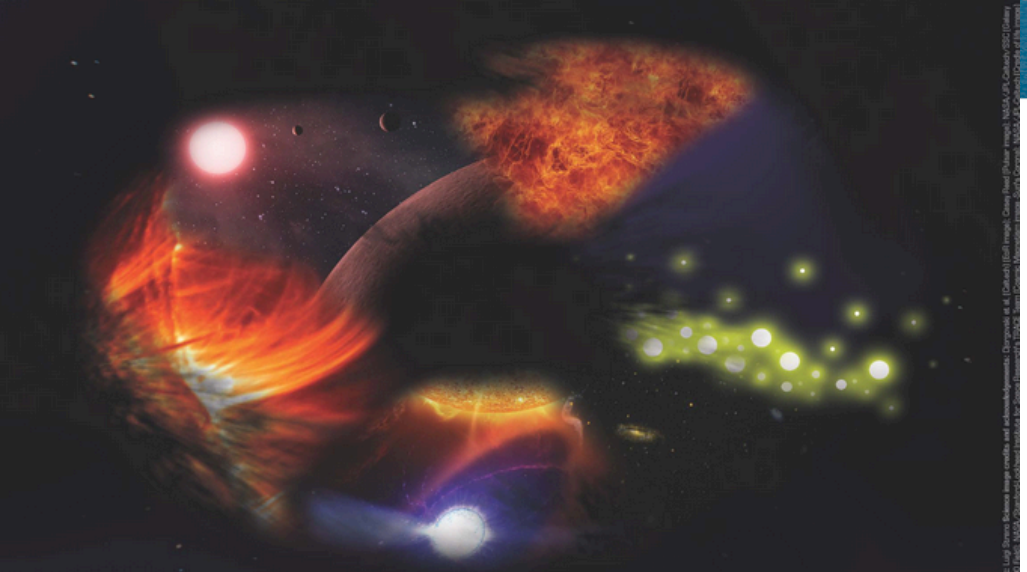
8 Science Assessment Workshops

- **Astrobiology ("The Cradle of Life")**
  - *6 – 8 November 2013*
- **Galaxy Evolution – Continuum**
  - *9 – 11 September 2013*
- **Cosmic Magnetism**
  - *22 – 24 January 2014*
- **Cosmology**
  - *13 – 15 January 2014*
- **Epoch of Reionisation & the Cosmic Dawn**
  - *26 – 28 March 2013*
- **Galaxy Evolution – HI**
  - *23 – 25 September 2013*
- **Pulsars ("Strong field tests of gravity")**
  - *17 – 18 July 2013*
- **Transients**
  - *27 – 29 January 2014*



Review of 2013 activities

Date	Milestone	Comment
2013		
March	Request for Design Proposals	Complete
June	Proposals received	Complete
July	Proposal Evaluation	Complete
	Board approval of cost-cap	Complete
Oct	Consortia approved by Board	Complete
	Board future governance discussion	Complete
Nov	Formal kick-off of Consortia	Complete
2014		
March	Board approve development of SKA prospectus scope	Complete
June	Finalise text of Hosting Agreements	
	SKA Science Meeting, Sicily	
Sept	All-hands Engineering Meeting, Fremantle, Australia	
Nov	Preliminary Design Reviews	
2015		
March	Approve re-baselined SKA design	
	Begin formal discussions with member nations on construction funding	
2016	Prototype dish and LFAA systems are installed on the South African and Australian sites respectively.	
	Critical Design Review	
	SKA Construction funding approved	
2017	Tender for and procure construction of SKA1	
2018 – 2023	Construction of SKA1	
	Detailed design of SKA2	
2020	Early science begins with some components of SKA1	
2023 – 2030	Construction of SKA2	



Advancing Astrophysics

with the Square Kilometre Array

9-13 June 2014, Giardini Naxos, Italy

#skascicon14

2014 marks 10 years since the publication of the comprehensive **'Science with the Square Kilometre Array'** book and 15 years since the first such volume appeared in 1999. In that time numerous and unexpected advances have been made in the fields of astronomy and physics relevant to the capabilities of the Square Kilometre Array (SKA). This meeting will facilitate the publication of a new, updated science book, which will be relevant to the current astrophysical context.

Scientific Organising Committee

Robert Braun (SKAO) – co-Chair
Grazia Umana (INAF-OACt) – co-Chair
Tyler Bourke (SKAO)
Rob Fender (Oxford)
Federica Govoni (INAF–OA Cagliari)
Jimi Green (SKAO)
Melvin Hoare (Leeds)
Melanie Johnston-Hollitt (Victoria Univ. Wellington)
Leon Koopmans (Kapteyn Astronomical Institute)
Michael Kramer (MPIfR)
Roy Maartens (Univ. Western Cape)
Tom Oosterloo (ASTRON)
Isabella Prandoni (INAF–IRA)
Nicholas Seymour (CASS)
Ben Stappers (Manchester)
Lister Staveley-Smith (ICRAR)
Wen Wu Tian (NAOC)
Jeff Wagg (SKAO)

Enquiries: ska-june14@skatelescope.org
or visit: indico.skatelescope.org/event/AdvancingAstrophysics2014

Square Kilometre Array @SKA_telescope

INAF ISTITUTO NAZIONALE DI ASTROFISICA NATIONAL INSTITUTE FOR ASTROPHYSICS

SKA SQUARE KILOMETRE ARRAY

SKA SQUARE KILOMETRE ARRAY

SKA All-hands Engineering Meeting

29th Sept – 3rd Oct 2014

Esplanade Hotel
Fremantle, Western Australia

2014

- Refresh of Science Case
- Continued development of designs
- PDR of Baseline Design in November 2014
- Cost review of Baseline Design in January 2015
- Re-baselining to occur late 2014 / early 2015

- Development of policy
  - Governance – preference for an SKA Treaty; other options still on table
  - Procurement principles accepted
  - Access principles under discussion
  - Funding framework – informal negotiations with governments soon
  - Hosting Agreements well-advanced

2014

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2014

- Refresh of Science Case
- Continued development of designs
- PDR of Baseline Design in November 2014
- Cost review of Baseline Design in January 2015
- Re-bas

➔ **SKA Prospectus by April 2015**
Critical document to persuade governments to provide €650M

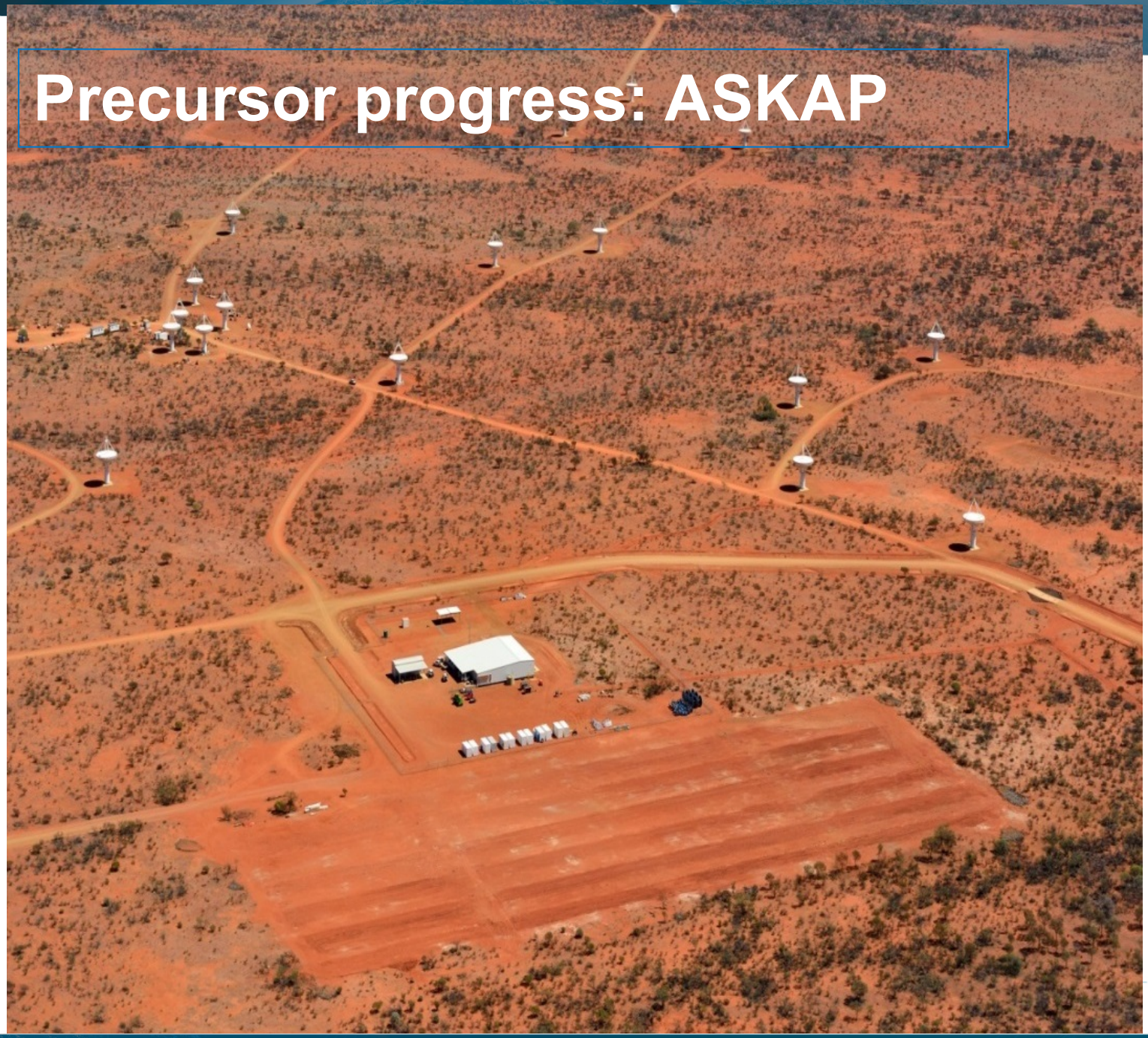
- Develc
  - Governance – preference for an SKA Treaty; other options still on table
  - Procurement principles accepted
  - Access principles under discussion
  - Funding framework – informal negotiations with governments soon
  - Hosting Agreements well-advanced.

Access Principles – now approved

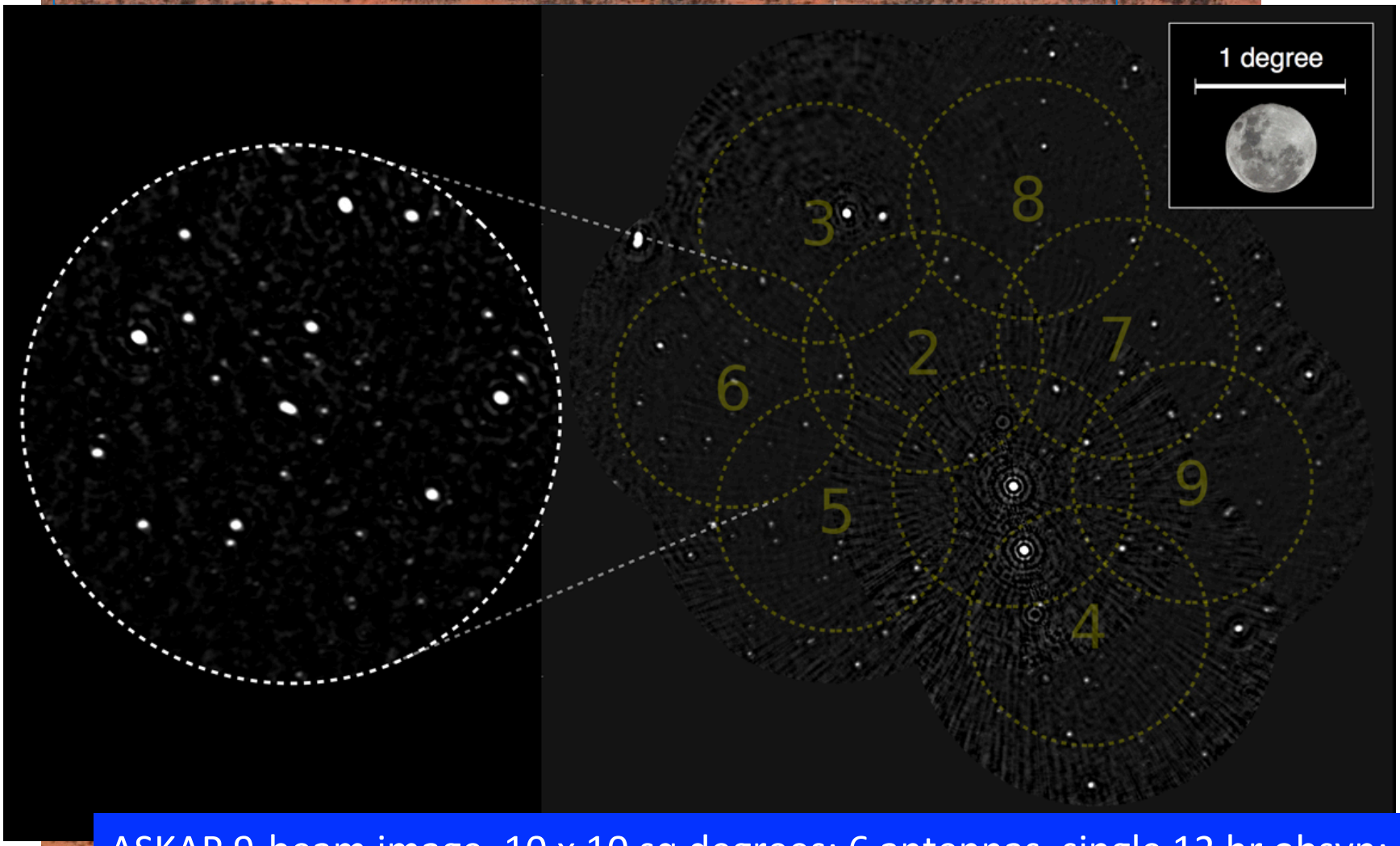
- That access should be based on scientific merit for scientists within Member states, evaluated via a single time assignment process
- That there should be a mechanism to ensure access is proportional to contribution level for each Member state
- That provision should be made to enable access for non-member states at a level TBD
- That all data/data products are to be made globally available after a suitable proprietary period
- That the D-G will formally allocate time

Precursor progress: MeerKAT

Precursor progress: ASKAP

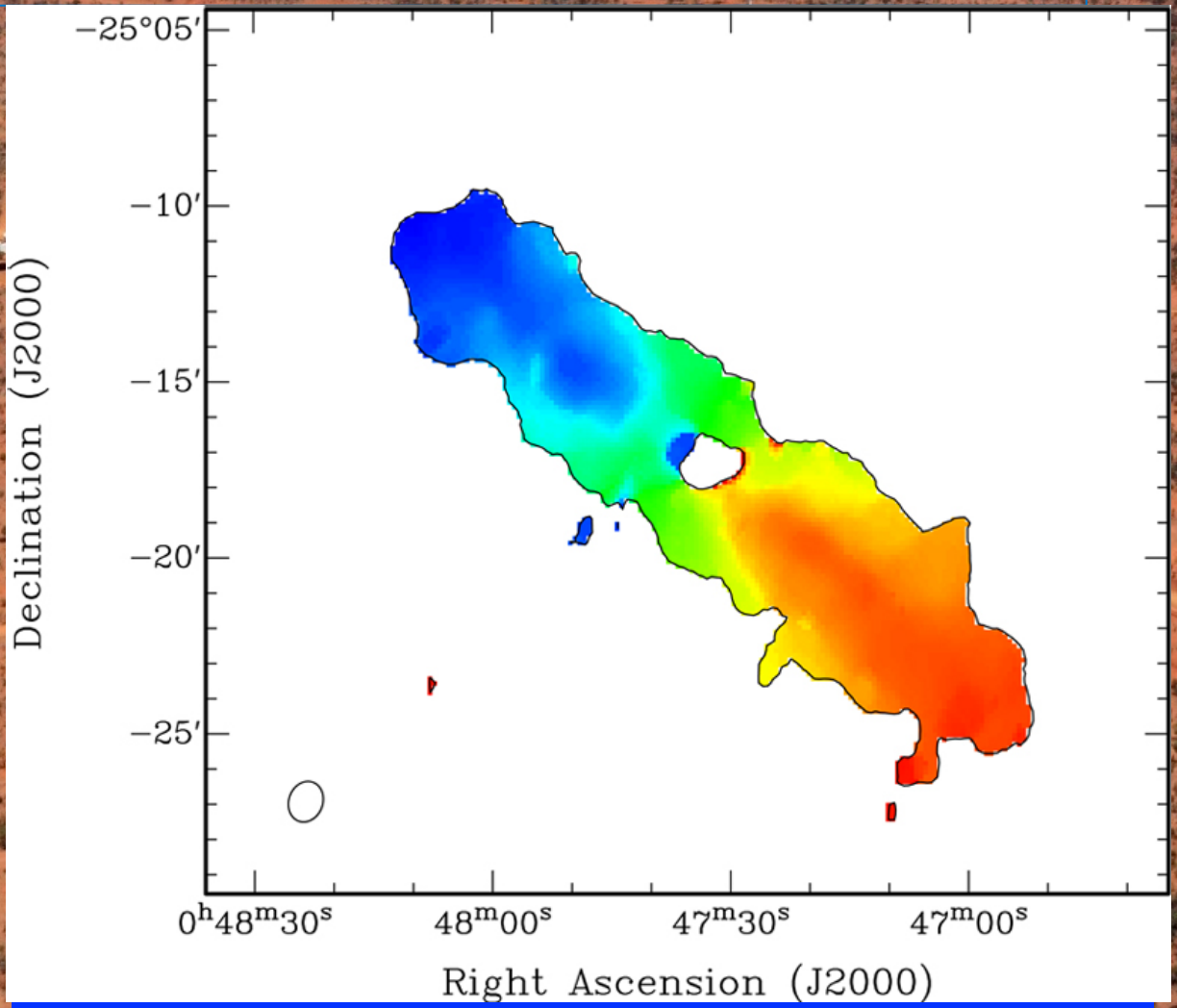


Precursor progress: ASKAP



ASKAP 9-beam image, 10 x 10 sq degrees; 6 antennas, single 12 hr obsvn; 50,000:1 DR; several hundred sources

Precursor progress: ASKAP



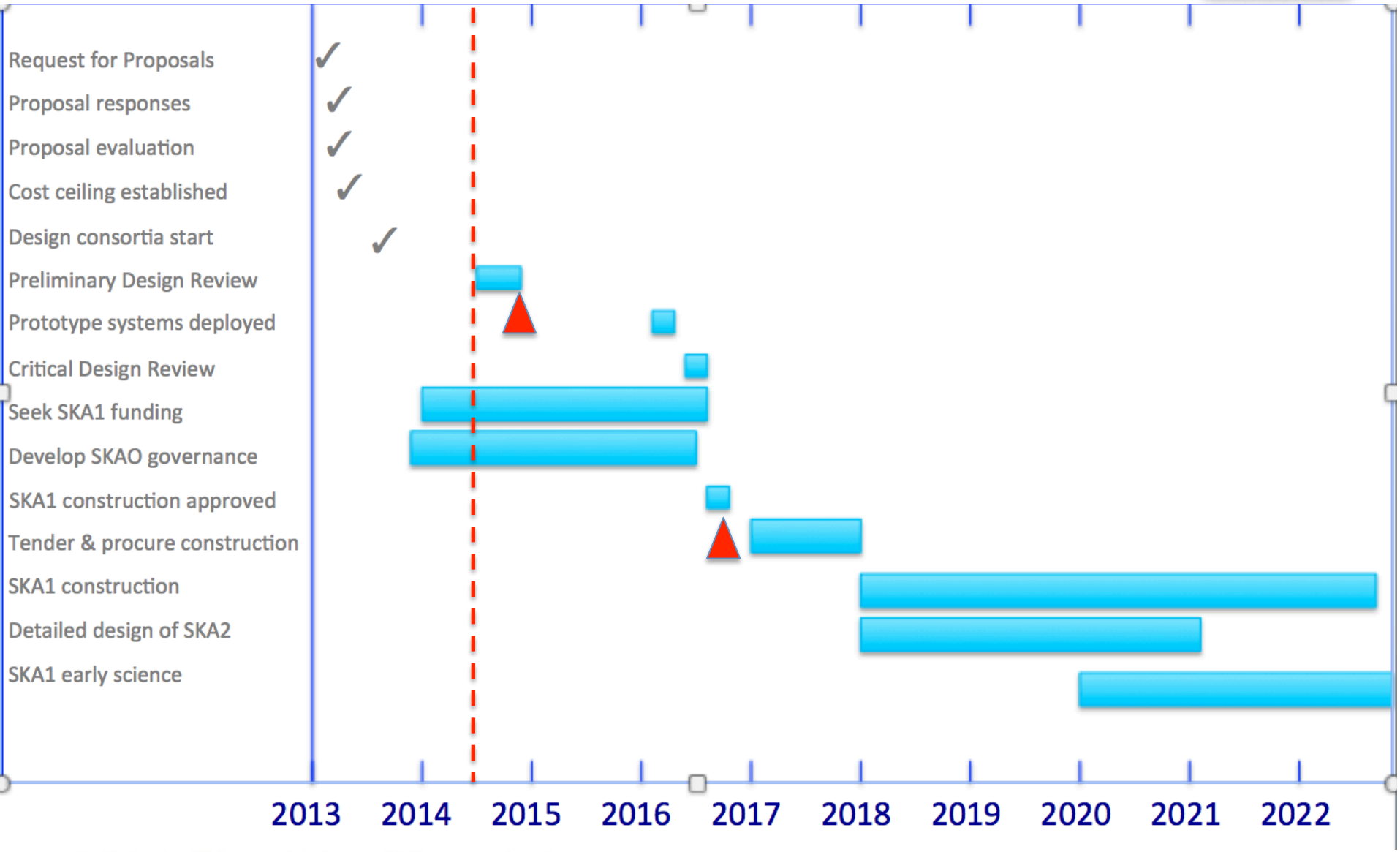
NGC253 in HI; 6 antennas, single 11hr obsvn; ATCA

SKA Precursor: Murchison Widefield Array

Issues and concerns

- SKA, as a global design effort, is a challenge to manage. Requires transparency, communications, openness – on all sides: SKAO Monthly Bulletin.
- In some consortia seeing worrying signs of schedule creep, and resource limitations already.
- Require dedicated, focused effort to deliver design. Cannot do it with small fractions of FTEs in work packages or organisations.
- Building processes to ensure re-baselining is transparent, robust and credible.
- Our international visibility is huge, we must not fail.

Schedule


Request for Proposals
Proposal responses
Proposal evaluation
Cost ceiling established
Design consortia start
Preliminary Design Review
Prototype systems deployed
Critical Design Review
Seek SKA1 funding
Develop SKAO governance
SKA1 construction approved
Tender & procure construction
SKA1 construction
Detailed design of SKA2
SKA1 early science
2013
2014
2015
2016
2017
2018
2019
2020
2021
2022

SQUARE KILOMETRE ARRAY

Exploring the Universe with the world's largest radio telescope

Thank you

www.skatelescope.org