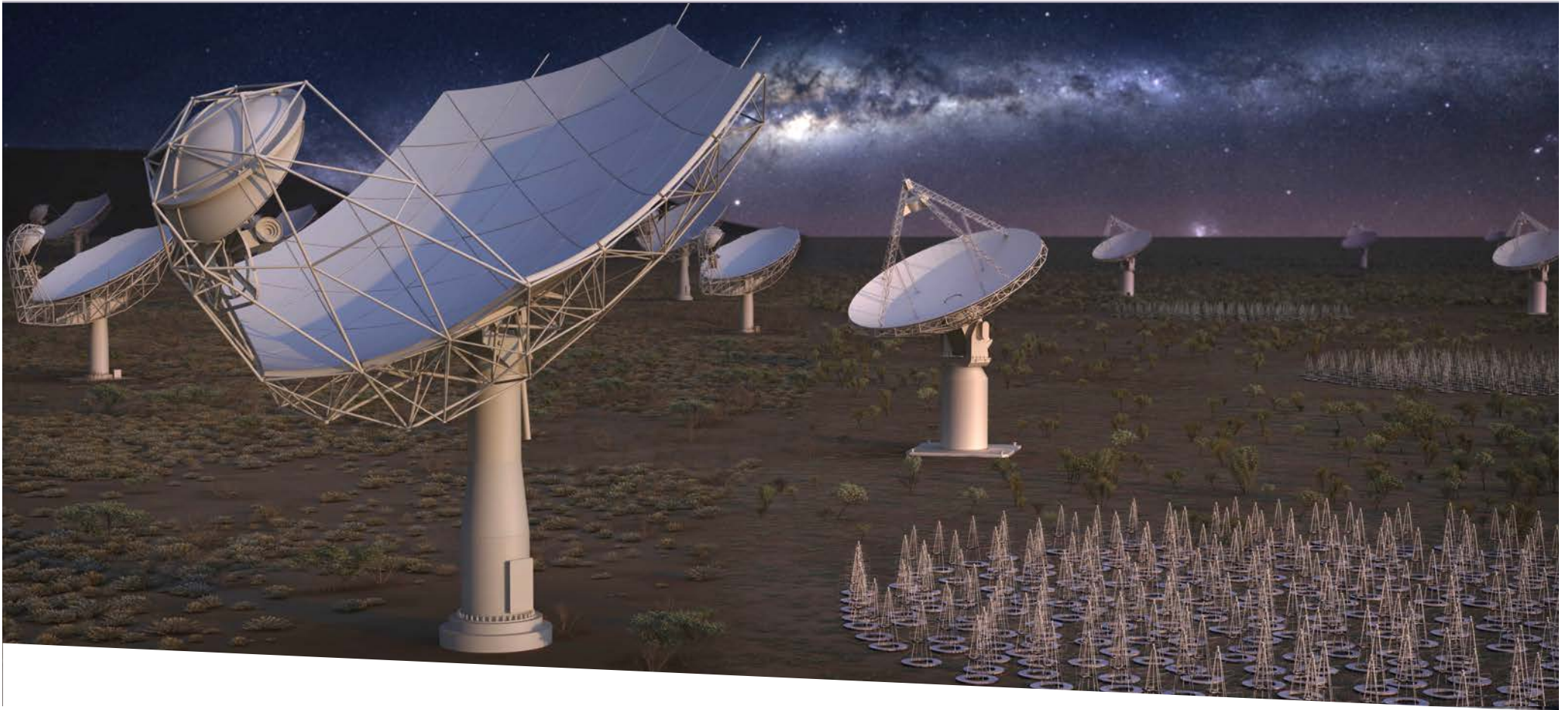


SKA SWG Update



SQUARE KILOMETRE ARRAY

Exploring the Universe with the world's largest radio telescope

Robert Braun, Science Director

21 Apr 2020

Science Activity Updates

- Countdown to Construction
 - Operations Review
 - System CDR Closeout
 - External Construction Cost Audit
- Science Data Challenges (Anna, Philippa)
 - SDC1 paper
 - SDC2 progress
- Low Bridging Update (Jeff)
- Proposal for “Fundamental Physics” SWG
- SKA related meetings (Anna)
 - SKA Science Meeting
- Round table SWG updates (All)
- AOB

Operations Review 23 – 25 March

- Strong endorsement and valuable recommendations (all of which are being implemented) from experienced review panel

Review Panel Members

Name	ID	Function	Review Area
Claire Chandler	CCH	Deputy Assistant Director for Operations at NRAO	All
Stuartt Corder	SCO	Deputy Director JAO (ALMA)	All
Andreas Kaufer	AKA	Director of Operations at ESO (review chair)	All
Phil Puxley	PPU	Vice President for Special Projects at AURA	All
Doug Simons	DSI	Director CFHT	All

Review Timeline

Date	Review Activity
23 December 2019	Review Scope & Terms of References released
13 January 2020	Kick-off meeting
21 January 2020	Background Data Package delivered
12 February 2020	First review preparation meeting
23 February 2020	Review Data Package delivered
08 March 2020	Initial set of Observation Action Records submitted by Panel members
17 March 2020	Second review preparation meeting
23-25 March 2020	Review meeting via video conference
7 April 2020	Delivery of Final Review Report to SKAO
7 May 2020	Response by SKAO
June 2020	Release of Revision 04 of SKA Operations Plan for presentation to Board

SKA1 OPERATIONS PLAN REVIEW – RESPONSE TO RECOMMENDATIONS

Document Number SKA-TEL-SKO-0001709

5 OAR Status

During the Review, panel members submitted 189 observations recorded as Jira tickets. Of these, 32 were flagged as Review Major Observations and 157 as Review Minor Observations. By the time of receipt of the OPR Panel report, 82 tickets had been closed, 106 had conclusions agreed between the Panel and the Operations group, and 1 had an associated action in progress. Once Revision 04 of the SKA1 Operations Plan is formally released under configuration control, all completed tickets will be closed.

6 Conclusion

The SKAO thanks the Review Panel members for their participation in this Review, especially given the difficulties imposed on all participants by the COVID-19 pandemic which developed over the period when this review was conducted. The expertise and engagement of each reviewer is evident from the perceptive nature of the observations and recommendations of the Panel. The SKAO appreciates the willingness of all the panel members to accommodate the changes to the review process to enable it to be completed effectively and without delays to the schedule.



System Critical Design Review Closeout: 31 March



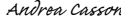




- Timely closeout of very positive review



SYSTEM CDR CLOSURE REPORT

Document number SKA-TEL-SKO-0001702
 Document Type REP
 Revision 01
 Author L Stringhetti
 Date 2020-03-31
 Document Classification FOR PROJECT USE ONLY
 Status Released

Name	Designation	Affiliation	Signature	
Authored by:				
L. Stringhetti	Project Engineer	SKAO		
			Date:	2020-04-05
Owned by:				
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			Date:	2020-04-05
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			Date:	2020-04-03
Tim Stevenson	Head of Mission Assurance	SKAO		
			Date:	2020-04-04
Released by:				
Joe McMullin	Programme Director	SKAO		
			Date:	2020-04-06

3 Recommendations status

In this section, the updated status for each recommendation identified in the System CDR report is shown.

# Rec.	Status	Note
1	Plan Implemented	Technical specification will be ready in time for construction start
2	Implemented	
3	Implemented	
4	Implemented	
5	Plan implemented	At this point, we do have a preliminary assessment. Our plan is to finalise the assessment and to take corrective action in the design as needed.
6	Implemented	
7	Plan Implemented	Simulation work is still on going on some requirements (e.g Polarisation Dynamic Range as per Rec. 9,)
8	Implemented	
9	Implemented	Plan completed as per recommendation. Polarisation dynamic range requirements not relaxed yet, analysis still to be completed.
10	Plan Implemented	Update of system level description of the DBD still on-going
11	Plan Implemented	Investigation and comparative tests to avoid phase ambiguity planned.
12	Implemented	
13	Implemented	
14	Implemented	
15	Implemented	
16	Implemented	
17	Implemented	
18	Implemented	
19	Implemented	
20	Implemented	
21	Implemented	
22	Implemented	
23	Implemented	
24	Implemented	
25	Plan Implemented	Strategy finalised; SKAO to issue an RfP for power supply
26	Implemented	
27	Implemented	
28	Implemented	
29	Implemented	
30	Implemented	
31	Implemented	

External Construction Cost Audit: 2 March – 3 April

- Strong endorsement by experienced engineering firm

Square Kilometre Array
Organisation (SKAO)

Square Kilometre Array

Independent Cost Review

REP/273948/01

Final | 3 April 2020

Ove Arup & Partners Ltd
6th Floor 3 Piccadilly Place
Manchester M1 3BN
United Kingdom
www.arup.com

3.3.12 Conclusion

Overall, the schedule and approach to construction follows logic and evidences good practice across both LOW and MID telescopes. There has been a significant level of planning work completed to date regarding both sites and this is evidenced in the detail shown throughout the reviewable documentation. The project appears to be in a very good place in advance of receiving funding and any competent contractor should be able to pick up and develop the delivery programme and schedule information as it currently stands. The internal SKA project management have proved to be a knowledgeable panel of experts and as collaboration with this team has been beneficial for Arup during this programme review, it should also ensure a smooth transition into the delivery phase of this project with the appointed delivery partners.

SDC1 publication of results

Square Kilometre Array Science Data Challenge 1: analysis and results

A. Bonaldi,^{1,2}★ T. An³, M. Brüggen⁴, S. Burkutean⁵, B. Coelho⁶, H. Goodarzi⁷,
C. Hale^{8,9}, P. Hartley¹, P. K. Sandhu¹⁰, C. Wu¹¹, L. Yu¹², M. H. Zhooldideh Haghighi⁷,
S. Antón^{13,6}, Z. Bagheri^{7,14}, D. Barbosa⁶, J. P. Barraca^{6,15}, D. Bartashevich⁶,
M. Bergano⁶, M. Bonato⁵, J. Brand⁵, F. de Gasperin⁴, A. Giannetti⁵, R. Dodson¹¹,
P. Jain¹⁰, S. Jaiswal³, M. Jarvis^{8,16}, B. Lao³, B. Liu¹², E. Liuzzo⁵, Y. Lu³, V. Lukic⁴,
D. Maia¹⁷, N. Marchili⁵, P. Mohan³, J. B. Morgado¹⁷, M. Massardi⁵, M. Panwar¹⁰,
Prabhakar¹⁰, V. A. R. M. Ribeiro^{6,18}, R. Rygl⁵, A. S. G. Robotham^{11,19}, V. Sabz Ali⁷,
E. Saremi⁷, E. Schisano²⁰, S. Sheikhnezami^{21,7}, A. Vafaei Sadr²² A. Wong²³, O. I. Wong^{9,11,19}

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⁵ INAF, Istituto di Radioastronomia, Italian ARC, Via P. Gobetti 101, Bologna, Italy

⁶ Instituto de Telecomunicações, Campus Universitário de Santiago, 3810-193 Aveiro, Portugal

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⁸ Astrophysics, University of Oxford, Denys Wilkinson Building, Keble Road, Oxford, UK

⁹ CSIRO Astronomy & Space Science, PO Box 1130, Bentley, WA 6102, Australia

¹⁰ Department of Physics, Indian Institute of Technology Kanpur, Uttar Pradesh-208016, India

¹¹ ICRAR-M468, UWA, 35 Stirling Hwy, Crawley, WA 6009, Australia

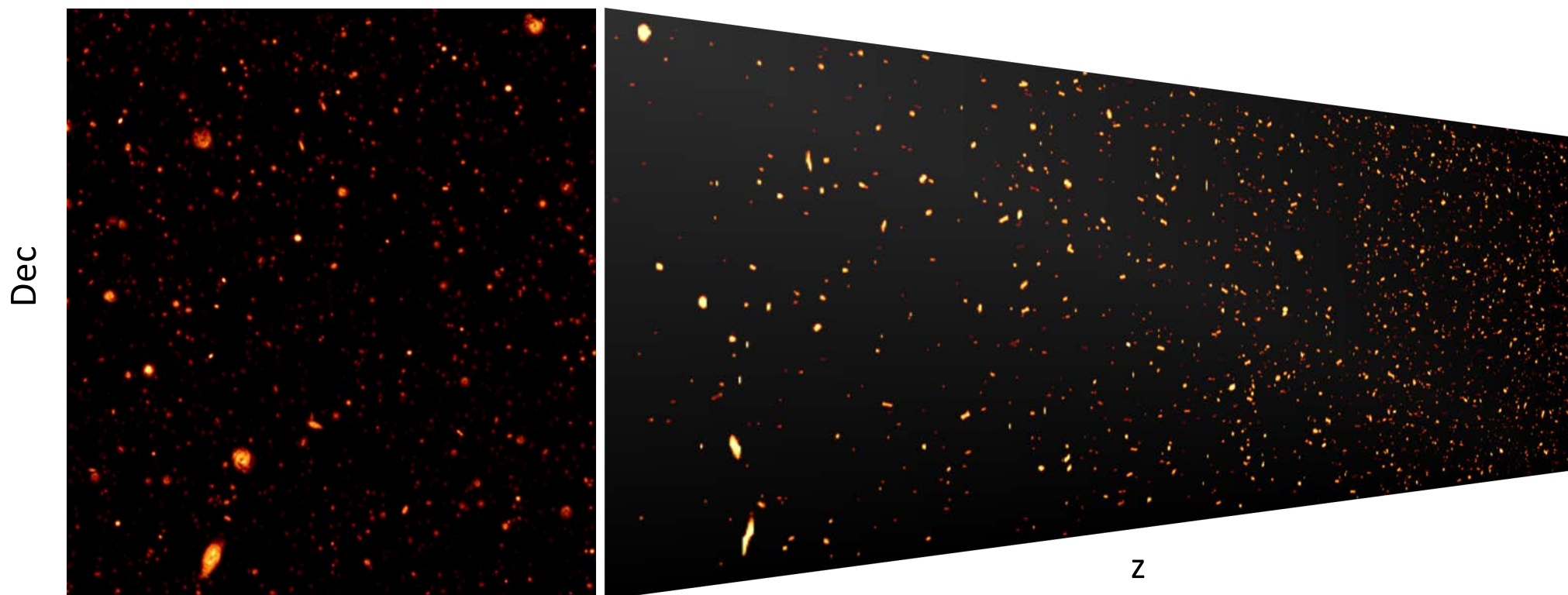
¹² CAS Key Laboratory of FAST, National Astronomical Observatories, Chinese Academy of Sciences, Beijing, China

¹³ CIDMA, Departamento de Física, Universidade de Aveiro, Campus Universitário de Santiago, 4810-981 Aveiro, Portugal

¹⁴ Institute of Astronomy, University of Cambridge, Madingley Road, Cambridge CB3 0ET, UK

To be submitted
end of April!

SDC2: HI simulated cube



$z=0-0.5$
 $20 \text{ deg}^2 \text{ FoV}$
 $5 \text{ arcsec} / 115 \text{ kHz resolution}$
 1 Tb disk space

Tests ongoing on a smaller test cube
 To be shared with HI SWG for feedback

SDC2 access and processing



Description

Provide access to different cluster facilities to assist the users on solving the challenge

Main goals

- Test and put in place strategies that take a step forward to deal with the real SKA data
- Exploring prototyping centralized data capabilities

Benefits

Users

- Provides Computing resources for the users
- No need to download the data
- Prepare the scientific community for future SKA practices

SKA

Tests SRC Prototyping

- Data access and transfer
- Containerization
- Access and security
- Protocols

Possible outcome with the challenge: pipelines



Clusters

Specialized in different tasks



Supporting

Access and usage instructions

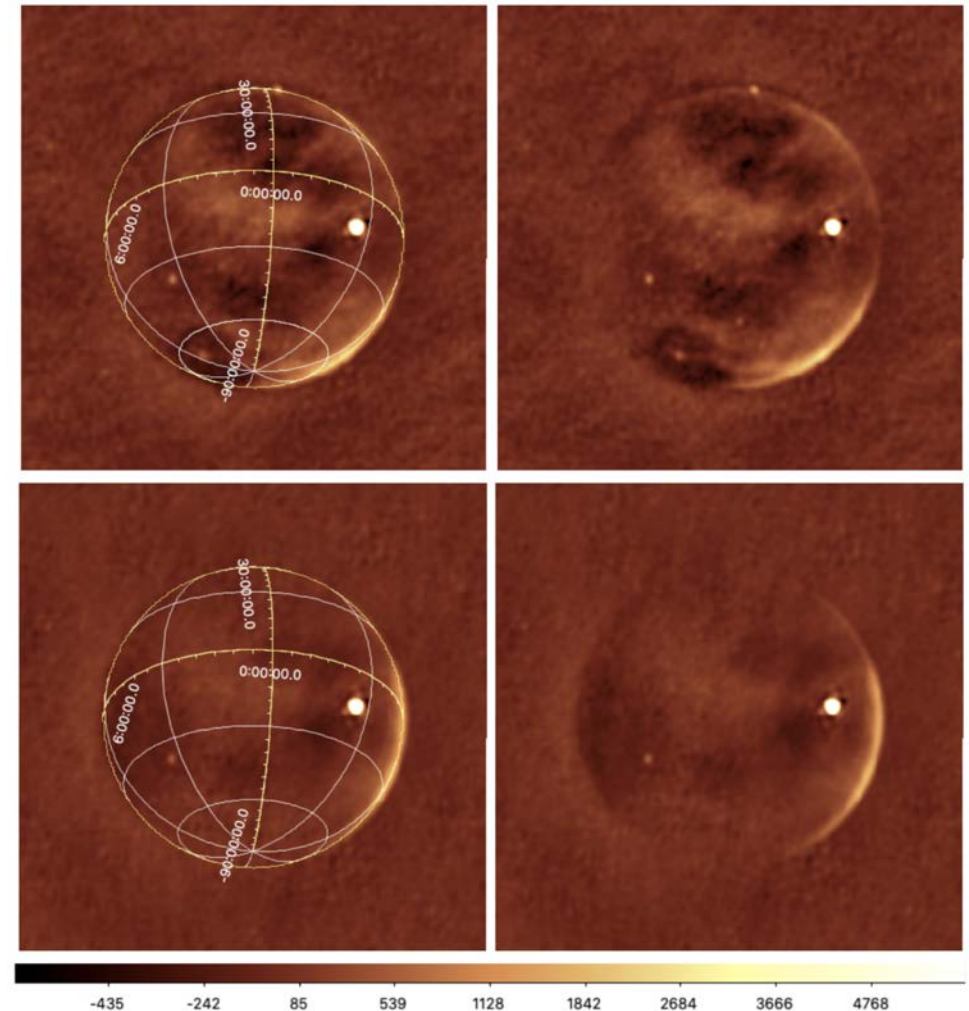
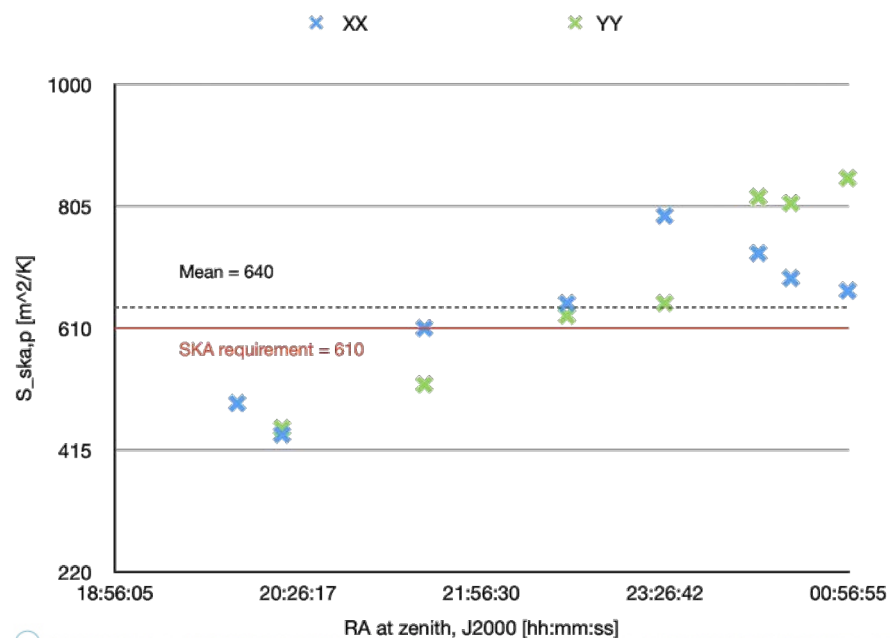


Teams

allocated to different clusters

Low Bridging Update

- AAVS2 sensitivity measurements at 160 MHz (Pupillo et al.) calibrated with Sun and estimated from sequence of 0.14s difference images



Fundamental Physics SWG?

- Proposal for new SWG
 - Connect theoretical physicists with practical radio astronomers to explore fundamental physics
 - Themes could include:
 - Dark matter direct and indirect searches
 - Gravitational waves, gravity tests
 - Early Universe physics (string theory, inflation, etc)
- Feed-back from Cosmology SWG
 - Already have strong theory representation with Cosmology SWG and good contacts with more technically minded
 - New Gravitational Waves SWG has scope for broadening their remit
 - Concern about duplication of effort as consequence of overlapping SWGs
 - Focus Groups within Cosmology and Gravitational Waves SWGs may offer more natural “home” for the proposed interest areas

Next SKA Science Meeting

- SKA Science Meeting, March 2021
 - Central Cape Town
 - Up to 350 participants
 - Title: “The Precursor View of the SKA Sky”
 - Main venue secured, details being finalized
 - Preferred format: 5 mornings of plenary, 5 afternoons of parallels
 - Parallel sessions based on multiple-SWG science topics, total number to be confirmed
 - Role of virtual participation needs more study

SQUARE KILOMETRE ARRAY

Exploring the Universe with the world's largest radio telescope

