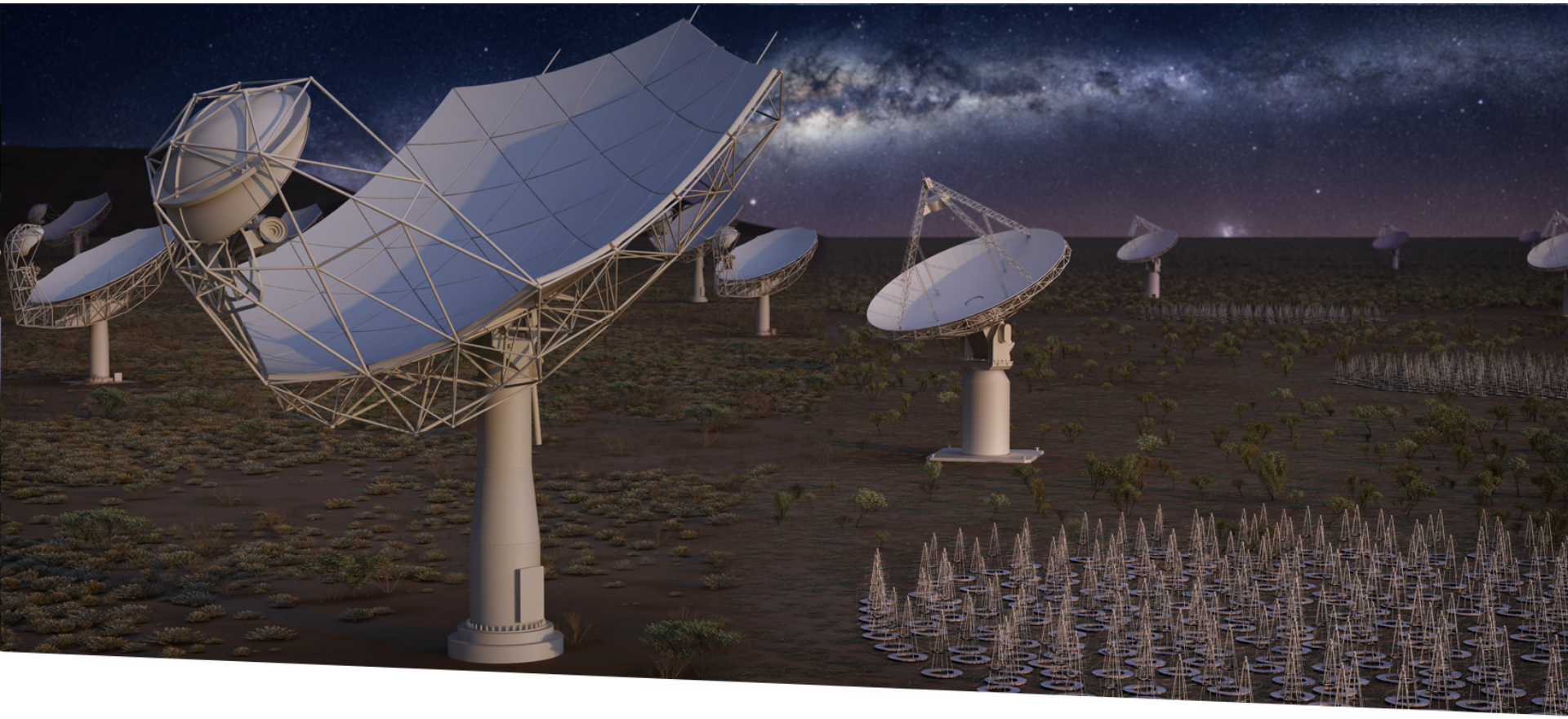
SKA from SEAC perspective



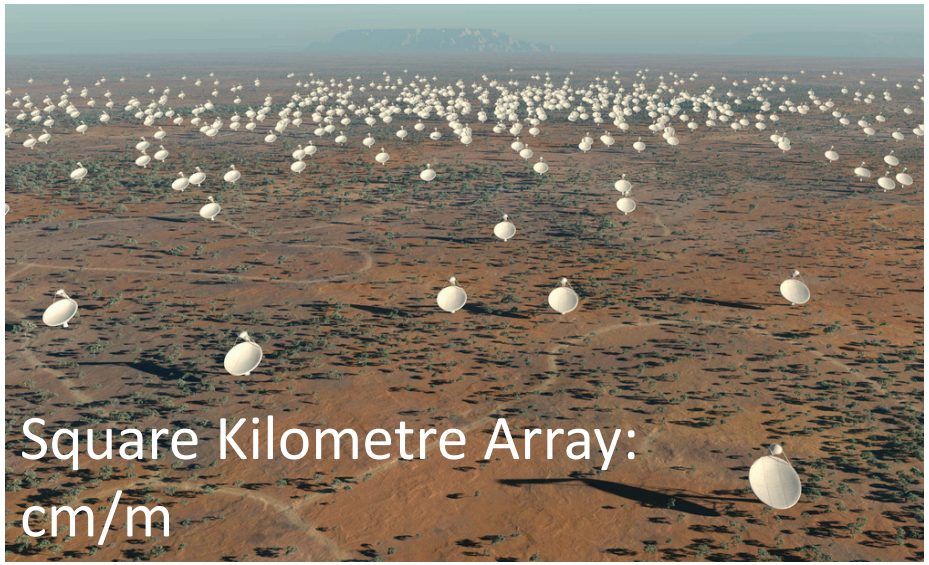
SQUARE KILOMETRE ARRAY

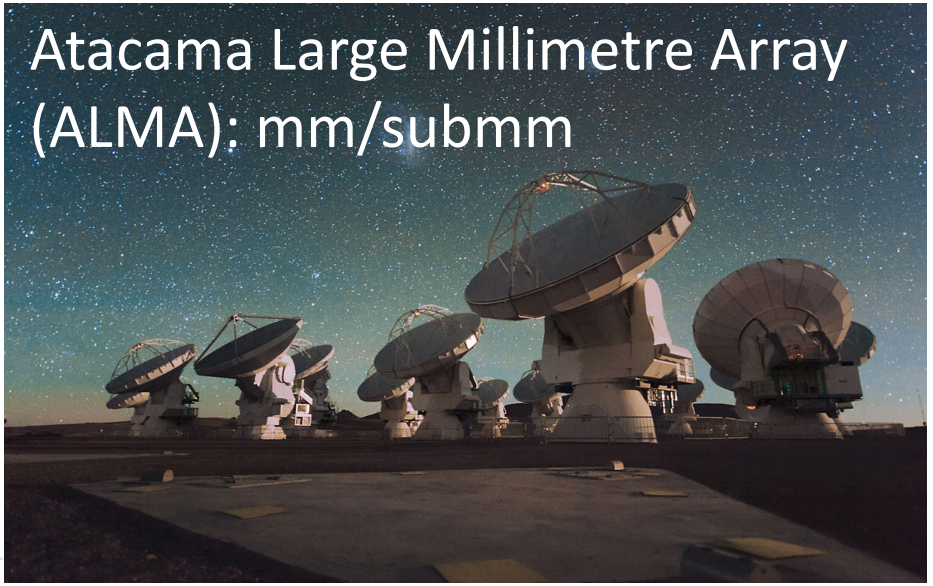
Exploring the Universe with the world's largest radio telescope

Andrea Ferrara, SEAC Chair

Scuola Normale Superiore, Pisa Italy

Great Observatories for the coming decades





What's SEAC?

SEAC provides advice to the **Director-General** and to the **Board** on the:

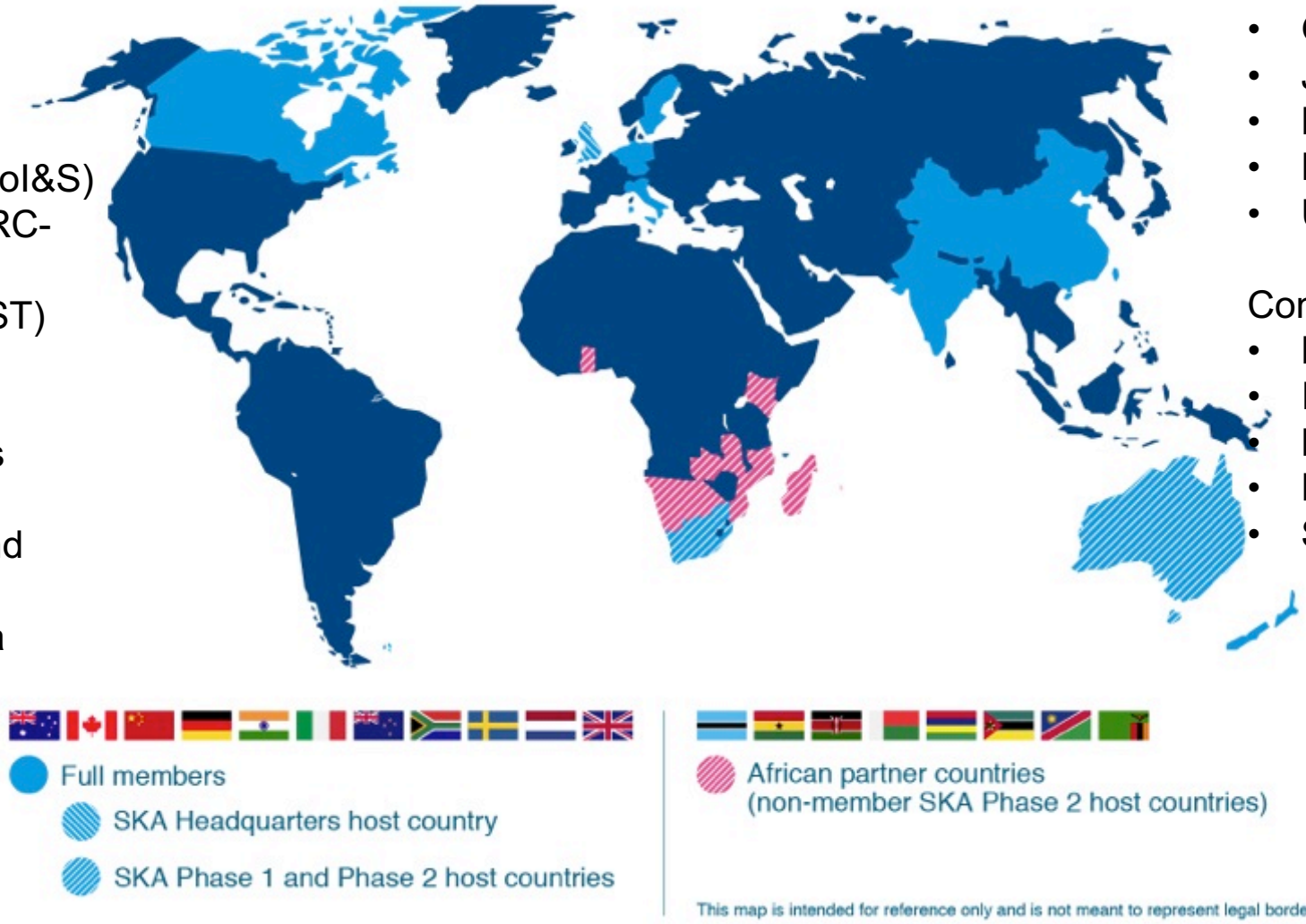
- Status of the SKA science case and the ability of the design to deliver it.
- Status of SKA technical developments and of the technical risk register.
- Impact of implementing specific design choices on the performance of the telescope
- Plans for, and progress on, the work needed to deliver a costed detailed design
- Plans for the construction, commissioning and operation of the facilities and for access to them by the scientific users
- Other scientific or technical issues as appropriate.

SEAC Composition

Members	Areas of expertise
Tracy Clarke (NRL, USA)	Low-frequency telescopes systems.
Jack Dongarra (UTenn, USA)	Computing, software, HPC
Andrea Ferrara (Pisa, IT) - Chair	Science: cosmology
Brian Glendenning (NRAO, USA)	Computing; software; technical expertise
Justin Jonas (SKA-SA, RSA)	Technical expertise
Andreas Kaufer (ESO)	Operations
Anita Loots (SKA-SA, RSA)	Project management; engineering
Naomi McClure-Griffiths (ANU, Aus)	Science: HI, galactic astronomy
Carole Mundell (U Bath, UK)	Science: extragalactic astronomy
Giovanni Pareschi (INAF, IT)	Technical expertise; instrumentation
Adrian Russell (ESO)	Engineering; technical expertise; project management
Uday Shankar (RRI, IN)	Science: galactic and extragalactic astronomy; instrumentation
Kristine Spekkens (Royal Military College of Canada)	Extragalactic HI and the structure and dynamics of spiral galaxies.
Matthias Steinmetz (IAP, DE)	Science: galaxy evolution
Greg Taylor (University of New Mexico, USA)	VLBI studies of radio galaxies and low-frequency radio arrays
Cathryn Trott (Curtin, AU)	Signal processing, epoch of reionisation
Marco de Vos (ASTRON, NL) – Deputy Chair	Engineering; technical expertise
Xiangping WU (NAOC, China)	Science: cosmology; project management

SKA Organisation: 10 countries, more to join

Australia (DoI&S)
Canada (NRC-HIA)
China (MOST)
India (DAE)
Italy (INAF)
Netherlands (NWO)
New Zealand (MED)
South Africa (DST)
Sweden (Chalmers)
UK (STFC)

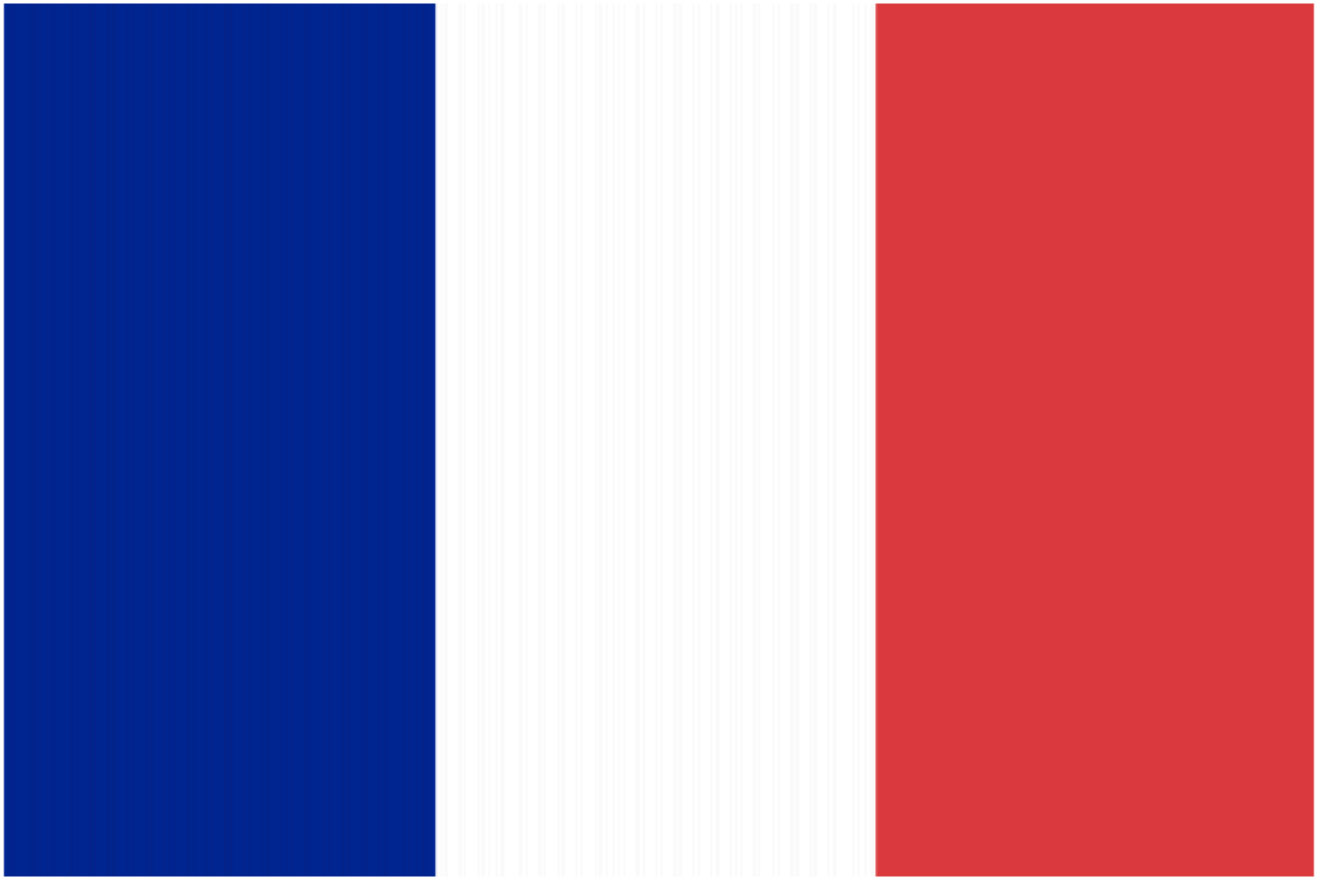


Observers:
- Germany
- Japan
- Malta
- Portugal
- USA

Contacts:
- Brazil
- Ireland
- Korea
- Russia
- Switzerland

Spain: Associate Member, June 1

France: Special Member, July 11



Establishing treaty organization similar to ESO, CERN

Text of treaty and key protocols now finalized and agreed.

Formal signing ceremony **was** expected in Rome in December 2018.

Information from Italian Ministry of Foreign Affairs is signing will be between 15 Feb – 15 March

Expect treaty ratification ~12 months later.

Organizational Structure

1. Various options being considered, including a hybrid approach taking the best of both IGO and commercial structures to match SKA needs

2. However, relative merits of the favoured option and the others that are considered require a more precise definition of the IGO and commercial structures.

Science Update

- SKA1 HPC and Archive Requirements discussed with SEAC
  - Doc 941: “Calibration Strategy” released
  - Doc 951: “Science and Archive Constraints” draft
- Science Data Challenges
  - Preparations for first release, 31 October (planned each ~6 months) – recruiting post-doc
- 2019 SKA Science Meeting and KSP Workshop
  - 8 – 12 April SKAO HQ
  - Focus on new techniques, instruments, methods

General

1. Encouraging to see that Spain is now an Associated Member of the SKAO, and France has become a Special Member.

2. Steady progress on IGO treaty, satisfactory given the complexity of such operations. Completion of (nice) HQ buildings.

3. SEAC endorses the planned Science activities (such as the SKA Science and KSP meeting, and the Data Challenge), and appreciate the clear overview of the SKA1 Science Milestones.

Ongoing project activities

- Support CDRs, prepare for System CDR
- Support and engage in bridging
- Planning for construction
- Planning for operations
- Planning for transition
- Planning for pivot from pre-con to construction, including development of Observatory structure and operating plan
- Development of Business Plan

CDR Process

Element	RRN Submission	CDR Submission	CDR Meeting	CDR Close
TM	29 January 2018	28 Feb 2018	17-20 Apr	27 Jul 2018
SaDT & SAT	17 January 2018	28 Feb 2018	15-18 May 2018	Oct 2018
INAU	19 March 2018	30 April 2018	27-29 June 2018	Oct 2018
INSA	19 March 2018	30 April 2018	2-4 July 2018	Oct 2018
CSP	18 May 2018 - PSS Element CDR - PST Element CDR - CBF Low - CBF Mid	30 Jun 2018 (includes LMC sub-element)	25-28 Sep 2018	31 Oct 2018
MeerKAT Integration			22 Oct 2018	31 Dec 2018 (t)
SDP Pre-CDR SDP CDR	09 Mar 2018 17 Sep 2018	25 Apr 2018 31 Oct 2018	20-22 Jun 2018 15-17 Jan 2019(t)	 28 Feb 2019(t)
LFAA	15 Oct 2018	29 Oct 2018	11-13 Dec 2018	31 Jan 2019 (t)
AIV	01 Oct 2018	12 Nov 2018 (t)	08 Jan 2019 (t)	30 Mar 2019 (t)
DSH Pre-CDR DSH CDR	07 Sep 2018 01 Apr 2019	28 Sep 2018 22 Apr 2019	08 Nov 2018 05 Jun 2019 (t) - Dish Structure: Mar 2019 - incl. B2;05 Jun 2019 - B1,5: 24 Oct 2019 (t)	
System CDR			Jun 2019 (t)	Sep 2019 (t)

CDR Process

1. SEAC continues to follow the element CDRs with observers (most recently the CSP CDR and MeerKAT Integration Review).
2. Excellent level of co-operation in terms of review documentation. The reviews achieved the set goals.

Critical points

- Further work is required for most Elements prior to System CDR
- Given that Element consortia will have dissolved and Bridging will be conducted transitioning to a matrix management structure, the appropriate level the appropriate FTE level must be guaranteed.
- It is essential that all IP issues be resolved prior to Element CDR.

LFAA

1. SKAO got directly involved in management of the LFAA after it became clear that the LFAA consortium was not going to be able to reach CDR.

2. SEAC to examine detailed summaries in regards to progress in deploying prototypes, milestones reached in understanding the instrument through simulations, and engineering decisions and how these might affect the scientific capabilities of the array.

3. The CDR meeting is set for 11 - 13 December 2018. The LFAA CDR Chair has been confirmed as Greg Taylor (SEAC) and the LFAA SEAC Panel Observer will be Uday Shankar. Closeout is expected by the end of February 2019.

Early Construction Opportunities

1. German/South African/Chinese proposal to add 16-20 SKA1-Mid dishes to MeerKAT
2. Also, provide 4 dishes to SKAO as the SKA-Mid Early Production Array
3. New MeerKAT dishes to be passed to SKA when MeerKAT is integrated.
4. Proposal being developed in detail
5. Will provide early start on EPA
6. Discussions ongoing for similar accelerated EPA for SKA-Low

Early Construction Opportunities

Comments

1. The majority of risk/cost lies with the MeerKAT/SARAO, e.g. on-site disruption and impact on the MeerKAT science programme etc.

2. SEAC welcomed the extension opportunity to do on-the-ground learning. However it is crucial that SKA construction and commissioning should continue as per schedule.

3. Third-party extension activities should not result in delayed SKA1 deliverables.

SKA Regional Centers

General principles

1. The SKA Observatory bears the responsibility for maximising the impact of SKA science

2. The SKA Observatory bears the responsibility for the delivery of SKA science, from proposal through to the production of advanced data products

3. The SKA Observatory bears the responsibility for ensuring the availability of compute and software resources to support the SKA community to deliver the SKA science programme

4. The SKA Observatory bears the responsibility for ensuring that the science programme fits within the available resources

5. The SKA Observatory retains ownership of all science data products generated using SKA data and software

SKA Regional Centers

Comments

1. SEAC welcome the establishment of a preliminary set of principles.
2. Parties involved should work towards a greater clarity of responsibilities and practical delivery.
3. Cost estimates for the computing resources of SRC, significantly less expensive than SDP; individual SRC might only require 10% of SDP resources.
4. HPC estimates based on simple scaling relationship to SDP processing require further analysis

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Thank You