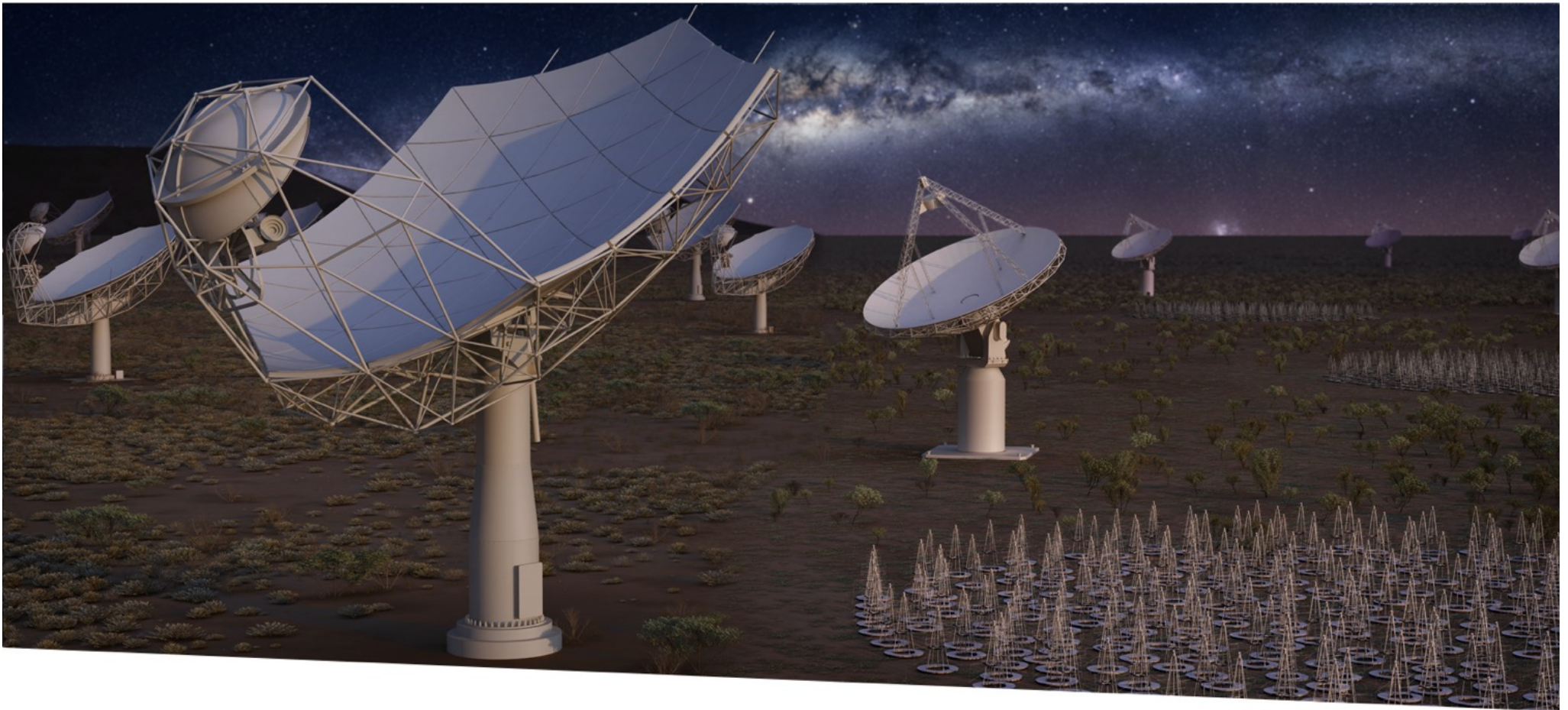


# Square Kilometre Array: Current status



**SQUARE KILOMETRE ARRAY** Rosie Bolton, SRC Project Scientist  
Exploring the Universe with the world's largest radio telescope AENEAS March 2019

# SKA– Key Science Drivers: The history of the Universe

Testing General Relativity  
(Strong Regime, Gravitational Waves)

Cosmic Dawn  
(First Stars and Galaxies)

Cradle of Life  
(Planets, Molecules, SETI)

Galaxy Evolution  
(Normal Galaxies  $z \sim 2-3$ )

Cosmic Magnetism  
(Origin, Evolution)

Cosmology  
(Dark Matter, Large Scale Structure)

Exploration of the Unknown

**Broadest science range of any facility on or off the Earth.**



# SKA Phase 1

3 sites (AUS, RSA, UK-HQ)

2 telescopes (LOW, MID)

one Observatory (SKAO)

Construction Cost-cap: €691M (2017)

Construction: 2020-2027 (Science commissioning 2022+)

**SKA1-Low:** 512 x 256 low-freq dipoles,

50 – 350 MHz

65 km baselines (11" @ 110 MHz)

Murchison, Western Australia

**SKA1-Mid:** 133 x 15m + 64 x 13.5m dishes,

0.35 – 15 GHz

120 km baselines

[0.22" @ 1.7 GHz; 34 mas @ 15 GHz]

Karoo, South Africa



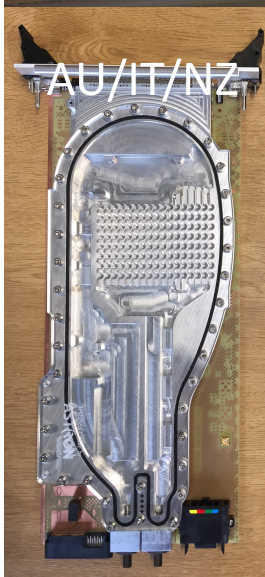
# CDR Activity – February 2019



Element	RRN Submission	CDR Submission	CDR Meeting	CDR Close
TM	29 January 2018	28 Feb 2018	17-20 Apr	14 Jul 2018
SaDT & SAT	17 January 2018	28 Feb 2018	15-18 May 2018	Jan2019
INAU	19 March 2018	30 April 2018	27-29 June 2018	Dec 2018
INSA	19 March 2018	30 April 2018	2-4 July 2018	Jan2019
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	Jan 2019
MeerKAT Integration			22 Oct 2018	31 Dec 2018
SDP Pre-CDR SDP CDR	09 Mar 2018 17 Sep 2018	25 Apr 2018 31 Oct 2018	20-22 Jun 2018 15-18 Jan 2019	<u>29 Mar 2019</u>
LFAA re-planned	15 Oct 2018	05 Nov 2018	11-13 Dec 2018	<u>28 Feb 2019</u>
AIV	Oct 2018	30 Nov 2018	<u>04 Mar 2019</u>	<u>30 Mar 2019</u>
DSH Pre-CDR DSH CDR	17 Sep 2018 <u>23 Aug 2019 (w B2)</u>	28 Sep 2018 <u>13 Sept 2019 (w B2)</u>	26-27 Nov 2018 <u>25-29 Oct 2019 (w B2)</u> (Dish Structure: Aug 2019)	<u>26 Nov 2019 (w B2)</u>
System CDR			<u>Nov 2019</u>	<u>Feb 2020</u>



# Prototypes

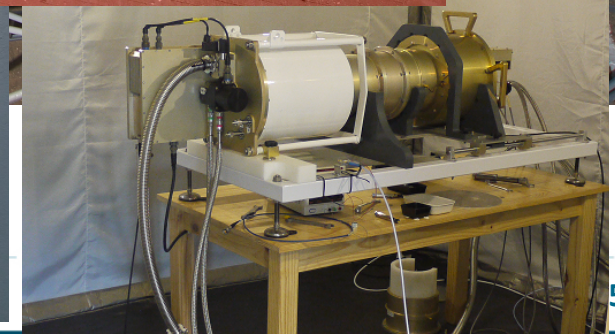
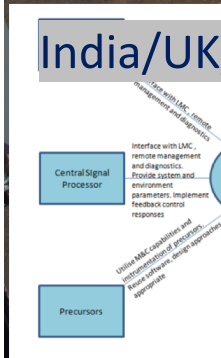


AAVS1: AU/IT/NL/UK



SKA-P2: Karoo  
MPG funded

ny/Italy)

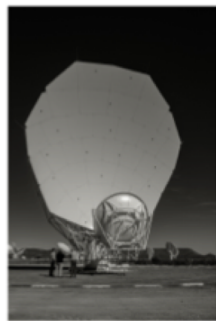




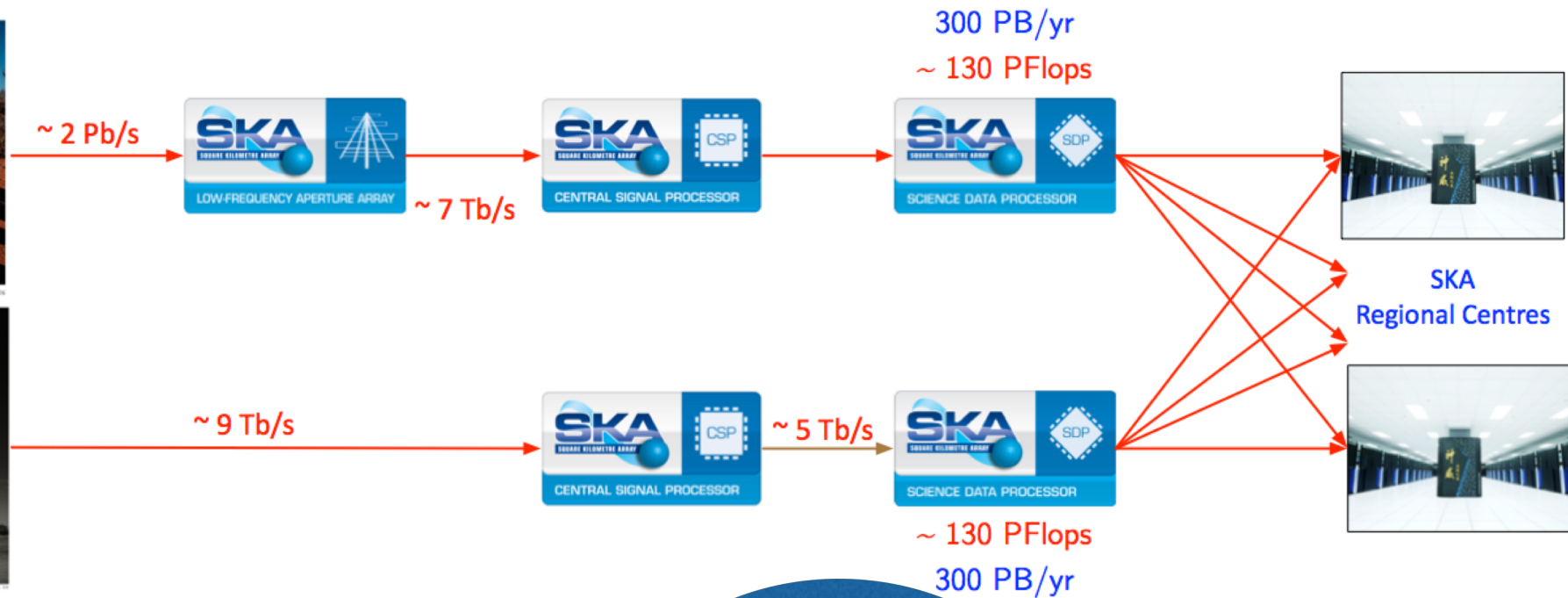
# • Data flow challenges



SKA1-LOW



SKA1-MID



Uploads to  
Facebook  
180PB

SKA  
Phase1 Science Archive  
600PB





# Development of Governance



Establishing treaty organization similar to ESO, CERN

Text of treaty and key protocols now finalized and agreed.

Ministerial-level signing ceremony in Rome on 12<sup>th</sup> March, 2019

Expect treaty ratification ~12 months later.



# Timeline

## Key dates:

- **Q1 2019: Convention signing**
- **Q4 2019: System design final**
- **Q1 2020: SKA Observatory exists**
- **Q2 2020: Construction and operations proposal submitted to SKAO Council**
- **Q4 2020: Construction begins**
- **2027: SKA1 construction complete**



# SRC Developments

- SKA Regional Centre Coordination Group
  - ✓ One representative per region
  - ✓ Good progress discussing many issues related to SRCs
  - ✓ System scaling work relative to SDP based on simple data rate model
  - ✓ Network cost model developed
  - ✓ Guidelines for Advanced Data Product archive

# SRC Developments

- SKA Regional Centre Coordination Group
  - Regions are very large and 50% of SKA stakeholders are within Europe
  - Less progress in terms of providing FTE to do work
  - Scaling model requires bottom-up use cases to improve estimates
  - Network needs to move into testing phase

We need to move into a more active phase and enable prototyping to be carried out.



# SKA Regional Centre Steering Committee

- New group will be established to take forward the development of SRCs.
- One representative per SKA member
  - Awaiting confirmation from Spain, Italy, UK, Sweden
  - Confirmed: Netherlands (Michiel), France (Vilotte), Scaife (UK)
  - Much better connection between individual countries and the work that will be done
  - Representatives will have access to resources (both infrastructures and people)
  - Working groups will be established to take forward various aspects of the work

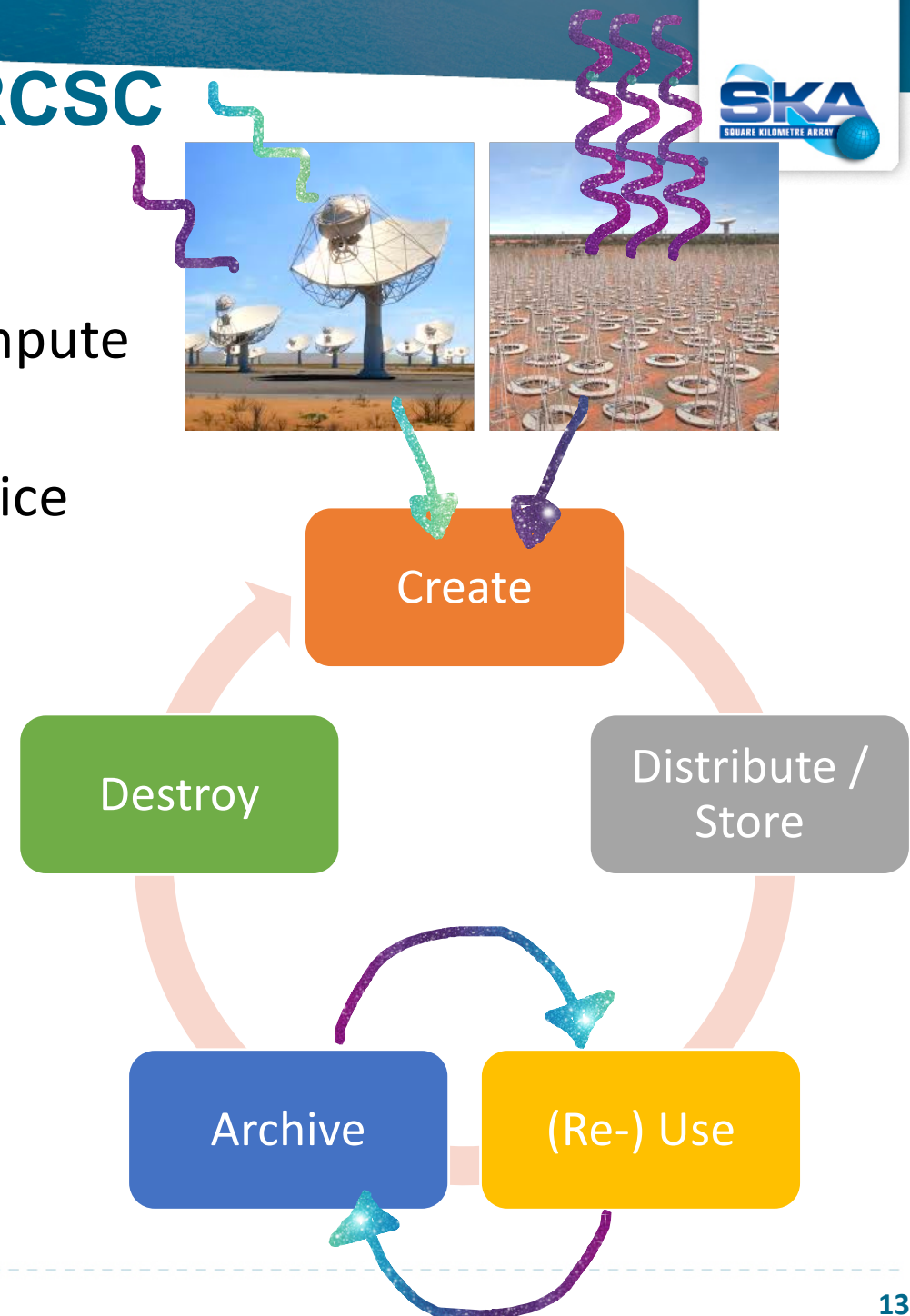
# Possible\* areas for SRCSC working groups

- Workload management - compute and data placement



# Possible\* areas for SRCSC working groups

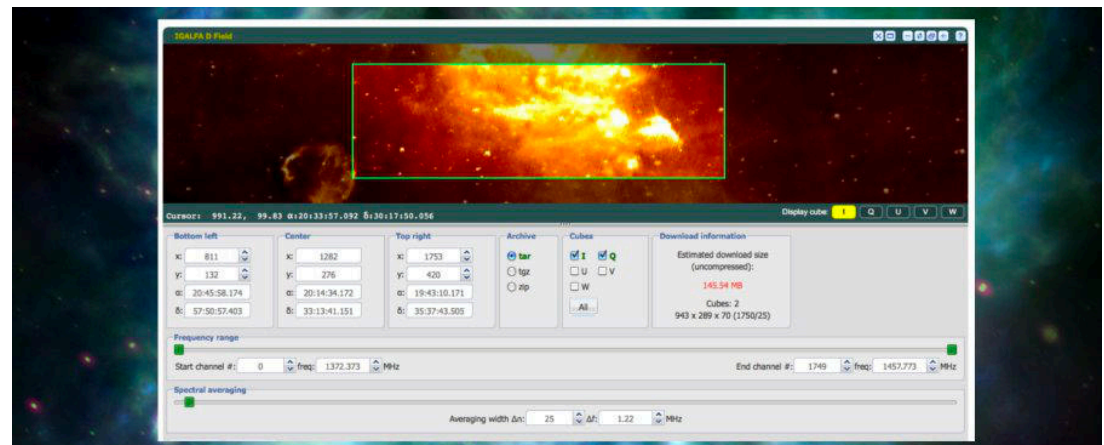
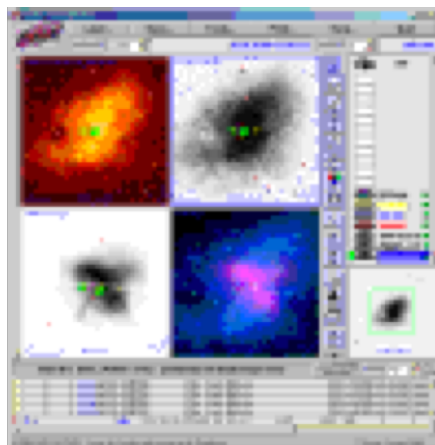
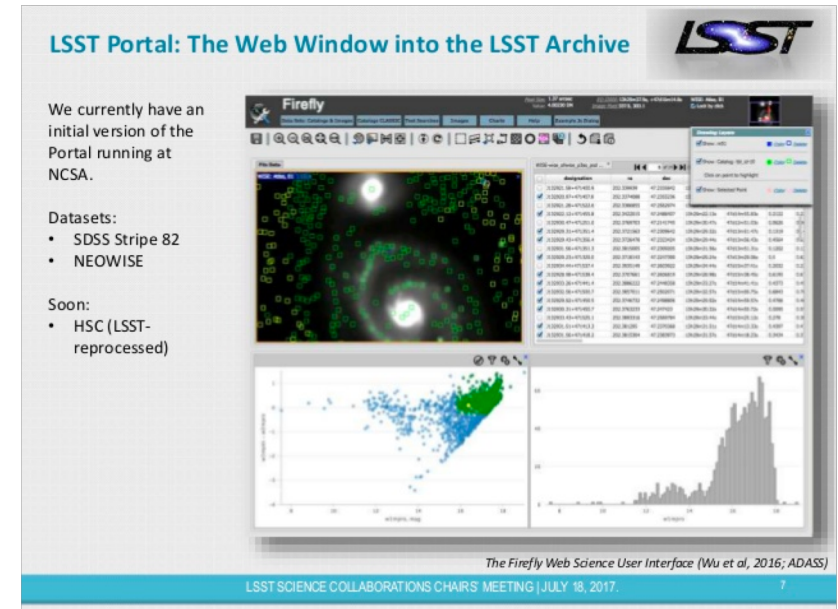
- Workload management - compute and data placement
- Data Lifecycle, Quality of Service requirements





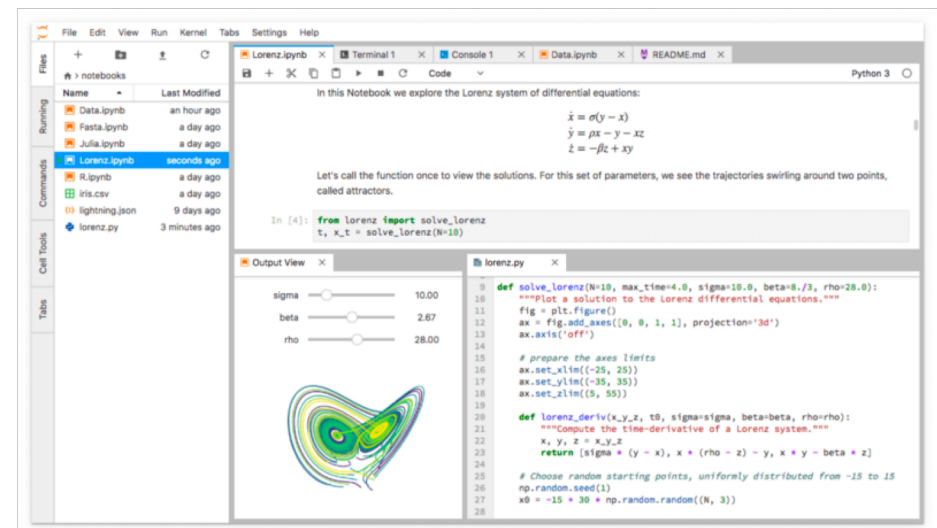
# Possible\* areas for SRCSC working groups

- Workload management - compute and data placement
- Data Lifecycle, Quality of Service requirements
- Users –
  - Archive Exploration
  - Data interaction and visualization



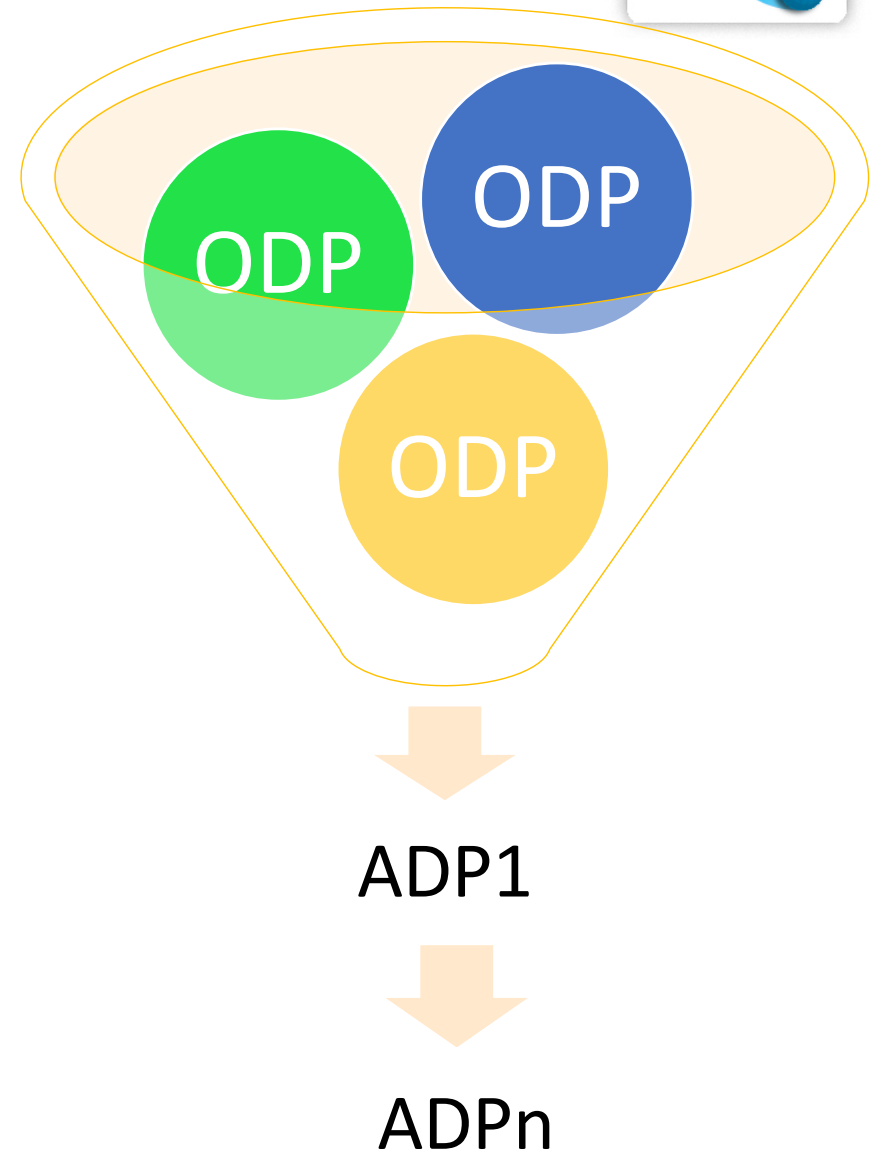
# Possible\* areas for SRCSC working groups

- Workload management - compute and data placement
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  - Data interaction and visualization
  - Science Gateway, large job submission



# Possible\* areas for SRCSC working groups

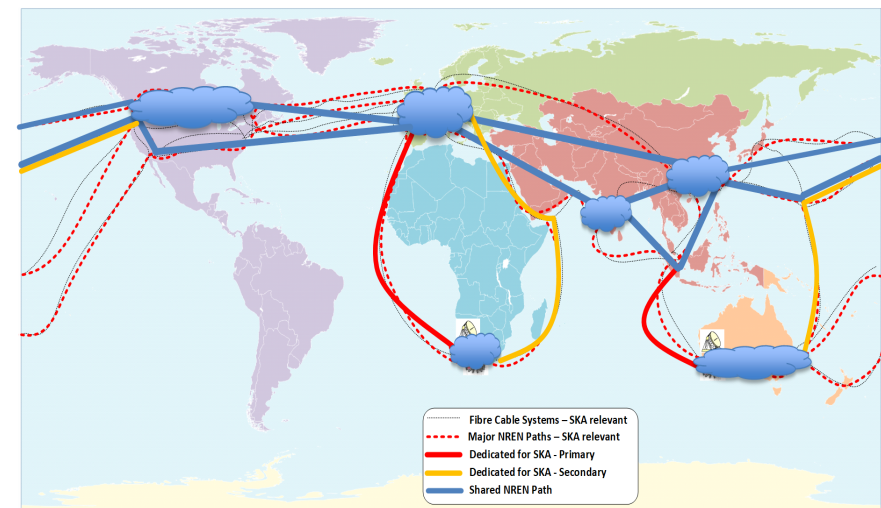
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  - Programme users (KSP, PI), User Support





# Possible\* areas for SRCSC working groups

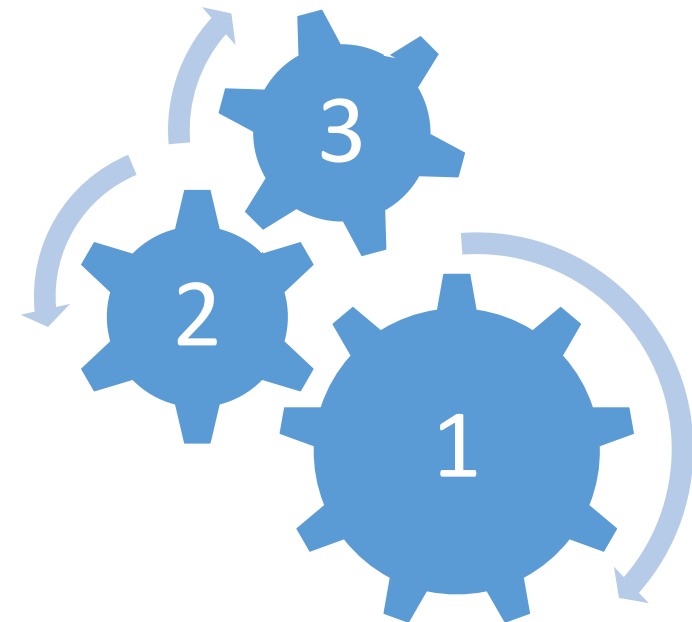
- Workload management - compute and data placement
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  - Science Gateway, large job submission
  - Programme users (KSP, PI) User Support
- NREN/ International data transfer



# Possible\* areas for SRCSC working groups

- Workload management - compute and data placement
- Data Lifecycle, Quality of Service requirements
- Users –
  - Archive Exploration
  - Data interaction and visualization
  - Science Gateway, large job submission
  - Programme users (KSP, PI) User Support
- NREN/ International data transfer
- SRC operations and resource management

\*Working groups still TBD at first SRCSC meeting





# How to engage with SRCSC work

- We need to hear the views from across the community – are there areas not covered here?
- Please get in touch with your national representative if you want to be involved in SRCSC sub-group work
- If you don't have a national representative, or if you represent an international body, but want to be involved, get in touch with us at SKA
  - Antonio Chrysostomou and Rosie Bolton  
([r.bolton@skatelescope.org](mailto:r.bolton@skatelescope.org))

# The importance of AENEAS

- Vital that engagement between AENEAS and SKAO is strong as the project draws to a conclusion
- Technical data challenges and prototype SRC work should build on the work done in AENEAS
- Documents and code use
- Use cases (e.g. from WP3) – these will continue to develop after AENEAS





# Opportunities at SKAO

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Several job vacancies –  
<https://recruitment.skatelescope.org/category/ska-jobs/>