

SKAO

SKA SWG Update

Robert Braun, SKAO Science Director

21 January 2025



SKA Science Update

Start Recording!

- Construction Progress
- SRCNet Developments (Rosie)
- SWG Survey Results (Tyler)
- 2025 SKA Science Meeting and Book Update (Philippa)
- Reminders & Information
- AOB

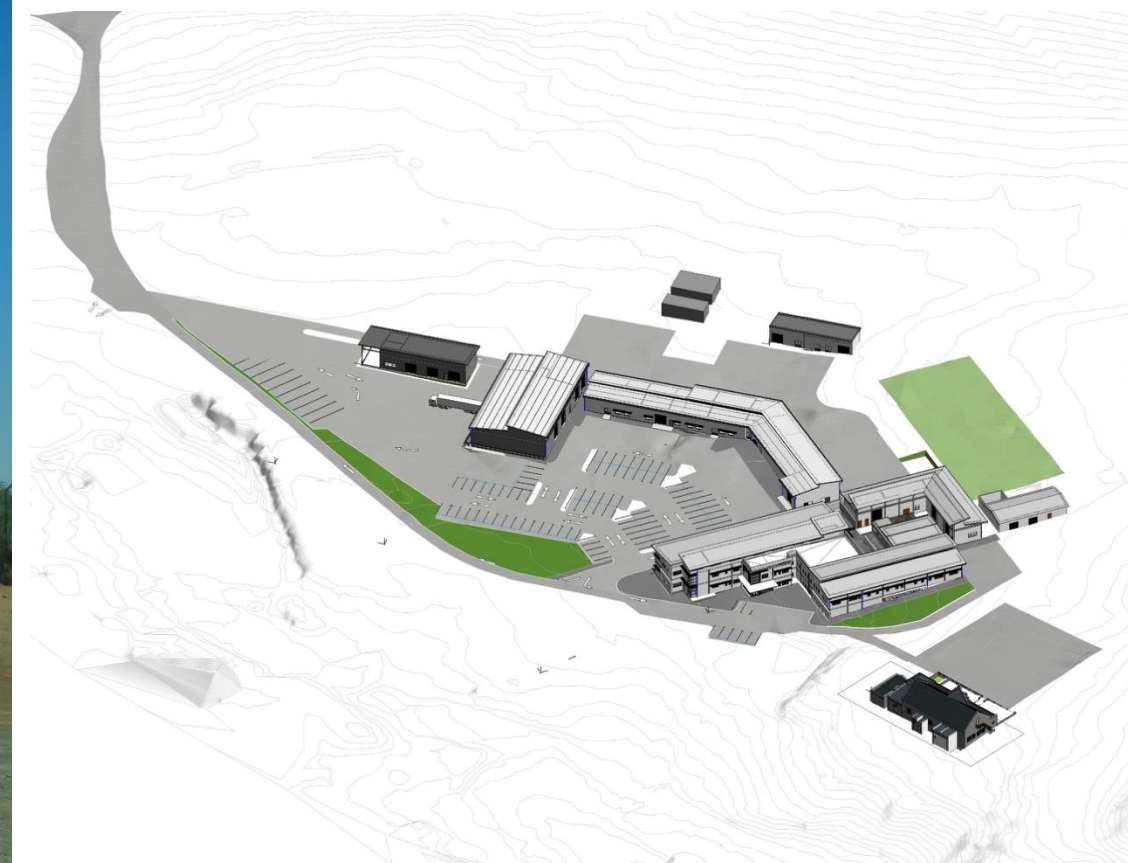


SKA-Low status



Construction focus

- SKA-Mid:
 - Dish erection accelerate
 - Photogrammetry
 - Continue infrastructure roll-out
 - Begin EOC construction at Klerefontein
 - AA0.5 start (include SKA-Mid fringes)*
- SKA-Low:
 - Station rollout continue
 - Commissioning, science verification
 - Complete infrastructure roll-out
 -Central Processor Facility included
 - AA0.5* → AA1*



* N.B. AA0.5/AA1 requires integrated use of increasingly capable SKAO software, digital, data transmission, receiver and other hardware systems



SRCNet Project SWG Update

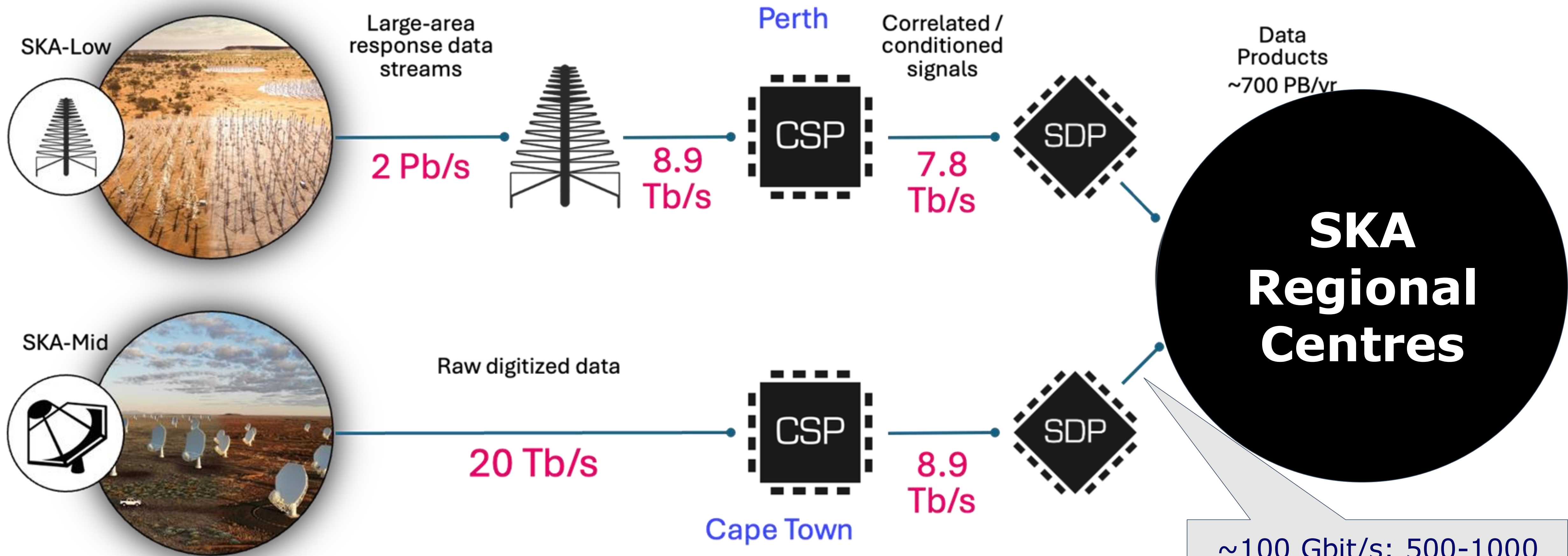
Rosie Bolton
rosie.bolton@skao.int

SWG Chairs meeting 19/11/2024
Document classification: Project Use Only



What are the SKA Regional Centres???

Several stages of cool, amazing, cutting edge data processing within the observatory... but **NO USER ACCESS**



*in the UK, 2024

~100 Gbit/s: 500-1000 times faster than "good" home internet speed*



What are the SKA Regional Centres???

SKA Regional Centres

Science Gateway, giving access to **Science enabling tools and applications**

running on federated compute and storage

enabling users to discover data in the **global SKA archive**, develop workflows, perform analyses and collaborate

addresses the "orders of magnitude" data problem



What are the SKA Regional Centres???



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SRC Network Vision

We will develop and deploy a collaborative and federated network of SKA Regional Centres, globally distributed across SKA partner countries, to host the SKA Science Archive.

The SRC Network will...

make data storage, processing and collaboration spaces available, while supporting and training the community, to...

maximise the scientific productivity and impact of the SKA.



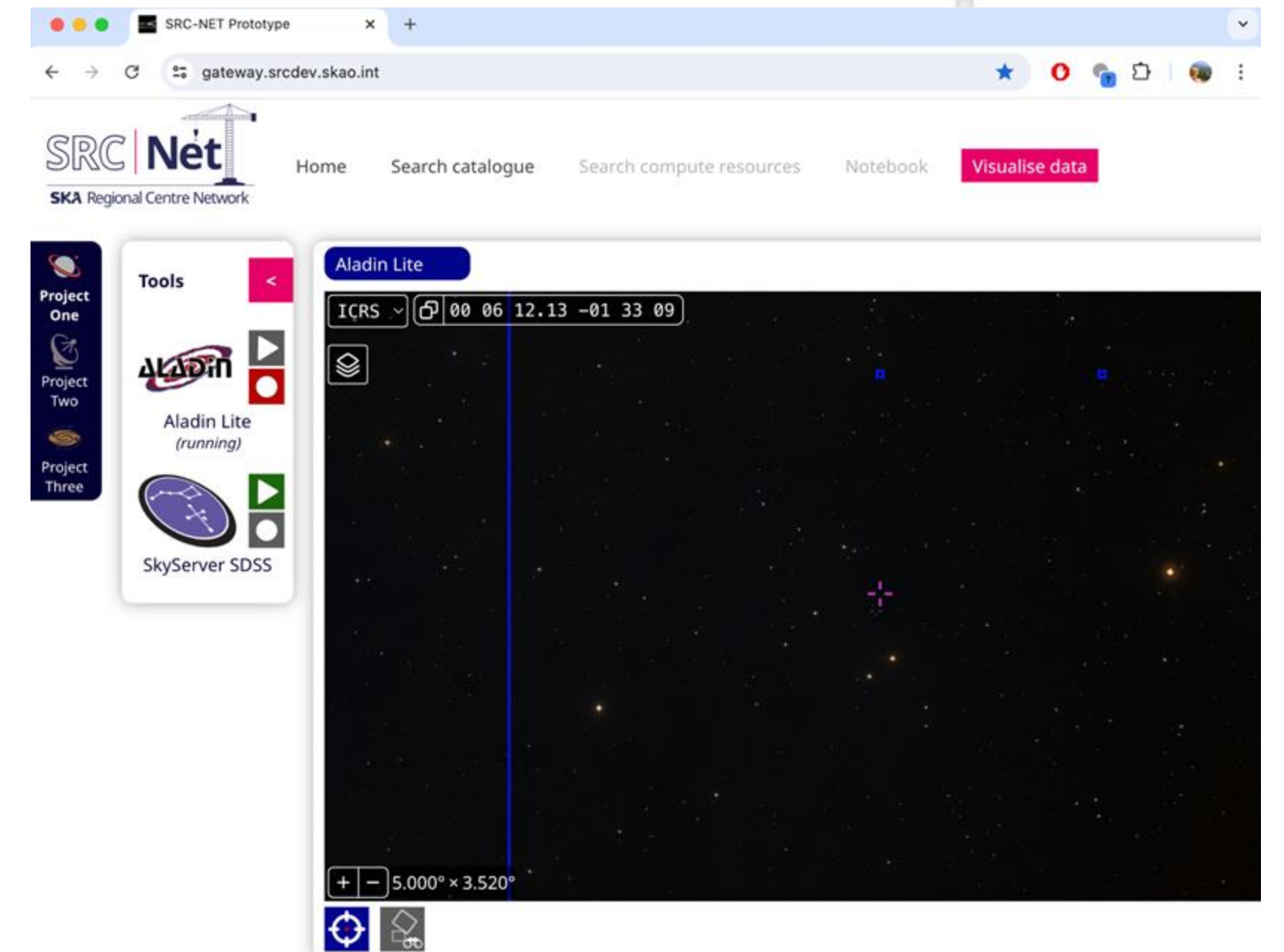
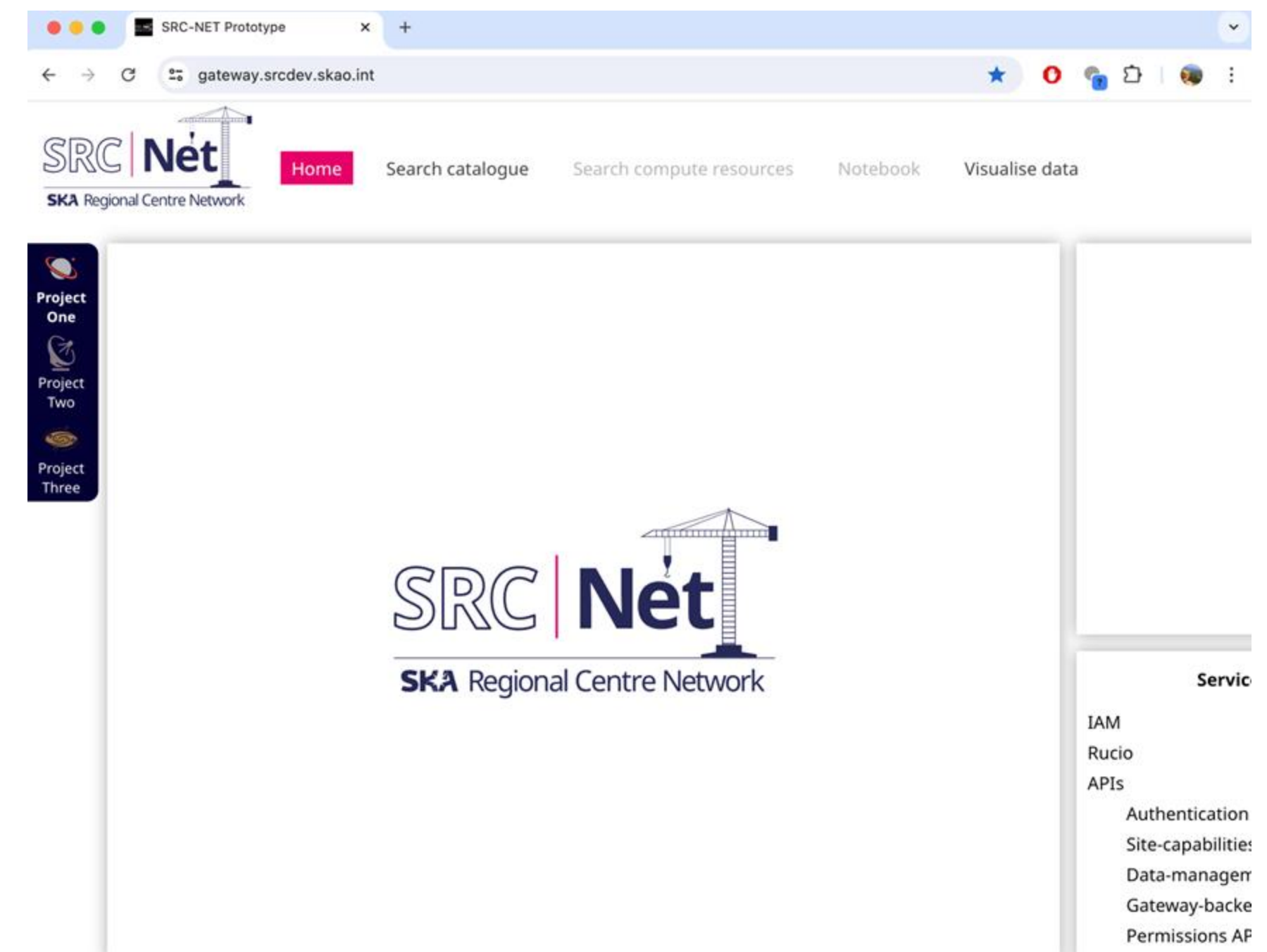
Intended user perspective

As a user, you'll be a member of one or more groups with an *SRCNet* allocation

- SKAO User (with successful SKAO proposal)
- Archival data user

You will log in via the Gateway

You will be able to select a current project, or discover data sets to add to a project

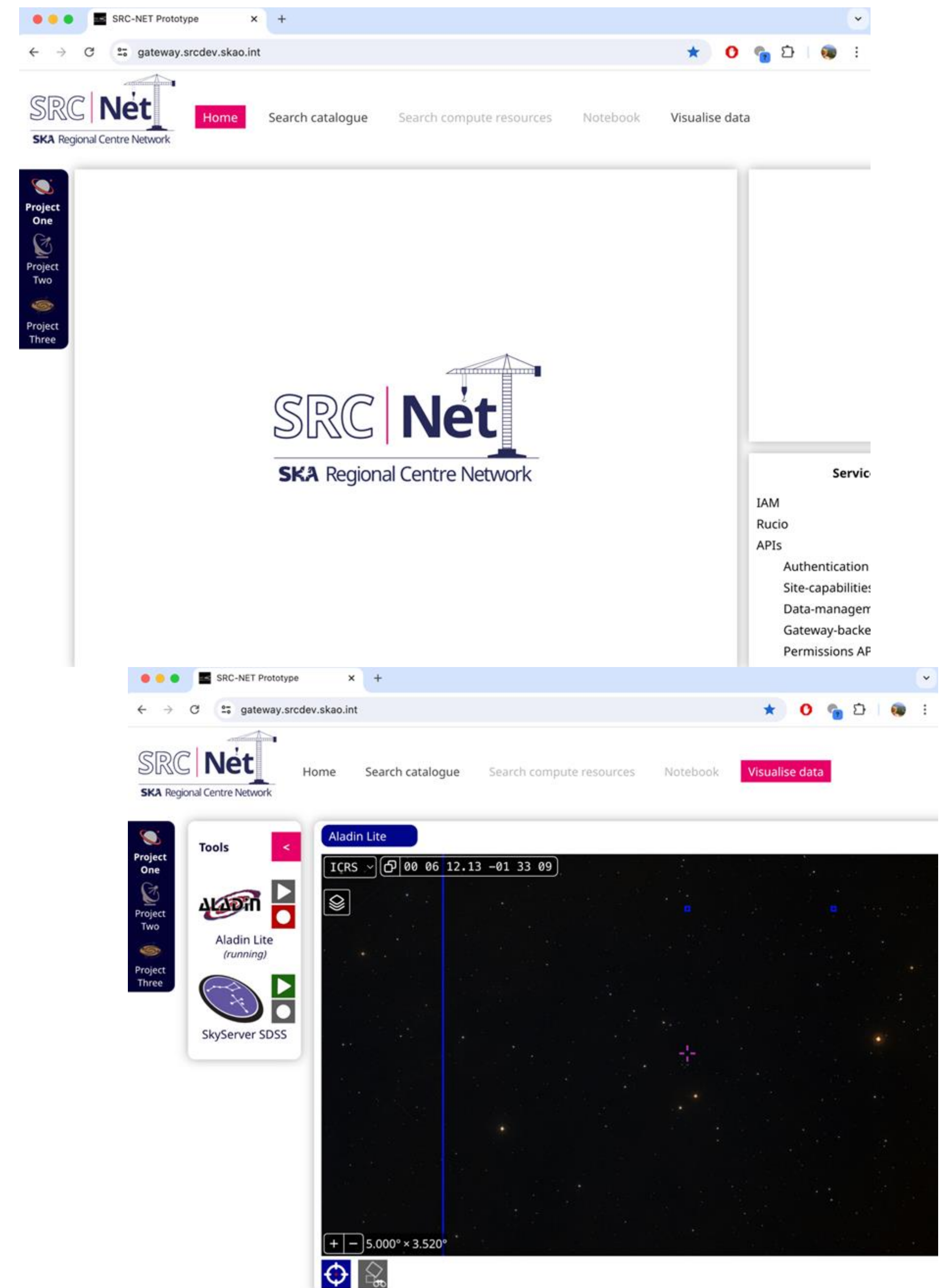


Intended user perspective

Within a particular project, with some allocated resources, you'll be able to identify services available to support your analysis of the data products you need

Then you'll be able to launch those services and run analyses

You'll be able to save intermediate results locally on the SRC your analysis is running on, and upload final data products ("ADPs") into the archive

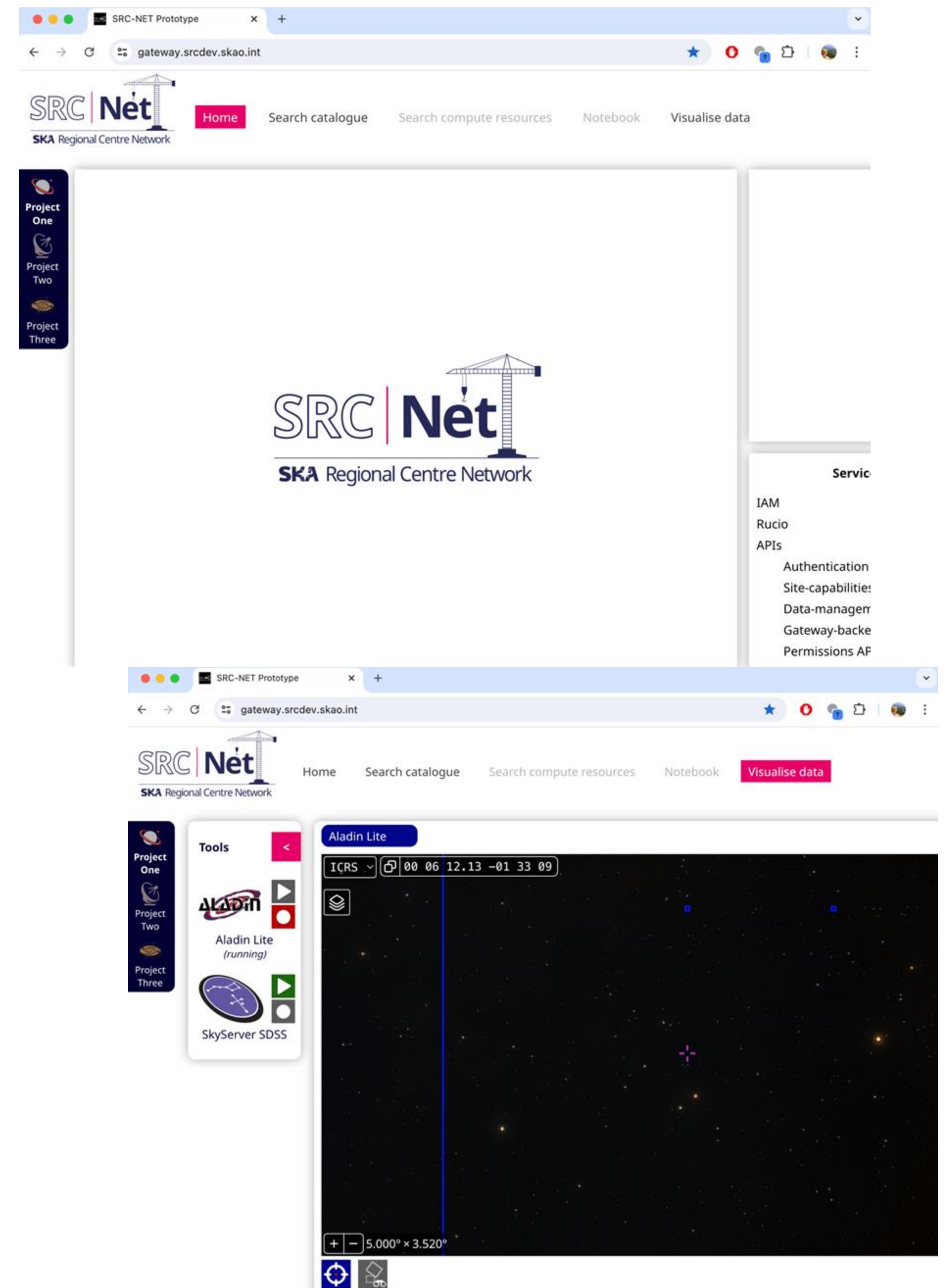


Intended user perspective

You will be provided with some template workflows to speed up your analysis work

Break away from the **(doomed)** "download and analyse locally" paradigm

Great opportunity to foster reproducibility in workflows - I would love to see user workflows published alongside data in papers by default. Being forced to write software to run on SRCNet will make this final step easier



Behind the scenes - all should be hidden from user

Several sites (around 10-20) spread globally

Data replication must be efficient, and minimised



"Move the user (or code) to the data" where possible

The bulk SRCNet science archive will be centrally managed

SRC Operations Group able to trigger replications

At least 2 copies on different SRCs, but also consider storage class (eg. disk faster but more expensive than tape) - data lifecycle support

Auto-recovery if one site fails

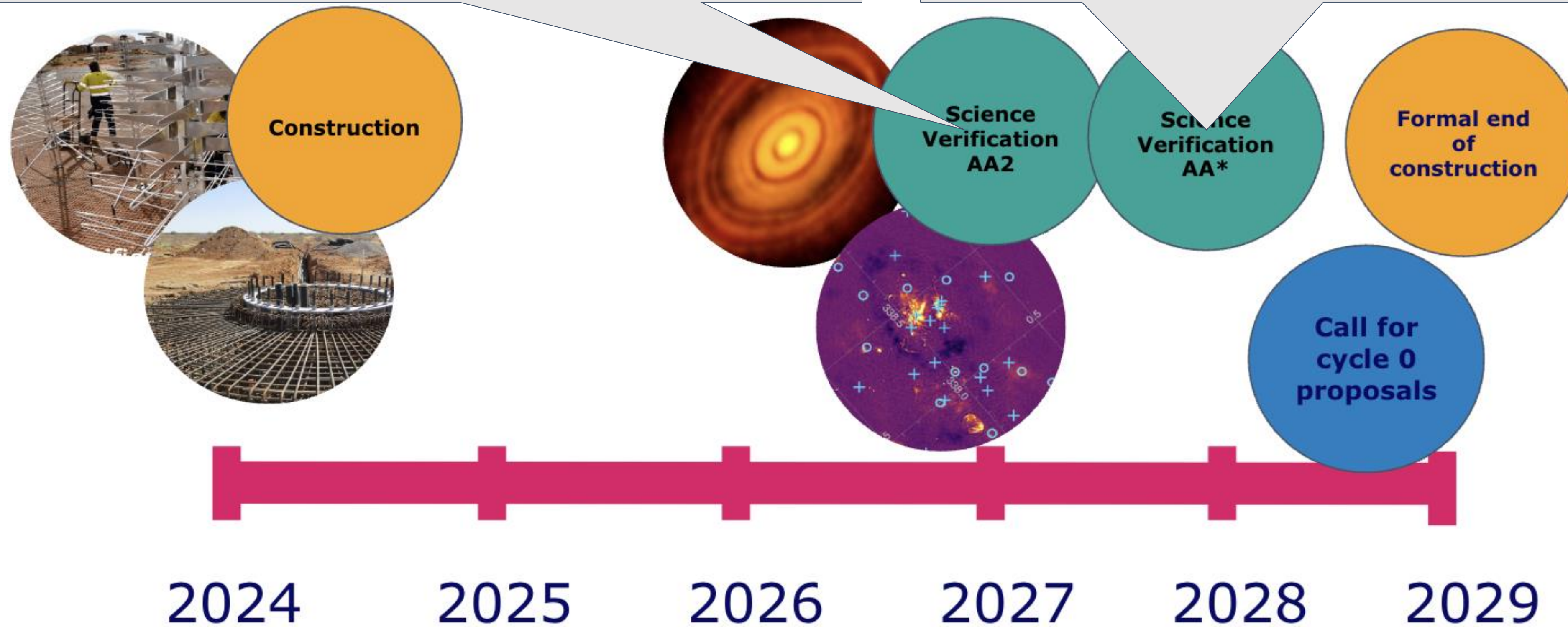
Users shouldn't have to care which site is hosting them - consistent experience across sites



SKAO Science timeline

2026-2027 SV campaigns produce up to 3.5 PBytes* of data each SV week

2027-2028 SV campaigns produce up to 14 PBytes* of data each SV week

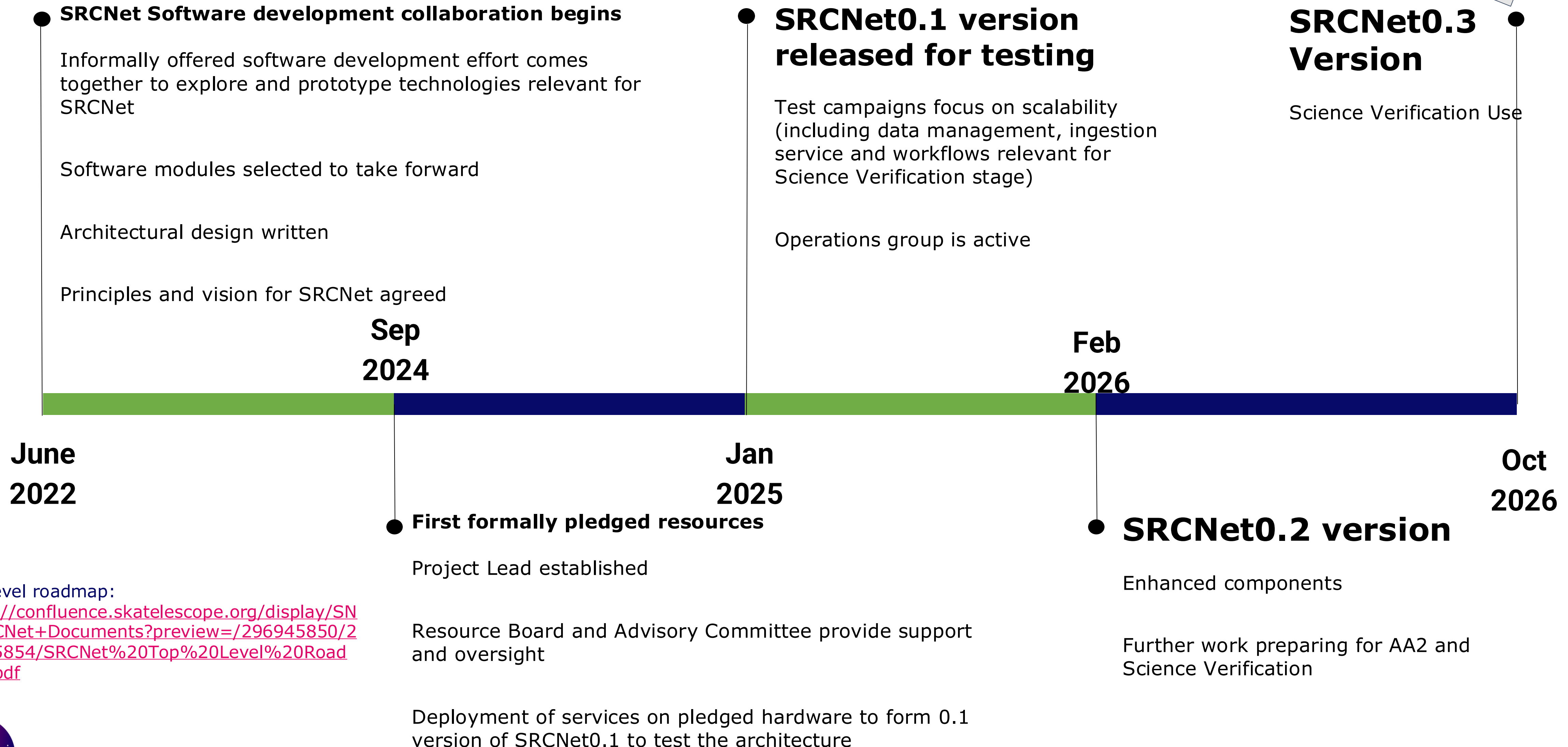


*CURRENT ESTIMATES, subject to change



SRCNet timeline

Real scientists start to use SRCNet



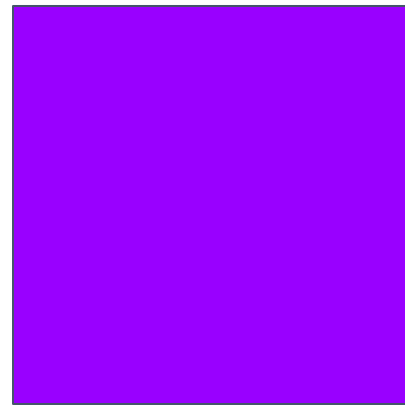
Top level roadmap:
<https://confluence.skatelescope.org/display/SNC/SRCNet+Documents?preview=/296945850/296945854/SRCNet%20Top%20Level%20Roadmap.pdf>



The current SRCNet teams



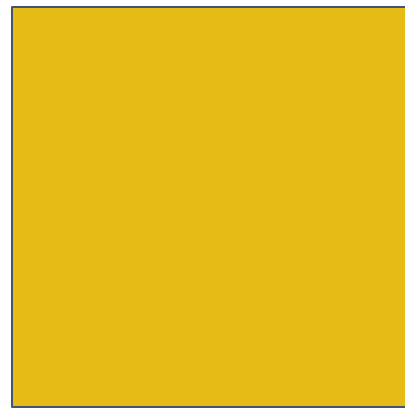
Coral



Purple



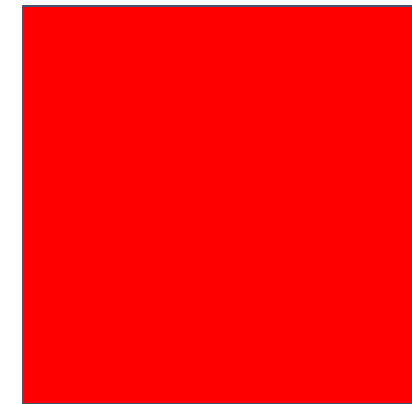
Lavender



Gold



Orange



Red



Magenta



Teal



Tangerine



Chocolate

DAAC

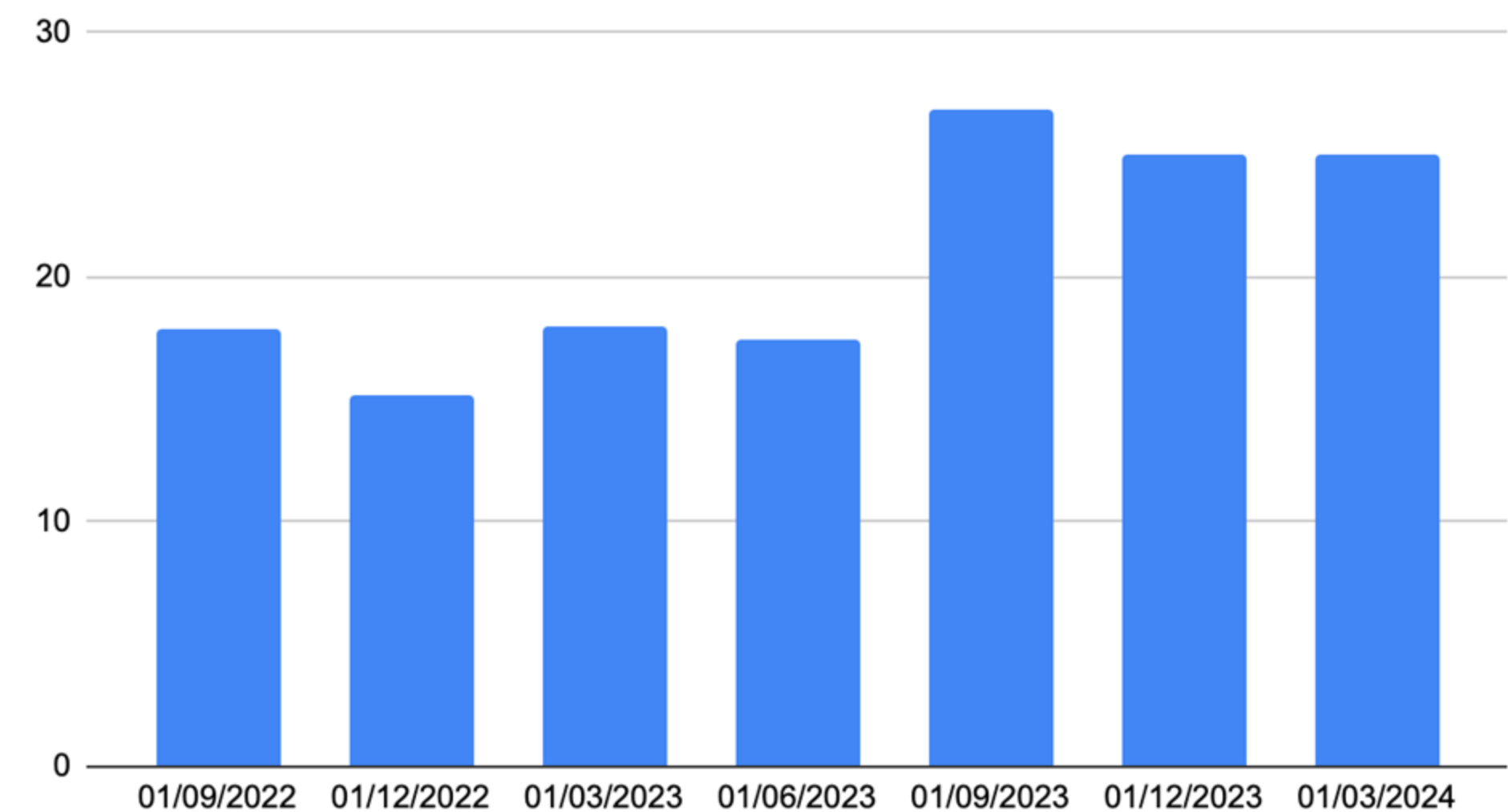
Indigo

Since June 2022 we have been working as a team-of-teams
Engagement from across most SKA countries

SAFe framework Agile Release Train,
same as for other SKAO SW
development

Currently 46 FTE, from 13 countries
plus SKAO, and 93 individuals

FTE in SRCNet SW development effort by date



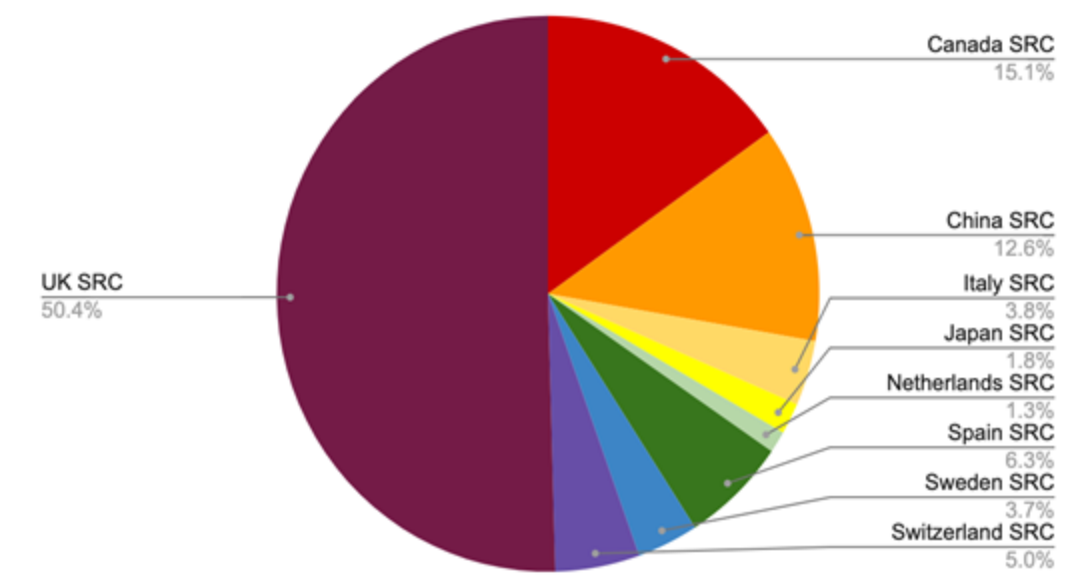
SRCNet0.1 planned sites

9 sites will contribute
total storage
of SRCNet0.1

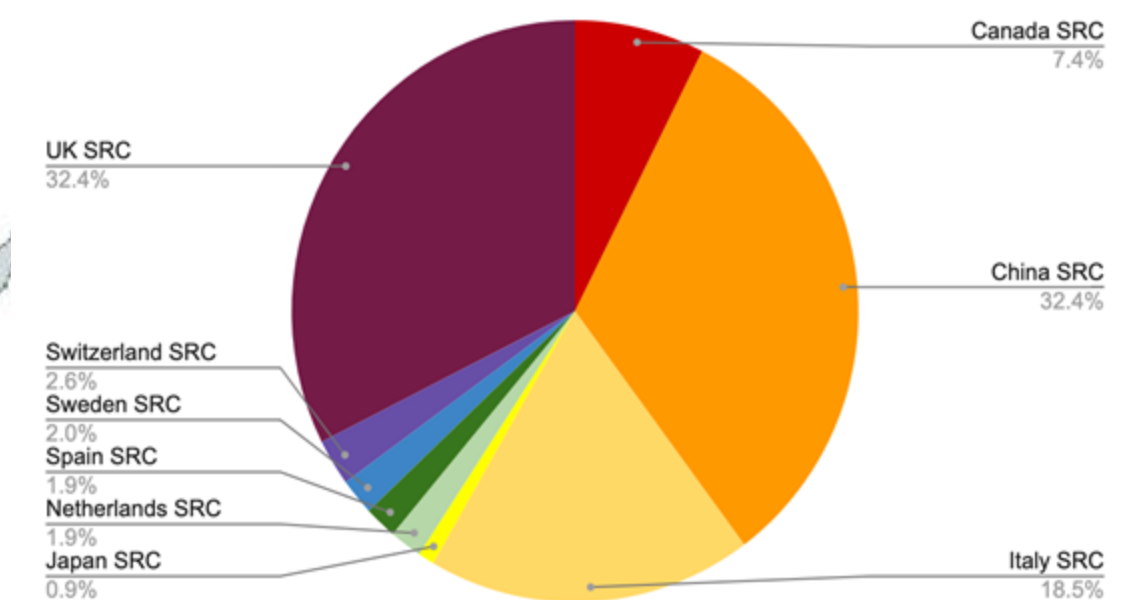
total

OPS Compute

Storage fraction for SRCNet0.1



Compute fraction for SRCNet0.1



- Canada UVic 1-4 PB
- China Shanghai Observatory 1 PB
- Italy, INAF IRA, 0.3PB disk, 1.2PB tape, 10 gbps
- Japan, Tokyo NAOJ, 0.14PB
- Netherlands, SURF, 0.1PB
- Spain, IAA Granada, 0.5PB
- Sweden, Gothenburg, 0.3PB
- Switzerland, CSCS Lugano, 0.4PB
- UK, STFC RAL, 4.0PB



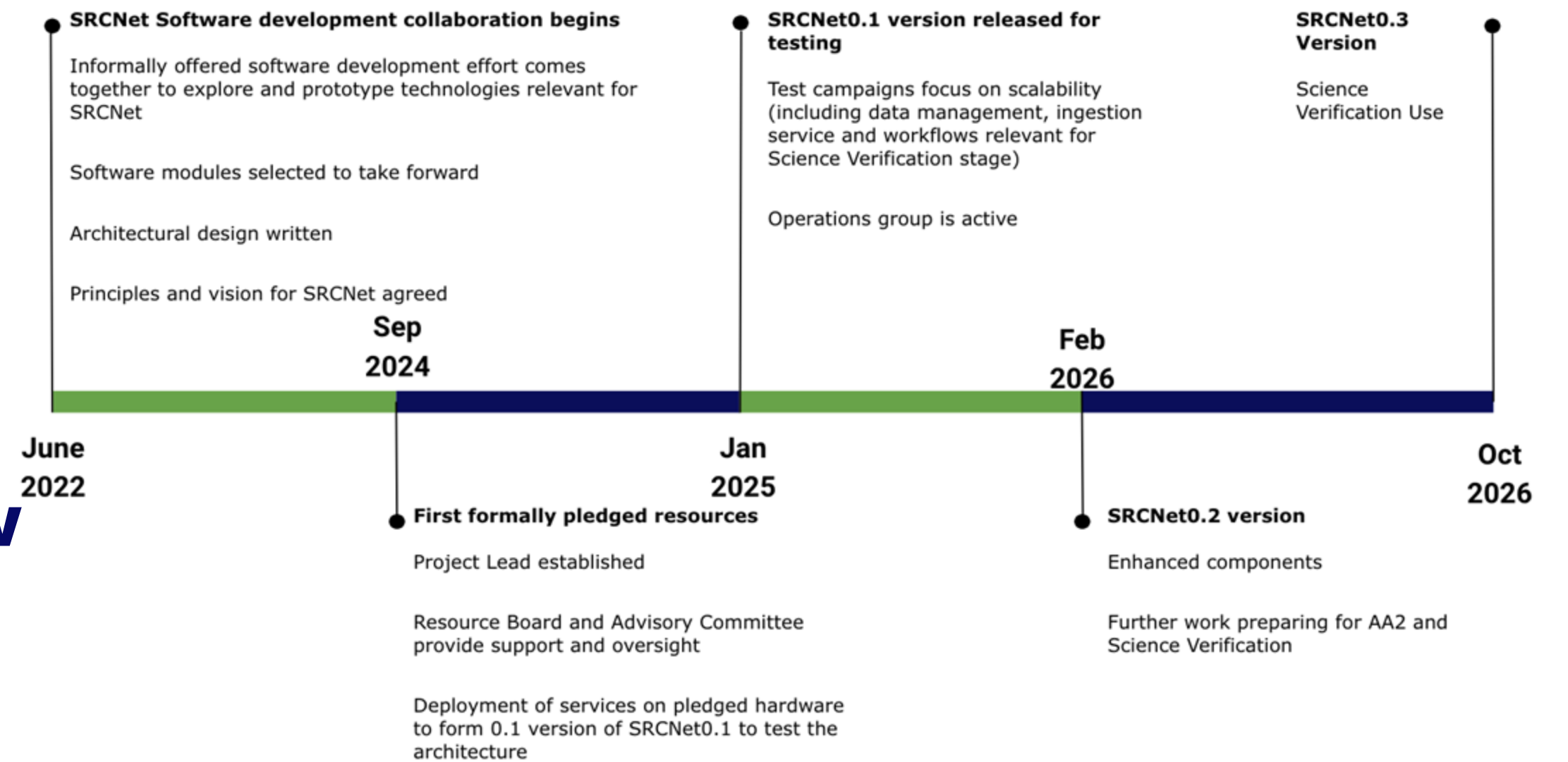
SRCNet0.1

At least 4 sites running full set of compulsory local services; global services also running to support this

First test of full SRCNet architecture

Due end of PI24; ie. 20th November 2024
(final work day of sprint 5)

Focus for activity now

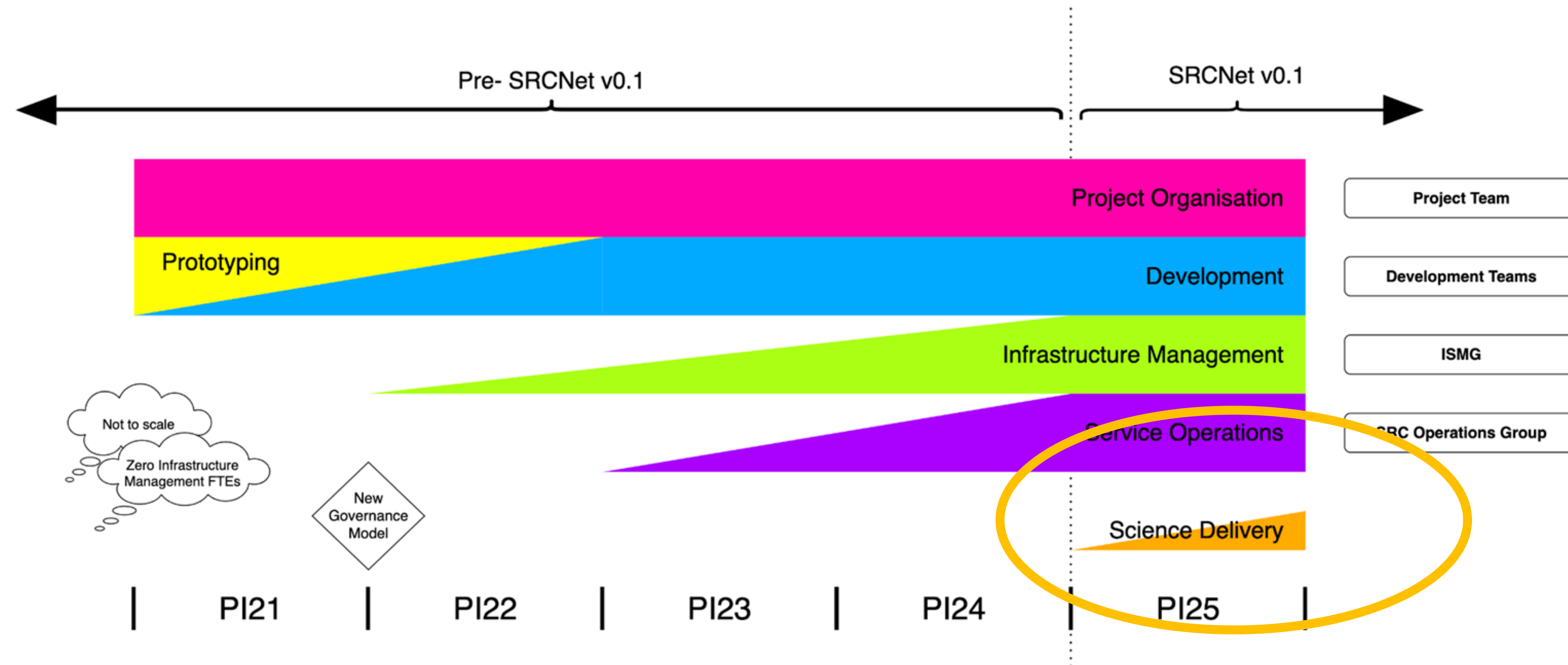


This is an "engineering" version

- **Built to show the architecture and test how it works**
- **Internal only** - no user-facing activities
- **Learn how to deploy and operate the services**
- Exclusive storage to use in testing
- Compute to use during testing campaigns (may be backfilled when idle)



Value Stream Development - Science Delivery



Seeking Project Scientists to represent different science areas: Science Use Cases, Requirements.



Project Scientist Roles

We have asked SRCNet resource board members to offer committed people at 0.5 FTE to take on SRCNet Project Scientist roles. Their mandate will be to represent the needs of the science community in the work needed within the Science Delivery and development value streams (and other areas if needed). They will work closely with the Science Delivery Business Owner (Shari Breen).

We anticipate covering the following SKA scientific areas with these roles initially:

- Extragalactic
- Galactic
- Spectral Line
- Epoch of Reionisation
- Pulsars
- Transients (including use of transient buffer data)
- Solar Astronomy



SRCNet Science Delivery

SRCNet Project Scientists will work alongside the SKAO Project Scientists and with the SKA Science Operations group.

Science operations schedule is very important for understanding early SRCNet priorities

(we will prioritise Science Verification and early science)

We will let you know the appointed people (anticipate having names by Friday 22nd, need to look at expertise, availability etc)



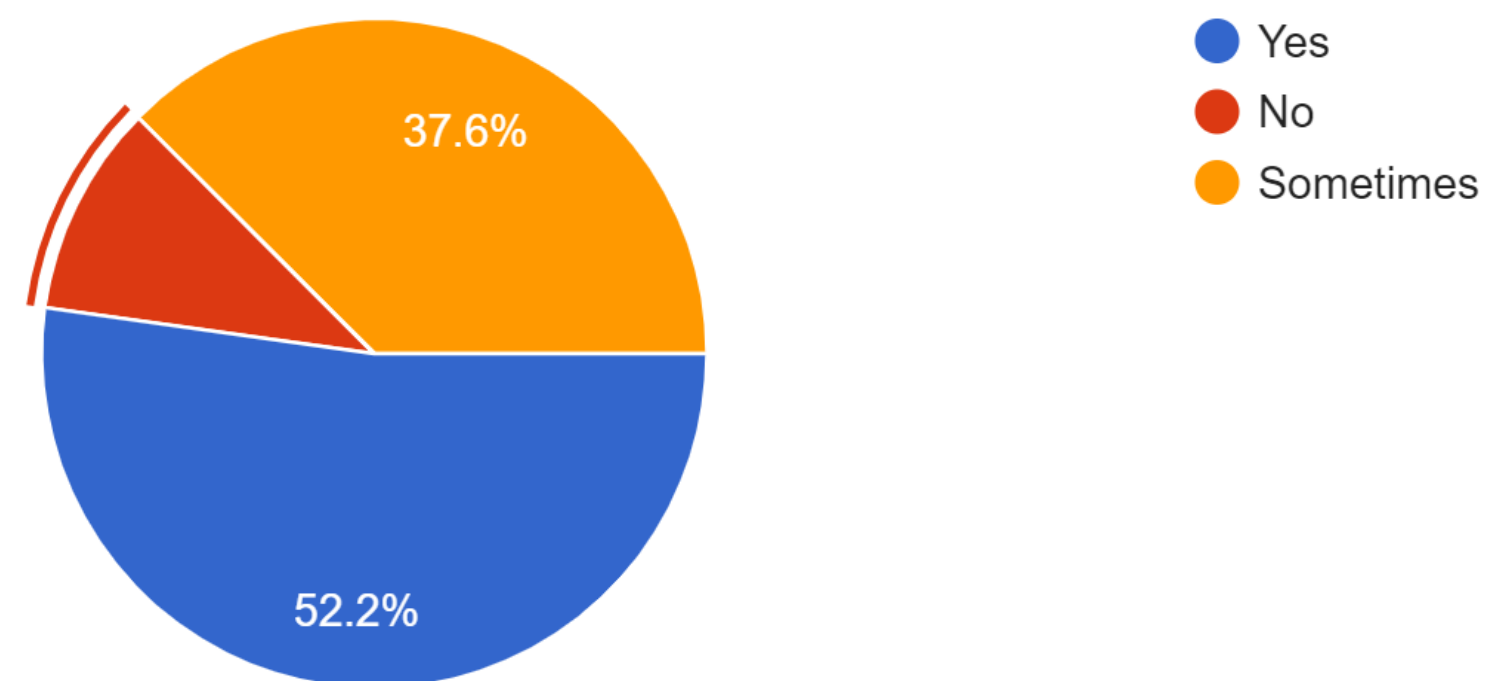
SKA SWG Survey

- Survey sent to swg-all in June 2024
- Aimed to gauge the current level of SKAO engagement with the science community
 - Is the current level of engagement working? (Section 1)
 - What other forms of engagement might we try? (Section 2)
- 205 responses (Thank you!)
- Feedback taken on board, now considering how to implement main recommendations

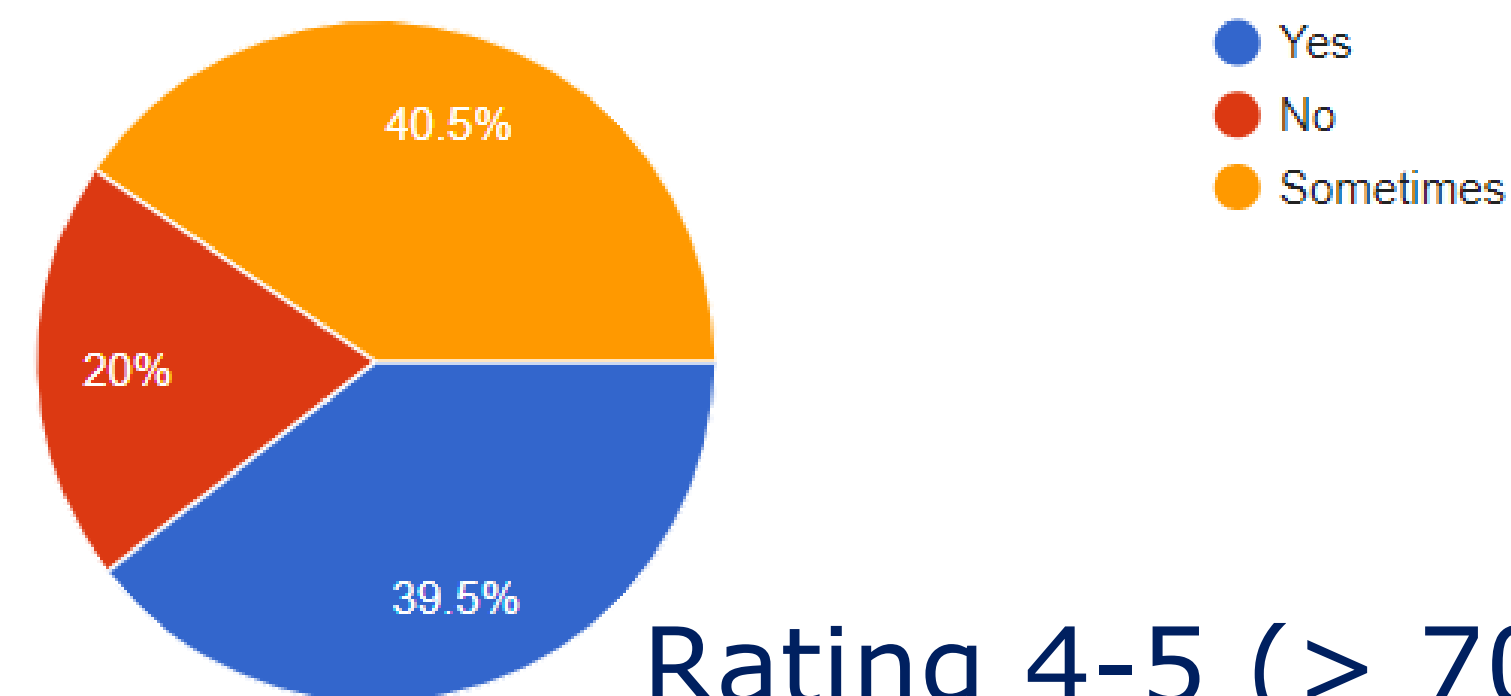


SKA SWG Survey

Do you usually open the monthly email?

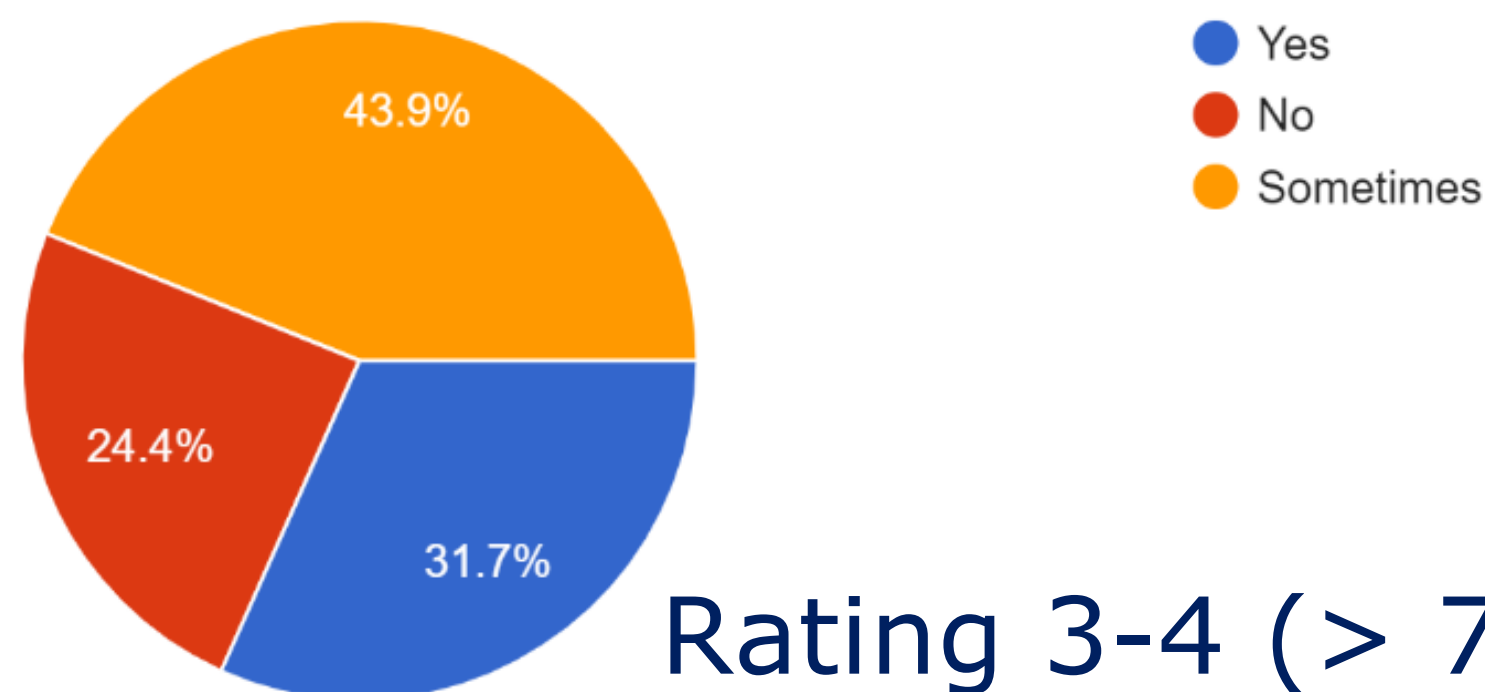


Do you usually view the slides?



Rating 4-5 (> 70%)

Do you usually read the minutes?



Rating 3-4 (> 70%)

Why not?

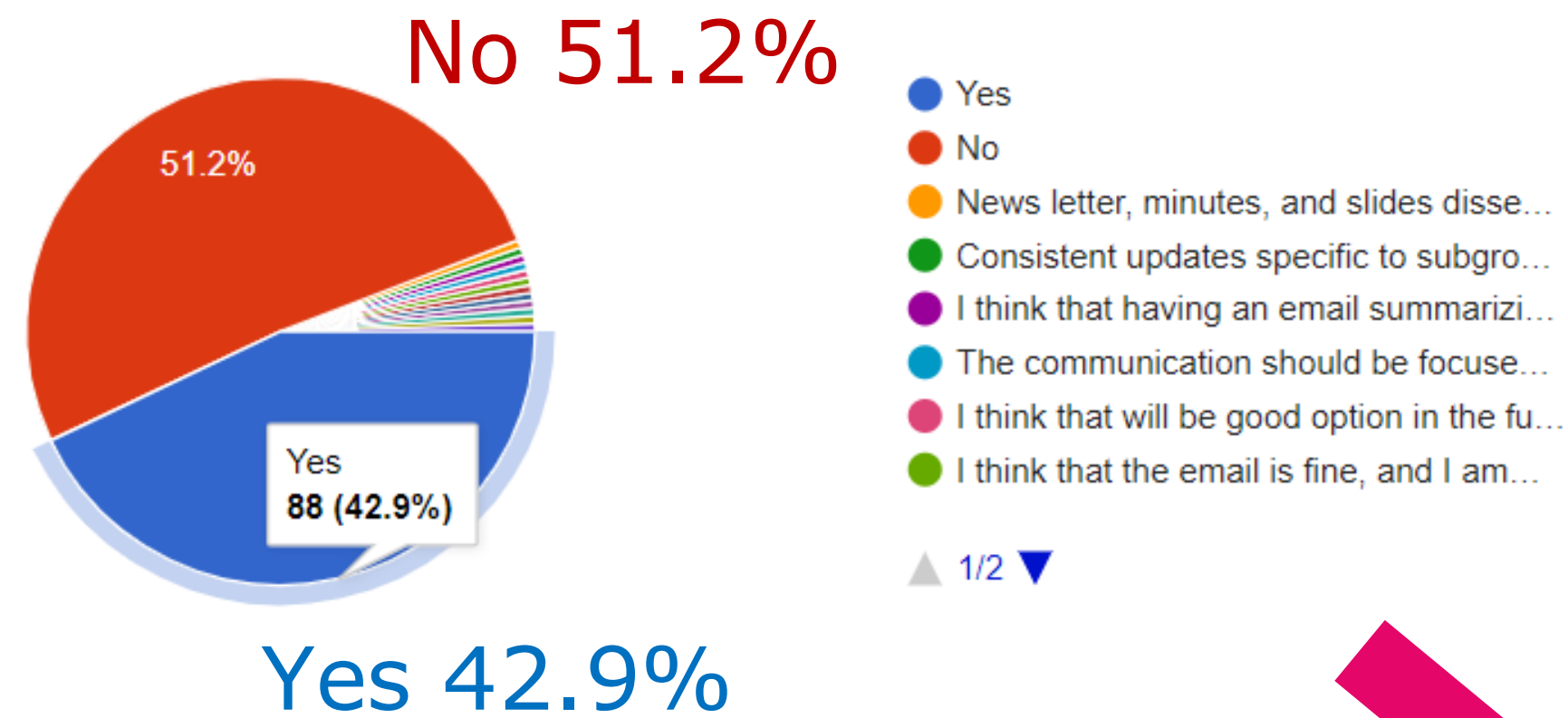
- lack of time ~75%
- not relevant ~28%
- not presented in accessible way ~15%

Main feedback: (1) provide more relevant information in body of the email, (2) include precursor/pathfinder science updates, (3) send out important news when available



SKA SWG Survey

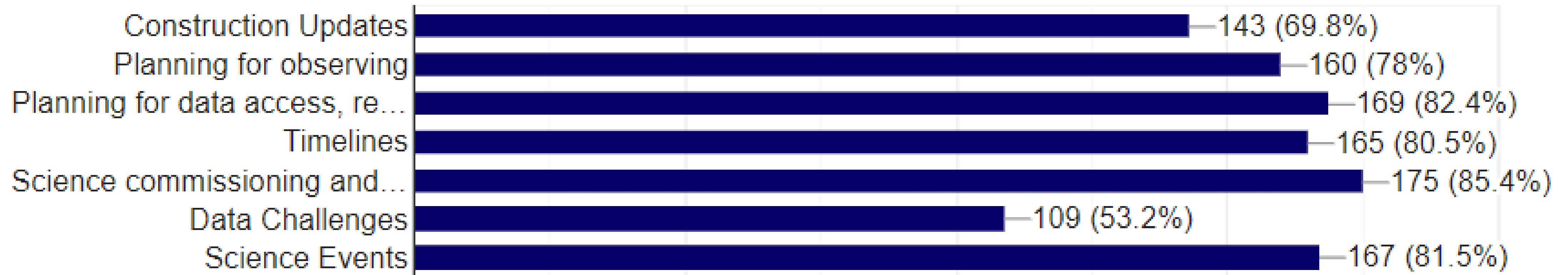
Would you prefer a more comprehensive newsletter?



Other suggestions for a newsletter:

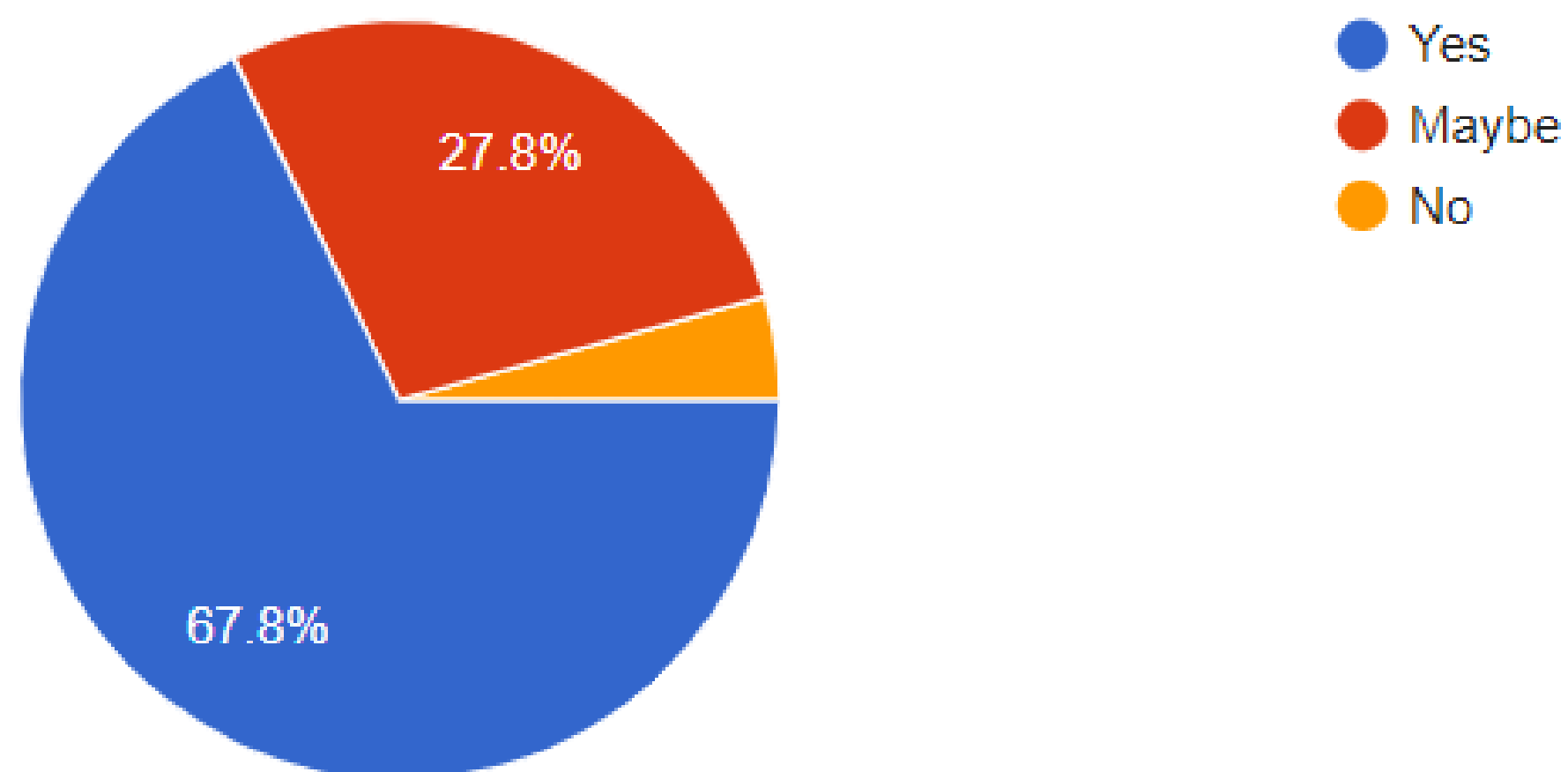
- Outreach events
- Training and support activities, workshops, collaborative information
- Science capabilities, less construction
- Plans on how to organise science teams
- Funding opportunities (consortium/individual)
- More clarity on design changes (e.g. SKA-Low)
- ESO-like

Which of the following topics would you like to hear about?



SKA SWG Survey

Would you be interested in a regular (twice/year) Webinar?



Please provide feedback on the Science Users webpages



Webinar Suggestions:

- Significant Q&A component
- Multiple times zones (repeat each webinar 2-3 times) and recorded
- Include updates from individual SWGs
- Science-led
- Science topics (KSPs, data,) not bulldozers
- Science capabilities
- Observing, data access, KSP planning, PI-led timelines

Webpages Feedback:

- Include info on data related topics (SDP, SRC, data access, pipelines, data products)
- Good! Tools are great!
- Precursor/pathfinder page?
- Summarise the technical information in one place (? Information sheets, landing page)



SKA SWG Survey

Feedback on SWGs:

- A few comments received on lack of information/engagement from and within the SWGs (we note that many SWGs are active and engaged)
- We (SKAO) rely on you, the SWG Chairs, to assist us with science engagement of the SKA community in your science areas
- Now is an opportunity for new chairs to set the tone for ongoing SWG engagement

From the Terms of Reference (link below), SWG Chairs are expected to:

- Organise and lead regular core member telecons (at least once every quarter)
- Facilitate the organisation of science-focused sub-groups
- Participate in the monthly SWG Chairs telecons, organised by SKAO
- Provide regular updates to their entire SWG, via the SWG mailing lists

Let's gooooooooo SKA!



2025 Science Meeting

- 2025 Science Meeting website now fully launched:
<https://www.skao.int/en/science-users/skao-science-meeting-2025>
- Key dates:
 - Abstract submission opened: 13 December 2024
 - Registration opened: 13 January 2025
 - Abstract submission closes: 7 February 2025
 - Speaker notification: 14 March 2025
 - In-person registration (reduced rate) closes: 31 March 2025
 - Virtual registration (reduced rate) closes: 31 March 2025
 - In-person registration closes: 1 June 2025
 - Virtual registration closes: 15 June 2025
- Call for abstracts:
 - Science Book EoI submitters invited to submit Science Meeting abstracts **focusing on AA* science**
 - General call also sent to all SWG members and wider science community via social media channels

Registration now open

A new era in astrophysics
Preparing for early science with the SKAO



16-20 June 2025 | Görlitz, Germany



skao.int/en/science-users/skao-science-meeting-2025

Updated SKA Science Book

- Thank you to all SWG chairs for the review and consolidation of the large number of Expressions of Interest in the book
- A total of 230 chapters planned for the book
- Submission of final drafts due September 2025 (advanced draft deadline now removed)
 - Latest and final version of the [Instructions for Authors](#)
 - [LaTeX template](#) (version has not changed)
- *A final collective review* will help us to ensure that there are no remaining gaps or duplications in topics to be presented
 - Propose a deadline of 31st January to complete this process – please see email for further details
- In the coming months we can begin to develop the overall structure of the book

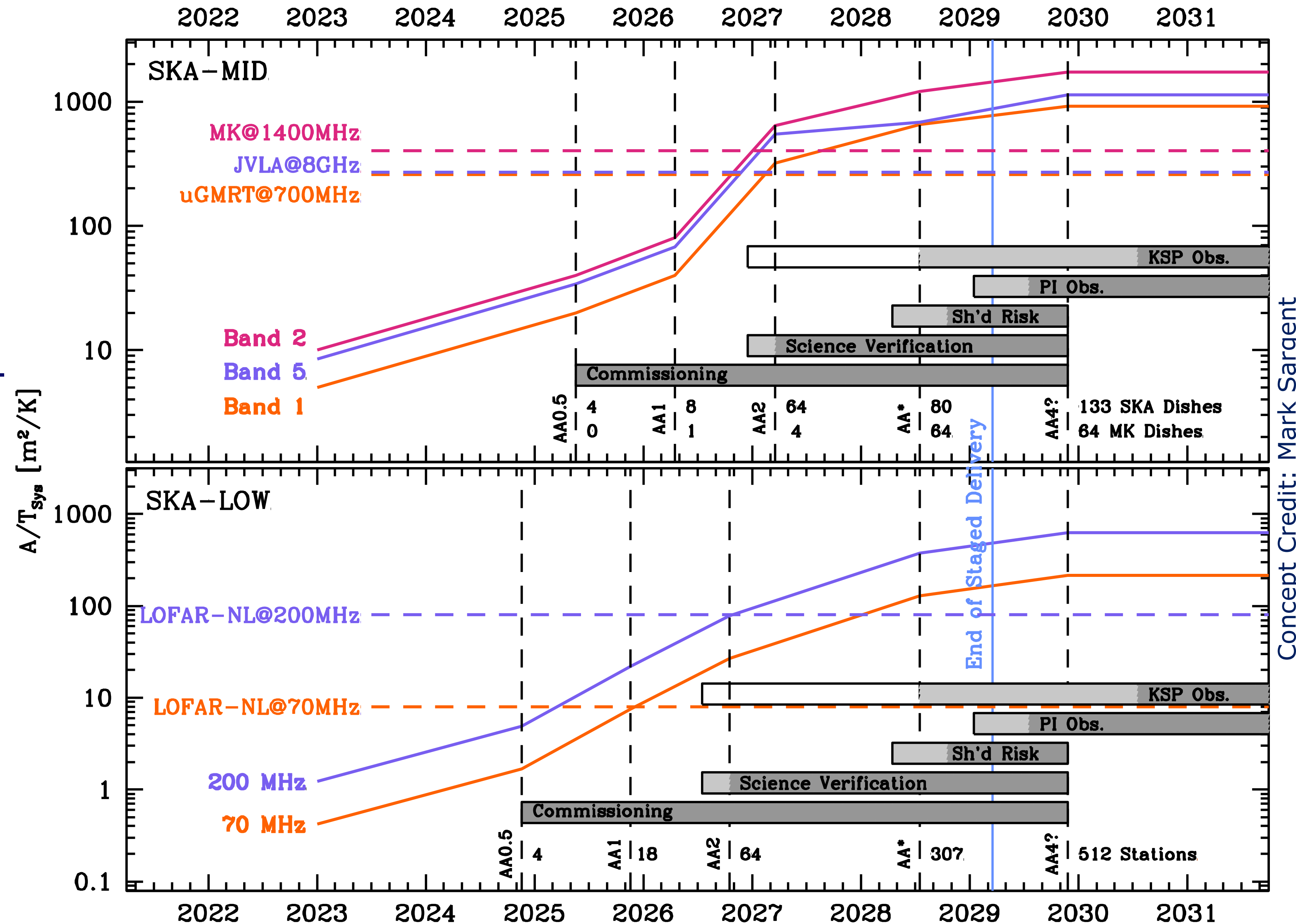




Reminders & Information

Commissioning Timeline

- AA0.5
 - Basic imaging and Tied-Array Beams
 - Off-line reduction
 - Limited BW/ N_{Chan}
- AA1
 - Plus multiple beams/sub-stations
- AA2
 - Plus pipeline reduction, more BW/ N_{Chan}
 - Science verification!
- AA*
 - Full BW, N_{Chan} , zooms
 - Shared Risk Cycle 0
 - PI (and KSP) Proposals!



Concept Credit: Mark Sargent



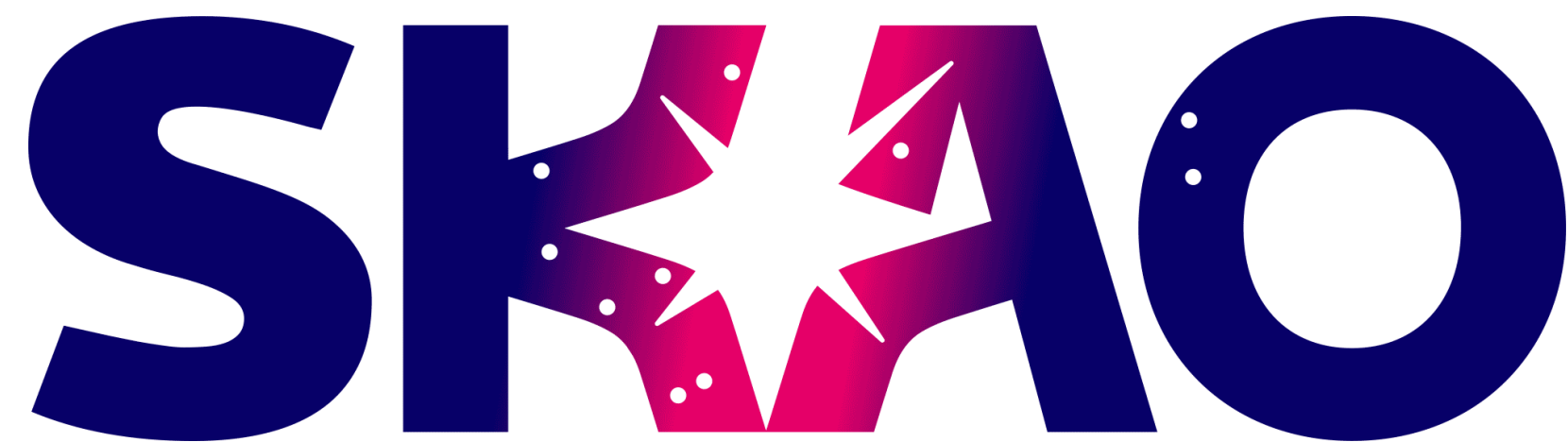
Outreach & Engagement

- **CONTACT** is the SKAO magazine aimed at the entire SKA community <https://www.skao.int/en/news-events/contact-skao-magazine>
- Ideas for articles for CONTACT are always welcome (email Tyler). These include:
 - Let's Talk About (Feature length ... science focussed)
 - Pathfinders & precursors. Short pieces on recent results
 - SKA-related events (e.g. SPARCS, etc)
 - any other news of SKA relevance (award/honours, job openings, ...)
- Encourage your SWG members to [sign up](#)



SKA Positions

- SKAO positions (HQ Manchester UK, Australia-Low, South Africa-Mid)
<https://recruitment.skao.int/vacancies.html>
- SARAQ employee SKA positions (Cape Town, Carnarvon)
<https://www.sarao.ac.za/vacancies/>
- CSIRO employee SKA positions (Perth, Geraldton)
<https://www.csiro.au/en/careers/career-opportunities/skao>

The SKAO logo features the letters 'SKAO' in a bold, dark blue font. The 'K' and 'A' are stylized with a red-to-white gradient and contain white starburst patterns.The logo for SARAQ (South African Radio Astronomy Observatory). It features the word 'SARAQ' in a large, grey, sans-serif font. Below it, 'South African Radio Astronomy Observatory' is written in a smaller, black, sans-serif font.

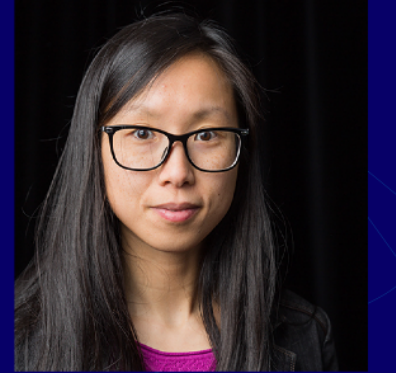
SKAO Speaker Series

- SKAO Speaker Series

- series of interesting talks, accessible to all within the broader SKA community, covering a wide range of topics, from astronomy to physics, engineering, big data and computing, EDI, and more.
- Encourage your SWG members to sign up to give a talk (and consider giving a talk yourself).
- Talks recorded – all available for reviewing via the [Speaker Series](#) page (2020+)

SKAO SKAO Speaker Series

My personal journey as a female astronomer of colour



Cherry Ng

Permanent Astronomer
Centre National de la Recherche Scientifique (CNRS)
Laboratoire de Physique et Chimie de l'Environnement et de l'Espace (LPC2E)
Orléans, France

This talk is a collection of reflections on my career: from X-ray binaries to exoplanets, from pulsars to Fast Radio Bursts and SETI; on the challenges of motherhood and how it shapes my personality, and on the search for my cultural identity moving through six countries.

Wednesday 13 March 2024

10.00am UTC

[Click to access the Speaker Series talk here](#)

SKAO SKAO Speaker Series

Establishing an Evolutionary Picture of Fast Radio Bursts



Di Li

Chief Scientist - FAST

With FAST, the largest single-dish telescope ever built, we have designed the Commensal Radio Astronomy FAST Survey (CRAFTS), which realizes, for the first time at any major facility, simultaneous data recording of pulsar search, HI imaging, HI galaxies, and transients (FRB and SETI). CRAFTS has discovered ~200 pulsars, ~10 FRBs including the only persistently active repeater FRB 20190520B, and ~5000 d² HI images with 1% calibration consistency, 5-10 times better than what is available from Arecibo.

Based on CRAFTS, we derived a FRB event rate ~ 120K per day per 4pi. We find universal frequency-dependent depolarization among repeating FRBs, which can be well fitted by multi-path scattering and a single free parameter sigma_RM that described the complexity of the magnetized environments of FRBs. We have published in 2021 the first complete energy distribution toward any FRB, which is clearly bimodal between 10³⁷ and 10⁴⁰ erg. Such bimodality was borne out in the subsequent monitoring of active repeaters. Recently, 10% drop of FRB 121102's DM on a decade time scale, is being robustly detected. I am proposing an evolutionary picture of FRBs, which aims to unify not only repeating FRBs, but most if not all non-repeaters.

Tuesday 23 April 2024

11.00am UTC (12noon BST)

[Click to access the Speaker Series talk here](#)



Any Other Business

- News from SWG Chairs?

We recognise and acknowledge the Indigenous peoples and cultures that have traditionally lived on the lands on which our facilities are located.



www.skao.int

www.skao.int/en/science-users