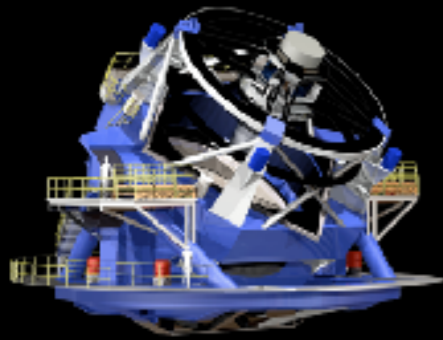


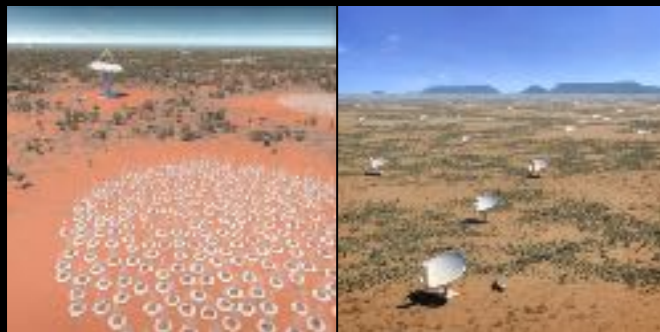
Data rates and volumes



ALMA Science Data Products ~ 1 PB/year



LSST Science Data Products 4-5 PB/year



SKA

SKA1-LOW excluding EoR: 3 Gb/s
EoR only: 22 Gb/s
SKA1-MID: 9 Gb/s
TOTAL: 34 Gb/s = 370 TB/day = 130 PB/yr
FULL DISCOVERY ARCHIVE : ~ 700 PB/yr

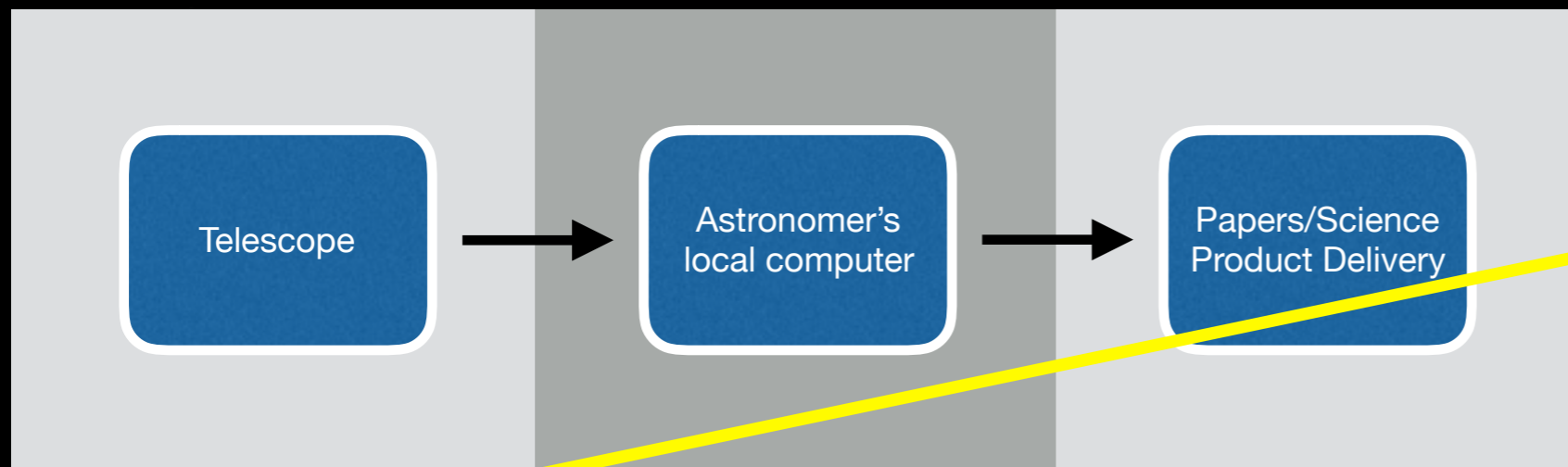


LHC

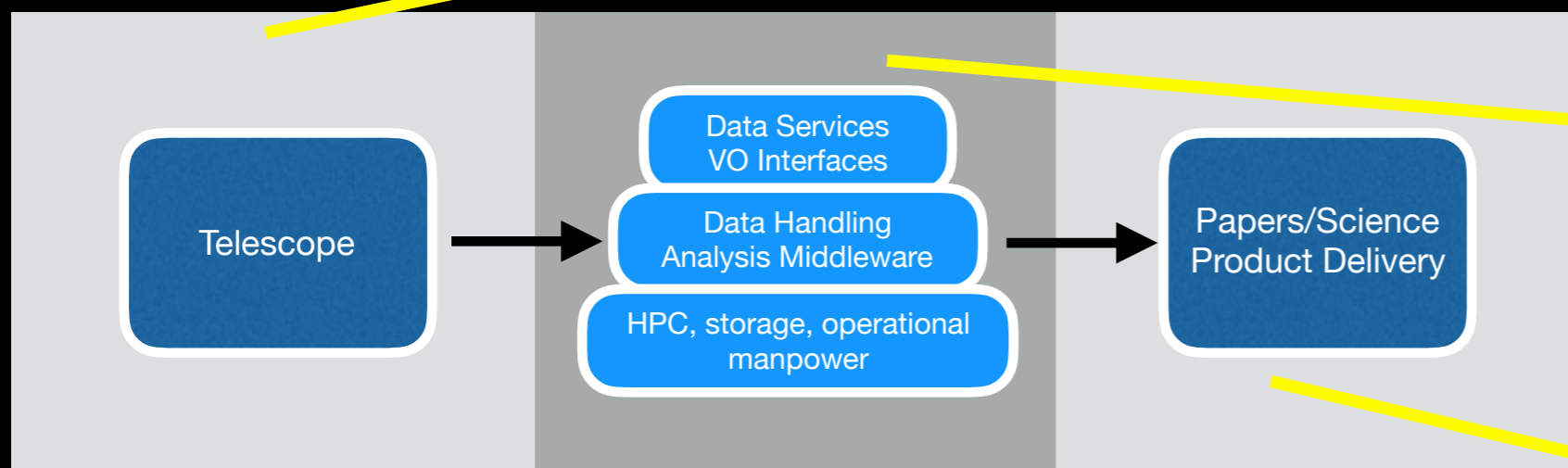
High Luminosity LHC 2023
Science Data Products ~ 400 PB/year

A change in approach...

Traditional



Future



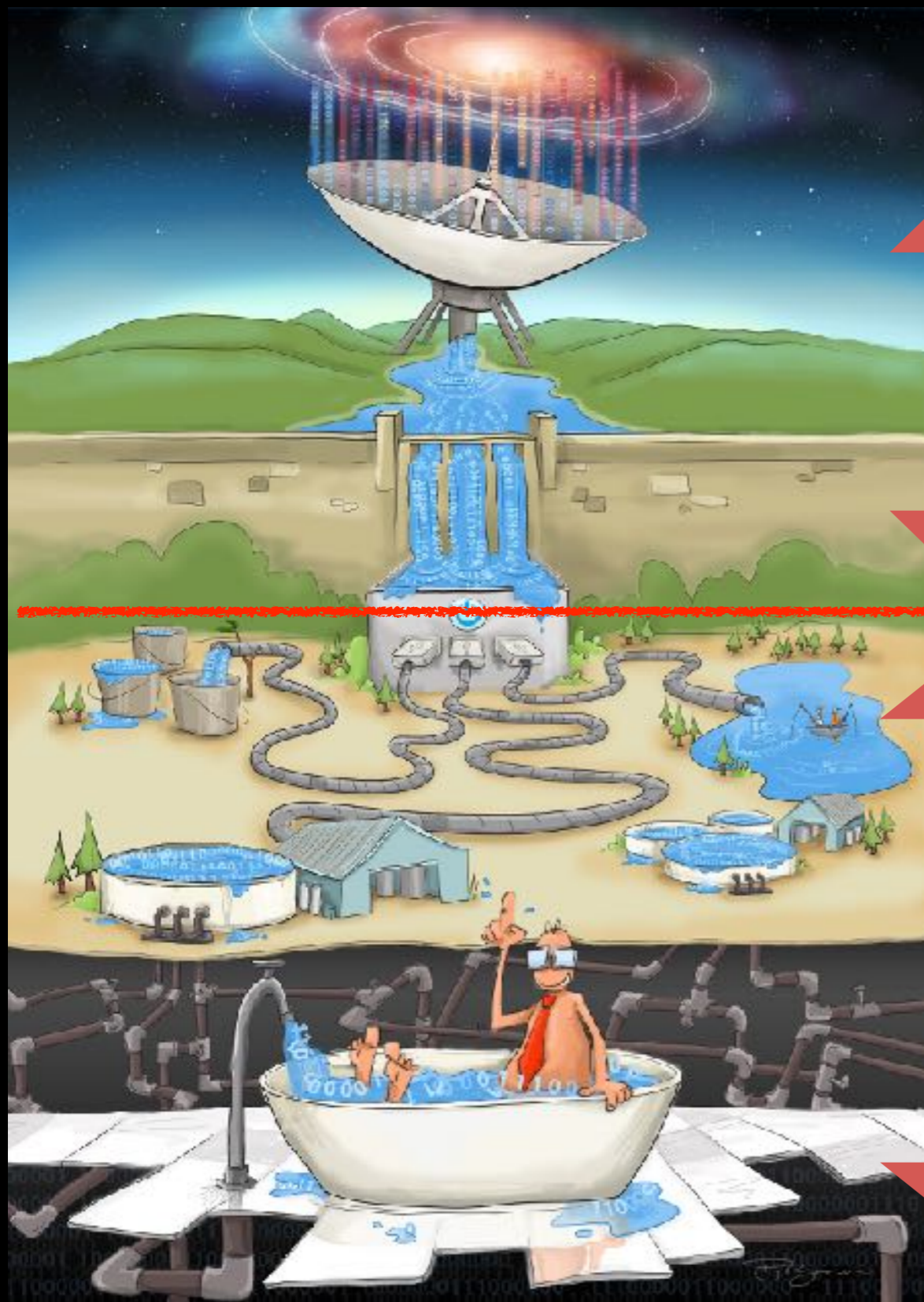
Observatory

Data Handling

Science Output



The Challenge



SKA 1 Constructed Observatory

- ★ Capacity: 100 PFlop
- ★ Output: 100-200 PB/year Sci Products

SKA 1 Community Regional Centre Alliance

- ★ Aggregate Capacity: 100 PFlop
- ★ Aggregate Input 100-200 PB/year Sci Products
- ★ Long term Science Archive: 1 Exabyte @ 5 years
- ★ User community survey science support
- ★ Data mining and discovery
- ★ Innovation as scale grows

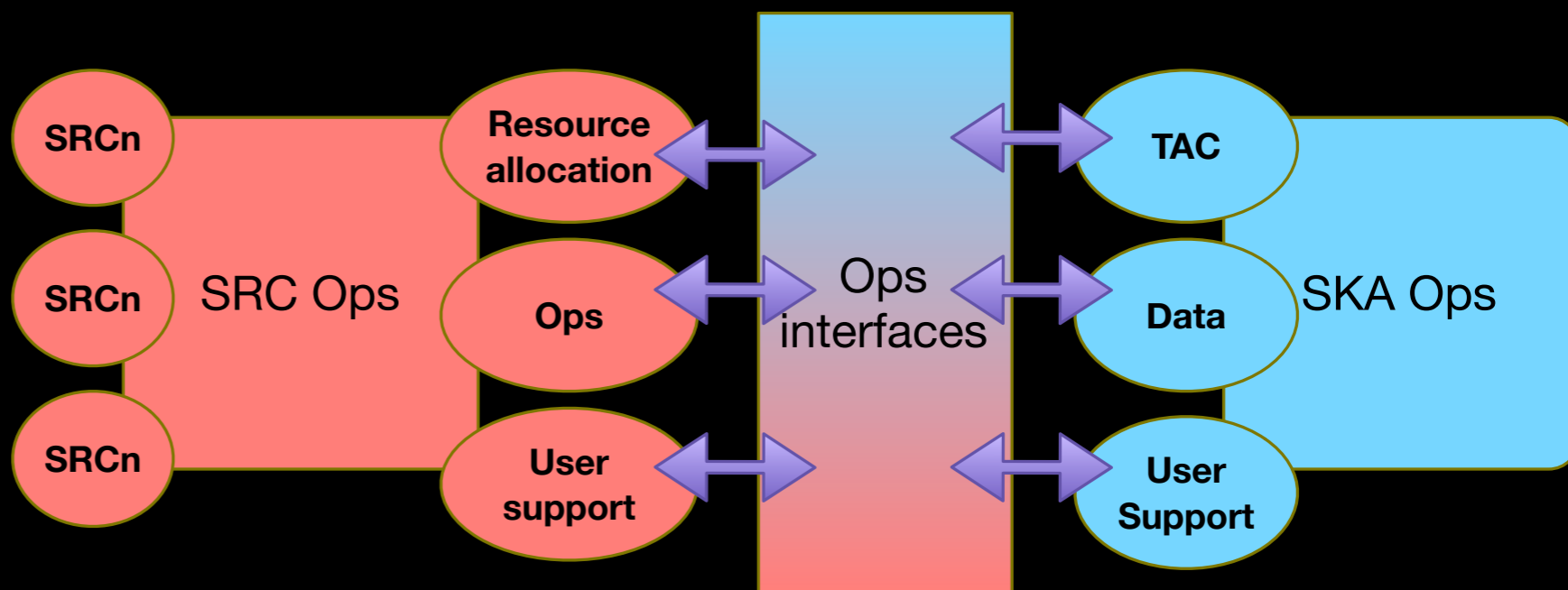
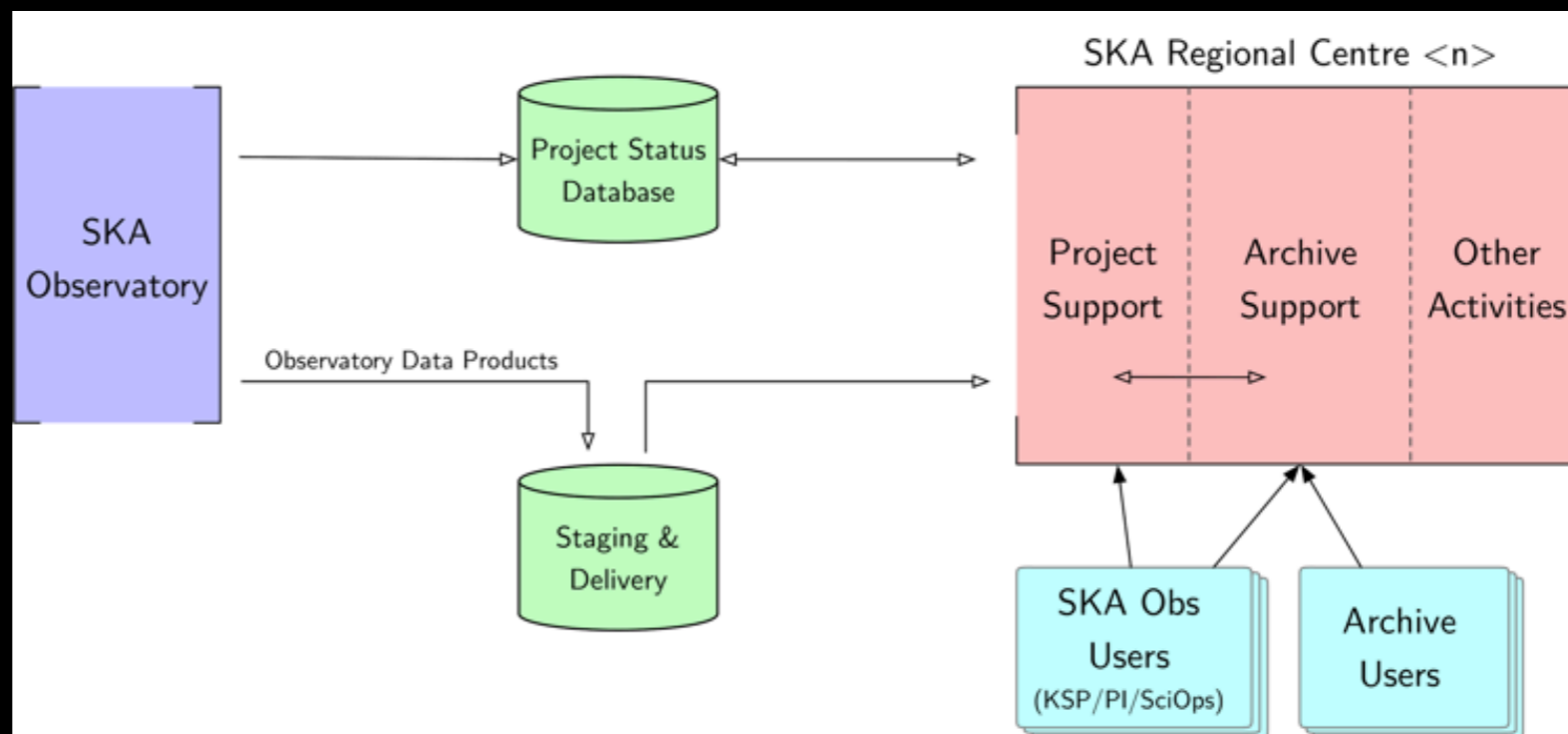
Construction \$\$

Community \$\$



SRC network

- ★ 2016-now: International collaboration through the SKA Regional Centre Coordination Group (SRCCG)
- ★ 2016+: National coordination through the Australia and New Zealand SKA Coordination Committee (ANZSCC)
- ★ 2018+: ANZSCC forms AusSRC Management Committee
- ★ 2019+ : new SKAO/ SRCs partnership





SRC Projects

AENEAS (EU) : 2017-19 : 3 million Euro

ERIDANUS (Aus/China) + AusSRC (Aus) : 2017-20 : \$4 million

IDIA (RSA) : Inter-University Institute for Data Intensive Astronomy : 2017 - 2022 : \$10 million

CIRADA (Canada) : Canadian Initiative for Radio Astronomy Data Analysis: 2018-2023 : \$10 million

SHAO (China) : **ERIDANUS** : 2017 + : \$2 million

NCRA (India) : 2019 - 2020 : 7 million Euro

Total : ~ \$45 Million AUD 2017 -2023

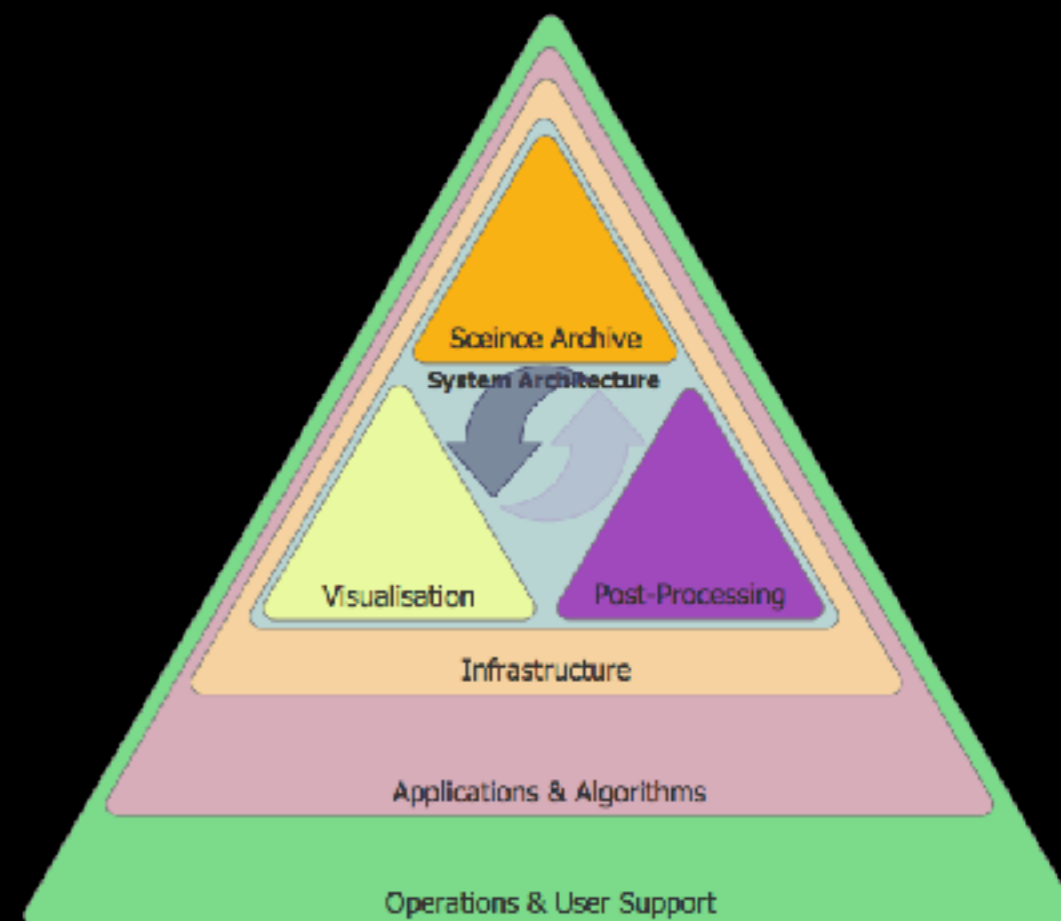
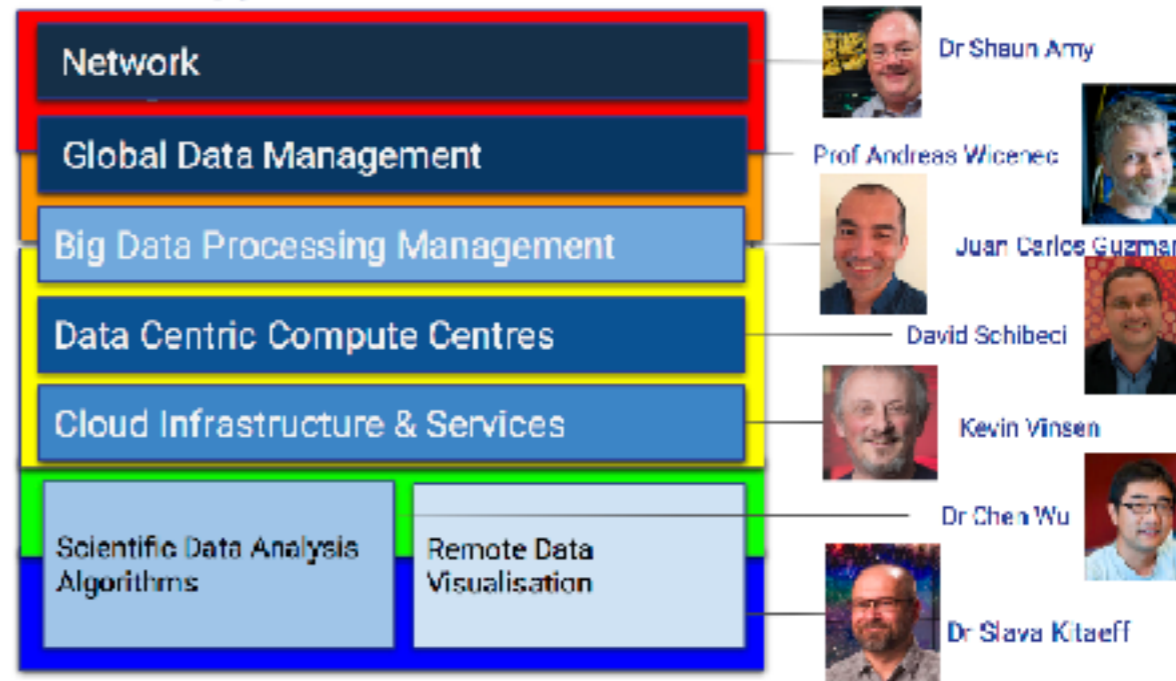




AusSRC

- Perform an analysis of community generated requirements and define an initial technical architecture
- Refine the architecture through a series of prototype implementations focused on the needs of science teams involved with ASKAP and MWA, connecting to new systems emerging at the Pawsey Centre
- Refine the architecture further with end-to-end tests of regional SRC capabilities with China and respond to global data challenges to the architecture coming from the SRCCG
- Assess Australian and international SKA1-LOW science team requirements for an AusSRC post 2022
- Define a production design, implementation plan, cost and business case for an at-SKA-scale AusSRC - business case submission in 2020

Technology Stack



Project Plan approval and start Nov 2019



SRC size and cost estimates

- SRCCG sizing study going to SKA Board Nov 2018
- Includes additional post processing and advanced data product generation by KSP teams - HW/power only
- Excludes archive development and maintenance, archival research projects and archive operations
- Excludes manpower for SRC operations and user services

From SRCCG estimate: total/year over first 5 years: ~12-18 MEuro
Including manpower and archive (PQ estimate) ~ 30 - 40 MEuro

AusSRC share (20%) ~ \$10M AUD - \$13M AUD / year



Collaboration

- ★ Any proposal to the Commonwealth for an AusSRC investment at SKA-scale MUST be supportive of and connect to other Australian data intensive astronomy developments and the national investment in research infrastructures
 - ★ multi-wavelength and multi-messenger astronomy
 - ★ other physical sciences (e.g. HEP)
- ★ An AusSRC will be a distributed resource and investment - investing as much in people as things
- ★ An AusSRC will be strongly internationally linked (particularly within the Asian-Pacific region)
- ★ A midterm white paper from the NCA must capture this necessary collaboration and wholistic view of Australian data intensive astronomy in the coming decade