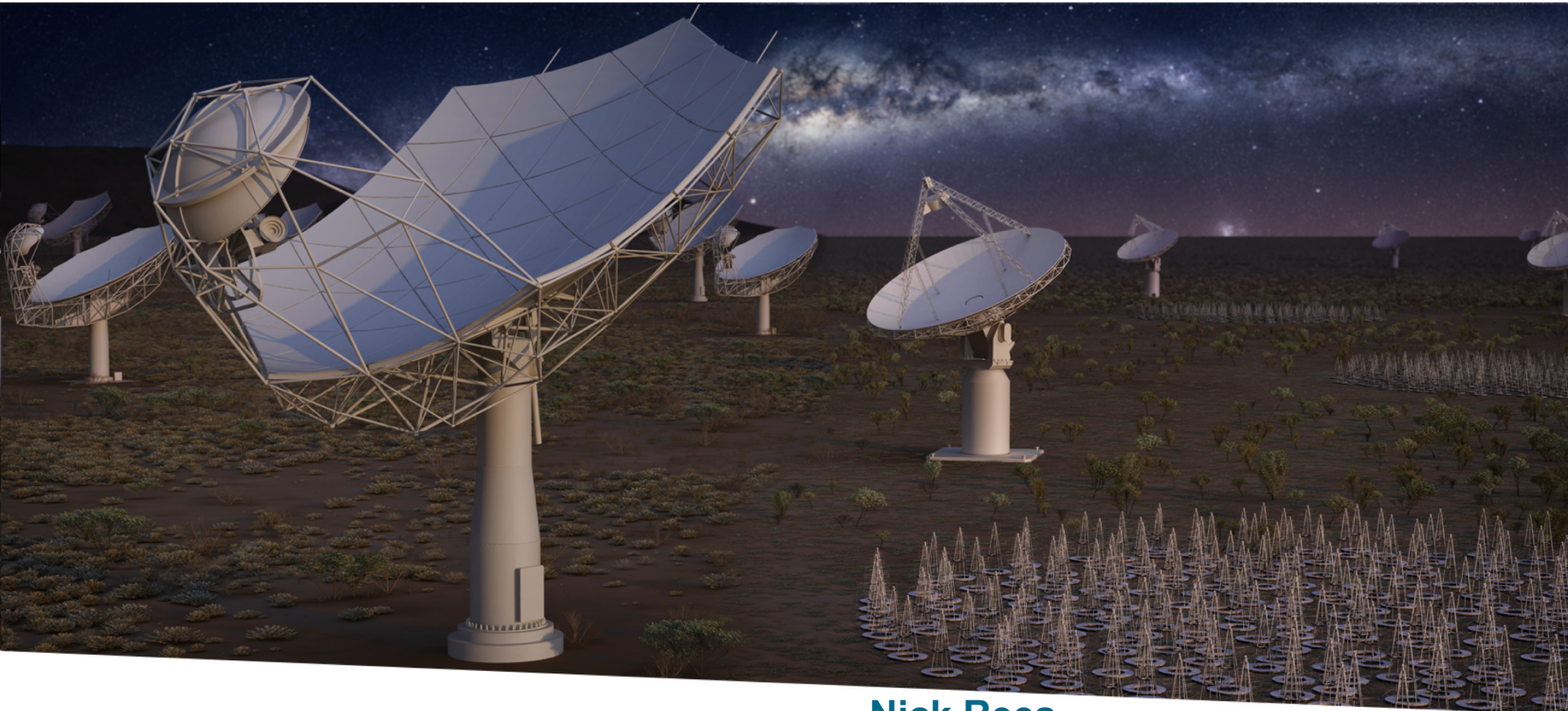


SKA Project Management

Planning for the SKA, contractual and politic aspects.



SQUARE KILOMETRE ARRAY

Exploring the Universe with the world's largest radio telescope

Nick Rees

Head of Computing and Software

5th April 2018

Square Kilometre Array

3 sites; 2 telescopes + HQ
1 Observatory

Design Phase: > €170M; 600 scientists+engineers

Phase 1

Construction: 2018 – 2024

Construction cost cap: €674.1M (inflation-adjusted)

Operations cost: €80-100M/yr

Phase 2:

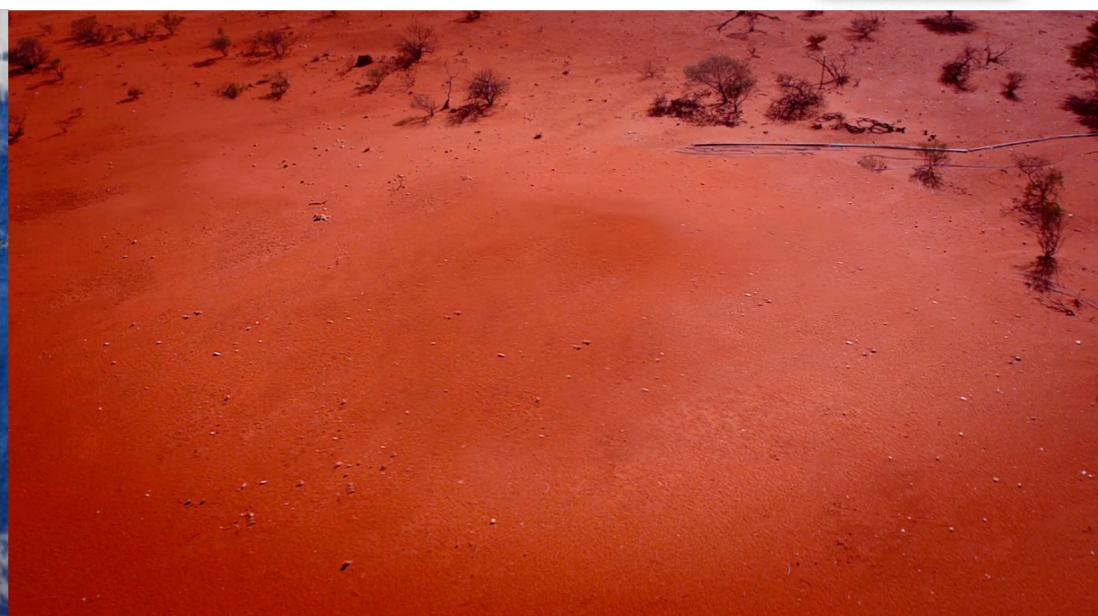
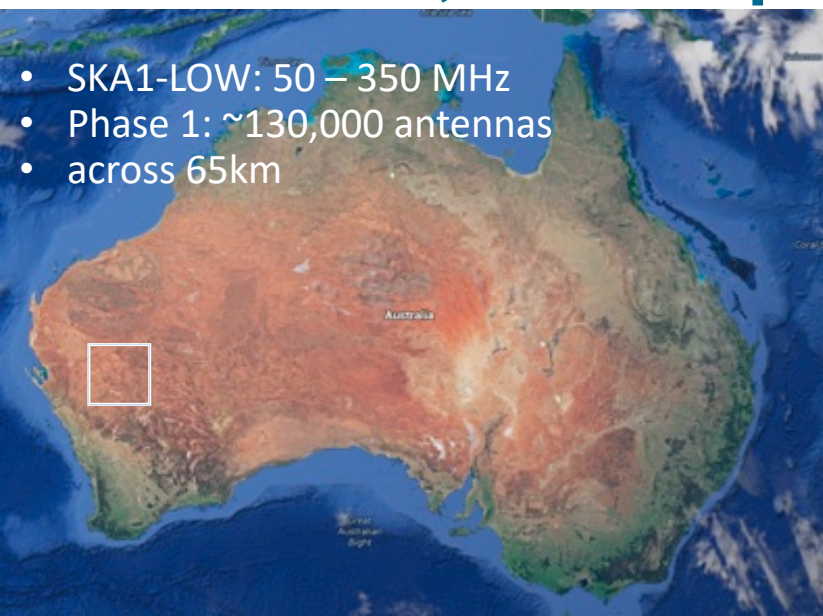
start mid-2020s

~2000 dishes across 3500km of Southern Africa

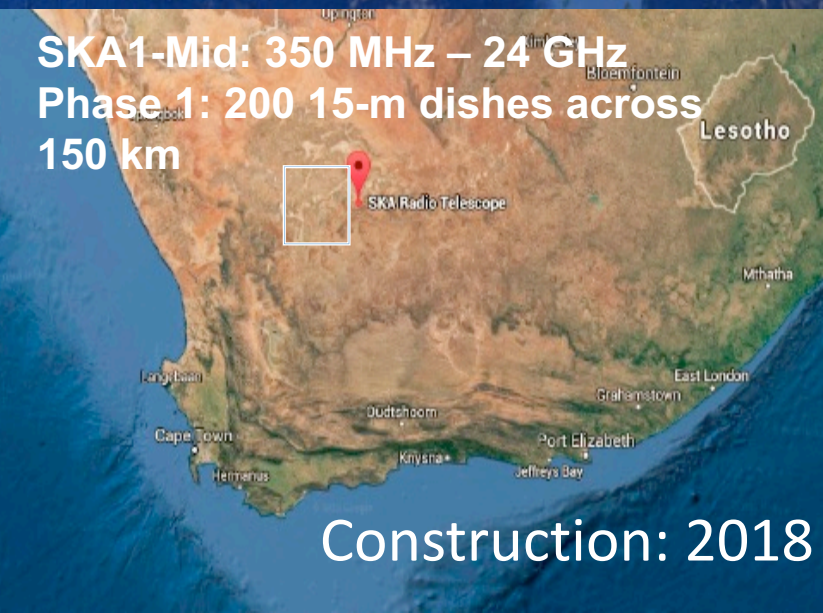
Major expansion of SKA1-Low across Western Australia

HQ in UK; telescopes in AU & SA

- SKA1-LOW: 50 – 350 MHz
- Phase 1: ~130,000 antennas
- across 65km



SKA1-Mid: 350 MHz – 24 GHz
Phase 1: 200 15-m dishes across 150 km



Construction: 2018 – 2024; Cost cap: €675M

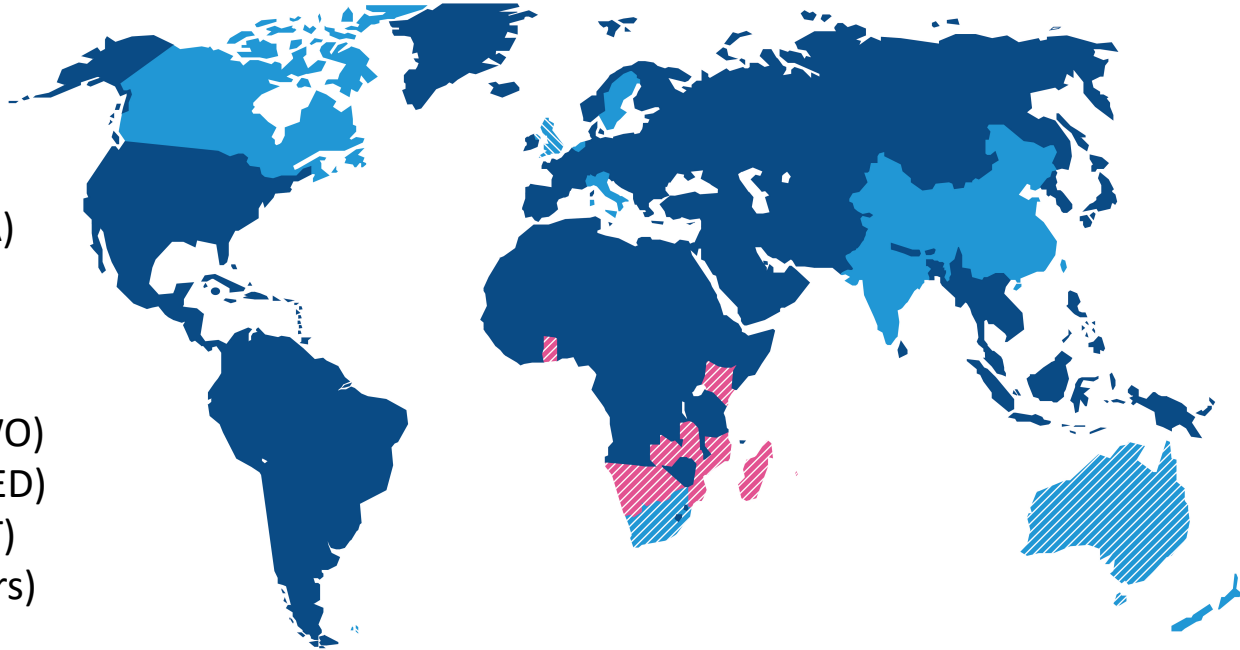
SKA Pre-construction Consortia



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)





-  Full members
-  SKA Headquarters host country
-  SKA Phase 1 and Phase 2 host countries



-  African partner countries (non-member SKA Phase 2 host countries)

This map is intended for reference only and is not meant to represent legal borders

Interested Countries:

- France
- Germany
- Japan
- Korea
- Malta
- Portugal
- Spain
- Switzerland
- USA

Contacts:

- Mexico
- Brazil
- Ireland
- Russia

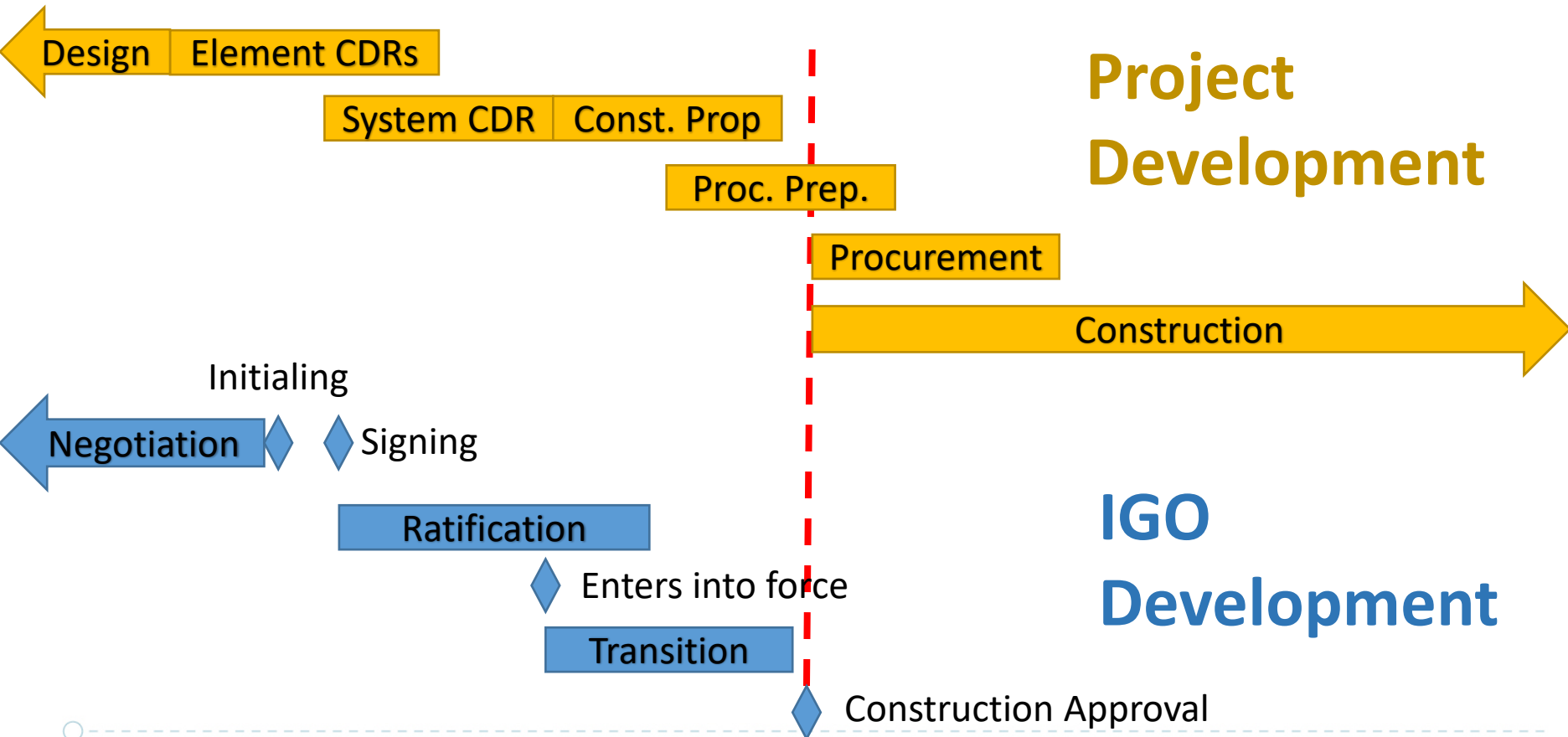
Future SKA governance structure

- IGO = ‘Convention’ agreed between governments
 - Government commitment: Long-term political stability, funding stability
 - A level of independence in structure
 - Availability of ‘supporting processes’ through Privileges and Immunities from members: functional support for project
 - ‘Freedom to operate’, specifically through procurement process, employment



Timelines

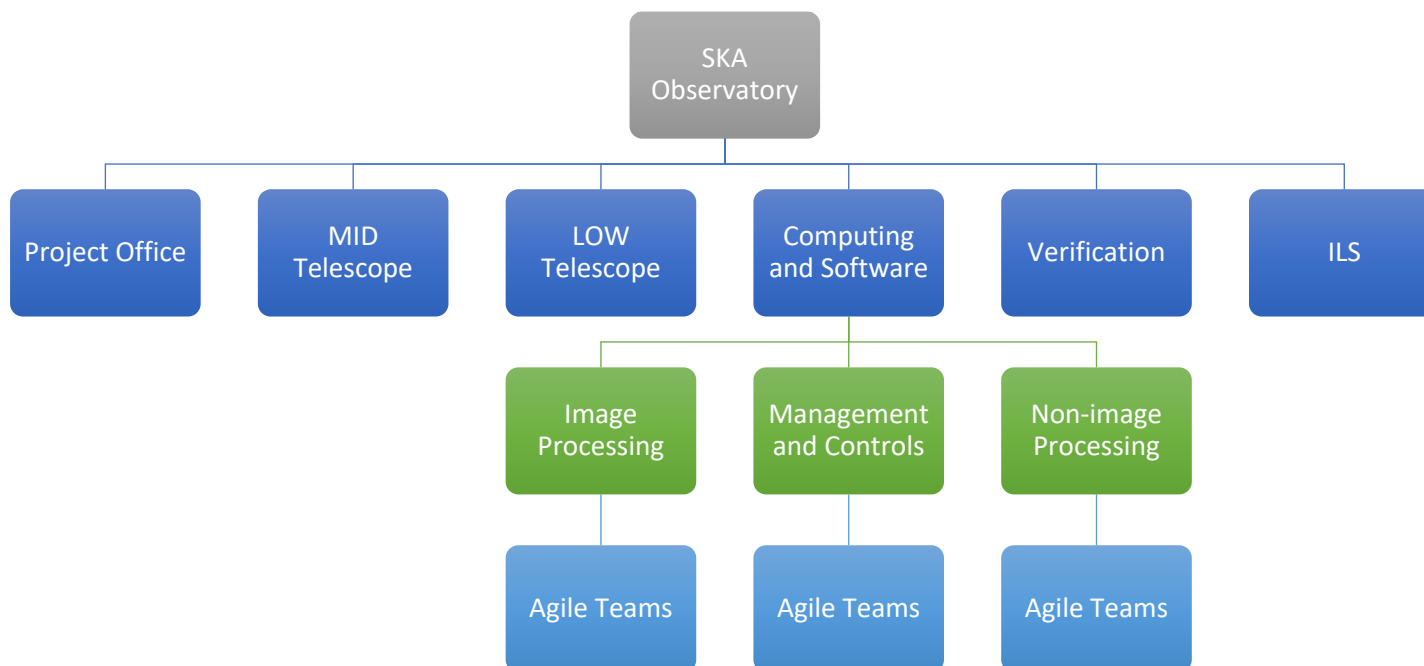
2018				2019				2020				2021				2022			
1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4



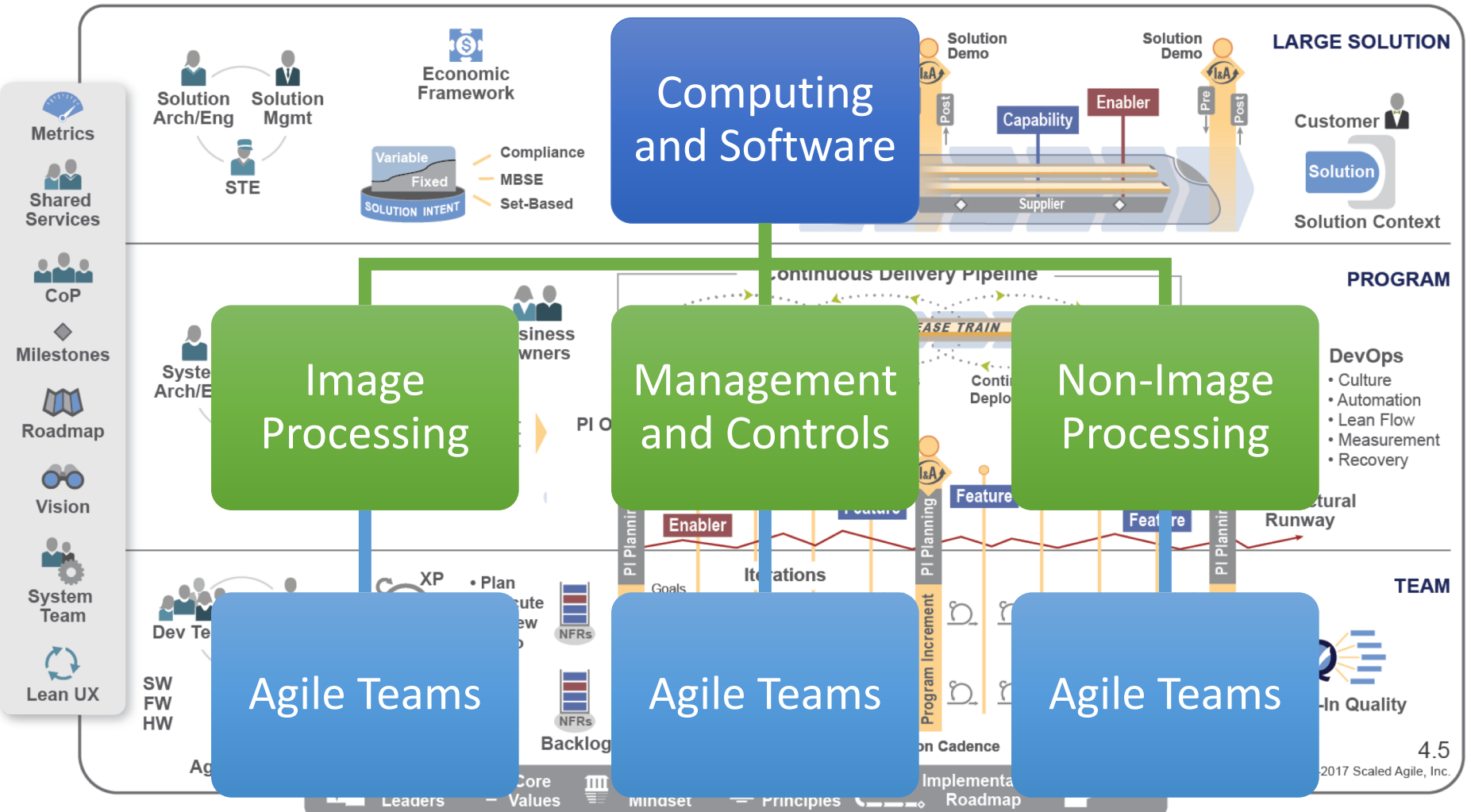
SKA Software Construction



SKA work breakdown structure

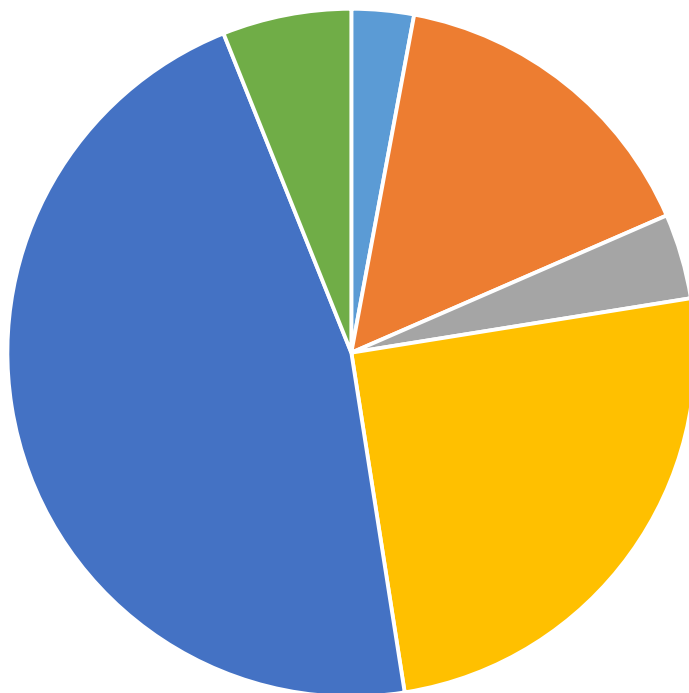


Software Construction



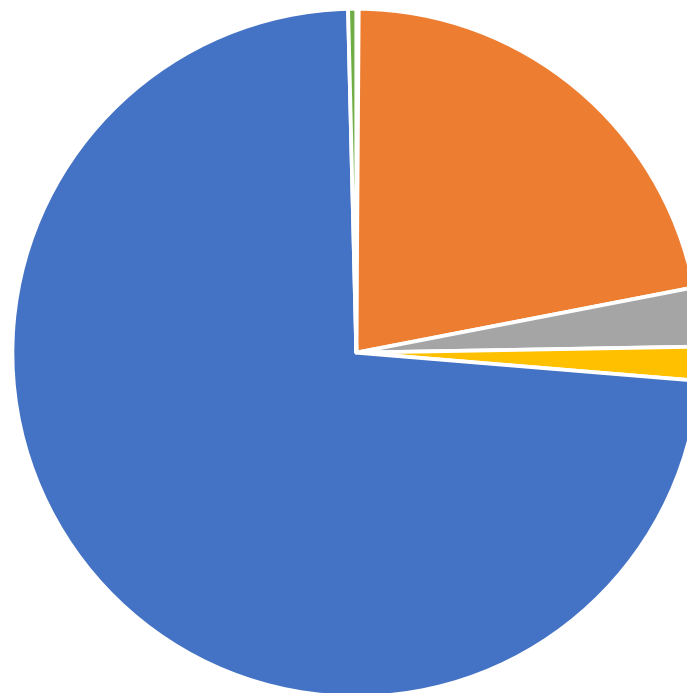
Software and computing costs

Software Costs (Total ~€90M)



■ CSP.LMC ■ CSP.PSS ■ CSP.PST
■ TM ■ SDP ■ LFAA

Hardware Costs (Total ~€82M)



■ CSP.LMC ■ CSP.PSS ■ CSP.PST
■ TM ■ SDP ■ LFAA

Software procurement:

- Based on lean/agile procurement principles.
- Must also satisfy IGO fair work return principles.
- Time and materials service procurement based on collaboration and trust but verify principles
 - Highly aligned with NEC4 (our preferred contracting suite) which emphasizes “acting in a spirit of mutual trust and co-operation”.
- Risk largely held by the SKA.
 - Hence, all contracts, with minimal exceptions, are directly with SKA.
- Aim is to procure co-located teams of ~7 people with broad skills in key areas:
 - High performance data processing
 - Control systems
 - Web applications
 - Software processes, CI, deployment, machine provisioning.
- Specific domain skills provided by product owners and architects

Computing procurement

- Procurement delayed until last reasonable time
- This allows SKAO to manage risk, work return etc.
- Software teams are responsible for developing final system specifications and procuring test hardware to demonstrate behavior.
- Procurement done collaboratively between software teams and SKAO procurement.
- Procurement bundled and negotiated with major vendors to ensure consistent approach and best pricing.

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Questions?