

# SKA Overview

CASCA SKA Lunch



**SQUARE KILOMETRE ARRAY**

Exploring the Universe with the world's largest radio telescope

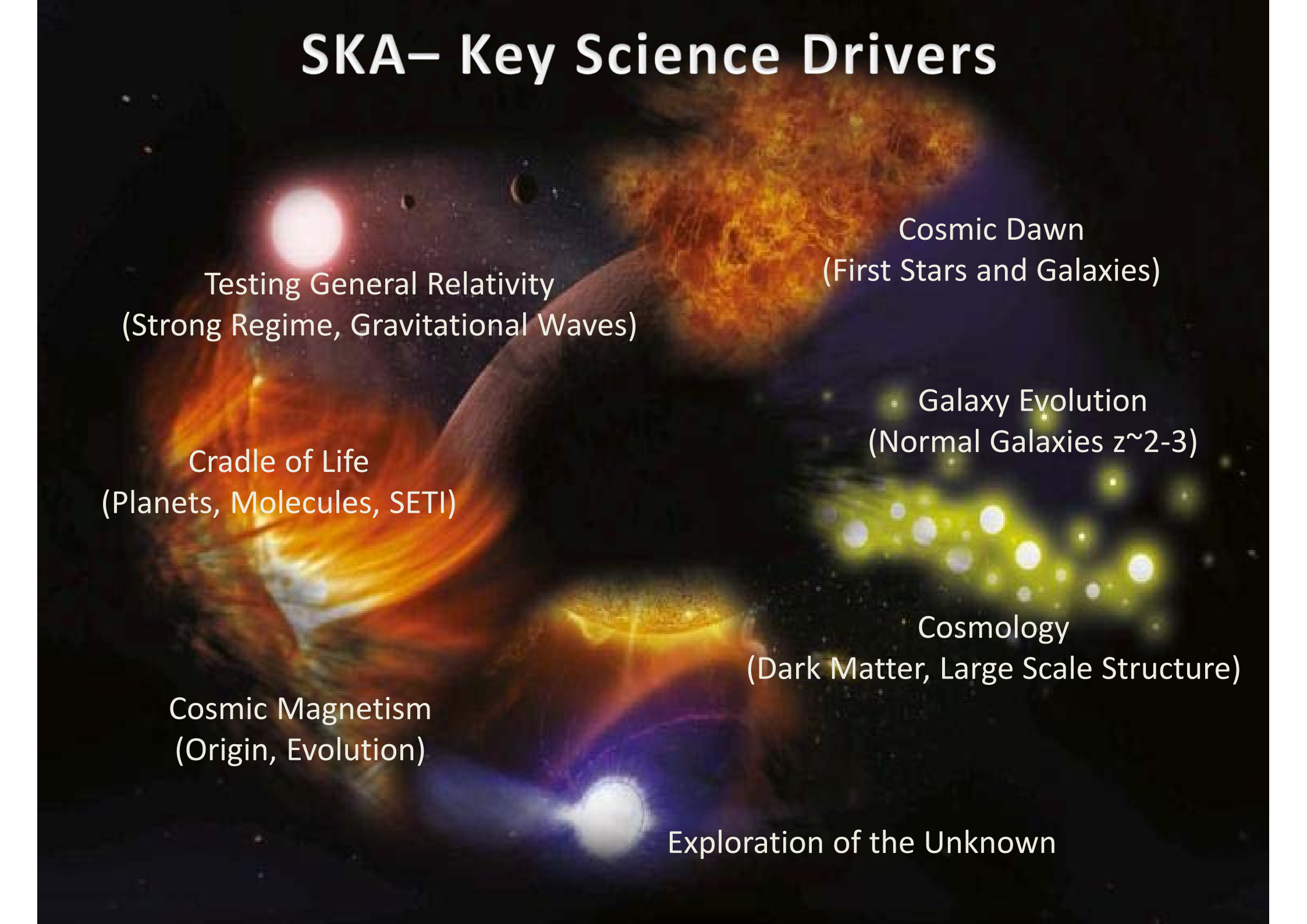
**Gary Davis**

2<sup>nd</sup> June 2016

# Outline

1. Introduction to the SKA
2. Current status of the project
3. Things you might want to know
4. Final thoughts

# SKA– Key Science Drivers



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

# The Square Kilometre Array



One Observatory

## Phase 1

Construction: 2018–2023

Construction cost: €650M

Operational cost: €70–100M/yr (TBC)

# SKA1-LOW

50–350 MHz  
~ 131,000 dipole antennas  
max baseline 65km



# SKA1-MID

350 MHz – 13.8 GHz  
197 dishes  
5 receiver bands  
max baseline 150km

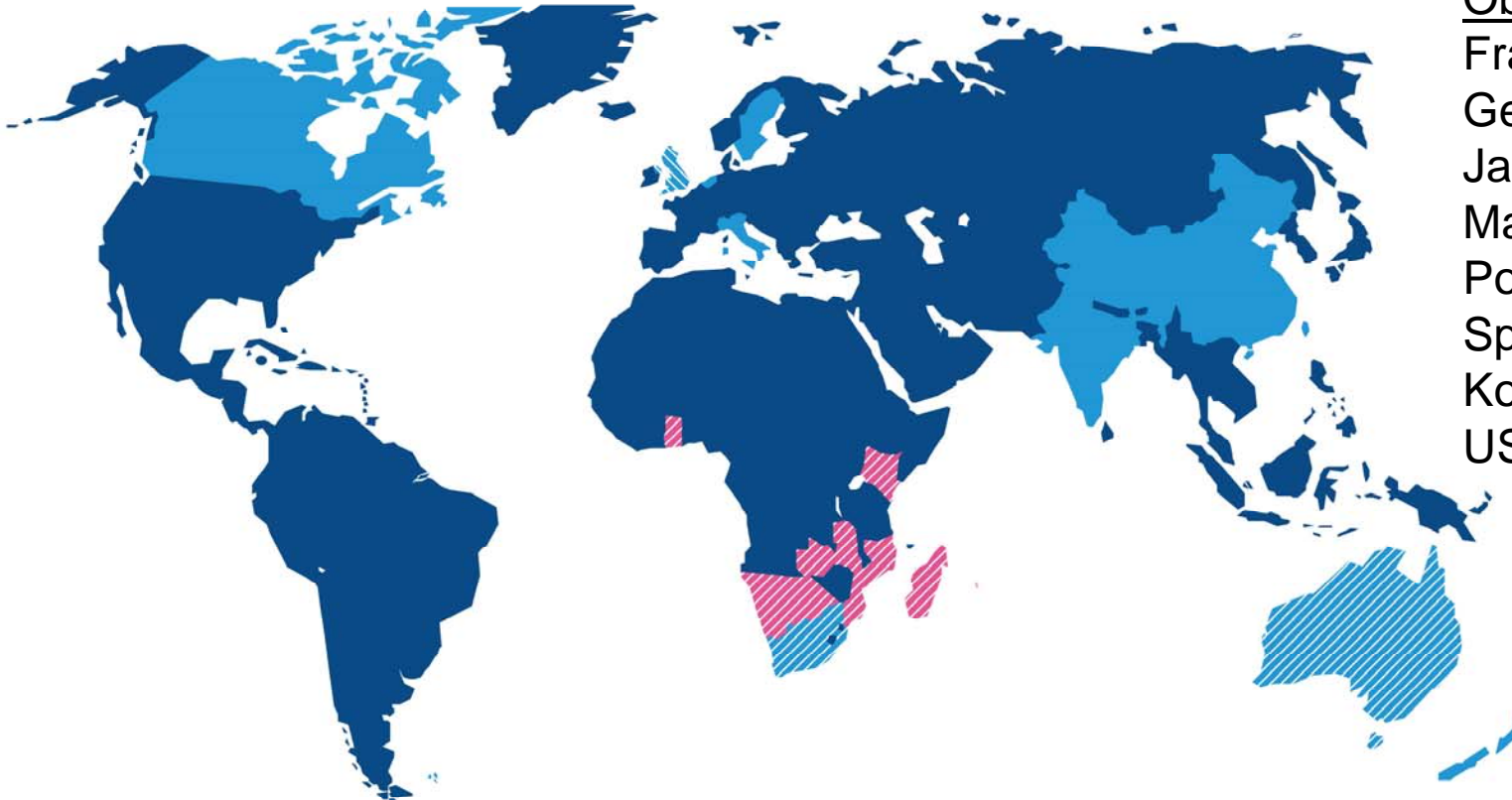


# A Global Collaboration

10 countries, more to join

Members:

- Australia
- Canada
- China
- India
- Italy
- Netherlands
- New Zealand
- South Africa
- Sweden
- UK



Observers:

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



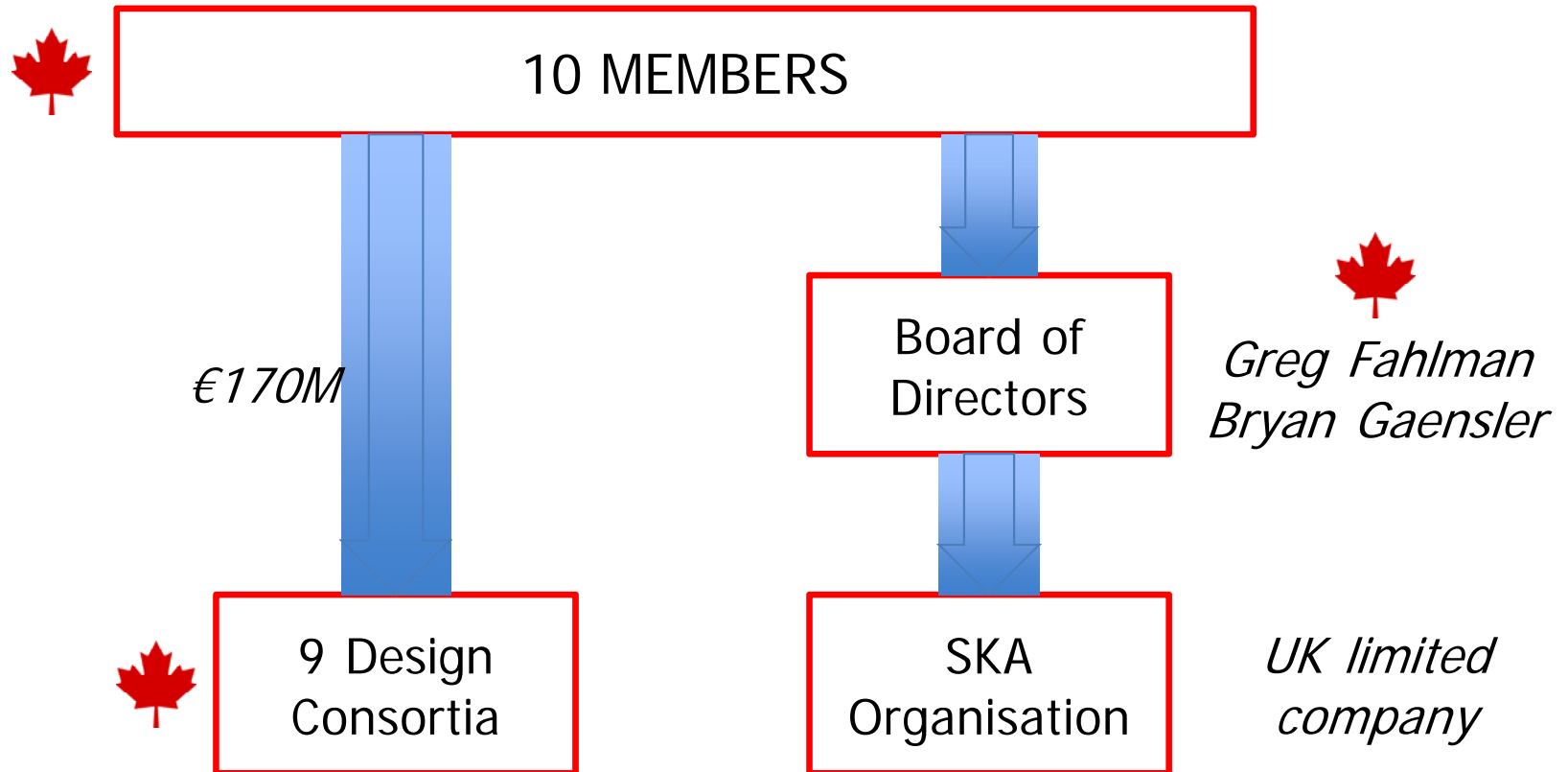
- Full members
- SKA Headquarters host country
- SKA Phase 1 and Phase 2 host countries



- 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

# Current Governance





# Future Governance

- Governments are negotiating to set up the SKA Observatory as an Intergovernmental Organisation
- Rationale:
  - Scale of project
  - Political and financial stability
  - Independence and protection of investment
  - Privileges and Immunities
  - Freedom to Operate
- Timetable:
  - signature of convention by end-2016
  - ratification over following several months

# Negotiation Meeting

SKA



Greg Fahlman

Gilles Joncas



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# Key Milestones





System PDR	December 2016
System CDR	December 2017
Submission of construction proposal	January 2018
Commencement of construction	July 2018
Completion of construction	July 2023

*(Schedule currently being re-worked for presentation to Board in July)*



# Key Issues

- **Cost and scope**
  - construction budget capped at €650M; but what can we deliver for that? won't know until CDR
  - operations budget being developed, but again won't be known until CDR
- **Timing**
  - pre-construction phase funded to end-2017
  - how to ensure smooth transition to SKA Observatory?
  - bridging arrangements needed – both funding and governance
  - evolving project schedule
- **Impact of Maunakea and TMT** 
- **Who will represent Canada?** 

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# Operational Model

- One observatory, two telescopes
- Science programme
  - blend of Key Science Projects and PI projects
  - split TBD but maybe 70:30
  - ongoing series of community science meetings

SKA 2016: Science for the SKA generation

*Goa, India  
7-11 Nov 2016*

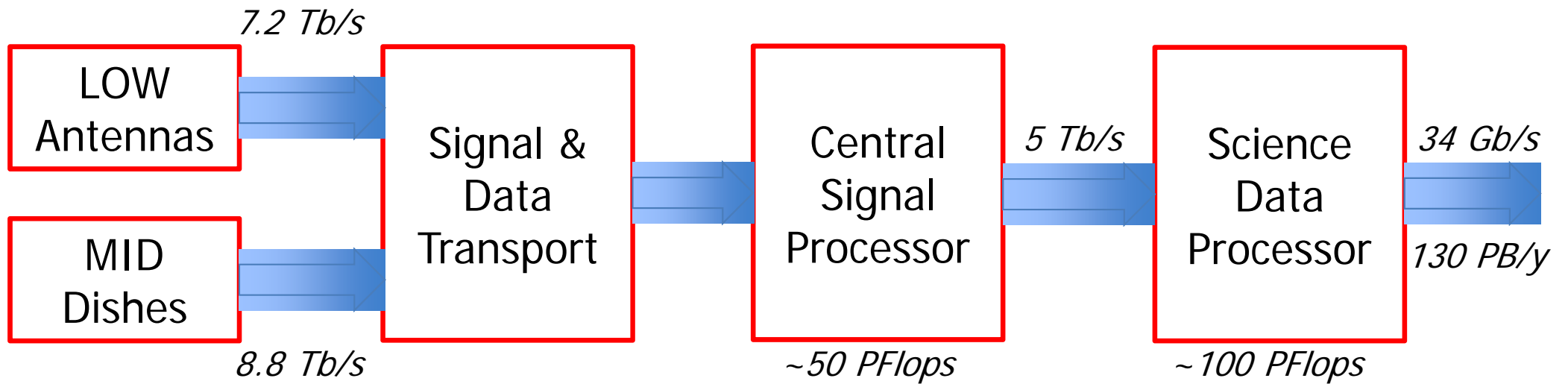


# Access Principles

- Total allocated time to each country (KSPs and PI projects) to be proportional to share in the project
  - major change emerging from treaty negotiation process
  - countries can focus on one or the other
- A small amount of Open Time
  - for members and non-members on basis of merit
- Cap on access for non-members
- Data to be made openly available following a proprietary period



# Data Flow

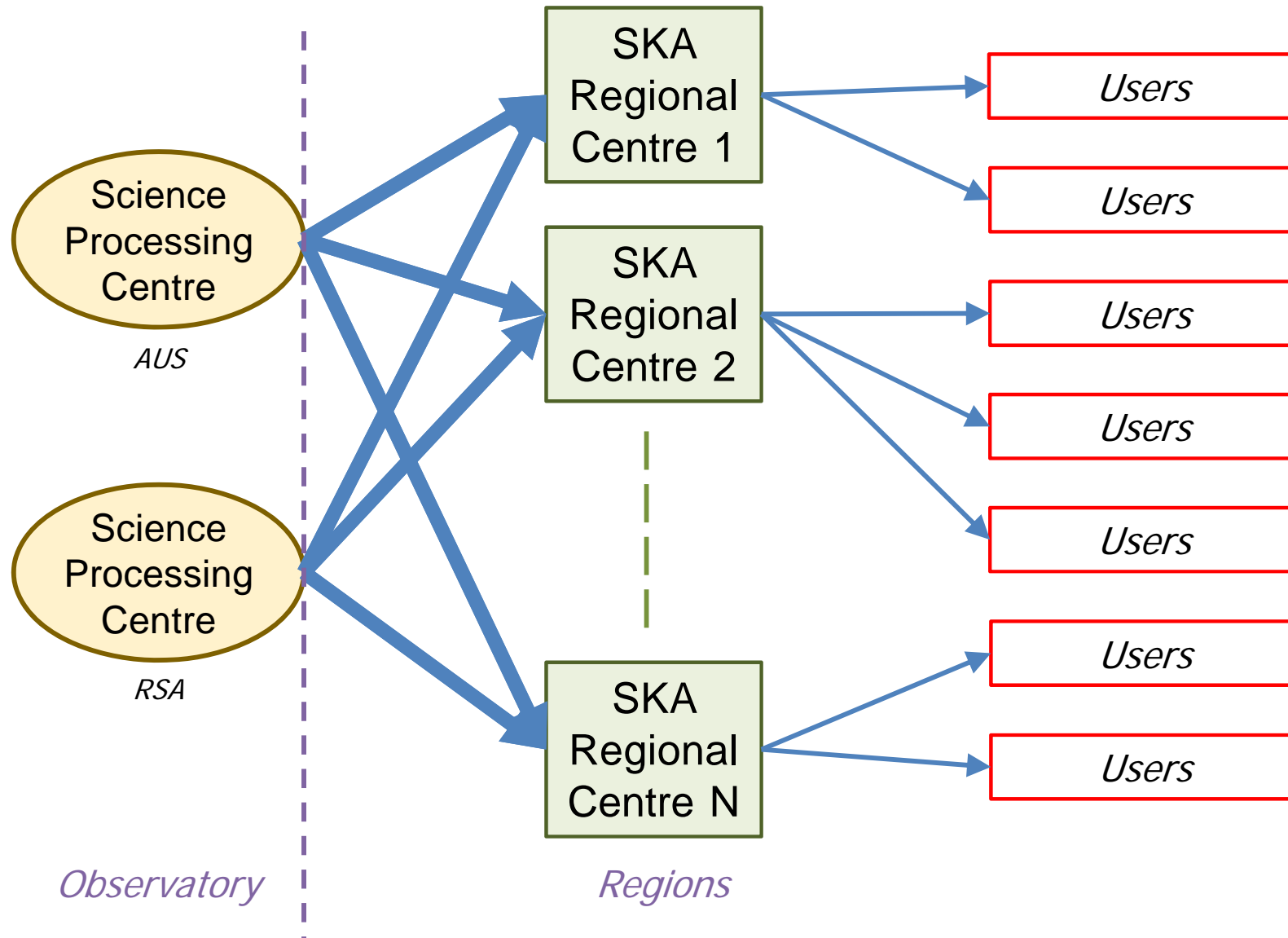


*SKA data rate exceeds global internet traffic*

*Tianhe-2: world's fastest supercomputer*



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# Things I Wish I Could Tell You...

- Will Canada be a Member or an Associate Member?
- What comes with Associate Membership?
- KSPs: proposal & time allocation process? timetable? membership rules?
- How is commensality actually going to work?
- Will there be Early Science before the full arrays are deployed?

# Get Involved!

- Attend the SKA 2016 Science Meeting
- Join a Science Working Group
- Join Bryan's mailing list
- Think about setting up an SKA Regional Centre in Canada
  - appoint a representative to the SRC Coordination Group



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