

African VLBI Network (AVN)

African Radio Astronomy Programme (ARAP)

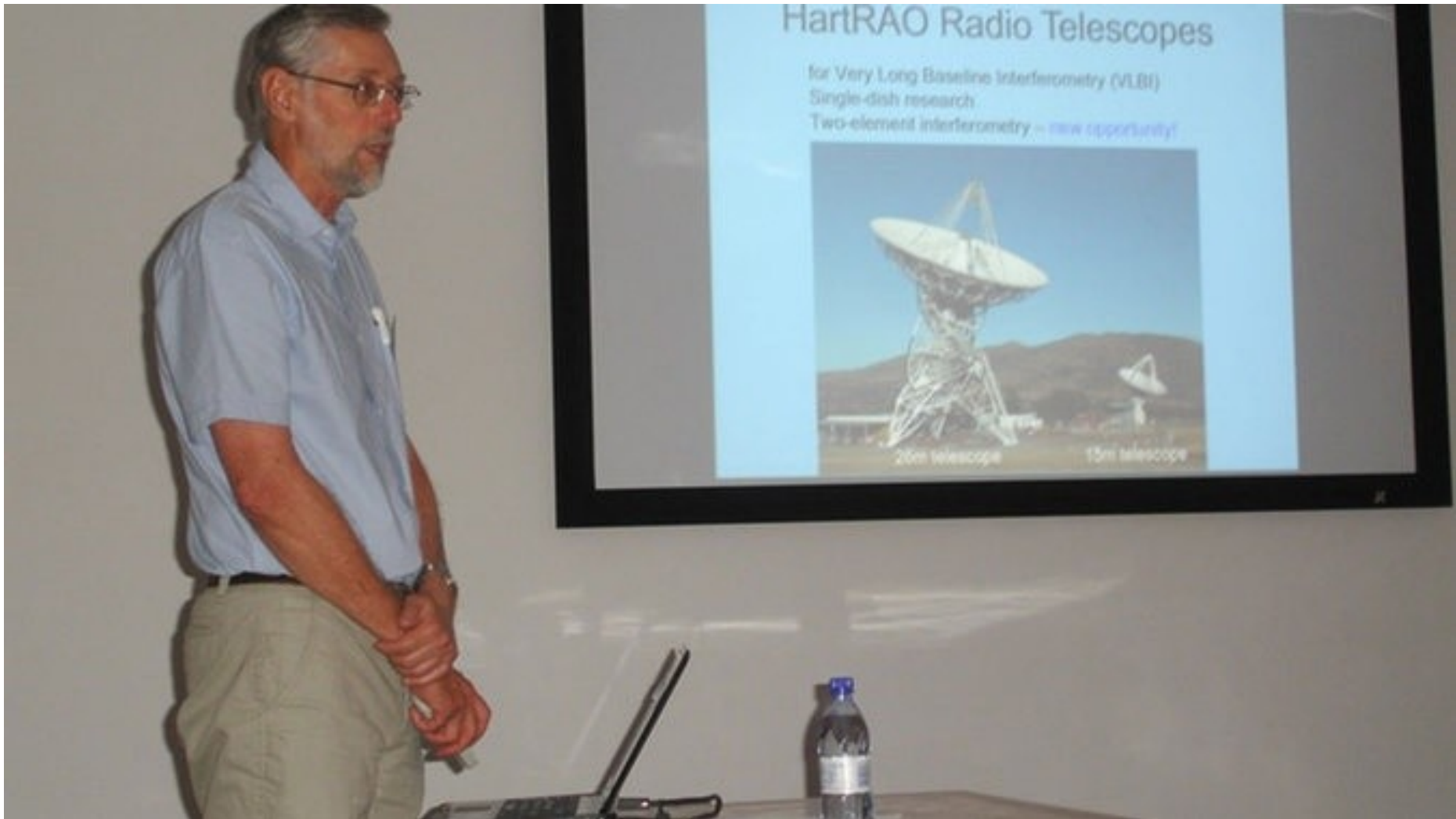


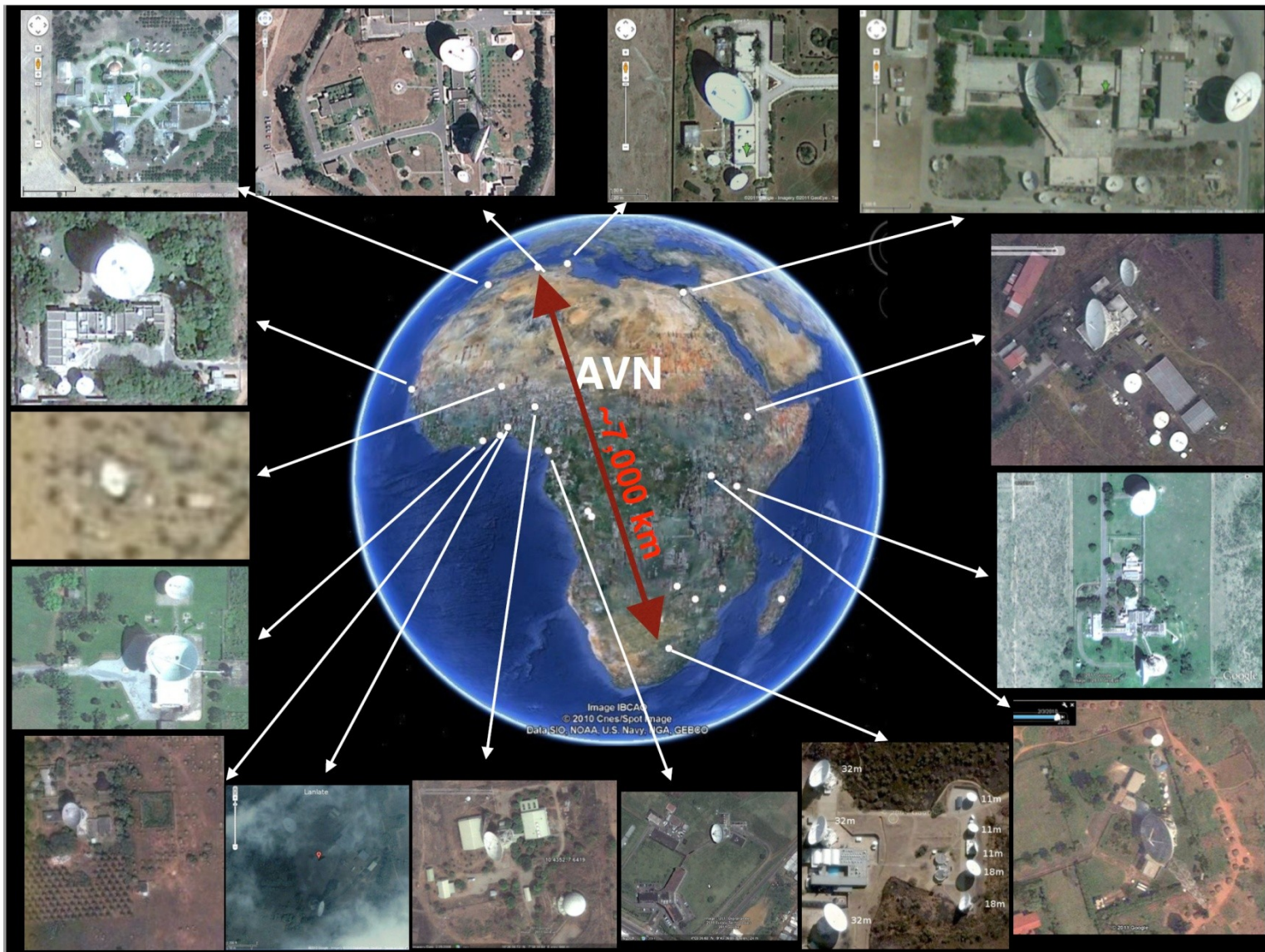
Nkululeko Qwabe
12 November 2024



The Global VLBI – Array







Chibueze, 2015



science & innovation
Department:
Science and Innovation
REPUBLIC OF SOUTH AFRICA

Celebrating 25 Years of Research, Innovation, Impact and Partnerships



SARAO
South African Radio
Astronomy Observatory

SKA African Partner Countries (APCs)

- Ghana
- Kenya
- Zambia
- Namibia
- Mozambique
- Madagascar
- Botswana
- Mauritius



African VLBI Network

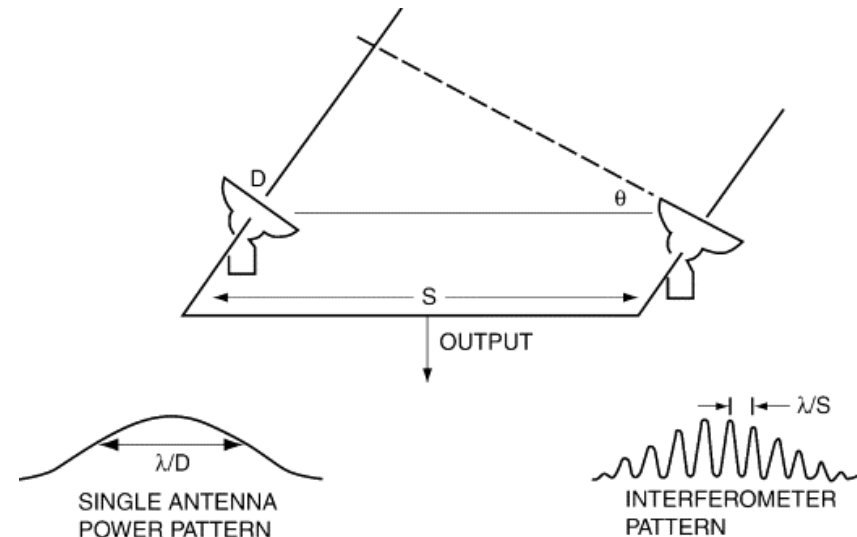
- Develop human capital for the SKA era
 - Skills and knowledge transfer (DARA, training)
 - Regulations and institutional capacity
 - Build, maintain and operate
 - HPC Data Centers
 - Instrument Collocation programme (GRAO is piloting)
 - Two Antenna Interferometers
-
- COVID19
 - Diversion of funds
 - Short-term strategy changed to smaller steps
 - Capacity building
 - Long-term strategy remained unchanged – funding uncertainty



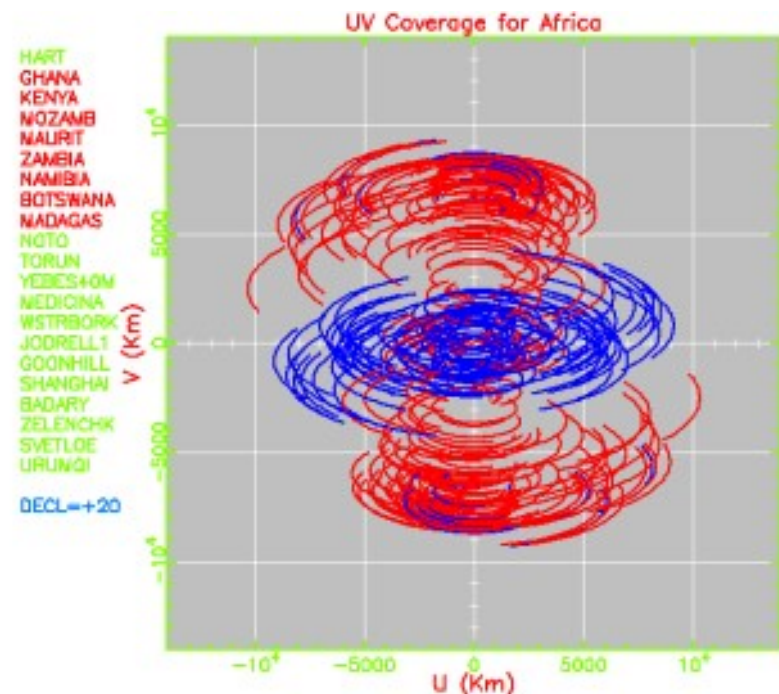
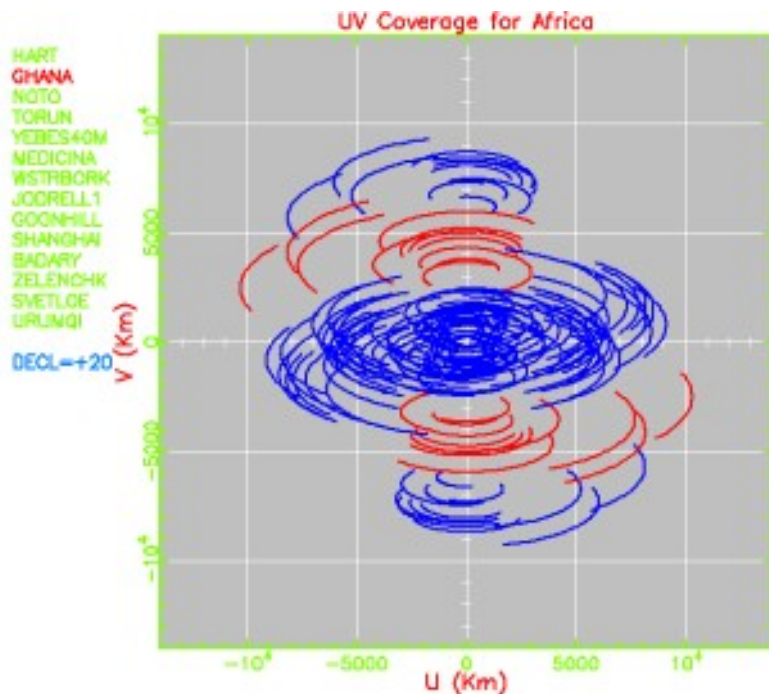
AVN and Global VLBI

Enhance the existing international VLBI network

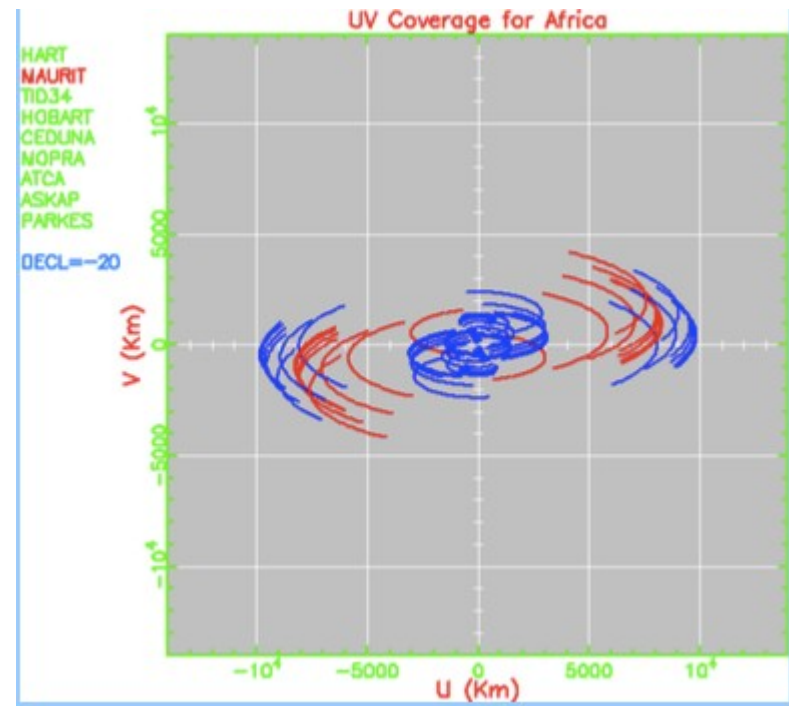
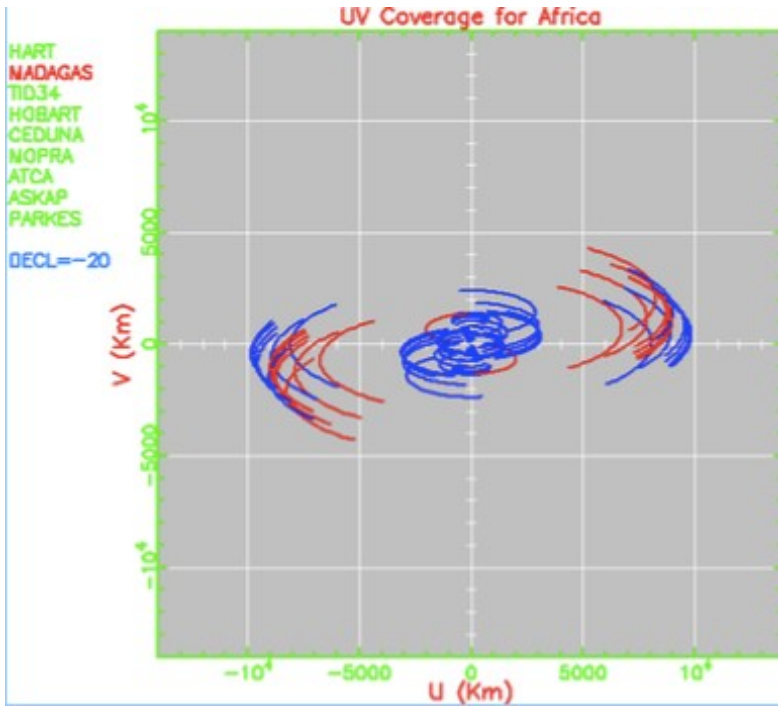
- Better uv sampling
- Improve sensitivity
- Improve image fidelity of VLBI observations
- Resolution?



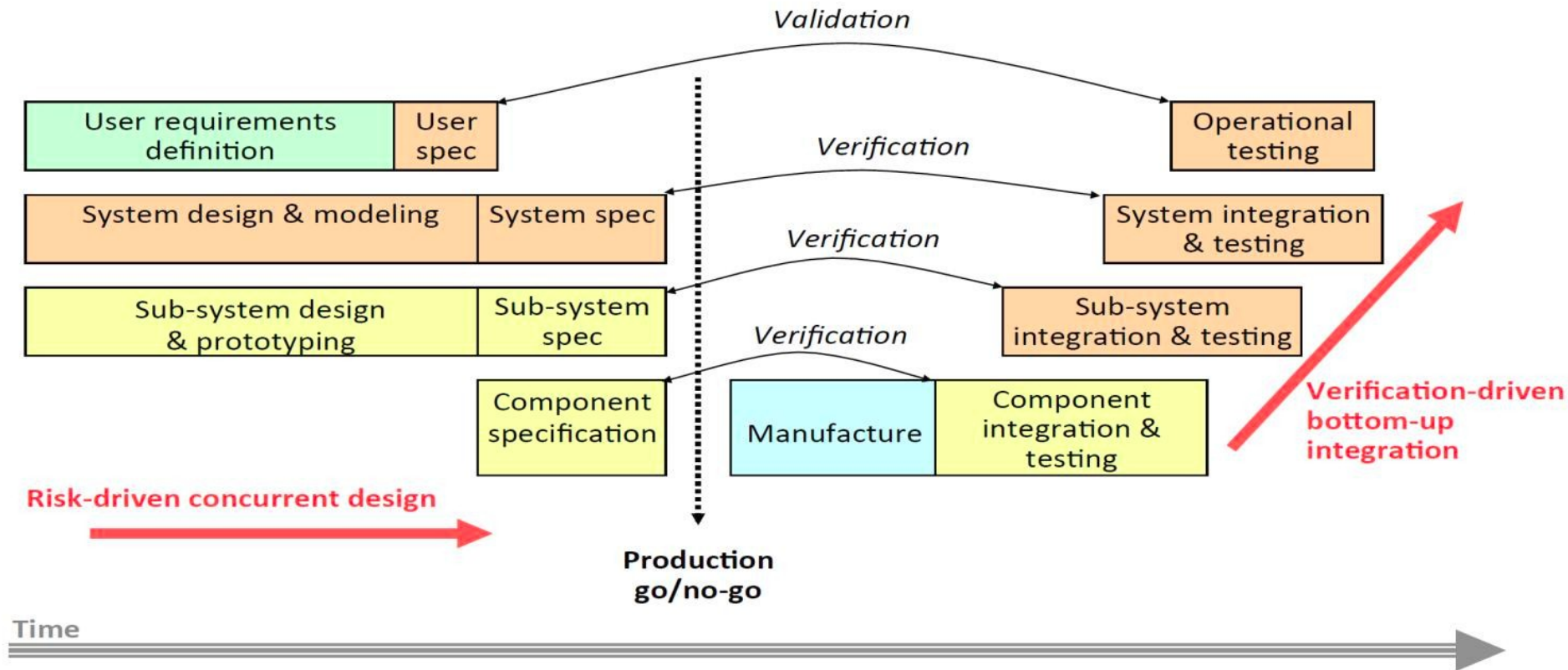
AVN and Global VLBI



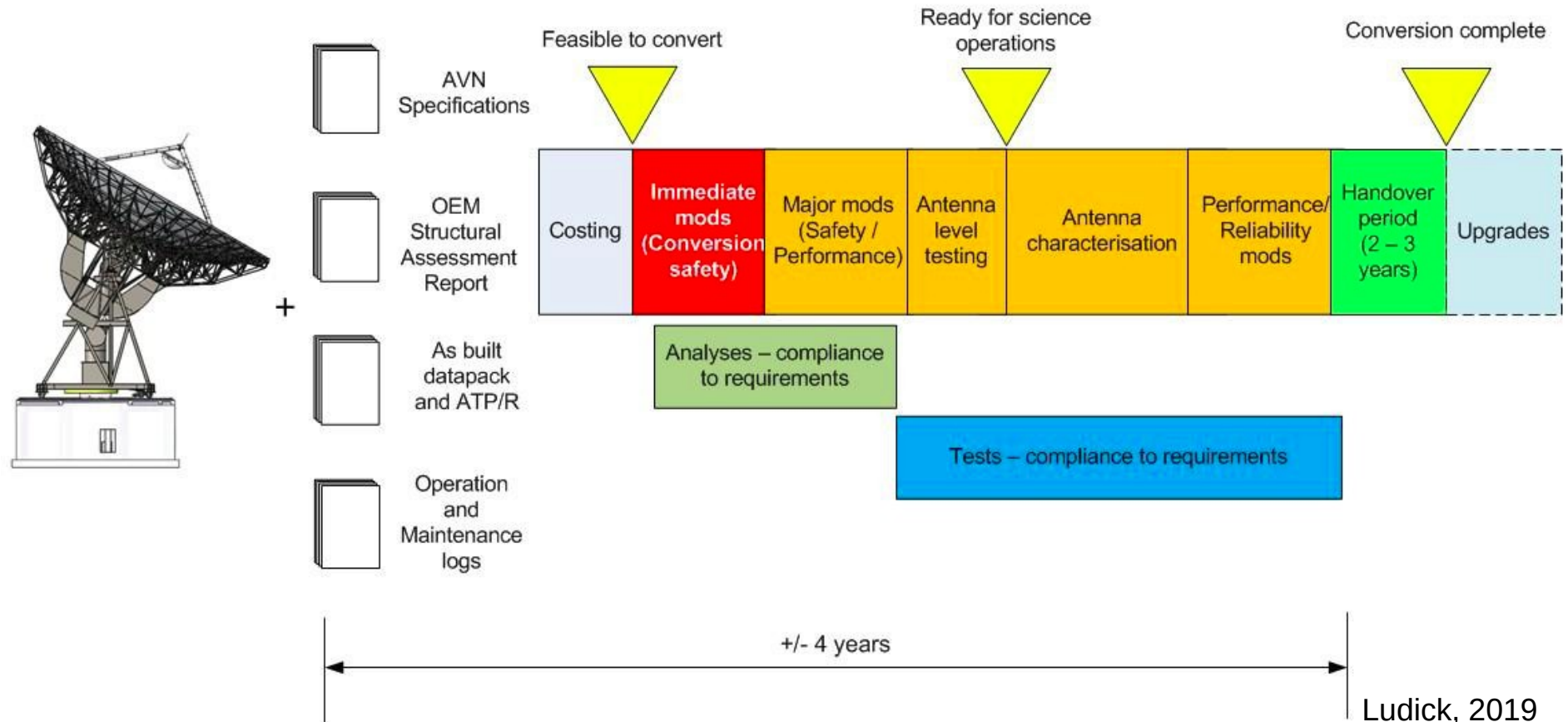
AVN and Global VLBI



Systems Engineering Approach



AVN Conversion Process



Ludick, 2019

Holistic approach - people

Observatory Essential Skills

(hands-on 6 month training of 6 member team from partner country in SA and thereafter during conversion)



Short courses not leading to degree / diploma

(eg Newton Fund, short courses (soldering, CAD, FEKO etc.))

Training for the AVN and towards self-sufficiency in maintenance and operations of AVN stations and participation in SKA2

Tertiary qualification

(aimed at ensuring a robust user / research community, incl. scientists, engineers, technicians, etc.)



Artisans - trades

(formal training towards a qualification as an artisans and other tradesmen etc.)



science & innovation

Department:
Science and Innovation
REPUBLIC OF SOUTH AFRICA

Celebrating 25 Years of Research, Innovation, Impact and Partnerships

Ghana Radio Astronomy Observatory (GRAO), 2017



science & innovation

Department:
Science and Innovation
REPUBLIC OF SOUTH AFRICA

Celebrating 25 Years of Research, Innovation, Impact and Partnerships



SARAO
South African Radio
Astronomy Observatory

Africa Radio Astronomy Programme (ARAP)

The Africa Radio Astronomy Programme Strategy was accepted in 2023 by the eight SKA African Partner countries (APC's)

ARAP encompasses the VLBI programme (AVN) and other programmes (e.g. DARA)

Africa Programme – portfolio managed by SARAO

- Implement, collaborate and coordinate efforts in APC's relating to Radio Astronomy

The Africa Programme Strategy (3 Pillars)

HUMAN CAPITAL DEVELOPMENT

- Training Partnerships: DARA
- Bursary Programmes, Engineering and Technical Skills Programmes
- Internships and Graduate Programmes
- Communications and Science Engagement

RESEARCH AND TECHNOLOGY INFRASTRUCTURE

- VLBI Infrastructure Network (AVN)
- The VLBI Training Telescope Network (SARAO and DARA)
- Big Data Africa Programmes (SARAO and DARA)
- Training Instruments (TART)

FUNDING, GOVERNANCE AND PARTNERSHIPS

- Policy and strategy development
- The Africa Colocation Programme
- Partner development and innovation
- Access foreign development funding



Strategic Interventions and Milestones

- SARAO has provided the partner countries with over 160 bursaries to date and continues to provide this opportunity, in addition to the 71 provided by DARA
- The VLBI Training Telescope project is intended to be implemented in partnership with the DARA program team, to enable training in single dish and interferometry science, maintenance and operations
- The e-learning platform offers online teaching and training resources in radio astronomy and is hosted on the SARAO website.
- TART training telescope in partnership with the DARA program team, to enable training
 - April 2024 – Mauritius (Université des Mascareignes (UdM))
 - August 2024 - Kenya (Technical University of Kenya (TUK))
- Collaboration with the implementation of a MeerKAT + dish in Botswana
- DARA and SARAO collaboration in site identification and testing towards the establishment of the SKA African Partner sites
- GRAO ongoing science operations with partners such as JIVE



Thank You!



nqwabe@sarao.ac.za

