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Science and Technology
REPUBLIC OF SOUTH AFRICA



SARAO
South African Radio
Astronomy Observatory

Commercialisation at SARAO

Economic Development through Radio Astronomy Workshop

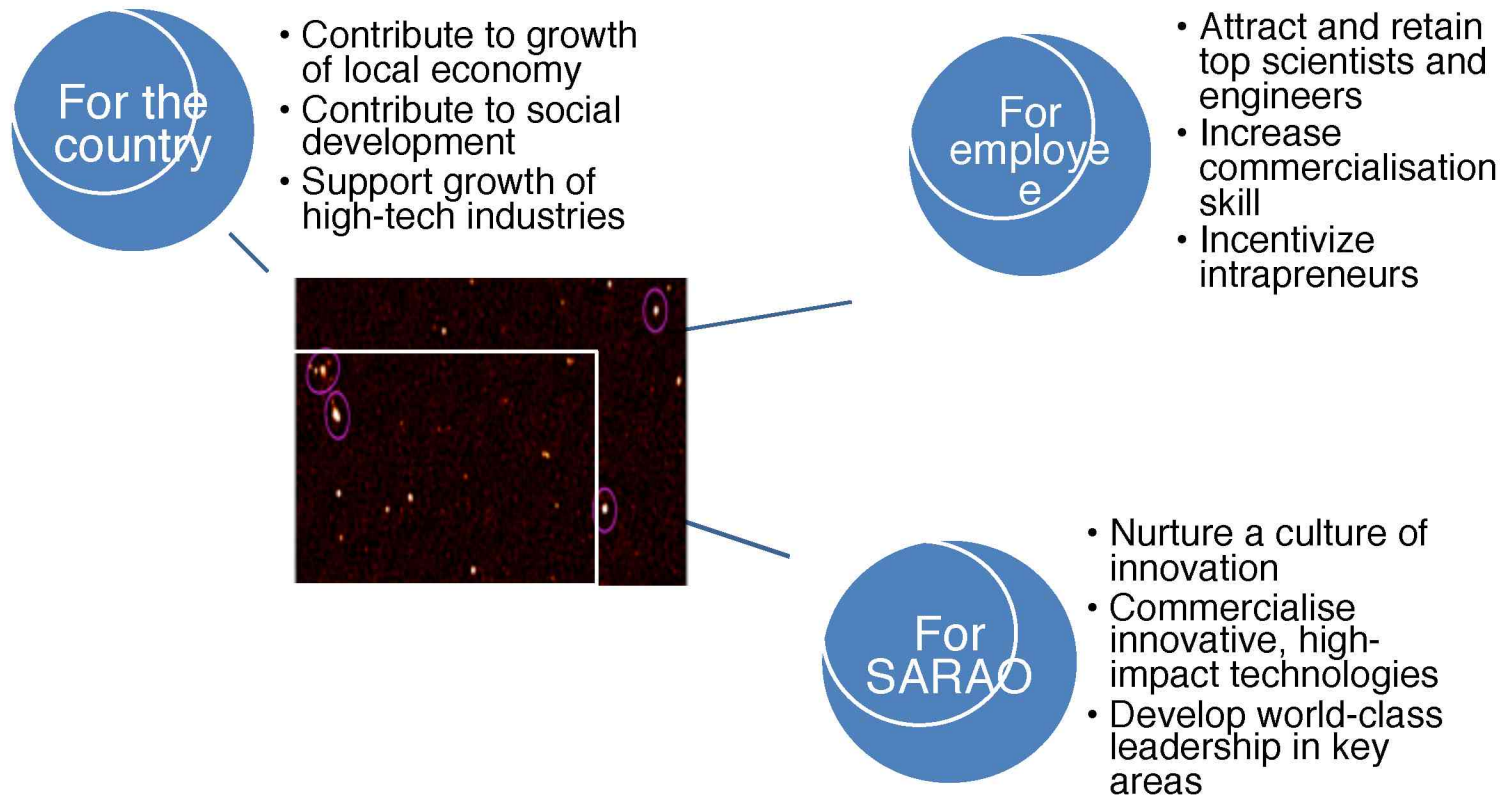
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Why commercialise?

- To optimise the associated national socio-economic benefit from radio astronomy activities
- To optimise the associated national socio-economic benefit from radio astronomy and space geodesy activities





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Economic Development Opportunities

Direct/Indirect
Commercialisation

Joint Technology
Development

Enterprise
Development/Localization

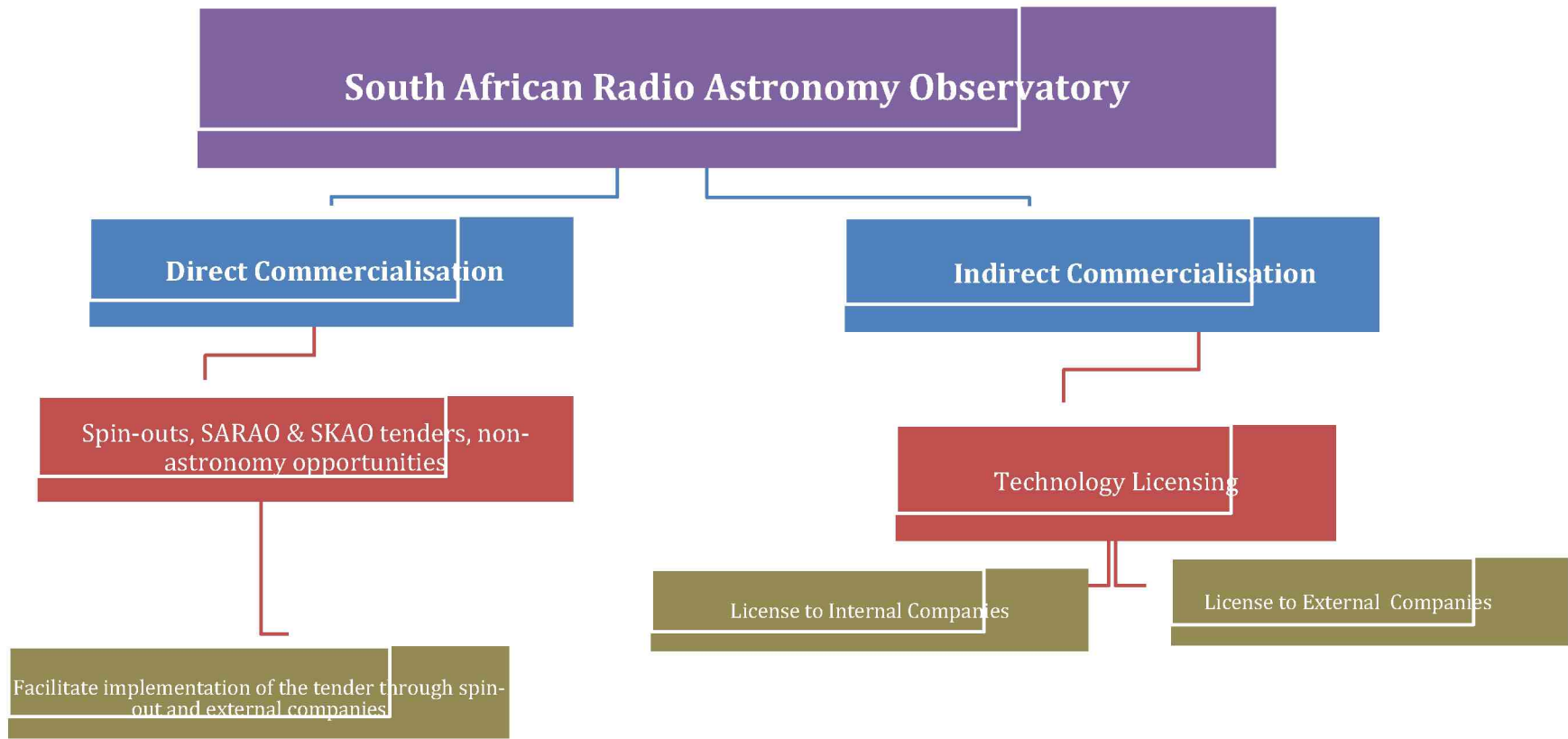
Social Entrepreneurship
Development

Government Service
Delivery

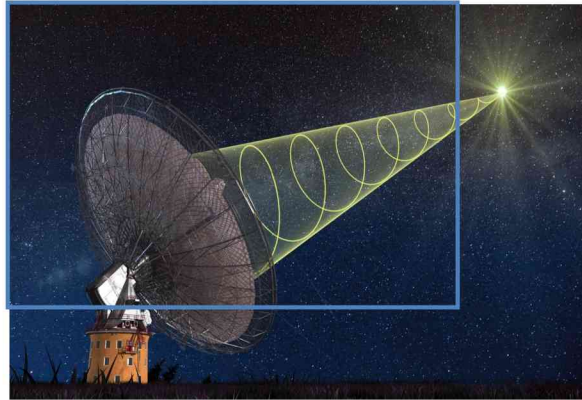
SKA Opportunities



Proposed Models



From Signal to Image



Radio-wave from outer space strikes the reflector of the radio telescope,



The receiver receives the radio waves of specific wavelengths and transforms into an electrical signal.



The electrical signal is converted into a digital signal by the digitiser



The digital signals are conducted via fibre optic cable to central point.



Receiver & Associated Technologies

Digitiser & Associated Technologies

Fibre Optic Instruments & Associated Technologies

The digital signal from the various telescope arrays is consolidated at a central point using a correlator to combine the digital signals into a single data beam.



The single beam of data is processed to produce a image



Digital information/ data is archived

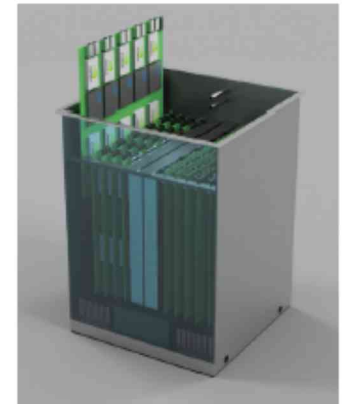
Correlator & Associated Technologies

Signal Data Processing & Associated Technologies

Data Storage & data archiving Technology

Direct/ Indirect Commercialisation

- Hardware
 - Storage pods
 - Tape library (in development)
 - Iron Hive (in development)
- Software
 - Platform to support hardware applications
- Competence
 - HPC solutions
 - Systems Engineering
 - Technology Development



The IronHive cooling system.



DSS HC Storage Pod populated
with 360 TB Storage© 2016
Peralex Electronics

Joint Tech Development

Antenna Array

VSAT Dish

Equipment Shelter

Solar Panel Array



- Visserskloof Farm
- First Remote Sensor Node (RSN) successfully commissioned and accepted in October 2018
- Off grid - solar powered and RFI shielded with VSAT for networking

Peralex ComRad



6/10/19



Enterprise Development/Localisation

- MeerKAT Antennas
 - Contracted to local company, Stratosat, with support from General Dynamics (constructed Greenbank, etc.)
 - Skills transfer to South Africa, E.G. panel shop

Local Engineering Companies		
Space Advisory Company		Kutleng
Perelex		Air Liquide
EMSS		Coriant
Reutech		Eclipse Holdings
MESA Product Solutions		Clearline



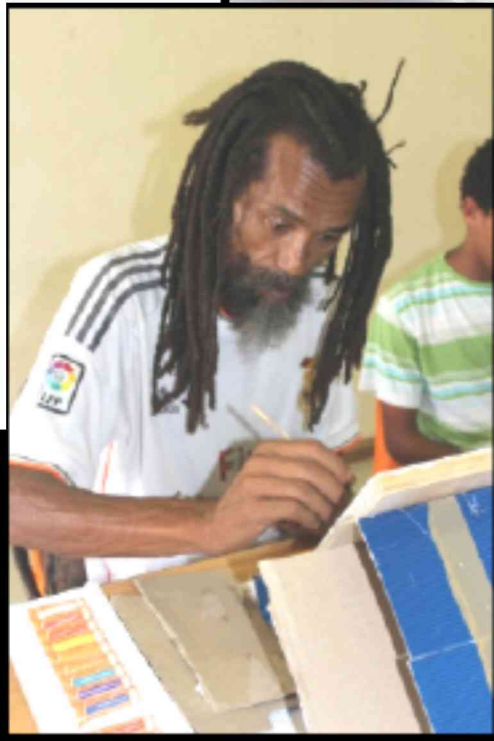
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Social Entrepreneurship

- Agriculture
- Craft
- Invasive species
- Rural job creation













David Mitchell / Acrylic on board / 30 cm x 40 cm / 2019

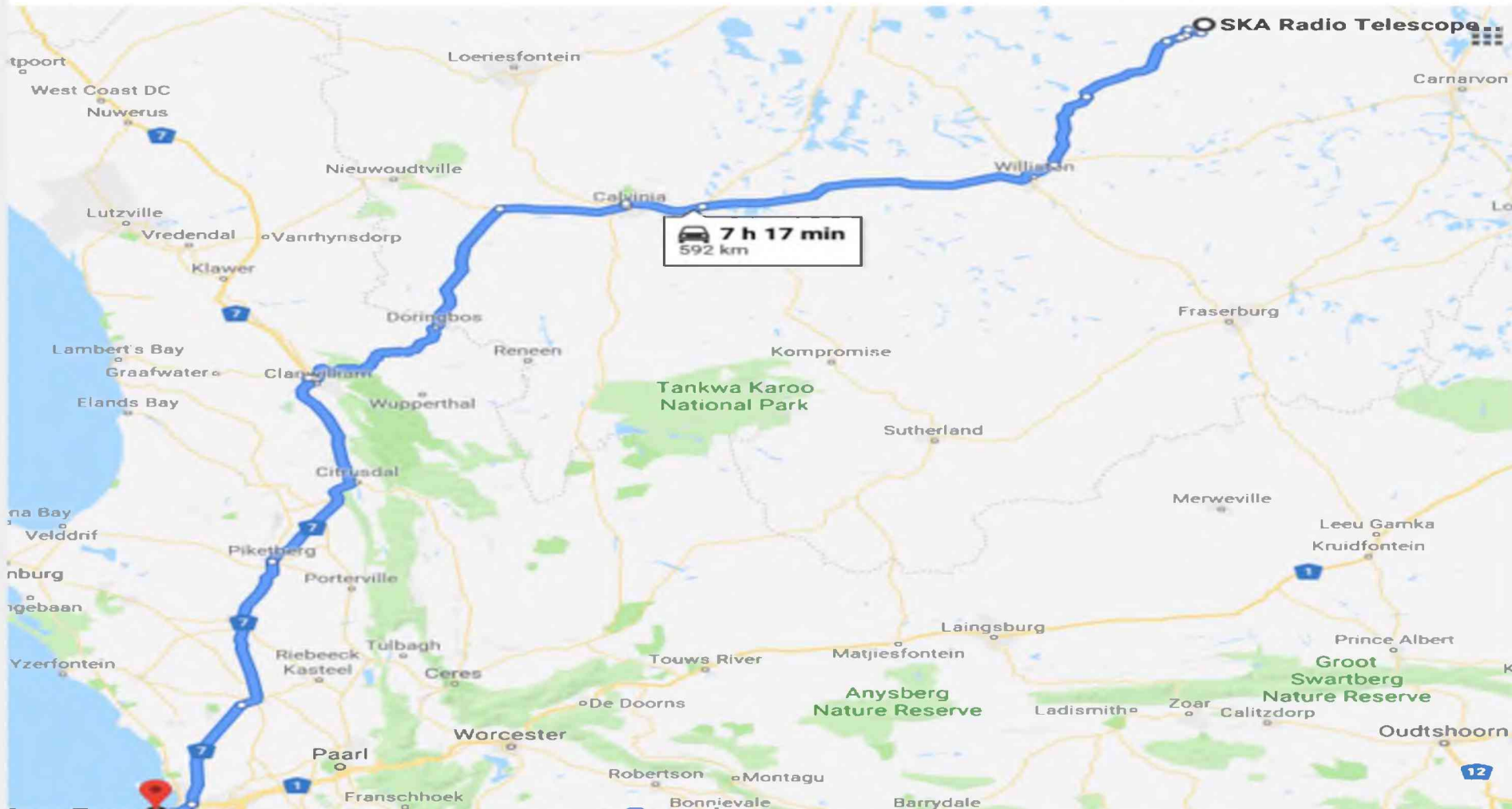
KARDO STORM

Local support

R136 million		Amount spent at local service providers and contractors for the construction of MeerKAT and related projects
R162 million		Amount spent on salaries for employees from the Northern Cape
R1 million		Amount spent on training for people in the Northern Cape
R5 million		Amount spent on materials from local suppliers for the equipment for the construction of the Hydrogen Epoch of Reionisation Array (HERA)
72		Number of students studying at technical colleges for further education and training through bursaries from SARAO since 2011
7284		The number of job opportunities created through the construction of KAT-7, MeerKAT and other related projects
22		The number of schools where structured SARAO Human Capital Development Programmes are facilitated. This includes Carnarvon High School, Carnarvon Primary School, Williston High School, Nico Bekker Primary School, Loxton Primary School, Vosburg Primary School, Brandvlei Primary School, Brandvlei High School and Fraserburg High School where more than 5400 learners are involved
130 000 ha		The area being declared a nature reserve and which will be preserved for future generations
At least 250		Farmers and farm workers to whom fixed line broadband data service connectivity was supplied via satellite (V-SAT) since December 2015
R3 million		Amount spent on local catering, tourism and accommodation in the Northern Cape
R4 million		Amount spent on local transport in the Northern Cape

1		Technical training centre established in Carnarvon
107		Number of local women directly employed by SARAO between 2015 and 2017
1267		Number of local women directly employed by SARAO subcontractors between 2015 and 2017
2		Libraries with internet connections supplied through SARAO
3		Cyber laboratories established in the Northern Cape with the aim of providing training to members of the communities. A fourth cyber laboratory is currently being established
25		The number of local business owners from Carnarvon, Williston and Brandvlei who received training from the SARAO supply chain management department
8		Number of wi-fi hotspots established for use by the communities
R3 million		The amount spent on community development initiatives
15		The number of SARAO sponsored students from local communities currently studying at universities
694		Number of Northern Cape adults who have already received training through SARAO

Rural/Small town Opportunities





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calvinia



Population – 10 000
Area – 154km²

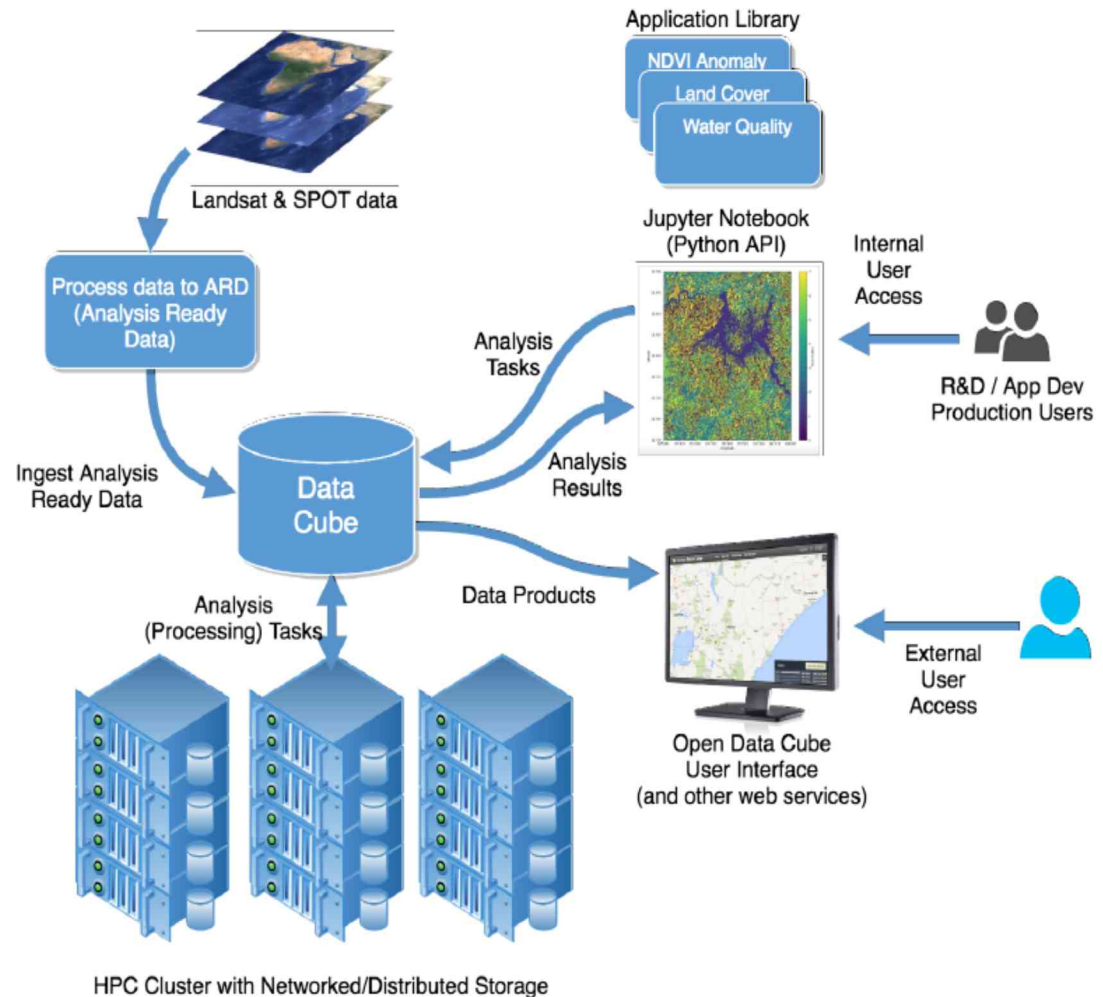
Average Rainfall – 0.6mm – 30mm
Mean daily sunshine – 6-12 hrs

Agriculture
Tourism

Government Service Delivery

Multi-disciplinary
competence that
can service the
public sector
providing
solutions in
Engineering, High
Performance
Computing, data
analysis, etc.

SARAO-SANSA data
cube development





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SKA Opportunities

- System assembly, integration and verification (AIV)
- Dish AIV
- Band 2 SPF, Controller & Vac
- SDP Program & System teams
- HPC Solutions
- ...



Big Data Opportunities

- MeerKAT Science Data Processor implements the largest data storage of its kind
- Storage System is geared for next-generation large survey telescopes
- Components have applicability in industry for cost-effective high performance and capacity
- Current core backbone infrastructure also opens opportunities in untapped markets e.g. fibre access in rural areas



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Commercialisation Strengths

- Substantial intellectual portfolio emanating from MeerKAT, primary in the form of know-how
- Excellent technical competence to productise technology for various market segments in High Performance Computing
- Validated technologies through MeerKAT deployment
- Ability to secure SKA opportunities both through selected work packages and collaboration
- Excellent reputation provides for public and private sector partnerships

THANK YOU

