



**National
Research
Foundation**



**science
& technology**

Department:
Science and Technology
REPUBLIC OF SOUTH AFRICA



SKA SA PROJECT OFFICE: Data Transport Update.

**Presented by: Dr Adrian Tiplady
Prepared by: Bruce Wallace**

**WP2 Meeting
27 October 2010**



“MeerKAT” Data Transport

1. A new 33 kV Powerline has been constructed from Carnarvon to the SKA Core site encompassing a MASS (Metal-Armoured Self Supporting) fibre optic cable implemented as the earth-wire.
2. The powerline is commissioned and is providing grid power to the Core Site / KAT-7 . The fibre optic component of the powerline is currently undergoing acceptance tests – completion expected mid November 2010.
3. A contract has been placed by SANReN (South African National Research Network) on SA national operators Neotel / Broadband Infracore for the initial 10 Gbit/s connectivity from Cape Town to Carnarvon. The full fibre optic connectivity will be in place by May 2011.



“MeerKAT” Data Transport (cont.)

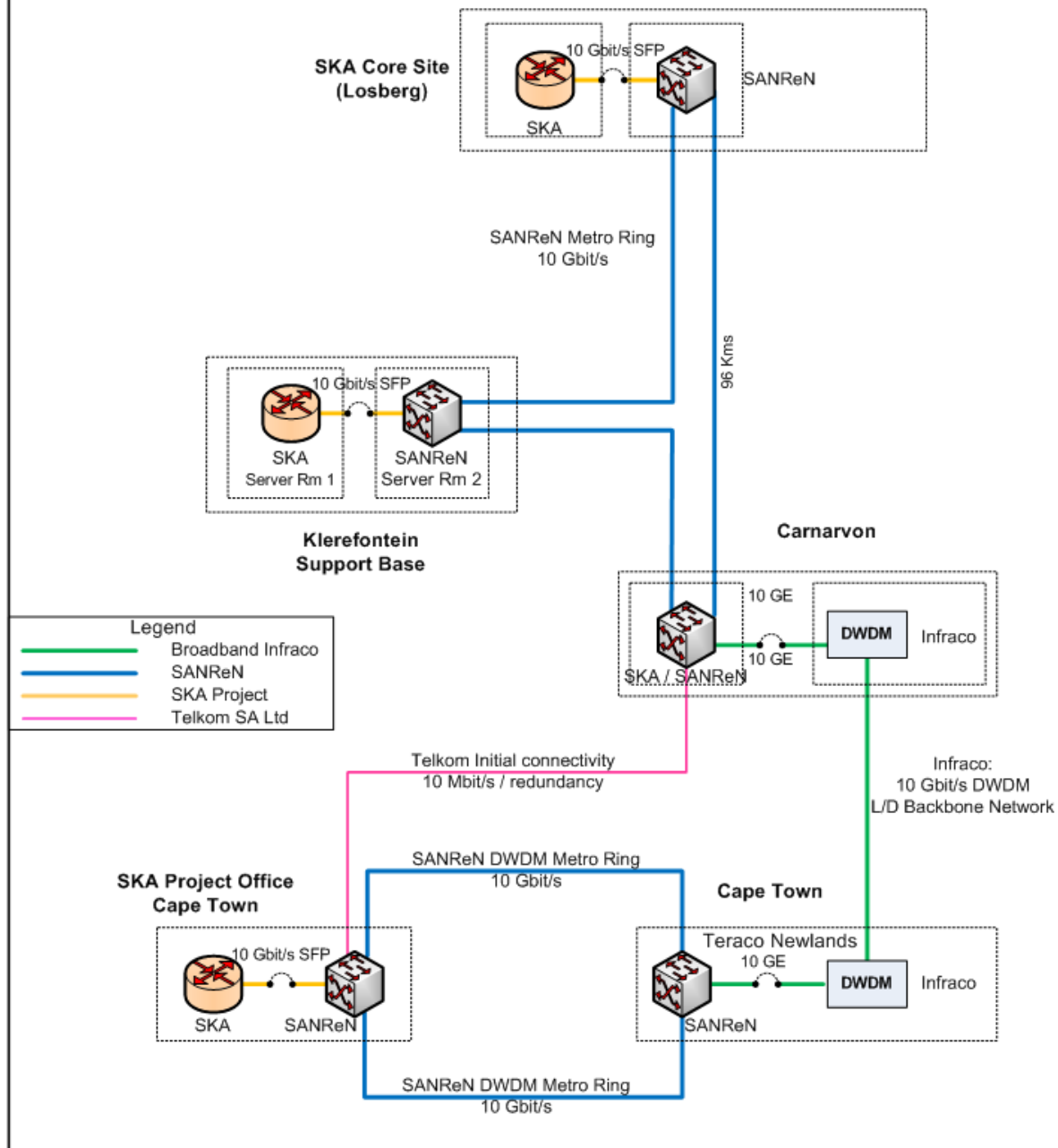
4. SANReN will establish a 10 Gbit/s fibre “metro ring” from the SKA POP site in Carnarvon, connecting the “Losberg” Core Site and the Klerefontein Support Base. This will provide full flexibility between these three sites. The sites will terminate in Cisco switches with DWDM functionality - expected completion end November 2010.
5. SANReN have placed a contract on the SA national operator Telkom for a temporary capacity of 10 Mbit/s from Carnarvon to the SKA Cape Town Project Office to facilitate KAT-7 antenna commissioning activities. This fibre link can be upgraded in future to provide a redundant fibre optic link. Completion end November 2010.
6. The SKA Cape Town Project Office will be connected to the SANReN fibre optic DWDM Cape Town “metro ring” during Q1 2011. This will provide full DWDM fibre connectivity via the Infracore L/D network from SKA Core Site to Cape Town.



SKA SOUTH AFRICA
SQUARE KILOMETRE ARRAY

MeerKAT / SKA Initial Data Transport Implementation

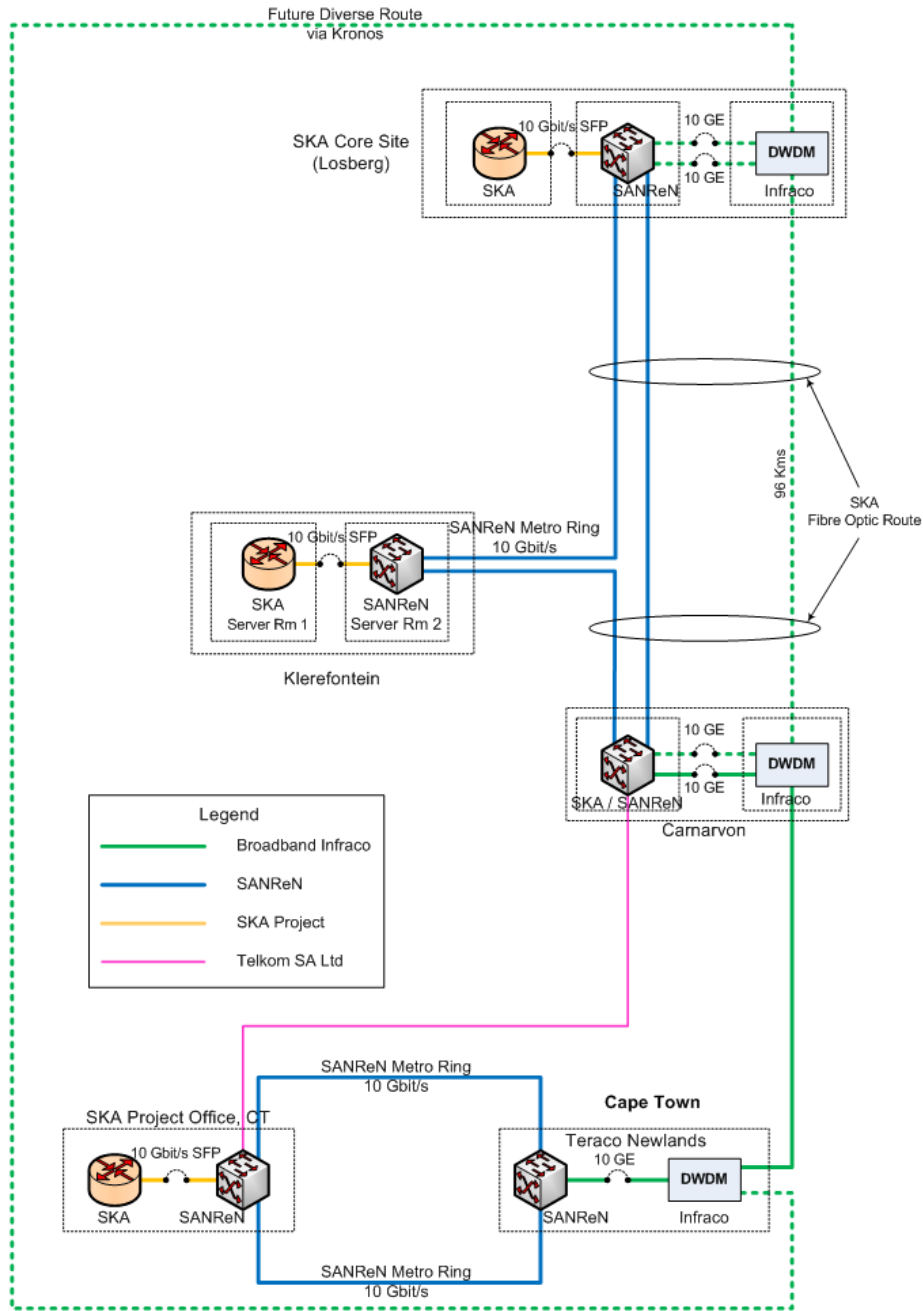
30 October 2010





SANReN 10 Gbit/s Link to SKA Project

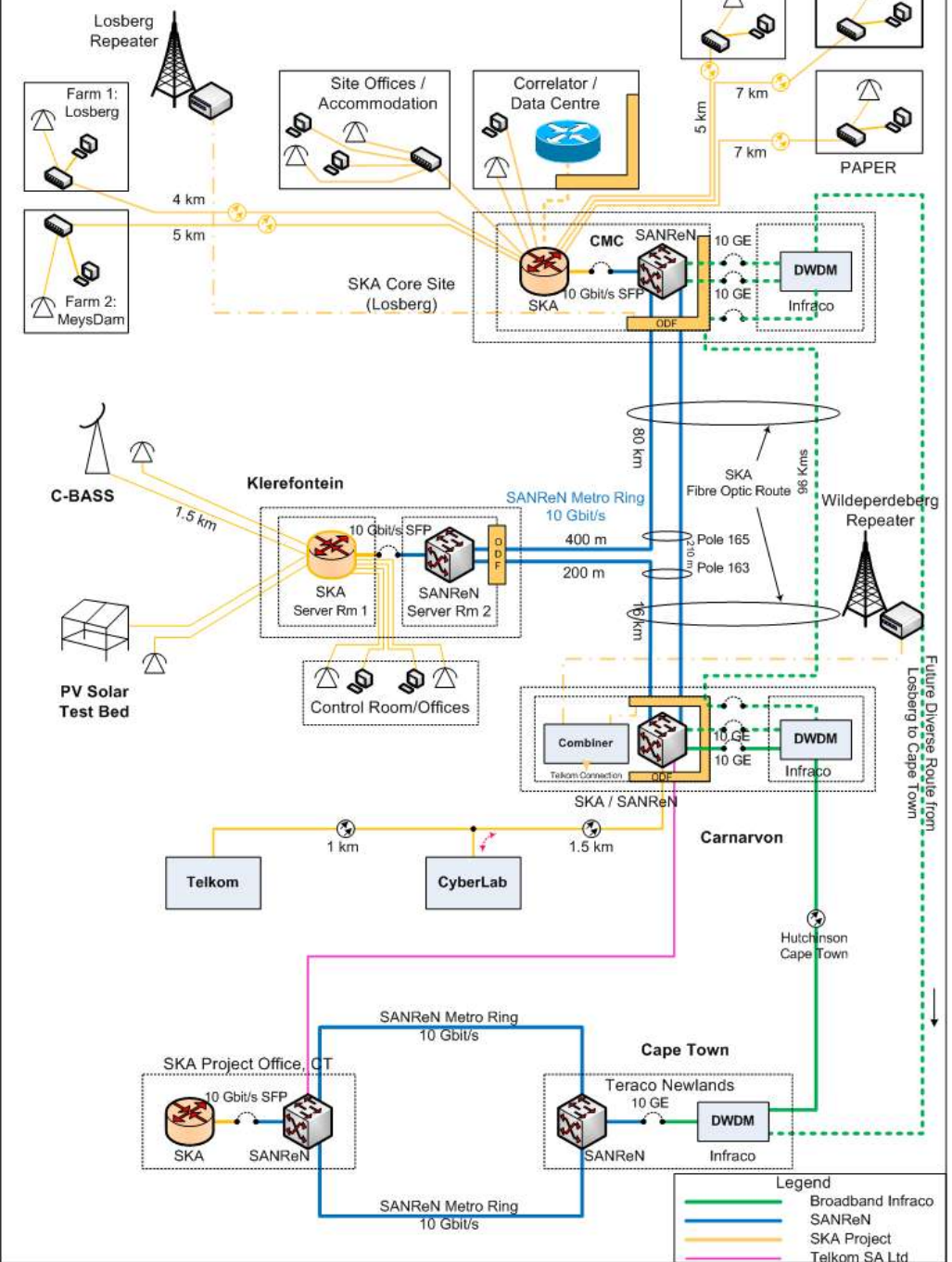
Rev1a





MeerKAT Network

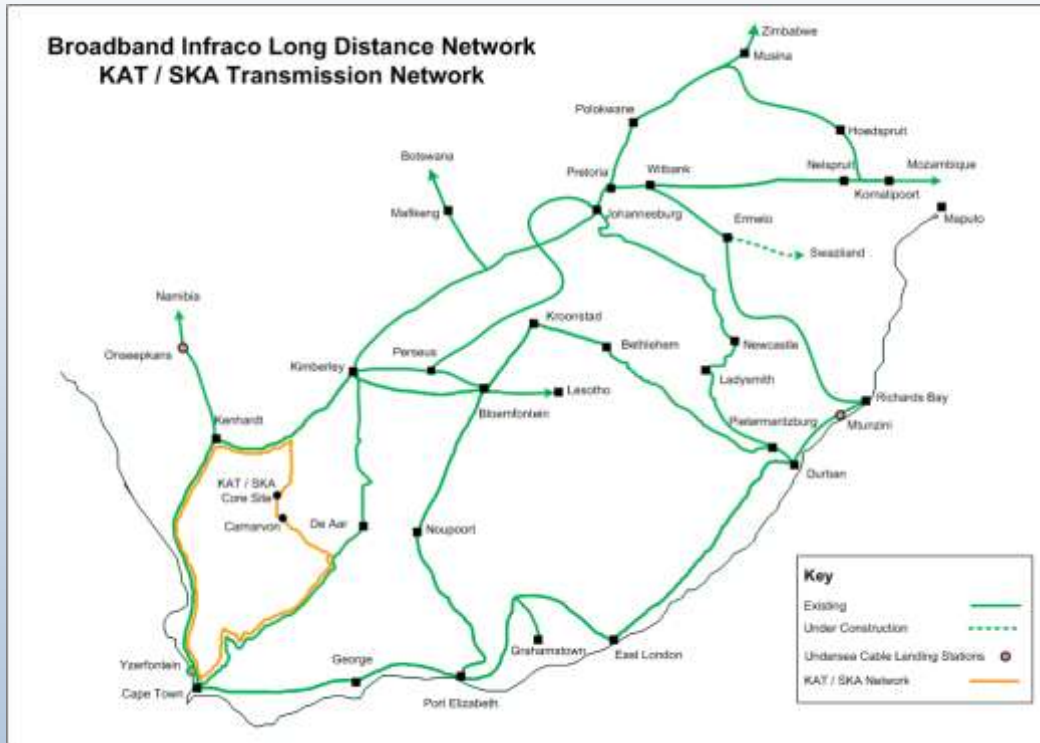
Rev 5a



Legend

—	Broadband Infracore
—	SANReN
—	10 GE
—	SKA Project
—	Telkom SA Ltd

SKA SA Power/Data Transport



New 33 kV Powerline with MASS fibre optic cable approaching Core Site



KAT 7 Pathfinder



KAT 7 Site April 2010



Minister Naledi Pandor and
Northern Cape Premier Hazel Jenkins
at the KAT 7 site in April 2010

KAT 7 Infrastructure



**Klerefontein
Support Base**



**Core Site
Complex**



78 Km access road to site



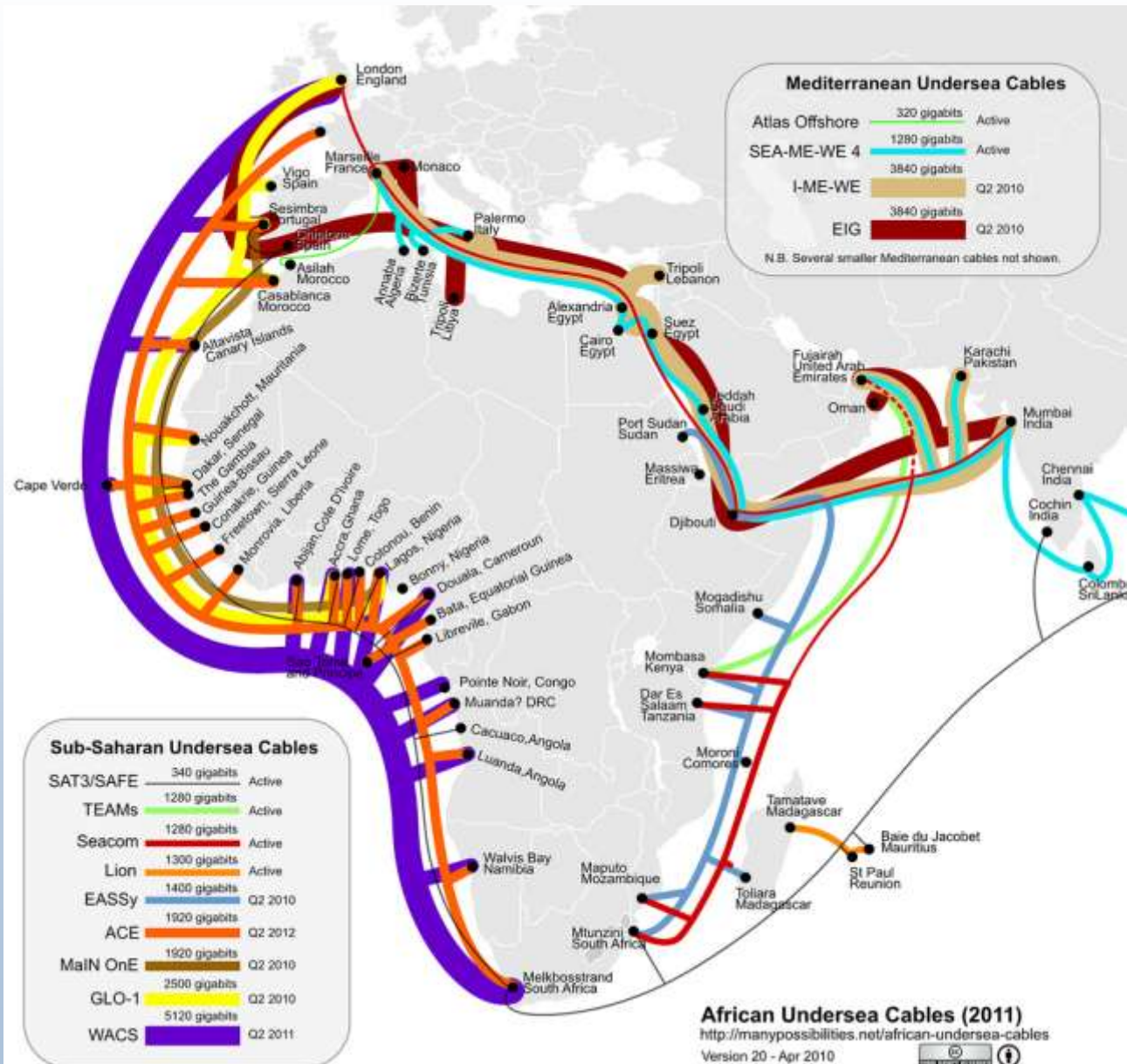
SKA SA Data Transport

1. The current fibre network provides the foundation for the future SKA transport network from the Core Site to Cape Town for connectivity to the undersea cable systems.
2. Broadband Infracore require to install an additional 170 kms of fibre optic cable to provide a fully redundant DWDM fibre network from the SKA Core Site to Cape Town (as per previous diagram). This could be incorporated into the power supply system required for the SKA Core site.
3. The initial Telkom SA link can be retained to provide an additional level of redundancy via a totally independent operator network
4. The fibre network will interface to the WACS (West African Cable System) submarine cable from Cape Town to Europe / United Kingdom with a capacity of 5.12 Tbit/s. Redundancy to this system to Europe will be provided by East Coast cable systems such as SEACOM / EASY / SAFE cable systems.



SKA SOUTH AFRICA
SQUARE KILOMETRE ARRAY

African Undersea Cable Systems





Antenna Data System Connectivity

- The three antenna cores and the antenna network spirals out to 180 kms will be implemented as a private network. The fibre optic cable network will be installed in the most cost effective network for both electrical and data transport networks. Nokia Siemens Networks (NSN) are assisting with the development of equipment to meet the asymmetrical nature of the network but with fully management capability across all DWDM wavelengths.
- The remote sites will be overlaid on the networks of three of the SA fibre optic network operators. Discussions are in hand to develop the following options:
 - Access to dark fibre / utilise existing repeater infrastructure
 - Access to managed bandwidths
 - Access to servitudes / provision own electronics
- The same process will be applied to the African Partner countries. A contract has been placed with a UK-based company to confirm the availability of fibre networks and/or managed bandwidth.



SKA SA Project Office: Data Transport Update.

Thank You