SOUTH AFRICA: RESEARCH TRENDS IN TELECOMMUNICATIONS

3RD INTERNATIONAL B2B SOFTWARE DAYS – CELTIC PLUS

Date: 28 April 2015

science & technology

Department:
Science and Technology
REPUBLIC OF SOUTH AFRICA

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Telecommunications Landscape in South Africa

- SA has a population of 53 million people
- SA's telecommunications infrastructure is considered the continent's most advanced in terms of technology deployed and services provided, with a network that is 99.9% digital and includes the latest in fixed-line, wireless and satellite communication;
- There are currently 2 landline telecommunications service providers operating in South Africa, namely Telkom and Neotel. The landline market penetration in South Africa stood at around 7.8%* at the end of 2013;
- There are 4 licensed mobile service providers operating in the country. MTN, Vodacom, Cell C and Telkom Mobile, a subsidiary of Telkom. Mobile penetration is estimated to be about151% and it has been calculated that more people in SA use mobile phones than listen to the radio, watch TV, or use a personal computer;
- South Africa also has a robust internet provider market which is evident in the size of the ISPA's (Internet Service Provider Association) member list, currently sitting at168 registered members of varying sizes;
- By 2013, SA's undersea cable capacity was 14.04 terabits per second which is expected to increase dramatically with the addition of new cables that are planned for this region.
- LTE, the new generation wireless broadband technology alsotook root in the country

South Africa Connect – National Broadband Policy

POLICY

- Vision
- Objectives
- Principles
- Definitions
- Targets

STRATEGY
(to achieve policy objectives)

- access - critical mass
- affordable
- improve use/diffusion
- production/innovation

PLAN

Identification of high-level programmes/ activities to achieve strategic objectives
(Ultimately roadmap of activities, timelines and budgets)

VISION

In line with the broader vision of the NDP, the Vision for broadband is that by 2020, 100% of South Africans will have access to broadband services at 2,5% or less of the population's average monthly income.

South Africa Connect: Objectives

- affordable, ubiquitous broadband to meet the diverse needs of public and private users, formal and informal business, and consumers and citizens
- policy and regulatory conditions that enable investment by public and private sector players to reach South Africa's broadband ambition
- efficient public sector delivery, including e-government services - national, provincial and municipal - have broadband connectivity ,extended to communities
- public and private enterprise, formal and informal, able to fully exploit the efficiencies offered by broadband and its potential for innovation
- a strong national skills base developed for the country to be a proficient and globally competitive knowledge economy
- create environment for a vibrant creative and software industry producing content and applications relevant to meet the needs of the diverse users in the country

South Africa Connect: Broadband Value Chain

Strategy

Networks → Services → Devices → Applications → Content

Digital readiness

Policy, legal & regulatory (institutional) framework

- Coordinated and integrated action on network builds
- Removal of administrative and regulatory bottlenecks (rights of way)
- Enforcement of wholesale access regulation
- Rationalisation of state-owned companies
- Appointment of Broadband Council

Digital development

Connected Government

- Aggregation of public sector demand
- Infrastructure extensions
- Health and education connectivity prioritised

Digital future

National Broadband Network

- Affordable, high speed broadband
- Universal coverage through multiple delivery modes
- Open access wholesale network
- Fibre and terrestrial wireless and satellite
- Public sector anchor tenant

Digital opportunity

Skills development

- ICT curriculum/e-literacy
- Skills to secure and create jobs to ensure equity and inclusion

R&D and innovation

- Quality of life
- National competitiveness

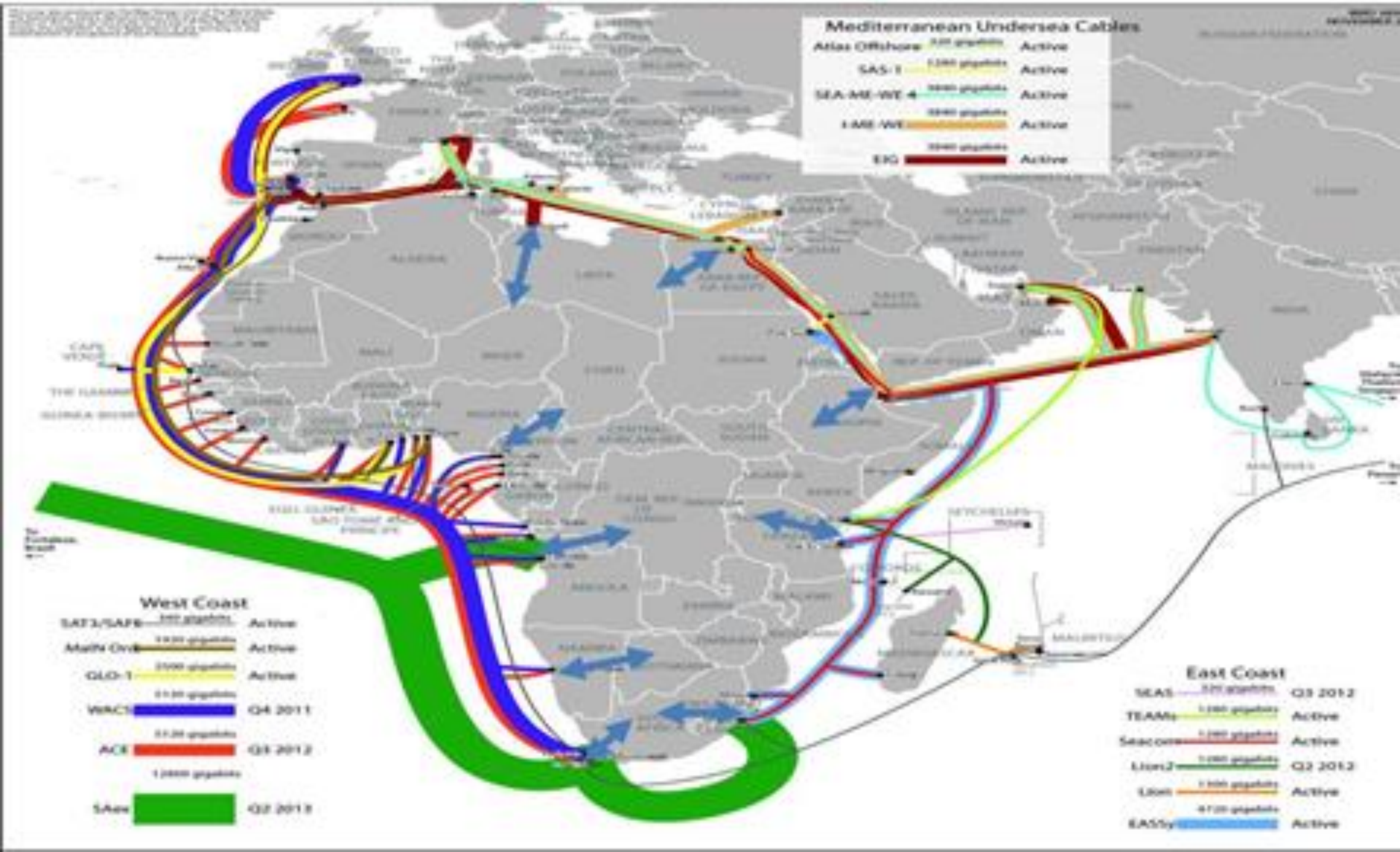
Applications and local content development

- Vibrant creative and software industry

Connecting More Communities to Broadband

FIIDEKA

Extending Fiber Connectivity Inland !



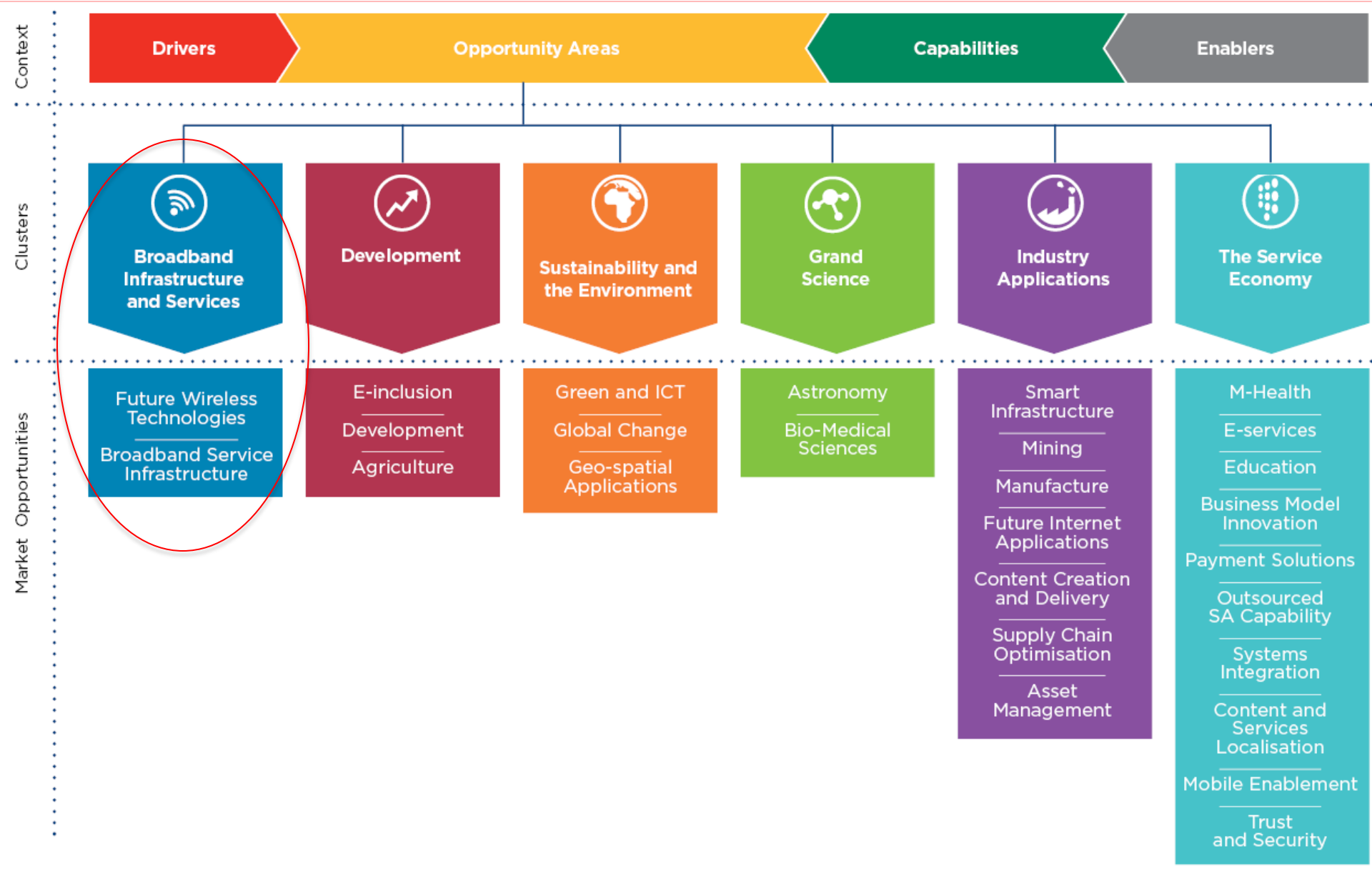
ICT R&D and Innovation Roadmap Vision: Create Digital Advantage for South Africa

Our vision is for a South Africa that has overcome the Digital Divide; by leveraging advances in ICT to address socio-economic challenges it has created ***Digital Advantage***

This will be done through **sound investment** and **effective coordination** of ICT R&D and innovation activities

- Principal focus: satisfaction of National Needs (deliver Impact against 12 Outcomes)
- Focused export activity as technologies arrive on-market (ie AFIS)
- Test technologies with local customers before

Digital Advantage: 6-Point Cluster Driven Strategy



Broadband Infrastructure & Services

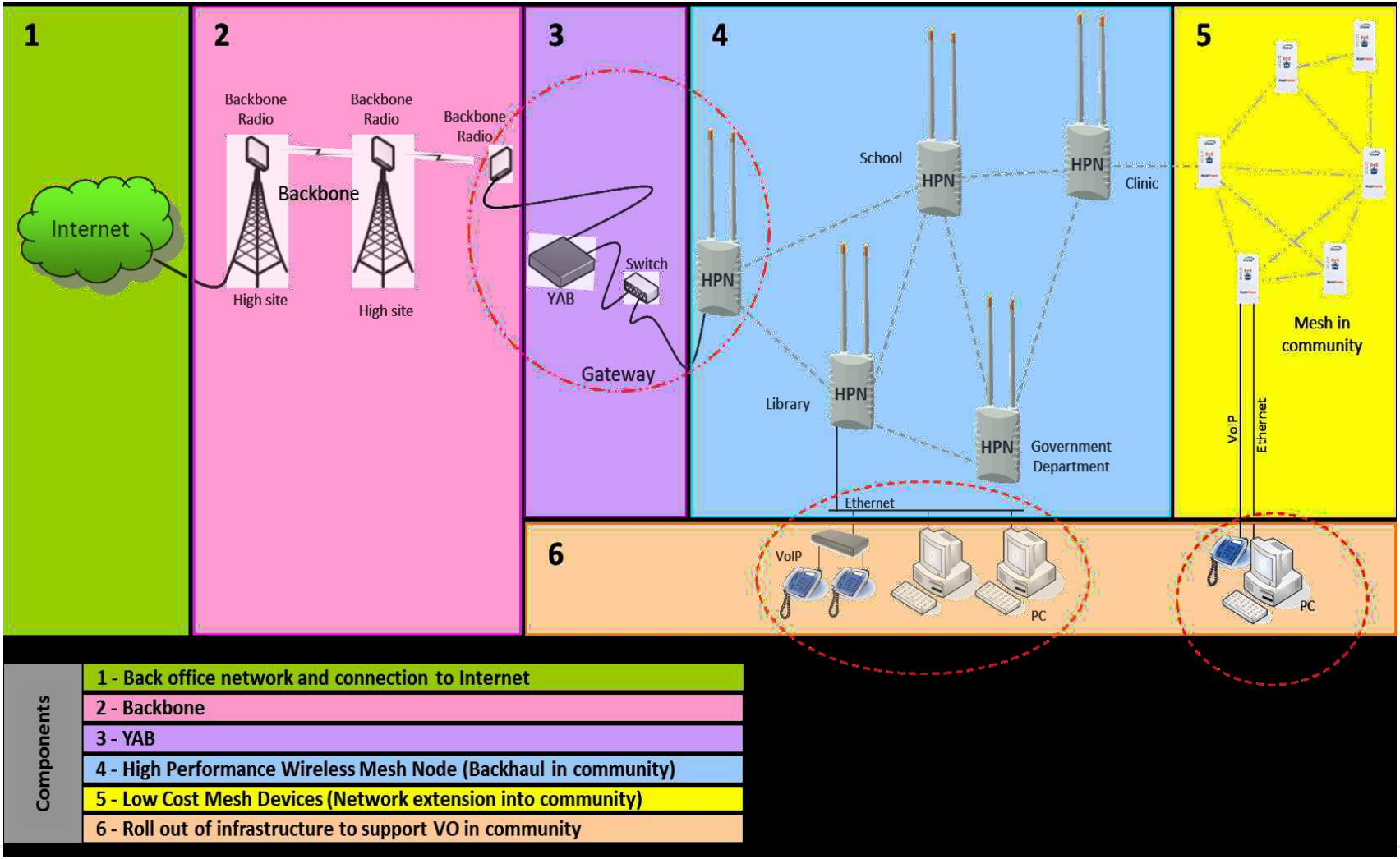
Future Wireless Technologies

- Design and development of technologies that respond to changes in demand for wireless broadband services, related to availability and quality of connectivity in rural areas (digital inclusion)

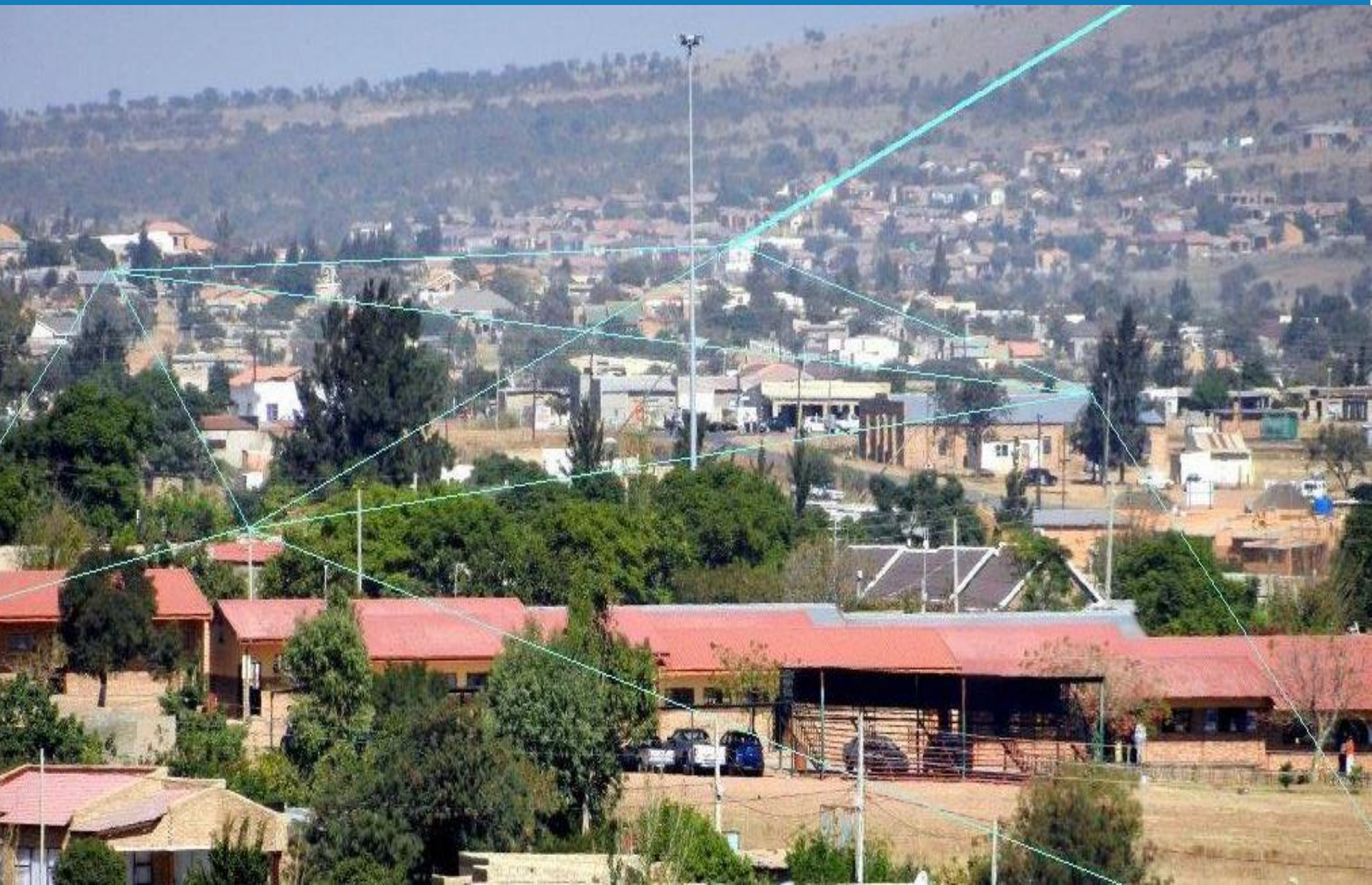
Broadband Service Infrastructure

- Utilisation of public broadcast and wireless spectrums, freed-up through digital migration and new approaches to spectrum regulation.

Future Wireless Technologies – Wireless Mesh Networks



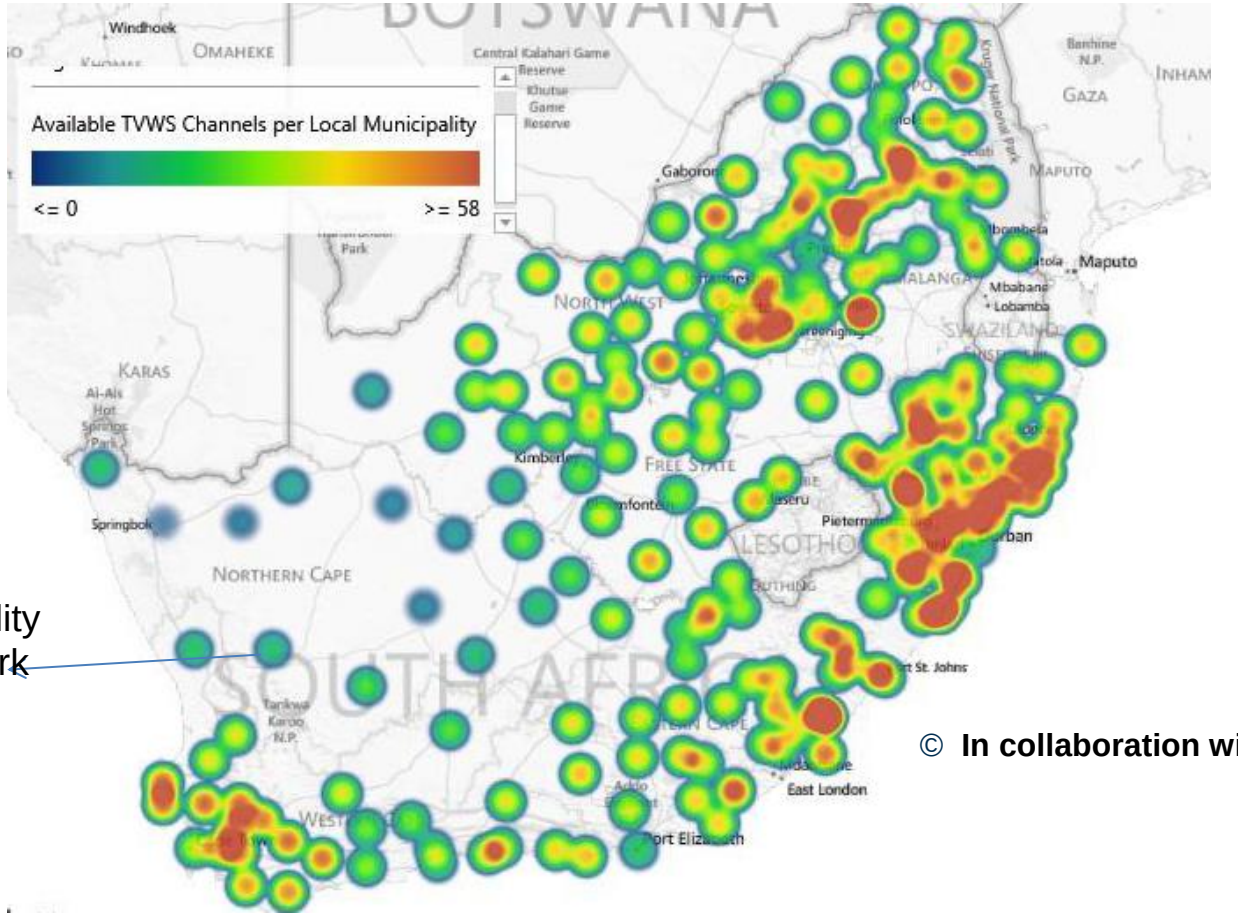
Future Wireless Technologies – Wireless Mesh Networks



Broadband Service Infrastructure – Dynamic Spectrum Networks

- Spectrum Toolbox:
  - Reconfigurable dynamic spectrum
    - Geo-location Dynamic Spectrum Allocation
    - Dynamic Spectrum Broadband Networks – TVWS Trials
  - 5G Initiative: Emerging market perspective
    - What does 5G promise to Africa,
    - Will there be change in the 80+ % broadband unconnected ?
  - Software Defined Radio & Networks
- WIFI & TVWS: 802.11xx offloading and co-existence with LTE/5G Cellular Networks.
- Dynamic Spectrum Networks for Smart-Grid Communication.

Smart Grid Communications: Available White space spectrum channels per municipality in South Africa



A Municipality Grid Network

Broadband Communication – Square Kilometre Array (SKA)

The SKA project is an international effort to build the world's largest radio telescope, with a square kilometre (one million square metres) of collecting area.

Deploying thousands of radio telescopes, in three unique configurations, it will enable astronomers to monitor the sky in unprecedented detail and survey the entire sky thousands of times faster than any system currently in existence.

Facts about SKA

BIG NUMBER FACTS

The SKA will use enough optical fibre to wrap twice around the Earth.

BIG NUMBER FACTS

The aperture arrays will produce more than 100 times the current global Internet traffic.

BIG NUMBER FACTS

The dishes of the SKA will produce 10 times the current global Internet traffic.

BIG NUMBER FACTS

The SKA will be so sensitive that it will be able to detect airport radar on a planet 50 light years away.

BIG NUMBER FACTS

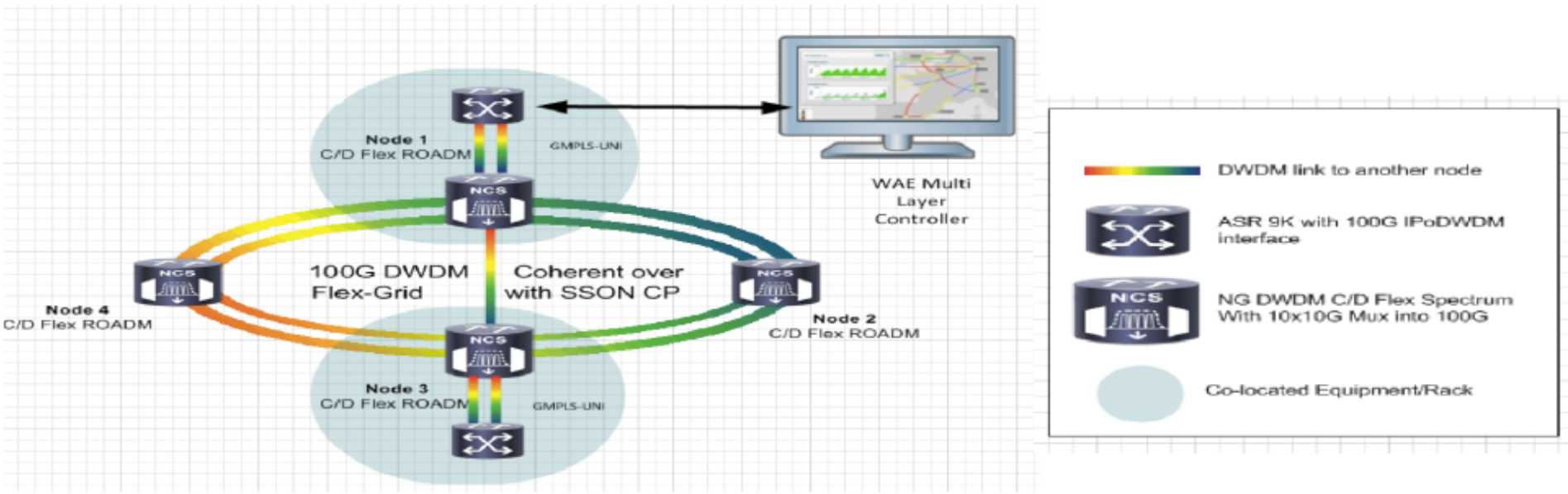
The SKA will contain thousands of antennas with a combined collecting area of about one square kilometre (that's one million square metres).

BIG NUMBER FACTS

The SKA central computer will have the processing power of about one hundred million PCs.

"Our Journey to Bring the SKA to Africa, http://www.ska.ac.za"

Broadband Communication – Spectrum Research



Research Topic:

- Non-static DWDM data channels
- Flex-spectrum wavelength allocation is dynamic
- Flexibility of resource utilization and network optimization
- Challenges in terms of the device physics and the algorithmic control plane (Network Intelligence)

THANK YOU

Zimbabwe
All Days
Tom Burk
Lephalale
Polokwane
Modimolle
Northam
Botswana
Mafikeng
Rustenburg
Pretoria
Witbank
Middleburg
Nelspruit
Mozambique
Swaziland
Ermelo
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Welkom
Newcastle
Ulundi
Richards Bay
Mtunzini
Pieter-maritzburg
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