



# Wireless@Meraka Experience with FP7

## Ntsibane Ntlatlapa

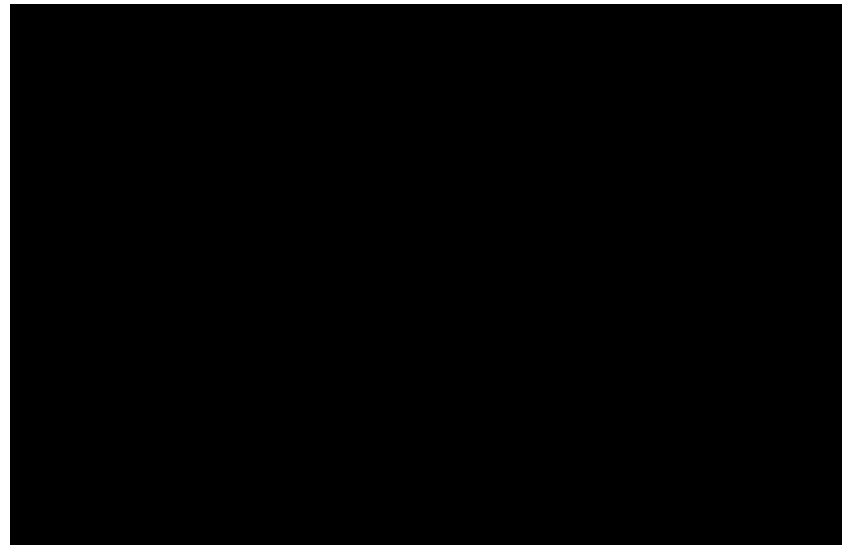
3<sup>rd</sup> EuroAfrica-ICT Awareness Workshop

# Roadmap

**Meraka Overview**



**AfricaWorks**



**meraka**  
I N S T I T U T E

African Advanced Institute for Information  
& Communications Technology



# Meraka Overview

PEOPLE – RESEARCH – INNOVATION

PARTNERSHIPS – UBUNTU



# National strategic initiative

African Advanced Institute for ICT (AAICT aka Meraka Institute)

- National strategic intervention to:
  - Radically change system of ICT innovation
  - Increase ICT R&D intensity for socio-economic impact (continental scope)
  - Special focus on advanced skills
- Timeline:
  - State of the Nation Address - February 2002
  - Inter-ministerial committee setup; concept accepted by cabinet – July 2002
  - Launch by Minister of Communications - 17 May 2005
- Meraka = common grazing ground (Sesotho Language)
  - Shared space for creative productivity
  - Partnerships: strengthen existing institutional capacity

# Meraka - mandate

- 📁👉 Undertake world-class needs-based **R leading to D and I** for Africa
- 📄👉 Champion an emergent SA ICT industry founded on **R&D**
- 📄👉 Produce ICT knowledge workers with sound **postgrad** qualifications
- 📄👉 Act as a **change agent** to increase SA **indigenous tech** production, decrease Africa reliance on imports. OSS.
- 📄👉 Harness Africa/Int'l **partnerships**, promote clustering... to develop **indigenous tech**
- 🕒👉 Raise SA international profile
- 🖨️👉 Futures instigated **R&D** activity
- 👉 Contribute, formulate, develop: ICT strategies, policies and initiatives
- 👉 Recruit foreigners, especially Africans
- 📁👉 Collaborate, exchange... African ICT orgs... employ and develop African Human Capital

# Mission – AAICT (Meraka)

Economy ↑

Quality of Life ↑

## Annual PhD graduations

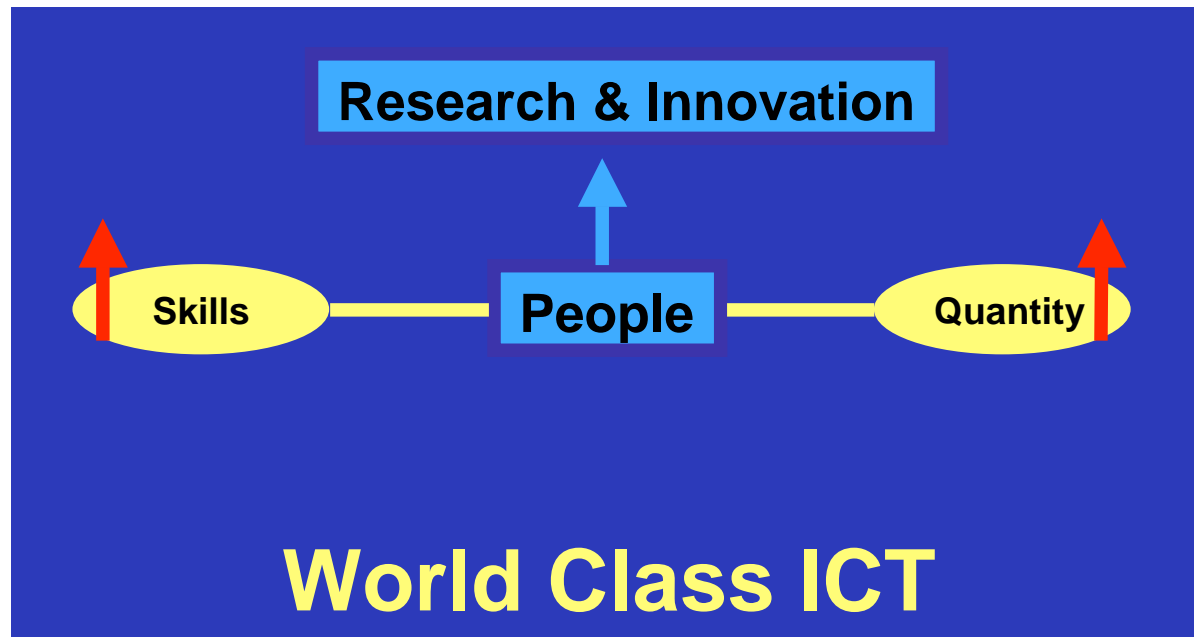
Ireland: 120

Sweden: 500

South Africa: 20

(Target – OM ↑ by 2015)

India: 50



# Meraka Research & Innovation Activities

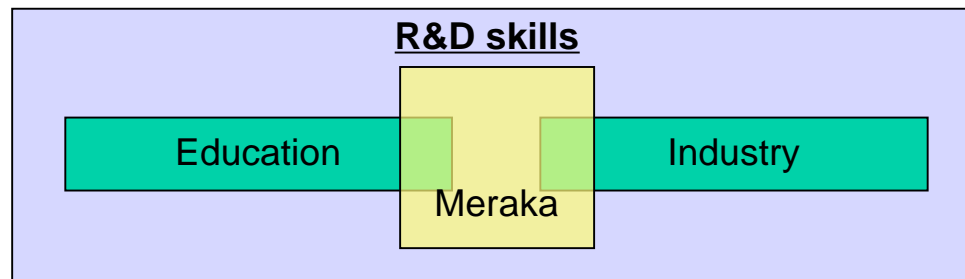
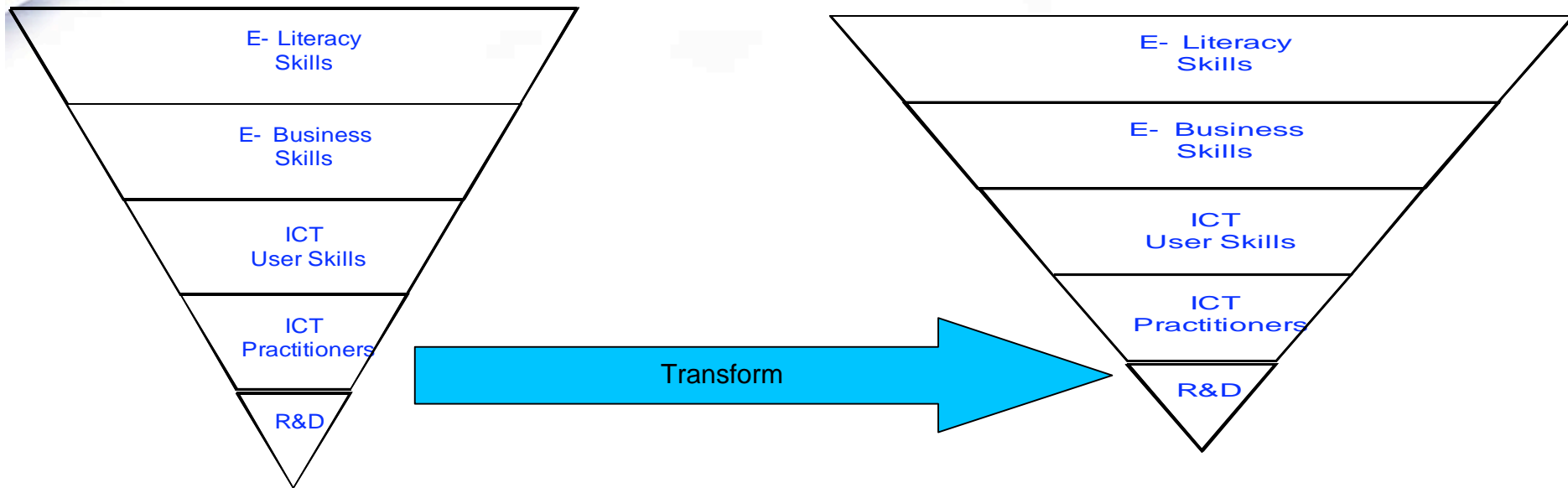
- Extending the reach of ICT and research infrastructure
  - Wireless Africa
  - Digital Doorway
  - SANReN, CHPC, EduNet
- Enabling the inclusive use of ICTs
  - Intelligent Environments for Independent Living (e.g. NAP)
  - Human Language Technologies
- Supporting national priorities through ICTs
  - Small business: Rural ICT entrepreneurs
  - Education: MObILED, YESA, FAB kids, NePAD e-Schools, Singa
  - Health: Rural tele-health
  - Planning & monitoring: earth observation and remote sensing
  - Information security
- Evaluating the use of ICTs
  - IST-Africa



**Meraka**  
I N S T I T U T E

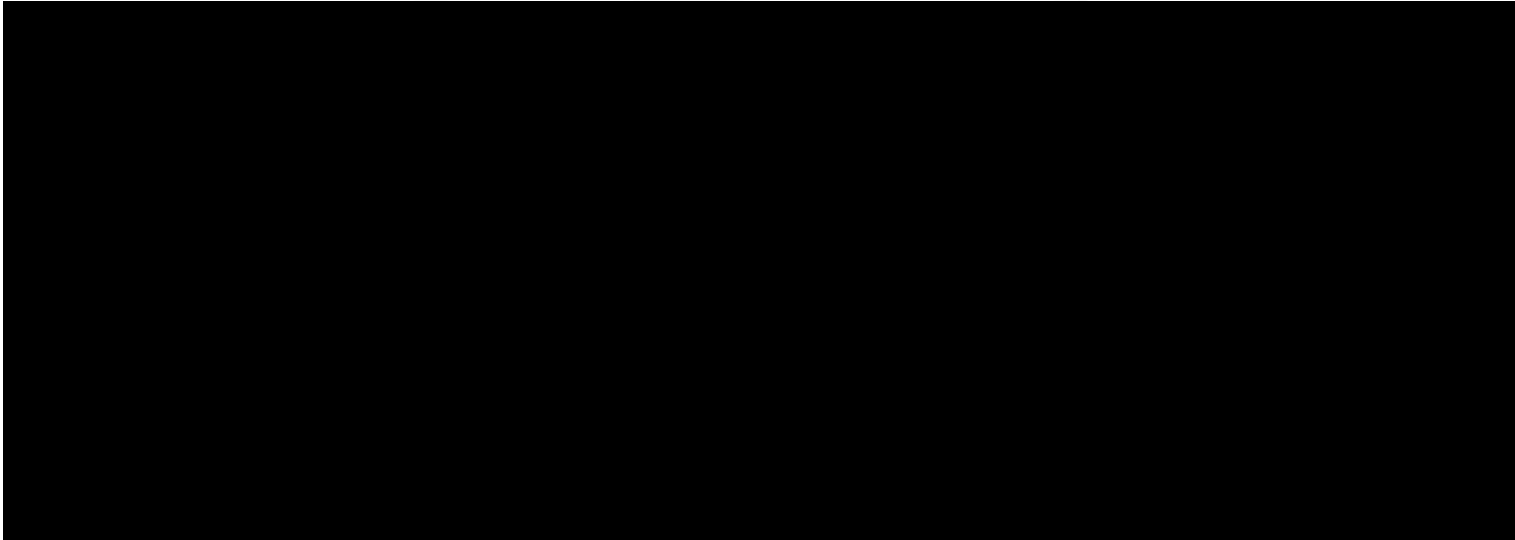
African Advanced Institute for Information  
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# Concept on skills development



# MERAKA: for the common good





# EU-FP7

**Ntsibane Ntlatlapa**

# About AfricaWorks

## GRA workshop in Delft, Netherlands

- Resolution: Establish AfricaWorks project
- Partners: Meraka, TNO, Fraunhofer, VTT, Linknet

## Actions points for Implementation

- Whitepaper
- Technical description of project
- Identify funding sources
  - R & D: EU FP 7
- Internal Communication
- Update of business plan

# Problem statement

## Sub-Saharan Africa is the most digitally isolated region in the world

- a bandwidth per capita that is only 1% of the world average and 0.2% of that in the United States
- highest connectivity costs in the world (50x)
- 70% of the population lives in isolated rural areas

## Why?

- lack of competition
- lack of infrastructure

## Impact

- social -> obvious
- economical
  - local population (access creates business)
  - European industry

# Challenges

## Convergence of infrastructure

- mesh networks
- satellite
- cellular networks

## The wireless mesh will be very large

- in terms of distance and in terms of hops in an extreme environment ( lossy hops, unreliable nodes, and limited bandwidth).

## Energy will be scarce

- **Network energy efficiency**

## Well-trained professional service personal may not be available,

- Requirements: self-configuration, self-management and self-healing equipments and protocols.

## Equipment needs to be cheap

- **Result:** enabling local operators to provide cheap (or even free) service to some or all potential users.

# R&D challenges

Adaptive modulation and coding

Cross-layer design (routing)

- IEEE 802.21s

Cognitive self-configuration and self-management

Converged infrastructures

Steerable Beam-forming Antennas

Network Monitoring

# Main innovation

Connectivity solution for large scale deployment applicable in rural Africa

- Ultra cheap, robust, energy efficient wireless

Converged infrastructure

- Mesh, satellite, cellular

Innovative business model for network providers

# Solid bases for an FP7 proposal

## ICT-2009.1.1 *The Network of the Future*

- c) Converged infrastructures in support of Future Networks
  - Converged service capability across heterogeneous access
- a) Future Internet Architectures and Network Technologies
  - Flexible and cognitive network management and operation frameworks

## Sound Policy and Strategy frameworks

- NEPAD CPA S&T
- EU/AU

## Solid commercial interest from European industry

- EuroAfrica-ICT platform
- Penetration of cellular operators (Orange, Vodafone) in Africa
- Similar issues in part of Europe

## and R&D challenges...

# Consortium

1	Fraunhofer Gesellschaft	Knowledge Institute	Germany
2	TNO	Knowledge institute	NL
3	VTT	Knowledge institute	Finland
4	Meraka Institute	Knowledge institute	South Africa
5	LinkNet	SME, mesh network	Zambia
6	Orange Labs	Mobile Operator	France
7	Romantis	SME, satcom	Germany
8	TurkSat	Satcom operator	Turkey
9	NWH Communication	Regional operator	South Africa
10	Bonn-Rhein-Sieg University	University, social impact	Germany
11	Thales	Equipement	NL

# WP breakdown (1/2)

## WP1: Administrative and Technical Management

- T1.1: Scientific Steering and Progress Monitoring
- T1.2: Administrative, Financial, Contractual, Ethical and Legal Assistance
- T1.3: Coordination and Information Exchange

## WP2: End-user Requirements and System Architecture

- T2.1: End-user Requirements
- T2.2: Business Requirements
- T2.3: System Specification and Architecture

## WP3: Energy Efficiency

- T3.1: Modeling of rural settlements in Africa
- T3.2: Available Power Sources and Backup solutions for power generation
- T3.3: Optimization of energy Consumption
- T3.4: Cross-layer design

# WP breakdown (2/2)

## WP4: Robustness and Usability

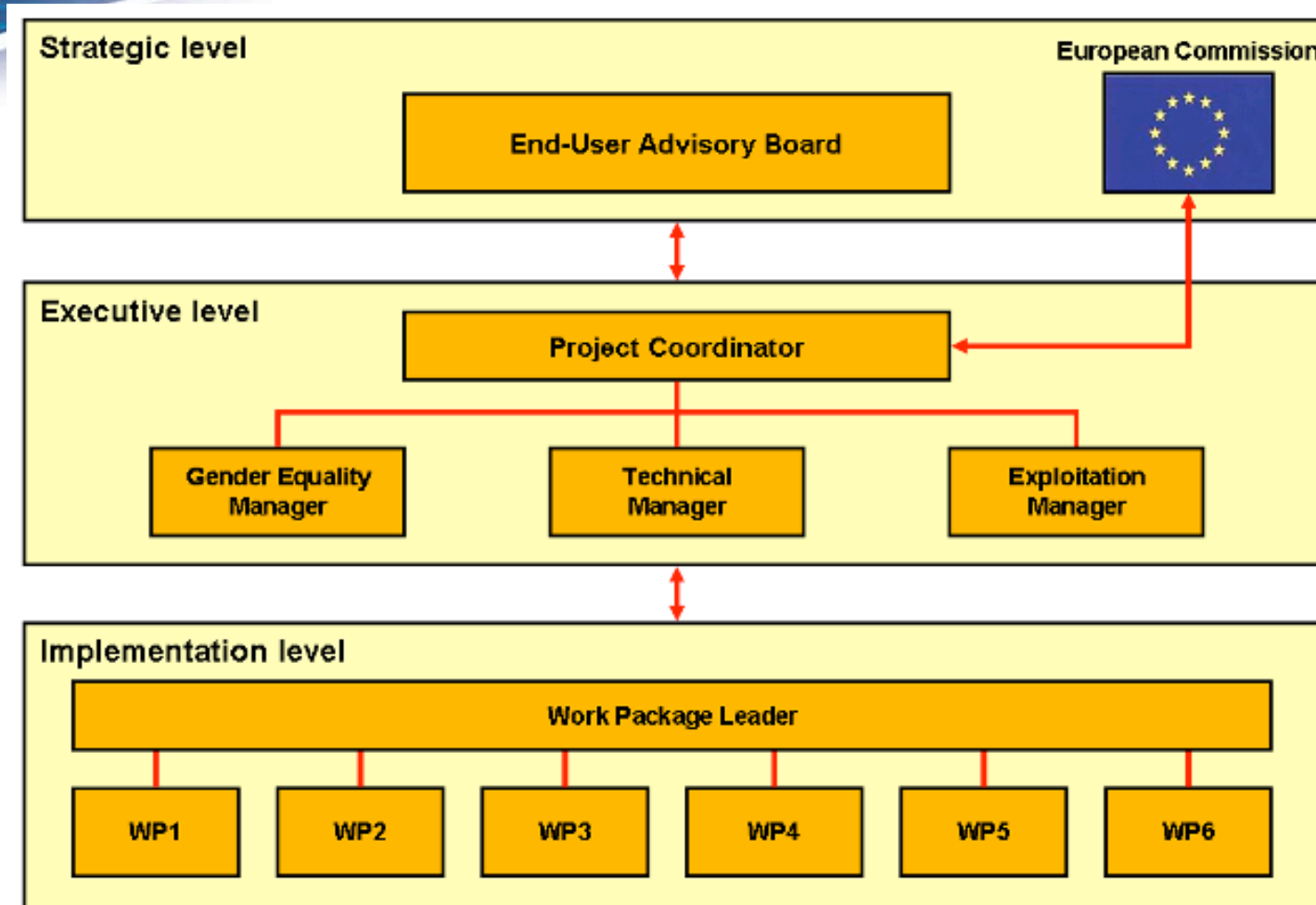
- T4.1: Cognitive Self-configuration and Self-management
- T4.2: Cross-layer Design and Mesh Support
- T4.3: Converged Infrastructures (e.g. selection between satellite and different terrestrial connections)

## WP5: System Integration, Field Trials and End-user Assessment

- T5.1: Conformance Verification and System Integration
- T5.2: Interoperability Testing and System Validation
- T5.3: Performance Evaluation and End-user Assessment

## WP6: Business Models and Social Impact

- T6.1: Techno-economic Assessment
- T6.2: Business and Social Opportunities and Risks



# Questions

