



**Dr Happy Sithole: Centre Manager (NICIS), CSIR
Providing Leadership to Africa by developing HPC
Capabilities and Supporting Large Scale Science
Projects**

**03 November 2022 12:30-15:30
CSIR ICC, Pretoria, Gauteng**



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Introduction



- High Performance Computing capacity and capabilities are necessary for advancing product development and innovation → Rapid Prototyping and Big Data Analytics
- Initial HPC system in Africa built in South Africa in 2007 – iQudu – 2.5 TFLOPS
- Since 2008 initiatives started to extend the capacity to the rest of the continent
 - SADC HPC Initiative → today adopted by SADC Ministers in ET-ST and forms part of annual agenda
 - Big Data Africa Initiative – based on supporting 8 SKA Partner countries – Annual Agenda of Senior Officials and Ministers
- Key objectives of these Initiatives:
 - Promote high quality education, research and innovation
 - Build cyberinfrastructure capacity
 - Promote cyberinfrastructure commons (an environment to share education, research and innovation resources)



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SADC Cyberinfrastructure Framework



- **Policies** - To enable optimal establishment and utilization of cyberinfrastructure
- **Computational Resources** - Ranging from HPC to other computing capabilities (hardware and software),
- **Data** - tools and facilities (including repositories) to enable sharing and efficient data-driven discoveries, technologies and innovations,
- **National Research Networks** -broadband infrastructure networks and service providers for education, research and innovation,
- **Human Capital** - effective use of the CI.



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Infrastructure Acquisition Strategy



- Repurpose of decommissioned (useful life) HPC Systems – TACC, Cambridge, CHPC
- Deploy SA – HDI, SADC and SKA Partner Countries
- Building of institutional/National HPC Capacity
- System Administrator Training – Sustainability of Operations
- User training in various recipient country/institution – tangible R,D&I projects
- Develop country strategy based on specific needs



Ghana



Mozambique



Badise at CERN



Namibia



Madagascar



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Mauritius



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Capacity Developed to date



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Project implementation



	Infrastructure			Staff			Development		Status of Hardware		
	Power & Cooling	Datacentre identified	Equipment Shipped	SysAdmin / Linux	Dedicated time	SysAdmin Course	Projects	Working Group	Operational	Used	Has Necessary Support Equipment
Mauritius : University of Mauritius (UoM)	✓	✓✓	✓✓	✓✓	✓✓	✓✓	✓	✓✓	✓✓	✓	✓✓
Namibia : Namibia University of Science & Technology (NUST)	✓✓	✓✓	✓✓	✓✓	✓✓	✓✓	✓	✓✓	✓✓	✓	✓✓
Botswana : University of Botswana (UB)	✓✓	✓✓	✓✓	✓✓	✓✓	✓✓	✓✓	✓✓	✓✓	✓✓	✓✓
Namibia : University of Namibia (UNAM)	✓✓	✓✓	✓✓	✓✓	✓✓	✓✓	✓✓	✓✓	✓✓	✓✓	✓✓
Zambia : ZAMREN - Zambia Research and Education Network	✓✓	✓✓	✓✓	✓✓	✓✓	✓✓	✓✓	✓✓	✓✓	✓✓	✓✓
Madagascar : University of Antananarivo (IOGA - INSTITUTE AND OBSERVATORY OF GEOPHYSICS OF ANTANANARIVO)		✓✓	✓✓	✓	✓	✓					✓✓
Ghana : GSSTI - Ghana Space Science & Technology Institute	✓✓	✓✓	✓✓	✓	✓✓	✓	✓	✓	✓		✓✓
Mozambique : MoRENet - Mozambique Research And Education Network	✓✓	✓✓	✓✓	✓✓	✓✓	✓✓	✓✓	✓✓	✓	✓	✓✓
Kenya : NACOSTI - National Commission for Science, Technology and Innovation	✓	✓✓			✓✓		✓	✓✓			



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Various Engagements



19 SADC Scholars attend workshop at TACC



Understanding Risk in Shared CyberEcosystems: URISC@SC17 in Denver Colorado



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- Partnerships with NSF, Airlink, Delta, SC
- Supporting the African participants every year – regional flights, accommodation, conference registrations
- This year a cohort of 10 delegates attending SC'22 in Dallas – November 2022



Annual SADC C.I. Meeting in December – South Africa

DARA Partnership with the UK



Venue	# of students	Countries involved	Date
EMU, Maputo	20	Mozambique	Nov-17
KUT, Nairobi	12	Kenya	Nov-17
IOGA, Madagascar	13	Madagascar	Feb-18
HartRAO, South Africa	19	Namibia, Botswana, Zambia	Mar-18
GSSTI, Ghana	20	Kenya, Ghana	Apr-19
HartRAO, South Africa	39	Namibia, Botswana, Zambia, Mozambique, and Madagascar	May-19
CHP Virtual Platform: Students attend Physically at their home institutions assisted by Tutors.	(95 Students in April + 100 Students in October) = 195	Namibia, Botswana, Zambia, Maputo, and Madagascar, Kenya, and SANSA Delegates from South Africa	Apr-21 & Oct-21



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Highlights



- Success in signing the agreements for SADC C.I. and SKA Partner countries
- Infrastructure deployment in most countries
- Petascale system in Africa (Morocco and South Africa)
- Growth of NRENs in the continent
- IDW 2018 hosted in Botswana and South Africa to host 2027 version
- Humanitarian Awards Global event for climate change program in 2022
- HPCWire 2018 Workforce Diversity Leadership Award



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