



Dr Paida Mangara
South African National Space Agency

Potential collaborations between the South African National Space Agency and the German Aerospace Centre (DLR)

The presentation looks at potential areas of collaboration between the South African National Space Agency (SANSA) and the Deutsches Zentrum für Luft- und Raumfahrt (DLR) in application areas related to Earth observation. These include remote-sensing applications for geological information, soil parameters and mining environments (of interest to SANSA since mining forms the backbone of the South African economy and has a number of environmental and socio-economic implications), the development of image-processing methods for the mapping and analysis of land use, land cover and topographic variables, disaster management, risk and vulnerability modelling, and human capital development.

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Mr Ian Kotze
Agricultural Research Council

Title: The application of remote sensing in a national invasive alien plant survey

The presentation looks at the negative impact of invasive alien plant (IAP) species on natural areas and agricultural land. Certain mitigation strategies and programmes have been put in place, but these require objectively determined spatial distribution data of IAP species (range and abundance) at the required scale to allow for effective planning, implementation and future monitoring of IAP spatial changes. Remote sensing, combined with intensive field verification, is an obvious choice to provide the required data. However, the natural environment of the study area (South Africa) is one of the most spatially heterogeneous in the world. A spatio-temporal analysis of vegetation patterns was therefore done by integrating relatively high spatial resolution data (SPOT 5) and coarse spatial/fine temporal (Modis) resolution data.

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Dr David Buckley
Southern African Large Telescope

SALT's transition to science operations (Monday, 16 April)

In 2011 the Southern African Large Telescope (SALT) transitioned from commissioning to full science operations, which was marked by the first call for charged science proposals from the SALT partners. This presentation briefly summarises SALT's capabilities, some of the commissioning experiences and the first science results.

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Dr David Buckley
Southern African Large Telescope
SALT's first-generation instruments: Technology innovation to science instrumentation (Tuesday, 17 April)

The three first-generation SALT science instruments have all benefited from technology innovation, from detectors to diffraction gratings. This presentation will review the instrument designs and innovations which have provided SALT users with a flexible range of observational possibilities. The existing and future SALT instrumentation will be reviewed.

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Mr Sivuyile Manxoyi
South African Astronomical Observatory
Southern African Large Telescope Collateral Benefits Programme (SCBP): A model for taking astronomy to all

Astronomy is a powerful vehicle for stimulating interest in science among members of the general public, learners and teachers. Its power lies in its ability to stimulate curiosity. This presentation will briefly outline the approach taken by the South African Astronomical Observatory to communicate astronomy to different sectors of society and how astronomy is used for socio-economic development. Future collaborations and programmes that have been undertaken with German partners will also be highlighted.

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Prof. David B. Davidson
Stellenbosch University
Numerical simulation for the electromagnetic design of MeerKAT using the FEKO code

MeerKAT will be one of the first radio telescopes whose electromagnetic design has been rigorously evaluated using full-wave numerical simulation. FEKO, the program that has made this possible, is an excellent example of South African-German scientific and engineering collaboration. The program is now one of the three market leaders in the field of radio-frequency electromagnetic simulation. FEKO was originally based on the method of moments, but has expanded to offer users a plethora of options. These include hybridisation with physical optics, the fast multipole method, and hybridisation with the finite element method.

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Mr Willem Esterhuyse
MeerKAT
MeerKAT overview

The MeerKAT array will consists of 64 receptors with 13,5 m diameter offset Gregorian dishes, designed to achieve high sensitivity and imaging dynamic range, while providing an array and functionality to provide for a wide range of science. Three receivers cover the required operating band in the frequency ranges 0,58-1,015 GHz, 0,9-1,67 GHz and 8-14,5 GHz. The offset Gregorian dish configuration enhances sensitivity by providing high aperture efficiency and low spill-over temperature contribution. The presentation will provide an overview of the MeerKAT telescope development, with emphasis on antenna structure developments, control and monitoring and science processing software development, correlator development and TRAPUM.

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Prof. Sergio Colafrancesco
University of the Witswatersrand

Building bridges between radio and gamma-ray astronomy.

The presentation will discuss the relevance of the multi-frequency studies between radio and gamma-rays in light of the MeerKAT/Square Kilometre Array (SKA) and High-Energy Stereoscopic System (HESS)/Cherenkov Telescope Array (CTA) projects, some relevant astrophysical and cosmological issues such as the nature and composition of "dark matter", the origin and the evolution of cosmic rays in large-scale structures, the feedback of super-massive black holes in large-scale structures, the structure and energetics of jets and lobes in active galactic nuclei (AGNs), and the nature of the highest-energy particle events in the Universe. A combined study of astrophysical plasmas in the Universe and in the laboratory will be relevant for the understanding of fundamental astrophysical processes in cosmic structures on a large scale and for the interpretation of future observations at radio (MeerKAT/SKA) and gamma-ray (HESS/CTA) frequencies.

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Mr Kevin Govender:
Office for Astronomy for Development

Astronomy for a better world! (IAU Office for Astronomy Development)

In 2009 the General Assembly of the International Astronomical Union (IAU) ratified a visionary decadal strategy which aimed to realise the immense developmental benefits of astronomy to society, including the three major areas of (i) technology and skills; (ii) science and research; and (iii) culture and society. At the heart of the implementation of this strategy was the establishment of a global Office for Astronomy Development (OAD), now hosted by South Africa at the South African Astronomical Observatory (SAAO) in Cape Town. This presentation will cover the history, current status, and future plans for the OAD in realising its vision of "Astronomy for a better world!"

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Dr Nicky Knox
South Africa National Space Agency

Potential remote-sensing collaborations between SANSA and German collaborators

The presentation will focus on the development of collaboration between German partners and SANSA in Earth observation-related application areas. Discussions taking place between SANSA and DLR and collaboration that has taken place between SANSA and the University of Jena will be highlighted. There will be a particular focus on remote-sensing applications for geological information, soil parameter and mining environments. There may also be potential cooperation in the development of image-processing methods for the mapping and analysis of land use, land cover and topographic variables. SANSA's participation in the Southern African Science Service Centre for Climate Change and Adaptive Land Management (SASSCAL), which is funded through German cooperation, provides a further platform for collaboration.

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Prof. Renée C. Kraan-Korteweg
University of Cape Town

Astronomy teaching programmes at the University of Cape Town

As an example of developments in astronomy education, the presentation will give an overview of the astronomy programmes offered at the University of Cape Town, including the very successful National Astrophysics and Space Science Postgraduate Programme (NASSP), hosted at UCT, which is a collaboration between 10 South African universities and three national facilities. The success of this programme stems from the very wide participation that gives the students access to the skills of South Africa's entire astronomy community. The presentation will also describe recent developments made possible through the South African Government's investment in world-class new facilities such as SALT, MeerKAT and the SKA bid, as well as the various human capacity development programmes that were put into place to prepare for optimal exploitation of these facilities.