

Space Science Research at SANSA

In order to obtain up-to-date information on the various regions of the Earth's atmosphere, as well as data to validate theoretical models it is essential to monitor the space environment over a very large area.

SANSA is currently responsible for monitoring the space environment over the Southern African region, Indian and Atlantic Ocean as well as the South Pole, and forms part of a global network of similar organisations throughout the world. Instruments are situated throughout South Africa, Namibia, Antarctica, Marion Island and Gough Island.

The research areas covered by this programme are diverse and include:

- Studies on the variation of the Earth's geomagnetic field and its application to navigation and earthquake detection
- The propagation of radio waves in the various regions of the space environment and the effects of the space environment on these waves
- Ionospheric characterisation and space plasma dynamics
- Space weather and space weather modelling
- Geomagnetically induced currents in long pipeline systems
- Lower atmosphere studies, including neutral atmosphere and lightning induced very low frequency waves

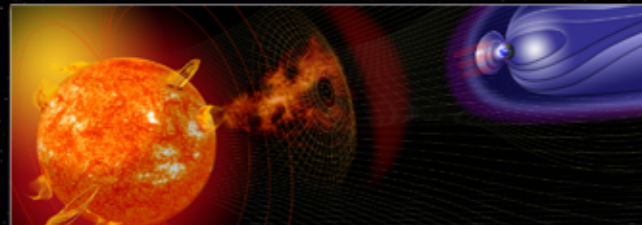
Monitoring space weather and the Earth's magnetic field plays a vital role in protecting technology on Earth and in space

SANSA Space Weather Centre

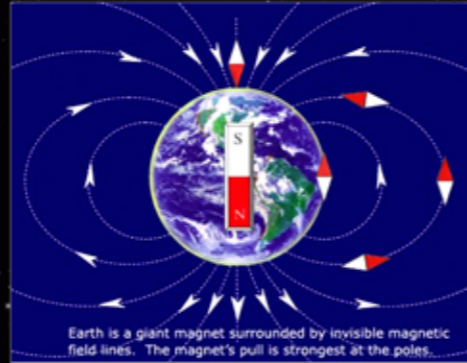
SANSA is host to the only Space Weather Regional Warning Centre in Africa which operates as part of the International Space Environment Service (ISES).

The Space Weather Centre provides an important service to the nation by monitoring the Sun and its activity to provide information, early warnings and forecasts on space weather conditions.

The space weather products and services are required primarily for communication and navigation systems in the defence, aeronautics, navigation and communication sectors.



South Africa is the only African country with a research base in Antarctica



Earth is a giant magnet surrounded by invisible magnetic field lines. The magnet's pull is strongest at the poles.
SANSA monitors variations in the Earth's magnetic field



Space science research is critical in our understanding of planet Earth

If you would like to find out more about SANSA please join the team for a fascinating tour of the Space Science facility in Hermanus. The tour is free of charge and takes place every Wednesday from 11:00-12:00.

Contact Us

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SANSA

SPACE SCIENCE

Developing space science and technology in service of humanity

The South African National Space Agency (SANSA) is South Africa's government body for the promotion and peaceful use of space while fostering co-operation in space-related activities and research in space science, communications, navigation and space physics.

SANSA seeks to advance scientific engineering and technological competencies and capabilities through human capital development (HCD), outreach programmes and infrastructure development, and supports the creation of an environment conducive to the industrial development of space technologies within the framework of national government.

SANSA, through the Space Science Programme, is part of the worldwide network of magnetic observatories. SANSA is responsible for research, infrastructure and data for monitoring the near-Earth space environment.

The scope of activities includes fundamental and applied space physics research, post-graduate student training, science advancement, space weather monitoring, and the provision of magnetic technology services.

SPACE IMPROVES LIVES, SAVES LIVES AND GROWS THE ECONOMY

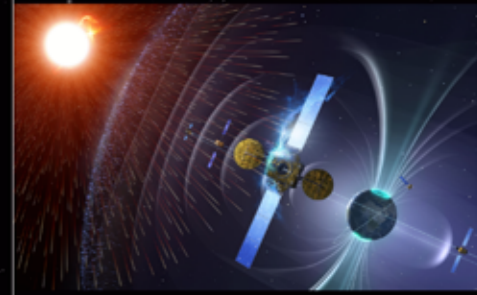


SANSA Space Science contributes to the nation by:

- Developing human capital with transferable skills through the interdisciplinary nature of space science.
- Improving capabilities in space technology, applications and services for the nation.
- Providing a diverse space science research portfolio for South Africa that inspires South Africans to achieve internationally recognised research goals.
- Providing Earth-space data and related services and developing practical applications for the benefit of the nation.
- Using space knowledge and capabilities to inspire innovation and develop new solutions to address national priorities.
- Educating the public and encouraging young South Africans to aspire towards careers in science, engineering and technology.
- Protecting technology on Earth and in space by monitoring space weather activity.

Did you know?

Space weather can damage satellites and impact our communication and navigation systems.



learn more at www.sansa.org.za



science & technology
Department:
Science and Technology
REPUBLIC OF SOUTH AFRICA

In Service of Humanity



SANSA

SPACE SCIENCE

Space science and technology benefit our lives every day

Developing capacity in space science and engineering for the future

SANSA aims to train and develop South Africans in key areas of national importance, develop scarce and transferable skills and contribute to transforming the country into a knowledge-based economy.

SANSA Space Science contributes to this initiative by means of summer and winter schools, the supervision of MSc and PhD students, as well as teaching at partner universities. **SANSA** also runs various in-service training courses in navigational support and space weather for the defence force.



Advancing Awareness of Space Science and Technology



SANSA aims to promote awareness and interest in Science, Engineering and Technology (SET) among the youth, educators, the general public and policy-makers through a successful Science Advancement Programme.

The majority of the activities are hosted within the **SANSA** Science Centre and from the **SANSA** Space Lab, a state-of-the-art interactive mobile laboratory.

The activities are specifically aimed at educators and learners with an emphasis on practical learning programmes which include:

- Outreach programmes for schools and learners
- Workshops for science educators
- Communication tools such as tele-education
- Decision-making tools and information

Training the next generation of engineers

Specialised Equipment at **SANSA** Space Science

SANSA is host to a wide range of state-of-the-art equipment and infrastructure for studying the near-Earth space environment. In addition to distributed networks of instrumentation utilised for research purposes **SANSA** also operates specialised magnetic technology facilities. This includes a non-magnetic temperature chamber, a zero-field magnetic shielding chamber, a magnetic test bench, DQ declinometers, two 4T30 theodolites and a high temperature Superconducting Quantum Interference Device (SQUID) operating unshielded in a magnetically quiet environment.

SANSA is also host to the only large tri-axial Helmholtz Coil system in Africa.

The coil system can be used to create or cancel any geomagnetic field and is controlled to cancel the local geomagnetic field in real time. This system is used to evaluate and calibrate various magnetic sensors and magnetic systems used by national and international organisations.



Applied Science and Technology Services

SANSA's facilities in Hermanus are well suited for characterising and calibrating magnetic sensors, as well as identifying the magnetic signature of dynamic platforms prior to sensor integration. **SANSA** is recognised as being the national expert in magnetic technology applications.

The applied science and technology services provided by **SANSA** contribute significantly to the work of the navy, airforce, army and to the safety and security of all South Africans.



Applied science and technology services include:

- Calibration and maintenance of landing compasses
- Training courses such as aircraft compass swing procedure
- Calibration and evaluation of systems containing magnetometers
- Development of magnetometers for satellite orientation
- Magnetic and electrical field measurements and interpretation
- Support with degaussing of marine vessels