

SANSA's Magnetic Test Bench is used for compass calibration and verification in the aerospace industry.



SANSA

The Space Science Directorate of the South African National Space Agency (SANSA) is a prototypical “back room” organisation that is hardly known or noticed by soldiers but critical to effective operations and, indeed, also to the ability of civilian aviators and mariners to go about their business safely.

Key elements of any military operation are knowing where you are and where you are going, and being able to communicate. The former requires magnetic compasses and regular updating of maps and charts to take into account changing magnetic inclination and declination. The latter requires effective radio communications and, in a large theatre, high frequency (HF) communications in particular – which are affected by “space weather” – must be taken into account when planning communications for an operation.

SANSA's Hermanus facility supports the South African National Defence Force, as well as other clients, in both respects.

Magnetic Technology

The earth's magnetic field is a key factor for accurate navigation and long-range weapons delivery, and is unfortunately not a static, unchanging phenomenon. SANSA provides an annual update of magnetic inclination and declination to enable charts and maps to be updated.

Magnetism is also relevant in other respects, the most obvious being the integration and calibration of magnetic compasses and other equipment with dynamic platforms such as aircraft, unmanned aerial vehicles (UAVs), ships or combat vehicles. The magnetic signature of a platform can also be a critical factor, for instance a warship transiting potentially mined waters, but also to deal with landmines or improvised explosive devices that use a magnetic sensor as a trigger or selective trigger.

SANSA assists the SAAF with compass swinging, training staff in compass swing procedures, calibration and maintenance of compasses, magnetic navigation ground support and geomagnetic data and field modelling. These services are also available to the civil aviation industry.

SANSA provides warnings and alerts on space weather conditions which can affect communication and navigation systems.



SANSA also assists the SANDF and the defence industry with identification and calibration of the magnetic signature of an aircraft, UAVs and other dynamic platforms prior to magnetic sensors being integrated with these platforms, as well as carrying out calibration and evaluation of systems containing magnetometers, and conducting magnetic field measurements and management.

Space Weather

SANSA is host to the Space Weather Regional Warning Centre for Africa which operates as part of the International Space Environment Service. It conducts real-time monitoring and forecasting of space weather and provides a range of services to the Defence Force and other clients. Among them:

- T-Index predictions: the ionospheric index that indicates the highest frequencies that will be reflected, a critical input for HF propagation software and communications planning.
- Solar activity and geomagnetic activity indices for frequency prediction.
- Daily and weekly HF prediction graphs for different signal paths, special frequency prediction and plots of signal-to-noise ratios, take-off angles and maximum useable frequencies versus time.
- Daily space weather bulletins.
- Space weather warnings and alerts.

The Space Weather Centre also presents training courses addressing the impact of space weather on HF communications and trains users on how to generate frequency predictions themselves.