

Focus on CSIR

Radar and Electronic Warfare (EW) systems



The CSIR's Radar and Electronic Warfare (EW) area operates as part of the in-house Defence Evaluation Research Institute (DERI) for the South African National Defence Force (SANDF) providing technology support, innovation, operational test and evaluation support, acquisition support, performance requirement studies, expert consultation and training. It collaborates with the international defence research community as well as local and international industries as an integrated part of the national system of innovation.

South African radar knowledge originated from the technology transfer South Africa received from the United Kingdom in 1939. Over the past decades the CSIR has built up a significant capability in the broader field of radar and EW.

Four groups work in close cooperation to provide Science, Engineering and Technology (SET) capabilities in platform self-protection, sensors and surveillance, the development of concept demonstrators and

prototypes as well as the design, building, operating and maintenance of specialised test and evaluation facilities.

The groups are:

- Radar research and applications group
- EW research and application group
- Radar experimental development group
- EW experimental development group



Each of the major capabilities is supported by people, facilities and processes in the different groups, and the capabilities are in many cases established across research groups. For this reason the research area has a strong culture of collaboration.

People and their skills are of paramount importance in transforming and leveraging processes and facilities to provide impact. Continued education and postgraduate studies, as well as innovative ways to increase the pipeline of top quality researchers and developers are priority activities.

Examples of work:

- Modern tracking radar technology that was from the outset designed to be robust against electronic countermeasures, was locally developed at the CSIR. This formed the basis of the Optronic Radar Tracker (ORT) developed for the South African Navy (SAN) in partnership with local industry. This collaboration is continuing, enabling the adaptation of the radar to changing threats and in-country optimisation for South African conditions.
- State-of-the-art, internationally competitive digital radio frequency memory (DRFM) technology was developed since the late 1980s and can nowadays be found in several specialised R&D, test and training facilities all over the world.

- SEWES, a few-on-few sensor and EW simulator, enables decision support by simulating “what if” scenarios consisting of a number of sensors and EW systems engaging each other in a simulated environment. It is used by defence research institutes for EW effectiveness evaluation, doctrine development and training.
- The acquisition of advanced sensors, such as the Gripen’s multi-function radar, requires experts that have made a career in radar and EW technology to support the definition of requirements related uniquely to South African problems, translating these into technical specifications and verifying that the delivered equipment satisfies these specifications. Now that the South African Air Force has taken the Gripens into service, CSIR can support them to further optimise operations that can capitalize on deeper insights into the operation of the radars.

The future:

Countries such as South Africa face the challenge of protecting their territories and their people against activities such as illegal border crossings, weapons trafficking, smuggling, piracy, poaching, organized crime, and terrorism on land, at sea and in the air. They are also required to contribute regionally and internationally to ensure:

- freedom of travel of oceangoing vessels, which enables prosperous economic activities,

- the fulfilment of the countries’ monitoring, control and surveillance responsibilities for their Exclusive Economic Zone (EEZ),
- the protection and safeguarding of natural resources.

Assets available for monitoring and securing such large land, air and maritime territories are insufficient, resulting in unfavourable force-to-space ratios. Modern sensing technology can provide a force multiplication effect by providing wide area, real time recognized situation pictures that enhance the situational awareness of commanders, and thereby the quality of their command decisions and the efficiency and effectiveness of the security operations.

As in-house science, engineering and technology partner of the country’s security forces, CSIR collaborates with local and international institutes, academia and industries to innovate efficiently towards impact.

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