The first line of defence in a combat situation is being able to recognise a threat before having to face it. Taariqa Maharaj forms part of an elite group of software engineers that keeps an eye on the sky with radar technology.

KEEPING AN EYE ON THE SKY WITH RADAR

THE CSIR HAS A TRACK RECORD in radar technology dating back to the Second World War, and continues to hold its own in this field in a style comparable to the best in the world.

A radar system is a complex combination of engineering, mathematics, programming, hardware design and signal processing. Radar is used in many different environments. In aeronautics, for example, it is used to detect and guide aircraft by emitting electromagnetic signals. These signals are bounced back from the aircraft, giving information on its speed and direction.

For a young software engineer, this might seem daunting. Not for Maharaj. Sitting in front of the control panels, she says: "I am not afraid to ask the obvious questions and in our group, no question is considered stupid. The people I work with have a wealth of knowledge that you cannot find in books, and it would be a big oversight on my part to not tap into that. I am curious by nature and the ever changing programming environment is a perfect fit."

After completing her BSc Honours in engineering, Maharaj joined the CSIR's radar and electronic warfare group. She says that she was eased into things by being given smaller tasks. This allowed her to grow her skills to a level where she can now work on the full integration of all of the subsystems.

Developing a tracking radar facility requires a group of experts from different fields. "Much of what we do comes from developing concepts obtained from user requirements. We integrate software applications for the user interface, control of the radar system and data communications," she says.

A radar system requires a control node, 'the brain', that signals the antennae to follow an aircraft, for example. This control system is made up of many subsystems, built by software engineers such as Maharaj.

Designing and prototyping form the essence of innovation in this domain. Maharaj says that the most difficult part of her work is having the patience to drive a project through when your code simply won't work. She explains: "It almost never works the first time. But little comes close to the deep sense of pride when it finally clicks."

She describes herself as someone who easily gets bored with routine tasks, but her work keeps her completely engaged. "Code can change almost daily, and it is my job to not only keep up, but keep ahead," she adds.

Radar development is a competitive space. Currently, South African radar research shares the world stage with an increasing number of countries. In order to stay ahead, the pressure is on the engineers to work faster, smarter and more cost-effectively. Maharaj designs and implements the neurons used to control the system. The greatest impact of her work is felt in border safeguarding and air traffic control.

The CSIR contributes to national safety and security which includes the sovereignty of our land, maritime and air space, by detecting and tracking entities that enter our territory. Radar is one technology field that is deployed for this purpose.

Maharaj's advice for budding young innovators is to study electronic engineering and develop their programming skills. She says, "In programming your knowledge base is never saturated, there is always something new to learn and experience and the more you know, the better you will be at it."

– Lèsa van Rooyen

WHAT TAARIQA MAHARAJ STUDIED

She obtained a BSc (Hons) in electronic engineering from the University of KwaZulu-Natal.

WHERE TO STUDY

Most universities in South Africa offer both undergraduate courses and postgraduate degrees in electronic engineering.

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Taariqa Maharaj

ELECTRONIC ENGINEER

CHARACTERISTICS
You must have the drive to learn new things, have a lot of patience to see things through and have an analytical mind to work through the processes. Problem solving forms a big part of your daily work and you must enjoy figuring out new coding languages.

RELATED CAREERS
Application integration engineer, software developer, software architect.