Position Title:	**Detection and Tracking Researcher**
Position Reference Number:	ECRNSID0012b
Division	National Security & ISR Division
Position Classification:	S&T3-4 (APS4/5-6)
Position Location:	Edinburgh (SA)
Security Level:	Negative Vetting 1
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Academic Disciplines

*	Aerospace/ Aeronautical Engineering, Naval Architecture		Chemical, Radiological, Biological, Food sciences		Materials Science
*	Computer Sciences, IT, Software Engineering, Telecommunications	*	Mathematics and physics		Psychology and Social Sciences
*	Mechanical and Mechatronic Engineering (including robotics)	*	Electronic/ Electrical Engineering	*	Other

Position Overview

If you are interested in using mathematics and computers to solve problems and build systems for Defence, then this position may be for you …

Data rates from air- and space-borne imaging sensors, observing the earth below, currently exceed the capacity of existing storage facilities and the capabilities of human analysts. Automation and artificial intelligence are therefore increasingly being used to handle the so-called 'data deluge'. However, replicating even the most basic functions of human visual perception, e.g. target detection, tracking and classification, using computer software is a very difficult task. The purpose of this position, and of the group within which it sits, is to meet these current challenges and to anticipate future capabilities as new sensors are added to the network.

Position Duties

Under the guidance of more senior research staff, this position involves research and development of:
• Multi-dimensional digital filters for the detection of targets in data streams from imaging sensors
• Multi-target tracking algorithms for state estimation (e.g. Kalman filtering) and data association
• Computer-vision, image-processing, pattern-recognition, and machine-learning techniques.

Demonstration of the above concepts and capabilities using real data and prototype software, with the support of other algorithm/software specialists within the team.

Other Requirements

Essential:
Bachelor of Science (e.g. Mathematics or Physics) or Engineering;
An interest and aptitude in mathematics (e.g. linear algebra and calculus) and computing;
Scripting language (e.g. Python or Matlab);
Data engineering and algorithm development; Data analysis and visualization;
An ability to attain NV1 clearance.
Desirable:
A Ph.D. in Science or Engineering and/or publications in conference proceedings and journals;
Advanced mathematics, e.g. digital signal processing, transforms, statistics;
Real-time programming language (e.g. C/C++); Development and integration of complex software systems;
Development of parallel and multi-threaded algorithms, e.g. on Graphics Processing Units (GPUs);
A willingness to apply for PV clearance.