



Dstl R-Cloud
Commercial Services
Porton Down
Salisbury
Wiltshire
SP4 0JQ

E-mail: dstlrccloud@dstl.gov.uk

Statement of Requirement for the R-Cloud Sensing Strategic Capability

Introduction:

The Defence Science and Technology Laboratory (Dstl), which is part of the UK Ministry of Defence (MOD), is refreshing its commercial agreement for Science and Technology (S&T) research contracts, known as R-Cloud (Research Cloud).

MOD places extensive fundamental, experimental and applied research with industry and academic suppliers and wants to broaden access for this supply base, reducing the cost of trading with MOD and enabling agile contracting. R-Cloud complements MOD's other contracting mechanisms and academic and industry suppliers of S&T research are now invited to apply to join MOD's research supplier community within the Sensing Strategic Capability.

This statement of requirement relates to suppliers joining R-Cloud within the Sensing capability area. R-Cloud provides a low barrier to entry for potential suppliers and offers direct access to MOD's current and future research requirements. Academic and industrial suppliers of Sensing research are invited to apply to R-Cloud if you are a supplier of Science and Technology Research in this area.

Support is required across MOD's products and services:

- **Research.** Original research and concepts to create new and enhanced capabilities for Defence & Security.
- **Requirements & Evaluation.** S&T support to the assessment, evaluation and delivery of current and next generation capabilities.
- **Specialist Advice & Services.** Specialist knowledge and facilities at readiness to meet priority needs.
- **Operational Support.** Rapid and deployed S&T to meet the urgency of operations.

Description

Sensing encompasses a broad range of sensing approaches to: detect, track / locate, recognise and identify threats; quantify threat material; support situational awareness; and



provide information to tactical and strategic decision-makers, for both Defence and Security applications. This includes information on position and time, being the home of the Positioning, Navigation and Timing Capability in Dstl.

Key skills within the SC include: Radar and Radio Frequency, Electro-Optical (EO), Infra-Red (IR), Hyperspectral Imaging (HSI), acoustics, X-ray, position (Including Global Navigation Satellite Systems (GNSS), Alternative PNT (Alt-PNT) and Navigation Warfare (NavWar)), timing sources and time transfer, tracking, domain awareness, systems engineering, platform integration and Test and Evaluation (T&E) approaches.

Sensing S&T covers underwater, littoral, maritime, land, air and space domains, with significant focus on distributed multi-modal sensing as well as counter-intelligence surveillance and reconnaissance (ISR) and anti-access area-denial (A2AD) countermeasures. Across all the technology and capability elements there is a drive towards data and information fusion (Inc AI/ML), informing strategic through to tactical decision support via both reactive and predictive ISR¹.

Elements

Below is a summary of overarching research requirements for Sensing by capability element:

Position, Navigation and Timing (PNT).

S&T to develop and deliver technology to provide resilient position, navigation and timing capabilities in all environments. Includes support to UK Global Navigation Satellite Systems (GNSS), robust receiver technology, methods to reduce our dependency on GNSS (Alt-PNT), PNT situational awareness, and methods to generate and distribute time and frequency for Defence and Security applications.

Electro-Optical and Infrared (EOIR) Sensing.

S&T to develop and deliver technology to provide resilient EOIR sense and effect capability. EOIR materials and metamaterial research, components and sensor technologies, including Multi-Spectral/Hyper Spectral Imaging, and LiDAR. Enabling long-range target identification, and counter ISR and A2AD, including sensor protection, assured performance, lasers and laser eye protection.

Radar & Radio Frequency (RF) Sensing.

S&T to develop and deliver technology to provide resilient situational awareness, force protection and security technologies. Identification and development of cutting-edge Radar concepts, including active, passive, multi-static, multi-function and cognitive systems. Covers modelling and signals processing expertise across multiple areas, including future RF Imaging and signal processing capability to Detect, Track, Recognise and Identify (DTRI) difficult targets, leveraging developments in machine learning. Radio Frequency (RF) sensing of emplaced devices and bomb making equipment, including through-barrier radar, mm-wave, magnetometry, magnetic resonance, metal detection and UAV-deployed technologies.

¹ Data and information fusion are led by the AI and Data Science (AI&DS) capability.



Sensing

High Energy Sensing.

S&T to develop and deliver technology leveraging high energy and particle physics for Defence and Security Applications. Including transmission and backscatter X-ray for non-invasive imaging.

Ultra-Intense Laser (UIL)-based Sensing.

S&T to develop novel sensing approaches using Ultra-Intense Laser (UIL)-induced plasmas, including particle beam generation, filament formation and stability research.

Discreet Sensor Mission Systems.

S&T to develop and deliver technology for discreet multimodal sensing systems, including Tag, Track and Locate (TTL) systems and sensor system integration and interoperability.

Acoustic.

S&T into Non-Maritime acoustic & related sensing capabilities, including audio analytics for Defence and wider Government, and acoustic systems for counter-UAS.