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Statement of Requirement for the R-Cloud Advanced Materials and Power 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 Advanced Materials and Power Strategic Capability.

This statement of requirement relates to suppliers joining R-Cloud within the Advanced Materials and Power 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 Advanced Materials and Power research are invited to apply to R-Cloud if you are a supplier of Science and Technology Research in this area.

Advanced Materials and Power encompasses a broad range of technical areas, not limited to but including:

- Simulation, prototyping & experimentation,
- Processing & manufacturing technology,
- Materials characterisation & forensics,
- Low observable materials,
- Materials state awareness,
- Structural materials,
- Electronic, photonic & functional materials,
- Power and energy.



Statement of Requirement:

The Strategic Capability (SC) for Advanced Materials and Power directs and develops essential and game changing Advanced Materials, Power and Energy research and development to enable the UK to translate to War Fighting Readiness. Advanced and novel materials discovery, design, and evaluation enable the development of solutions across all operational environments—from the deep ocean to outer space—serving as a future, stepwise differentiator that enhances warfighting performance against adversaries in an increasingly dynamic geopolitical landscape. It covers all aspects of materials and structures research including materials selection and performance, manufacture, integration into structures, material ageing, operating environment, shock and impact resistance, physical performance, corrosion, design and lifing. The capability covers most types of materials including electronic and photonic materials, metals (and their alloys), polymers, ceramics, composites and functional materials. Energetic materials and CBR protection materials are covered by their SCs respectively.

The sub-capability elements for the Advanced Materials SC are as follows:

Extreme Environments Materials

Focuses on the discovery, design and advancement of materials capable of operating in high-temperature and demanding conditions, particularly within hypersonic and ballistic re-entry environments, including sensor windows and radar dome components. Leads and directs research into novel materials such as ceramic matrix composites and ablative thermal protection systems, combining modelling of thermal response with experimental validation to build a deep understanding of the underlying physics governing thermal transport and material degradation. In addition to high-temperature materials, the team contributes to fire science, supporting land and maritime domains through analysis of material fire behaviour, smoke, and toxicity to protect personnel.

Stealth Materials (*includes functional, multifunctional and animate materials*)

Low observable materials provide options for signature management across all parts of the electromagnetic and acoustic spectra (e.g. radio frequency, electro-optic, infra-red, acoustic). Electronic materials (developed for their specific conducting or semi-conducting properties), and photonic materials (developed specifically for their optical properties). Functional materials are defined as those materials that perform specific functions (exploiting properties such as magnetic or dielectric behaviour) other than possessing a load bearing capacity. These include smart materials and systems, which can sense and respond to the environment around them in a predictable and useful manner.

Structural and Protection Materials

Delivers the science and technology required to design, assure, and sustain materials that provide structural integrity and survivability across all defence domains, including land, maritime, air and space. It spans a broad portfolio from advanced steels, composites and



Advanced
Materials

ceramics to additive manufacturing, repair technologies and coatings supporting applications such as platform structures, armour systems, and survivability against threats including blast, impact and directed energy. The capability integrates modelling, simulation including materials digital twins, testing and qualification to enable rapid material down-selection, performance prediction, while supporting the full lifecycle from manufacture to in-service sustainment and repair.

Power and Energy

Provides Defence with a critical, cross-cutting capability focused on the understanding, integration, and application of energy technologies to military systems and operations. As MOD's intelligent customer and technical authority, the team delivers expert advice, system-level analysis, and applied research across areas including batteries, power distribution, microgrids, alternative energy, fuel technologies, and soldier systems. The team aim to exploit emerging technologies and translate them into operational capability.