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Statement of Requirement for the R-Cloud Operational Research 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 Operational Research Strategic Capability.

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

This document describes overarching requirements for the Operational Research (OR) strategic capability that will be drawn upon when placing work via R-Cloud.

The Operational Research capability helps Users with complex policy, planning and operational problems using analytical methods and techniques. It enables evidence-based decision-making, across Defence and Security, through the development and application of single and multiple disciplinary methods, models, techniques and tools. The OR capability requires a rich mix of disciplines including quantitative OR, systems thinking, data analytics, and soft OR approaches. Within UK Defence, the term Operational Analysis (OA) is often used synonymously with OR.

The OR capability relies on inputs, data and qualified people from almost all other strategic capabilities and those capabilities, in turn, need to draw on OR for evidence-based support to their decision making. R-Cloud tasks will often be let spanning multiple strategic capabilities, using OR as both a driving and as a supporting strategic capability. Suppliers with deep OR specialisms are therefore encouraged to sign up to those areas in which they have domain expertise in addition to the OR area.



Requirements for the approach to OR tasks

MOD aim to share our data and models seamlessly within security constraints, use data from outside of Defence and Security to fill gaps, and embrace a contemporary approach to communication of findings. We are looking to work with companies who are:

- New to Defence and Security but are willing to learn enough context to apply ideas and conduct OR.
- Experienced in Defence and Security, and willing to work constructively, openly and collaboratively with other companies.
- Expert in one or more OR methods or have made innovations around applications of techniques.
- Willing to work with us to bring techniques into common usage (which typically requires robust demonstration and support).
- Ready to work with data of variable age, provenance and relevance and find ways to improve it for application to problems, wherever possible making improved data available for subsequent work regardless of who conducts it.
- Able to create modern, interactive and potentially sophisticated visualisations and use innovative ways to communicate findings.
- Willing to find or generate new data sets and apply them to Defence and Security.

Requirement areas:

Shaping strategic Defence and Security problems

Working across senior levels in Defence to help shape the questions asked of S&T and Defence & Security as a whole. Providing advice on approaches to shape the direction within high level areas of Defence and Security at both Defence level and domain level. Includes:

- Strategic gaming with senior stakeholders
- Consultancy tasks to diagnose and understand complex problem spaces

Defence enterprise operating environment analysis

Understanding global strategic context and its impact on the operating environment from increasing strategic competition, geopolitics and transnational challenges such as climate change, alongside the ethical, legal, moral and economic considerations. Considering the changing international environment, changing national culture and changing Defence environment. Providing high level implications for Defence with respect to the future character of conflict. Includes:

- Identifying geo-political drivers, regional contexts, futures and trends and the impact of climate change.
- Historical analysis across Defence and Security to provide evidence for future planning.



Policy and strategy analysis

Providing senior decision makers with advice and evidence to make well-informed and evidence-based decisions concerning the development and assessment of Defence and Security policy and strategy. This includes the development, analysis, testing and challenge of Defence and Security strategy and policy options

Force design, evaluation and campaign modelling

Assess and test force structure options for the whole force to balance cost achievement and efficiency and inform force and capability mix options by domain to achieve Defence policy. Campaign planning to Analyse the likely outcome(s) of whole joint military campaigns in support of operational planning of forces and capabilities.

- Design and evaluate how we use current and potential future capabilities to the best effect to achieve our aims.
- Development of system, organisational elements of the armed forces and enabler capability options, including collection and collation of necessary and sufficient cost and performance data.
- Conduct strategic cost assessments and capability costing
- Develop conceptual models to represent key dynamics in campaigns,
- Evaluate potential approaches/tools for campaign analysis,
- Develop military and non-military credible scenarios and vignettes in multiple timeframes and environments and evaluate future worlds.
- Design, develop and assure manual and computerised wargames to test concepts and decisions.

Capability decision support:

Provide OR to support decision makers with capability planning and decisions relating to delivery options for capabilities across and within air, land, maritime, space, cyber and joint environments, and other strategic capabilities and enablers. OR work placed via R-Cloud will usually support the earlier phases in the lifecycle of capabilities, and will not typically directly inform equipment investment decisions

Supporting problem statement development across all the domains translates Defence policy into defining problem statements for capability requirements. Provides the advice and evidence to underpin deciding the future capability mix at domain level to meet policy and strategy.

Tasks typically include:

- Identifying how well Defence or Security currently meets the needs e.g. through capability investigations,



- Understand current capability gaps including through capability audits
 - Informing the prioritisation and balance of force capability options. Includes activities such as Balance of investment (BOI) at Defence and domain level.

Defence/Security concepts and innovation analysis, identify future technologies and ways of working to meet gaps and where emerging technology may change defence approaches. Assess the value they would add to allow Defence and Security to have operational advantage. Tasks typically including:

- Horizon scanning of future technologies
- Identification of work undertaken on future technology areas
- Gathering data on status of future technologies to allow assessment of their value to Defence/Security

Support to capability development and delivery across all domains Supporting the case for development and acquisition of Defence capabilities.

- Defining the necessary missions (roles, tasks and tactical situations) for individual systems, capabilities, force elements, support and enablers to meet scenario and broader requirements
- Assessment of the cost effectiveness and cost benefit of alternative investments, including military capabilities and organisational, process and business options

Develop new and improve current tools, techniques and concepts to improve ability to undertake OR

- Includes key development areas for the S&T capability to be able to operate effectively including AI for OR, model, method and tool development and improvement and novel data science approaches.
- Verification and Validation of models, methods, tools and previous OR studies to assure that the rate of errors is reduced to an appropriate level, and outputs adequately represent the systems or situations being examined.

Common tasks for all areas that maybe required are:

- Collection, collation and delivery of required data to support OR tasks.
- Running trials and experiments to generate data or test the efficacy of solutions derived using OR in real world contexts, (e.g. a military exercise).