Serapis Tasking Form

Tasking Form Part 1: *(to be completed by the Authority's Project Manager)*

To:	Lot 6 Frazer-Nash Consultancy Ltd	**From:**	The Authority

Any Task placed as a result of your quotation will be subject to the Terms and Conditions of Framework Agreement Number:

LOT 6 DSTL/AGR/SERAPIS/UND/01

VERSION CONTROL

V0.5

REQUIREMENT

Proposal Required by:	14/01/2022	**Task ID Number:**	[U76]
The Authority Project Manager:	[REDACTED UNDER FOIA EXEMPTION]	**The Authority Technical Point of Contact:**	[REDACTED UNDER FOIA EXEMPTION]
Task Title:	AI Tech Watch Deep Dives		
Required Start Date:	[01/02/2022]	**Required End Date:**	[30/04/2022]
Requisition No:	[REDACTED UNDER FOIA EXEMPTION]	**Budget Range**	£50k -£65k

TASK DESCRIPTION AND SPECIFICATION

Serapis Framework Lot	☐ Lot 1: Collect ☐ Lot 2: Space systems ☐ Lot 3: Decide ☐ Lot 4: Assured information infrastructure ☐ Lot 5: Synthetic environment and simulation ☒ Lot 6: Understand

Statement of Requirements (SOR)

Dstl has a requirement to increase its knowledge and understanding of the state-of-the-art in Artificial Intelligence (AI) research around two specific areas - Broad AI, and Machine Assisted Forecasting and Prediction.

For each area, we are seeking a technical deep dive report which should contain:

- An overview of the key technical observations across each AI topic, drawing together the relevant research from both recent publications as well as still-current techniques which may have been known for some time
- A series of observations on the topic, providing commentary on public announcements and / or academic articles made by industry and academia
- Next steps, which recommend further work with Dstl or partners could undertake to better understand the implications for Defence

Each report should be produced to a high quality and be suitable for sharing with other stakeholders within HM Government, and our 5-eyes international partners.

The activity should be confined to the topics of interest, and be undertaken by technical experts in that speciality. This approach will provide a coherent overview of the topic, with deep technical insight.

Topic 1: Broad AI

We recognise that Broad AI is a potentially very widely scoped term, and so provide a proposed definition below to help guide the scope. However, we welcome as part of this Deep Dive any input to help refine and define the area, including more clearly defining key sub-categories where that may help to understand the topic more effectively.

Given the breadth of topics within Broad AI, in addition to the specific contents described above, we require the report to provide a comprehensive introduction and summary of Broad AI, and sufficient background to the development and progress in this area that in future Tech Watch activities we can clearly focus on new and emerging research and publications, and link that to prior work captured through this report.

Our suggested scope for Broad AI is as follows:

Current "narrow AI" techniques are essentially highly specialised "one trick ponies". Globally, scientists and engineers are seeking the next big break-through in AI that overcomes the short comings of narrow AI techniques and enables machines to develop, "conceptual" and "contextual" understanding of the tasks they undertake (e.g. understanding the laws of physics) and ultimately "common sense". This would represent a step change in capability for Defence & Security applications by reducing the reliance on large amounts of labelled data and enabling high levels of robust performance across a large range of related Defence and Security tasks.

Examples include "advanced algorithmic approaches" such as self-supervised learning, context based machine learning, deep reinforcement learning, combining symbolic and statistical approaches to machine learning, transfer learning & spiking neural networks; and "novel hardware" approaches such as neuromorphic computing, memristors and quantum machine learning.

We are interested in the widest definition of Broad AI so would like to understand and contrast both ML and non-ML approaches, hence also including for example rule-based systems, fuzzy logic, Bayesian reasoning and agent-based systems.

Topic 2: Machine Assisted Forecasting and Prediction

This deep dive will support the "AI and Autonomy for the ISR Enterprise" project which seeks to release human capacity and maximise understanding in our ISR enterprise in order to maintain Information Advantage. One area of focus is prediction and forecasting. Humans are typically subject to bias, and increasingly challenged by the volume, variety and velocity of information that might be employed in prediction-making. Tools to support the Intelligence Analyst in making predictions are relatively limited at present (although fairly prevalent in industry e.g. financial markets) which results in high demand for human analyst resources and limits capability.

In a step to address this problem this requirement focuses on canvasing new and emerging AI applications and techniques, to better understand the current and future technology landscape of machine assisted prediction and its potential impact upon the ISR Enterprise. By reviewing and capturing emerging technologies we can ensure we have the best chance to adopt these promising technologies early, utilising their benefits as well as ensuring we can assist in developing them to reach their potential and deliver capability to defence, in particular the ISR enterprise.

Our suggested scope for Machine Assisted Forecasting and Prediction covers four linked technology application areas. We welcome as part of this deep dive any input to help refine this scope further including the suggestion of new areas.

- AI to assist human analysts to make better predictions. This could be achieved through decreasing the time taken to make a prediction, increasing the accuracy of predictions, enabling predictions to be made with improved uncertainty estimates or a combination. How AI is implemented to assist analysts is key

to the benefits it offers, for example AI could be used to allow an analyst to sift through their regular data more quickly therefore increasing the pace of predictions. Alternatively AI could be used to extract new insights from data, or allow the analyst to utilise more data while making their predictions therefore lowering uncertainty by increasing the accuracy/volume of the underpinning evidence. Or AI could be used to challenge analyst's hypotheses, leading to greater confidence in the prediction.

- AI that is capable of making their own predictions. This requires a complex platform that provides a sufficiently complete/coherent model of the world, and an encoding of historic behaviours from which to learn and make predictions about outcomes. It is also important that the algorithm is explainable and an audit trail can be produced to enable the predictions to be used in the decision making process.
- AI that combines or selects predictions from multiple sources. In this case the sources of the original predictions could be from machine predictors, human analysts, human-machine teams or any combination of the three.
- Technologies that enable true human-machine teaming not just the combining of outputs from humans and machines or machines as tools to support to human analysts or humans as operators of machines. True Human-machine teaming is a relationship—one made up of at least three equally important elements: the human, the machine, and the interactions and interdependencies between them.

Procurement Strategy

☒ Lot Lead to recommend ☐Single Source / Direct Award

Pricing:

☒ Firm Pricing ☐ Ascertained Costs* ☐ Other*

Firm Pricing shall be in accordance with DEFCON 127 and DEFCON 643

Ascertained Costs shall be in accordance with DEFCON 653 or DEFCON 802.

*only at Authority's discretion

Task IP Conditions

Task IP Conditions	**Summary of the Authority's rights in foreground IP (IP generated by the supplier in performance of the contract)**
DEFCON 703 ☐	Vests ownership with the Authority
DEFCON 705 Full Rights ☒	Enables MOD to share in confidence as GFI or IRC under certain types of agreements. Can be shared in confidence within UK Government.
OTHER IP DEFCONS: 14* ☐, 15* ☐, 16* ☐, 90* ☐, 91* ☐, 126* ☐	Generally only suitable for deliverables at TRL 6 and above.
BESPOKE IP Clause ☐ *	Details to be added and agreed by IP Group
* Do not use without IPG advice and approval	
Please state in this text box if MOD or the customer has a requirement a) that one or more Other Government Departments is able to share confidentially with their own suppliers, b) to publish but you do	

not think there is a requirement to own or control the deliverable, or c) to share under a procurement Memorandum of Understanding (MOU).*

*If any of these three issues applies, please contact IPG for advice before completing this form. *Listing research MOUs is not required, but can be a helpful courtesy to the supplier.*

DELIVERABLES

Ref	Title	Due by	Format	TRL	Expected classification (subject to change)	Information required in deliverable	IPR DEFCON
D1	Start up meeting	T0	Meeting	NA	[REDACTED UNDER FOIA EXEMPTION]	Delivery plan	705
D2	Progress Review	T0+6 weeks	Meeting	NA	[REDACTED UNDER FOIA EXEMPTION]	Progress against delivey plan	705
D3	Broad AI technical deep dive report.	T0+11 weeks	Report	NA	[REDACTED UNDER FOIA EXEMPTION]	See SOR section	705
D4	Machine Assisted Forecasting and Predictiontechnical deep dive report.	T0+11 weeks	Report	NA	[REDACTED UNDER FOIA EXEMPTION]	See SOR section	705

DELIVERABLE: ACCEPTANCE / REJECTION CRITERIA

Unless otherwise stated below, Standard Deliverable Acceptance / Rejection applies. This is 30 business days, in accordance with DEFCON 524 Rejection, and DEFCON 525 Acceptance.

Standard Deliverable Acceptance / Rejection:-

Yes ☒ (DEFCON 524 Rejection, and DEFCON 525 Acceptance)

No ☐ (if no, please state details of applicable criteria below)

Deliverable Acceptance / Rejection Criteria:-

If there are any other specific acceptance/rejection criteria you would like to apply to any of the deliverables, please state them here.

Government Furnished Assets (GFA)

ISSUE OF EQUIPMENT/RESOURCES/INFORMATION/FACILITIES (*if not applicable, delete table and insert "None" in this text box)*

NONE

QUALITY STANDARDS

☒ **ISO9001** (Quality Management Systems)

☐ **ISO14001** (Environment Management Systems)

☐ **ISO12207** (Systems and software engineering — software life cycle)

☐ **TickITPlus** (Integrated approach to software and IT development)

☐ **Other:** (Please specify in free text below)

SECURITY CLASSIFICATION OF THE WORK [REDACTED UNDER FOIA EXEMPTION]

TASK CYBER RISK ASSESSMENT. *(In accordance with DEF STAN 05-138 and the* Risk Assessment Workflow)

Cyber Risk Level	[REDACTED UNDER FOIA EXEMPTION]
Risk Assessment Reference	[REDACTED UNDER FOIA EXEMPTION]

ADDITIONAL TERMS AND CONDITIONS APPLICABLE TO THIS CONTRACT

Please ensure all completed forms are copied to DSTLSERAPIS@dstl.gov.uk when sending to the Lot Lead.

Tasking Form Part 2: *(To be completed by the Lot Lead)*

To: The Authority	From: The Lot Lead

Proposal Reference **015021-96726L U76 AI Tech Deep Dives - Frazer-Nash Proposal** **(attached)**

Delivery of the requirement:

The proposal <u>shall</u> include, but not be limited to:

- A full technical proposal that meets the individual activities that are detailed in Statement of Requirements (Part 1 to Tasking Form).
- Breakdown of individual Deliverables, with corresponding Intellectual Property rights applied.
- Breakdown of Interim Milestone Payments, with corresponding due dates.
- A work breakdown structure/project plan with key dates and deliverables identified.
- A list of required Government Furnished Assets from the Authority, including required delivery dates.
- A clear identification of Dependencies, Assumptions, Risks and Exclusions which underpin your Technical Proposal.
- Sub-Contractors Personnel Particulars Research Worker Form and security clearances (if applicable)

PRICE BREAKDOWN

You are to use the costs detailed in Item 2 Table I in the Schedule of Requirement and at Annex E Table 2 of the Serapis Framework Agreement. Please also provide a price breakdown which should include, but is not limited to: Lot Lead Rates, Sub-contractors costs and rates, travel and subsistence. In support of your Proposal you are requested to provide clear details of all Dependencies, Assumptions, Risks and Exclusions that underpin your price.

Offer of Contract: *(to be completed and signed by the Contractor's Commercial or Contract Manager)*

Total Proposal Price in £	£64,926.72		(ex VAT)
Start Date:	ASAP	**End Date:**	30/04/2022

Lot Leads Representative	Name	[REDACTED UNDER FOIA EXEMPTION]
	Tel	[REDACTED UNDER FOIA EXEMPTION]
	Email	[REDACTED UNDER FOIA EXEMPTION]
	Date	18/01/2022
Position in Company	Project Manager – Serapis	
Signature	[REDACTED UNDER FOIA EXEMPTION]	

Core Work – Breakdown

[TABLE REDACTED IN ITS ENTIRITY UNDER FOIA EXEMPTION]

Core Work – Milestone breakdown costs

[TABLE REDACTED IN ITS ENTIRITY UNDER FOIA EXEMPTION]

Tasking Form Part 3:

To be completed by the Authority's Commercial Officer and copied to the Authority's Project Manager.

1. **Acceptance of Contract:**		
Authority's Commercial Officer	Name	[REDACTED UNDER FOIA EXEMPTION]
	Tel	[REDACTED UNDER FOIA EXEMPTION]
	Email	[REDACTED UNDER FOIA EXEMPTION]
	Date	25/01/2022
Requisition Number		1000170359
Contractor's Proposal Number		015021-96726L
Purchase Order Number		TBC
Signature		[REDACTED UNDER FOIA EXEMPTION]
Please Note: Task authorisation to be issued by the Authority's Commercial Officer or Contract Manager. Any work carried out prior to authorisation is at the Contractor's own risk.		