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

Version control please ensure this is kept up to date

REQUIREMENT

Proposal Required by:	[17/06/2022]	**Task ID Number:**	U90
The Authority Project Manager:	Redacted	**The Authority Technical Point of Contact:**	Redacted
Task Title:	Mixed-initiative human-machine teaming and explainable AI		
Required Start Date:	[01/07/2022]	**Required End Date:**	[31/01/2023]
Requisition No:	[RQ0000009409]	**Budget Range**	£200k

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)

Background

The *Future Data Science* (FDS) project seeks to generalize Data Science by creating and demonstrating the underpinning science through which the machine will be able to re-use its models with a confidence of validity, and generalize (broaden) Data Science and AI to answer counterfactuals. The *Next Generation Information and Knowledge* work package within FDS will study knowledge representation and reasoning (KRR) to support these aims.

The overarching themes for this work are *mixed-initiative human-machine teaming* and *explainable AI*, and break down into specific technical topics and approaches as follows:

Human Computer Interaction (HCI) - Consider the humans in human-machine teaming, and how they interact with KRR. Minimize skill costs and cognitive burden in HCI. In other words, make the machine understand the

human, rather than the other way round. We focus on **conversational agents** for these purposes. This implies problems of natural language understanding (NLU) and natural language generation (NLG).

Linked Data - Where possible, link to data rather than move it. Share globally unique identifiers. Share schema, taxonomies and ontologies. Make data discoverable. Develop techniques for **reasoning over linked data**. We focus on OWL/RDF for these purposes. Consider the analyst user (a subject domain expert with little knowledge of ontology), and pragmatic approaches to analyst interaction with a **knowledge graph**: adjunct ontology, taxonomy, conversational agents, natural language processing (NLP), controlled natural language (and combinations thereof).

Argumentation - Argument Interchange Format (AIF) as the open standard format for argumentation. Focus on **argument mining** to extract structured machine arguments from natural language, and **explanation** to interpret structured machine arguments as natural language. Manipulate **argumentation schemes** for these purposes. Exploit models of **dialogue** to place information extracted from natural language in the context of a wider discourse (questions, answers, clarification, explanation, disagreement, etc.). Consider both how natural language processing can help construct models of dialogue (argument mining), and how models of dialogue can provide a context to assist natural language processing.

Causality - Identify causal arguments (as a specific case of general argument scheme classification). Identify observables and indicators. Relate causal graphs to argument maps: (a) to support discovering and confirming causality statistically; (b) to explain a causal relationship. Explore and exploit any relationship between **causal strength** and **value of information**.

Uncertainty - Move beyond probabilistic uncertainty to consider uncertainty as classes or labels. Consider uncertainty in terms of consequences (costs, risks, etc.). Consider uncertainty in terms of its sources (e.g. the credibility of testimony might depend both on expertise and position-to-know of the witness). Extend the notion of **communicating uncertainty** to **explaining uncertainty**. Explore and exploit any relationship between **uncertainty** and **value of information**.

This analysis positions OWL/RDF as the primary mechanism for knowledge representation and argumentation as the means for reasoning. We mandate Argument Interchange Format (AIF) as the argumentation modelling language for all tasks (GFA 1).

The FDS project runs for 3 years (FY 2022/3-2024/5), with work in each year themed under the broad titles of *discovery*, *delivery* and *evaluation*. The primary goal in this first year is therefore to develop a deep understanding of the topics described above. Deliverables will be reports and, where appropriate, high-level design for solutions to delivered and evaluated in the second and third years of the project. With the *delivery* theme of FY 23/24 in mind, Authority will consolidate the design of past and present Serapis argumentation software to create a Unified Modeling Language (UML) high-level design. Authority will consult with suppliers over the course of the FY 22/23 tasks specified below, and will provide a formal release of the UML model in the latter half of the FY (GFA-10) that can be referenced in final reports.

The specific requirements are:

Task 1 – Explaining Uncertainty

1. Use argumentation to provide a richer representation of uncertainty than a simple probability or label; so that a claim is accompanied by qualifications, caveats and exceptions expressed as arguments.

2. Allow a *decision maker* or *expert* to moderate or override arguments about uncertainty - for example, a decision maker might reject specific concerns, or specify an appetite for risk; an expert might challenge qualifications and caveats, or suggest new exceptions. These inputs from a decision maker should be arguments that extend the argument map before evaluation (rather than parameters in some argument evaluation tool).

3. Build a dialogue about uncertainty. This means that any arguments a decision maker puts forward must be locutions, and so attributable to source.

4. Multiple experts and decision makers may extend the same uncertainty argument, and may have conflicting views. This raises the question of uncertainty about the uncertainty. It should be possible to

both: (a) use conflict about uncertainty to adjust the uncertainty on the main claim; and (b) isolate the causes of disagreement to seek clarification or adjudication, and extend the dialogue accordingly.

5. Use the richer representation of uncertainty described above to extend capability for *communicating uncertainty* into *explaining uncertainty*. This implies the ability to answer questions about uncertainty, and to ask questions that might reduce uncertainty (e.g. "Is X in this list of exceptions?"). How, when and if these questions are raised will depend on context.

6. There may (or may not) be an uncertainty argument about any single claim in the argument map. Uncertainties across the argument map will aggregate as in previous work on applying probabilistic argumentation to uncertainty. Details to be supplied as GFA-4 (from Serapis U33).

Prior work (GFA-4) used ASPIC+ to generate a Dung Argumentation Framework (DAF) from an Argument Interchange Format (AIF) argument map. Dstl have developed an alternative method (GFA-5) for generating a DAF from AIF that assumes support relationships are presumptive, and therefore not transitive. This allows a 1:1 mapping from AIF S-Nodes to arguments in the DAF. The thesis is that this makes it easier to relate results of evaluating a DAF in terms of the original AIF, and so make the results more *explainable*. In the first instance, we wish to test this by comparing results of applying the existing U33 methods to DAF's generated by both ASPIC+ and the new method from the same AIF argument map. Lessons identified here should feed into design thinking that addresses the issue of richer representations of uncertainty.

We require the development and assessment of a dialogical model of uncertainty that satisfies the requirements listed above. Consideration should be given to dialogue turns between "human" and "machine" agents; and what this means in terms of the KRR requirements on machine agents, or skills requirements on human agents. In addition, whether the dialogical approach offers value over and above the stated requirements; for example, in counterfactual reasoning, or in suggesting risk mitigation options in a planning process. The design should focus on AIF dialogue models and uncertainty, and simply specify requirements on notional KRR or argument mining services that might be needed.

Task 2 – Argument at the edge

In the spirit of *edge computing*, this is argument at the edge of the *knowledge graph*: close to the sources of argument, where arguers may have limited ability (or desire) to engage with the knowledge graph directly. It extends Serapis U2 and U33 work on reasoning over linked data (GFA-6). In particular, we wish to support, enable and encourage *mixed-initiative human-machine teaming*. This means relating (human) arguments expressed as natural language to (machine) arguments expressed as Argument Interchange Format (AIF).

Relevant contributions from prior work (GFA-1,2,3,6) are:

- **Dedwi** produced the AIF-HEVY adjunct ontology; a lightweight ontology that enables AIF argument maps that reason over events in a knowledge graph.

- **Opis** has produced the Opis core ontology. This is a phenomenological upper ontology that can be shaped into a domain-specific ontology through concepts modelled in SKOS.

- **Semi-automated argument mining** has shown that natural language processing (NLP) techniques for *information extraction*, such as named entity recognition or topic analysis, can enable better *argument mining*; and suggest that argument mining can be used to reinforce information extraction.

The above bridge between knowledge representation as natural language and knowledge representation as a graph; with argumentation as the medium for presenting and evaluating hypotheses, and reasoning over uncertainty. This is the "ontological edge" between human and machine in mixed-initiative human-machine teaming. A dialogical model of argumentation can capture discourse between human and machine. We wish to study how such a dialogue may come about when the human is a subject-matter expert in the domain modelled by the knowledge graph, but has no knowledge at all of its structure (ontology).

Argumentation and phenomenology both present knowledge from a subjective or first person point of view. In argumentation, an agent makes a locution, and in phenomenology, an agent makes an observation. Both of these acts are modelled as events in their own right; directly in Opis, and via AIF-HEVY locution events in

argumentation. This is the "ontological edge" between AIF and a knowledge graph. Dedwi demonstrated using argumentation to reason over a knowledge graph describing events, but we now wish to explore reasoning over knowledge graphs in general. We also wish to explore the utility of dialogue between different machine agents backed by different specializations of Opis core ontology. One question is how much useful information can be exchanged if agents restrict themselves to concepts modelled in the common Opis core. Another question is whether agents can use the common Opis core to negotiate a useful degree of ontology matching between their different specializations of that core.

The specific requirements on this task are:

1. To understand the interface between human and machine agents when the human agent understands the domain modelled by the knowledge graph, but has no knowledge of its structure (ontology). This is argument mining and explanation.

2. To understand the interface between two machine agents, when one agent has a full understanding of the knowledge graph ontology, but the other does not. This is the ontology alignment problem.

3. Expressing the output from an algorithm as an argument supports the expression of results that are ambiguous, or that offer alternatives. We seek pragmatic solutions to adapting existing machine agents to a role in a mixed-initiative team through argumentation. For example, if a predictive model makes a claim then we would like that claim modelled as an argument that might allow the claim to be challenged. If making the claim is modelled as a locution then it is explicitly associated with the agent identity, and it becomes possible to form opinions on the agent's credibility.

The requirement is for solution design rather than implementation. Solutions that generalize as much as possible are desirable. For instance, it may be that some ontology alignment step in (2) is an enabler for argument mining in (1), or vice versa. If so, then clear benefit to the more general *information extraction* problem.

This task is exploratory in nature. We therefore seek an interim report that gives an overview of potential solutions, and that suggests and prioritizes a list of topics for further work in the remainder of the task.

Task 3 – Argument representation

The purpose of this task is to develop and document best practice for modelling and manipulating argument maps. This task will consolidate prior argumentation work under Serapis, and will inform work in this round. To that end, the task will collect and extend documentation under the Dstl eleatics GitHub project as it proceeds. Dstl will engage in this task to manage the documentation process.

Contribution is invited from suppliers under the following headings:

a) Argument modelling – With considerations of "human and machine scale". This rather vague expression is meant to convey a requirement to construct, discover or relate both "high level" (human) and "low level" (machine arguments) that are equivalent. A low-level machine argument might, for example, consist of a large number of premises that are weather sensor data, perhaps linked to intermediate results through statistical and logical inferences, producing a final claim about the weather in some spatio-temporal time frame. An equivalent high-level, human argument might be "I think it will rain tomorrow".

It is the case that the same argument can be represented in different ways. We wish to explore the utility of argumentation in critical discussion, and to explore applying pragma-dialectical theory to that end.

b) Argument explanation - A key requirement is that arguments should be explainable. This relates to the question of "scale" in that an explanation should be as terse or verbose as required at the time and pragma-dialectics in that explanations must be relevant to the points at issue. Research into explaining arguments and explaining uncertainty are separate tasks, but argument structures that enable explanation are relevant here.

Prior work (Serapis) has looked using argumentation schemes for the purposes of manipulating argument maps. There has also been some prior work (Dstl internal) in using the Toulmin pattern (in

combination with argumentation schemes) to model or summarize larger arguments. We wish to build on this work in this task, and the related explanation tasks.

c) **Argument linking** - This is about joining argument maps. This may be needed when the argument maps are independently developed, applying a critique at some later time, review and amendment, distributed agreement, joining public argument with private argument, mechanical claims, making a move in a dialogue game.

d) **Argument visualization** - There are better ways to convey some important aspects of an argument than presentation of an argument map as a network diagram or list. We are interested in understanding the requirements for visualization rather than developing visualization as the art of the possible. In particular, we are interested in visualization that would allow a user to interact with an argument as well as understand it. For example, in prior work we have studied the problem of when and how an argument map can be usefully represented as an Analysis of Competing Hypotheses (ACH) matrix.

   ACH is a structured analysis technique (SAT) - and we propose that SATs are a way that analysts can engage in building and evaluating arguments without needing to understand argumentation theory. Other SATs and methodology to support critical thinking in general, come with their own visualization. We are interested in finding or inventing visualizations that assist critical thinking. The value of these in representing a general argument map should be assessed in terms of whether an AIF argument map can be mechanically transformed into the visualization in such a way that any claims justified by the visualization are also justified by the argument map. In other words, the transformation should preserve the meaning of the arguments presented, even though details or structure of the general argument map might be lost in the transformation process.

   This suggests that a visualization *represents* an argument map that is a subset or simplification of a larger argument map. There should be some sense in which the two argument maps are equivalent, analogous to the "high level human" and "low level machine" arguments above. We are interested in understanding this equivalence in detail.

This task is exploratory in nature. We therefore seek an interim report that gives an overview of potential solutions, and that suggests and prioritizes a list of topics for further work in the remainder of the task. The interim report should consider all the above use cases for argument representation, but limiting the scope of deeper investigation to a subset of these headings will be acceptable.

Task 4 – Dialogue

Prior work placed a question-answering conversational agent into a dialogical framework. This allowed the dialogue structure to be captured as interrogation of the conversational agent proceeded. At the same time, speaker turns in the dialogue were subjected to argument mining and analysis of the results. The framework allows multiple agents to take part in the dialogue. Analysis of evolving dialogue suggests "context" that can be monitored by additional agents (each with some specialist role), and might trigger them into interjecting a comment into the dialogue. This architecture, called *Dialogue-as-a-Service* (DaaS), is central to our vision for human-machine teaming (GFA-9).

The purpose of this task is to explore the utility of models of dialogue. As well as an interactive dialogue (i.e. a conversation), this work should consider dialogue generally. For example, an extended dialogue that defines requirements, develops a plan, explores possibilities or develops a scientific debate.

Speaker turns in a dialogue should be considered generally. As well as utterances made in conversation, these might be written comments, propositions or critiques specifically prompted by the dialogue; or might be third-party arguments quoted by an agent engaged in the dialogue.

A dialogue model from a conversation managed by DaaS should have the same structure as dialogue model constructed by piecing together disparate arguments from various sources. Both should be amenable to the same analysis. For example, we may want formally to relate questions to their answers; when applying a methodology perhaps, or in collecting responses to a request for information (RFI). Modelling this as a dialogue gives agency to the utterances, and provides hooks for extending the dialogue with clarification, follow-up

questions, etc. This gives an extended “conversation”, with a developing context, that could nevertheless be played out in a DaaS framework for the benefit of critical agents.

The requirement here is to assess the value of modelling knowledge elaboration as a dialogue, and to assess the application of DaaS to support that. If this task suggests any reusable argument modelling approaches, or conventional use of argumentation schemes, then these should be described documented. Similarly, specifications should be produced for any generally useful argument mining services that this task might identify.

This task is exploratory in nature. We therefore seek an interim report that gives an overview of potential solutions, and that suggests and prioritizes a list of topics for further work in the remainder of the task.

Task 5 – Engaging in argument

This task concerns development and testing of methods to allow collaborative and distributed development of arguments over time. It builds on prior work (Serapis U33) to extend the Adaptive Report Generation Assistant (ARGA) to allow mark-up of argument structures in text reports (GFA-7).

The aim is to build one or more open arguments that can be extended and developed over the lifetime of FDS. As well as developing, testing and refining the procedures and practices needed to achieve this, such arguments will also be used to generate test cases and exemplars for wider use. Dstl will select the theme or themes for the arguments and Serapis suppliers will be invited to participate.

In a long-lived argument, there is likely to be a broad overarching theme that breaks down into a number of topics for debate. Debates on specific topics may develop separately, but will likely overlap, and will share arguments (either consciously or through developing equivalent arguments independently). Arguments get refined over time. This generally leads to expansion of an argument map, but debate may also lead to mutual agreement and refinement of terms that allows an argument map to be simplified. Understanding the lifecycle of extended arguments is an objective.

Participants in the extended argument may engage directly or indirectly, and with differing degrees of effort and expertise required. ARGA should be the prime (but not only) mechanism for engagement. This implies standing up an ARGA server that can be accessed by relevant parties over the internet.

The artefacts of the argument will collect under the Dstl eleatics GitHub project. Consideration must be given to how a developing argument can be packaged, versioned and released at various stages. Each release should be a self-contained dataset that could support further research.

Initially at least, this task will exploit the functionality ARGA as is, rather than ask for modifications. However, its use in the above scheme suggests we should think about how a group of analysts with ARGA engage more widely, and with ad hoc arguers who do not have access to the tool. This suggests an instance of ARGA that anyone can read, but only an authorized (small) group can edit. It should be possible for anyone to create their own argument maps (by whatever mechanism) and refer to ARGA arguments (re-use of ARGA I-node URIs). Also, for one of the authorized ARGA users to construct an argument inside ARGA that refers to claims on an external argument. A change control process must be agreed that can capture and action any requests to modify ARGA over the lifetime of this task.

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 (Follow the Redacted guide to identify your information and IP requirements for each deliverable)	**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
Task 1, D1	The role of DAF construction in evaluating uncertainty	T0 + 3 Months	Document (Word or PDF)		Redacted	A report comparing U33 probabilistic evaluation and value-of-information algorithms when applied to DAFs generated from the same AIF argument map in different ways: Using ASPIC+ (as for U33); and the supplied "presumptive" method (GFA-5). An assessment of the utility of the latter method's "explanation graphs" in this context.	705
Task 1, D2	Dialogical models of uncertainty	February 2023	Document (Word or PDF)		Redacted	A report describing how the dialogue modelling elements of AIF might be used to provide richer descriptions of uncertainty. This should include the consideration of both human and machine	705

						agents in dialgoue about uncertainty, and assess the value of algorithms such as value-of-information (or similar) in reducing uncertainty.	
Task 2, D1	Interim report	T0 + 3 Months	Document (Word or PDF)		Redacted	Results of inititial investigations that give an overview of the task, and plans for further work in the remainder of the project.	705
Task 2, D2	Final report	February 2023	Document (Word or PDF)		Redacted		705
Task 3, D1	Interim report	T0 + 3 Months	Document (Word or PDF)		Redacted	Results of initial investigations that give an overview of the task, and plans for further work in the remainder of the project.	705
Task 3, D2	Final report	February 2023	Document (Word or PDF)		Redacted		705
Task 4, D1	Interim report	T0 + 3 Months	Document (Word or PDF)		Redacted	Results of initial investigations that give an overview of the task, and plans for further work in the remainder of the project.	705
Task 4, D2	Final report	February 2023	Document (Word or PDF)		Redacted		705
Task 5, D1	ARGA instance	T0 + 3 Months	Document (Word or PDF)		Redacted	An instance of ARGA accessible over the internet.	705
Task 5, D2	ARGA operations	T0 + 3 Months	Document (Word or PDF)		Redacted	Procedures, to be agreed with Authority, for maintaining and managing the ARGA instance to end of FY 22/23. To include access control and change request process.	705
Task 5, ad hoc	ARGA modification	TBA	Source Code and Document (Word or PDF)		Redacted	Source code and documentation for any changes made under the process described in D2.	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)*

Unique Identifier/ Serial No	Description	Classification	Type	Available Date	Issued by	Return or Disposal Date	Any restrictions?
Serial no	*Description*	*Official-Sensitive*	*Equipment*	*00/00/0000*	*Issuer*	*00/00/0000*	*Include details here*
1	AIF Ontology	Redacted	Data	T0			
2	Opis (Core) Ontology	Redacted	Data	T0	Authority		
3	Opis Best Practice Guide	Redacted	Document	T0	Authority		
4	Serapis U33 Task 1, final deliverables	Redacted	Code, Document	T0	Authority		
5	Explaining presumptive arguments	Redacted	Document	T0	Authority		
6	Project Dedwi U2 Deliverable D2: Inference over Knowledge Graphs	Redacted	Document	T0	Authority		
7	Adaptive Report Generation Assistant (ARGA), Serapis U33 Task 3, final deliverables (Docker images and documentation)	Redacted	Code, Document	T0	Authority		
8	Argument Mining deliverables: Serapis U1, D3; Serapis U33 D3/D4/D5; Serapis U33, D6.	Redacted	Document	T0	Authority		
9	Conversational Agent deliverables: Serapis U1, D4; Serapis U33, Task 4.	Redacted	Document	T0	Authority		

10	Argumentation Framework	Redacted	UML Model	T0 + 6 months	Authority			

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

The highest classification of this SOR

OFFICIAL ☐ OFFICIAL-SENSITIVE ☐ SECRET ☐ TOP SECRET ☐ STRAP ☐ SAP ☐

The highest expected classification of the work carried out by the contractor

OFFICIAL ☐ OFFICIAL-SENSITIVE ☐ SECRET ☐ TOP SECRET ☐ STRAP ☐ SAP ☐

The highest expected classification of Deliverables/Output

OFFICIAL ☐ OFFICIAL-SENSITIVE ☐ SECRET ☐ TOP SECRET ☐ STRAP ☐ SAP ☐

Is a Security Aspects Letter (SAL) required? *(A Security Aspects Letter (SAL) will be required for each Task above Official-Sensitive and above)*

Yes ☐ No ☐

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

Cyber Risk Level	Redacted
Risk Assessment Reference	Redacted

ADDITIONAL TERMS AND CONDITIONS APPLICABLE TO THIS CONTRACT

Please ensure all completed forms are copied to Redacted **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 _____ **(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 £	£199,819.96		(ex VAT)
Start Date:	08/08/2022	**End Date:**	**31/03/2023**
Lot Leads Representative	Name	Redacted	
	Tel	Redacted	
	Email	Redacted	
	Date	Redacted	
Position in Company	SERAPIS Lot 6 Project Manger		
Signature			

Core Work – Breakdown

Lot Lead Rates for Task Management Services (TMS)							
Team Member Name	**Role**	**Activity Type**	**Rate (£)**	**Total Hours**	**LMS recovery per role per hour ('d' element)**	**Total LMS recovery due (£) ('d' x total hours)**	**Total TMS Cost (£) (Rate x total hours)**
Redacted							
		Total		Redacted		Redacted	Redacted

Work Delivered By Sub-Contractor(s)						
Name of Sub-Contractor	**Supplier Type**	**Activity Description**	**Team Member Role**	**Rate (£)**	**Total Hours**	**Total Cost (£)**
Redacted						
				Total	Redacted	Redacted

Travel, Subsistence, Materials & Equipment Travel & Subsistence					
Supplier Name	**Spend Type**	**Description / Rationale**	**Unit Cost (£)**	**Quantity**	**Total Cost (£)**
Redacted					
		0	**Travel & Subsistence Total**		**Redacted**
Materials & Equipment					
Supplier Name	**Spend Type**	**Description / Rationale**	**Unit Cost (£)**	**Quantity**	**Total Cost (£)**
Redacted					
			Materials & Equipment Total		**Redacted**
		Travel, Subsistence, Materials & Equipment Total			**Redacted**

Core Work – Milestone breakdown costs

Proposed Milestones Payments

Your TMS bid costs shall be included in milestone 1.

The final Milestone must reflect the actual cost of the deliverable, and be greater than 20% of the Task value, unless otherwise agreed with your Commercial POC

Please duplicate the template per milestone table format below as necessary, and rename milestone number accordingly.

Milestone M1						
Description	**TMS cost (£)**	**Self-Delivery cost (£)**	**Sub-contractor cost (£)**	**Total milestone cost (£)**	**Milestone due date**	**DEFCON**
Redacted	Redacted	Redacted	Redacted	Redacted	08/08/2022	705
Redacted				Redacted		
Redacted				Redacted		705
Redacted	Redacted		Redacted	Redacted		

Milestone M2						
Description	**TMS cost (£)**	**Self-Delivery cost (£)**	**Sub-contractor cost (£)**	**Total milestone cost (£)**	**Milestone due date**	**DEFCON**
Redacted	Redacted	Redacted	Redacted	Redacted	08/11/2022	705
Redacted				Redacted		
Redacted				Redacted		705
Redacted	Redacted		Total cost	Redacted		

Milestone M3						
Description	**TMS cost (£)**	**Self-Delivery cost (£)**	**Sub-contractor cost (£)**	**Total milestone cost (£)**	**Milestone due date**	**DEFCON**
Redacted	Redacted	Redacted	Redacted	Redacted	31/03/2023	705
Redacted				Redacted		
Redacted				Redacted		705
Redacted	Redacted		Total cost	Redacted		

Milestone M4						
Description	**TMS cost (£)**	**Self-Delivery cost (£)**	**Sub-contractor cost (£)**	**Total milestone cost (£)**	**Milestone due date**	**DEFCON**
Redacted	Redacted	Redacted	Redacted	Redacted	08/11/2022	705
Redacted				Redacted		
Redacted				Redacted		705

Redacted	Redacted		Total cost	Redacted		
Milestone M5						
Description	**TMS cost (£)**	**Self-Delivery cost (£)**	**Sub-contractor cost (£)**	**Total milestone cost (£)**	**Milestone due date**	**DEFC ON**
Redacted	Redacted	Redacted	Redacted	Redacted	21/02/2023	705
Redacted				Redacted		
Redacted				Redacted		705
Redacted	Redacted		Total cost	Redacted		
Milestone M6						
Description	**TMS cost (£)**	**Self-Delivery cost (£)**	**Sub-contractor cost (£)**	**Total milestone cost (£)**	**Milestone due date**	**DEFC ON**
Redacted	Redacted	Redacted	Redacted	Redacted	18/11/2022	705
Redacted				Redacted		
Redacted				Redacted		705
Redacted	Redacted		Total cost	Redacted		
Redacted	Redacted	**Total Cost (All Milestones)**		Redacted		

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
	Tel	Redacted
	Email	Redacted
	Date	25 July 2022
Requisition Number		RQ0000009409
Contractor's Proposal Number		016829/97613L dated 19 July 2022
Purchase Order Number		DSTL0000005893
Signature		Redacted
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.		