Serapis Tasking Form

Tasking Form Part 1:

To:	Lot 1 Roke Manor Research 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 1 DSTL/AGR/SERAPIS/COL/01			

VERSION CONTROL		
1.0	12 Oct 22	Initial Issue

REQUIREMENT			
Proposal Required by:	21/11/2022	**Task ID Number:**	C86
The Authority Project Manager:	[REDACTED]	**The Authority Technical Point of Contact:**	[REDACTED]
Task Title:	Wideband Tuneable RF Filter		
Required Start Date:	19/12/2022	**Required End Date:**	28/02/2025
Requisition No:	RQ0000016458	**Budget Range (ex VAT)**	[REDACTED]

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)

The Radar Sensing (RAS) project under the Future Sensing Programme (FSP) aims to deliver revolutionary sensing solutions that enable pervasive situational awareness and targeting for all users in the future [REDACTED] environment. One aspect of this is the development of Generation-After-Next (GAN) S&T for technologies and architectures of radar systems that provide high sensing performance and flexibility [REDACTED].

In order to improve the ability of future RF systems to perform [REDACTED], it will be necessary for them to be more flexible and more able to operate across wider bands. To this end, there is a requirement to develop the components that will be needed to support these future systems. One of the areas in which there is scope for further development is in the capabilities of tuneable filters, current tuneable filters generally operate over limited bandwidths [REDACTED].

In order to support future developments with wideband systems, the Authority is interested in determining what is possible with the current and emerging filter technologies. As such, this activity shall be focused on the development of a novel tuneable filter covering the [REDACTED] multiple bands. Ideally, this filter should be capable of generating and maintaining several passbands [REDACTED] . It shall be designed with future use

cases [REDACTED] in mind - if not possible for the initial prototypes, it should have the potential to achieve these qualities in the future:

- high efficiency
- low size, weight and power (SWAP)
- ruggedized for defence use with appropriate vulnerability to humidity, pressure, vibration and shock loads

It may be beneficial, depending on the final architectures, to also investigate the issue from the perspective of a bandstop filter rather than a bandpass filter. The initial phase of works shall be focused on examining the current state of emerging filter technologies in order to determine the most suitable methods for achieving the desired performance, as well as understanding the trade space needed around the various aspects of filter performance.

In short, the desired filter should have the properties found in Table 1 and should aim to minimise undesirable properties such as passband ripple and insertion loss. The transition bands between pass and stop should be narrow to maximise selectivity.

[REDACTED]
Table 1: Desired Properties

Minimising noise figure is an important consideration and the expected performance of the chosen technologies in this regards should be addressed in the Phase 1 study. Likewise there is interest in the application of these technologies at lower frequencies so consideration of their suitability down to VHF bands should also be considered.

The task will comprise two phases (potentially undertaken by two separate parties), with a contract breakpoint in between. Phase1 shall be offered on a firm price basis, together with a maximum limit of liability (LoL) cost for Phase 2. [REDACTED]

Phase 1 – Solution Definition (up to 5 months' duration in FY22/23)

This Phase will require a Contractor with knowledge of, and contacts in, the filter landscape to identify the best solution for MOD's needs:

1a. Confirm the minimum requirements for a wideband tuneable filter [REDACTED] (to include SWAP considerations);

1b. Understand the commercial off-the shelf (COTS) and modified off-the shelf (MOTS) solutions available now and in future (i.e. those being researched and developed by academia, industry and government across the globe);

1c. Identify promising solutions and/or gaps, recommend where investment will be beneficial for MOD's applications (either to accelerate existing research of start something new);

- This is to inform a decision gate for the Authority project leadership team (or higher if significant investment is recommended) on the course of action to take.

1d. Deliver a proposal that re-validates the requirements, scope and cost of Phase 2 (with sub-contractor input if required). This shall be supplemented by the following plans provided as separate documents (building on initial versions provided with the ROM cost for Phase 2):

- a description of the approach to solution development and quality assurance, to include a Systems Engineering Management Plan (SEMP) plus any other design or planning documentation considered necessary by the Contractor. The SEMP shall be the overarching engineering document produced by the technical lead that is subservient to the Project Management Plan (PMP) (repetition should be kept to a minimum). The SEMP shall outline the engineering activities and engineering approach to the design and development of the system. The SEMP shall conform to, or include, as a minimum, the following::

    i. any applicable engineering activities, models, tools, techniques, customs, processes, practices and standards used for the hardware and software development, integration and test

ii. approach to UK Conformity Assessed (UKCA) marking

iii. risk & complexity

iv. roles & responsibilities

v. the activities and methods to be applied to all technical risks, assumptions, dependencies, issues, and opportunities (RADIO)

vi. approach to quality assurance/management & configuration/version control

vii. approach to reviewing, testing, verification & validation activities (to include details of any unit testing, system-of-systems (SoS) testing and suggested User Acceptance Tests (UATs))

viii. software/hardware artefacts/deliverables, e.g. system and subsystem design documents (functional, architectural, detailed, etc.), interface control documents, test plans and test results

ix. software/hardware technical/design reviews, with defined entry and exit criteria, to be held during the task

x. software/hardware options with justification for the chosen route

xi. software/hardware project lifecycle and any ongoing support

- a description of the approach to project management, to include but not be constrained to:

i. the project plan (to include plan for safety and quality assurance) and schedule

ii. forecast spend profile

iii. deliverables

iv. risk register with post-mitigation probability and impact

v. dependencies and assumptions

vi. GFX

vii. project team

Early input from the Authority on deliverable and acceptance criteria expectations is strongly advised to avoid proposal rework and/or delays in contracting Phase 2.

Phase 2a – Filter Development Iteration 1 (up to 12 months' duration in FY23/24)

This Phase will require a Contractor with experience in RF filter design and manufacture to deliver a prototype for GAN radar systems:

2a. Develop filter design with consideration of potential environmental requirements (as specified in Phase 1);

2b. Deliver a prototype wideband tuneable filter that has been validated by the manufacturer in a laboratory environment (TRL3-4) –tests shall include, as a minimum, the following:

- Characterisation of filter bandwidths and cut off frequencies (-3 dB)
- Measurement of passband ripple and roll off characteristics
- Insertion loss and out of band rejection
- Impedance characteristics
- Phase and group delay

Phase 2b – Filter Development Iteration 2 (up to 12 months' duration in FY24/25)

This Phase will require the Contractor to refine the filter design and manufactured prototype based on the test results gathered in Phase 2b:

2c. Refine filter design with consideration of potential environmental requirements;

2d. Deliver a refined prototype wideband tuneable filter that has been validated in a laboratory environment (TRL4) (suggested tests as detailed for Phase 2a);

2e. Demonstrate the potential benefits of the technology design on RF sensor performance and flexibility;

2f. Inform a decision on further testing in a relevant environment with consideration of the potential challenges in further developing and implementing such a device.

The Contractor shall host monthly detailed technical updates (in person if easier) during both Phase 1 and Phase 2.

Engineering Severity Level (ESL) Matrix

The Contractor shall communicate the projected characteristics of the tuneable filter (as defined in Phase 1) and the progress made in achieving those characteristics during Phase 2 through completion of an Engineering Severity Level (ESL) matrix (a quantitative technology maturity assessment tool)[REDACTED]. This matrix is a visualisation tool for comparison of achieved, projected and required characteristics (with the latter being added by the Authority) – it highlights any capability gaps that might need to be filled. The matrix [REDACTED] is generic as it is designed to be applied to a variety of different research projects; the Contractor shall propose, in Phase 1, an ESL template that best demonstrates the important characteristics of a tuneable filter and progress towards the end goal (this shall include SWAP considerations).

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 NIPPY 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. [REDACTED]
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

DELIVERABLES

[REDACTED]

[REDACTED]Confirmation of ITAR status and background IP included shall be provided on the front page of all documentation delivered. Full Rights Versions and Limited Rights Versions shall be provided for any deliverables that include background IP with both versions being fully comprehensible in isolation from each other.

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:-

During Phase 2, the Contractor shall run through their validation process (as defined in the SEMP) with the Authority as confirmation of the solution meeting the agreed requirements. The Authority will also complete the UATs suggested in the SEMP during Phase 2.

Government Furnished Assets (GFA)

ISSUE OF EQUIPMENT/RESOURCES/INFORMATION/FACILITIES

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)

The prototypes shall be subject to UKCA marking prior to delivery to the Authority (to be covered in the SEMP).

SECURITY CLASSIFICATION OF THE WORK

[REDACTED]

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

[REDACTED]

ADDITIONAL TERMS AND CONDITIONS APPLICABLE TO THIS CONTRACT

[REDACTED]

[REDACTED][REDACTED]

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 OPPFBL000548 Iss 2 **(attached)**

Delivery of the requirement:

The proposal shall 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 £	Phase 1 £166,007.35 Options – see table below		(ex VAT)
Start Date:	06/02/2022	**End Date:**	28/02/2025

Lot Leads Representative	Name	[REDACTED]
	Tel	[REDACTED]
	Email	[REDACTED]
	Date	01/02/23
Position in Company	[REDACTED]	
Signature	[REDACTED]	

Core Work – Breakdown

[REDACTED]

[REDACTED]
[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.
[REDACTED]

Options – Summary
[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	08/02/2023
Requisition Number		RQ0000016458
Contractor's Proposal Number		C86
Purchase Order Number		DSTL0000013184
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.		