Serapis Tasking Form

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

To:	Lot 4 QinetiQ Plc	**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 4 DSTL/AGR/SERAPIS/AII/01			
VERSION CONTROL			
Version control please ensure this is kept up to date			
REQUIREMENT			
Proposal Required by:	02/07/21	**Task ID Number:**	AII62
The Authority Project Manager:	[Redacted under FOI exemption]	**The Authority Technical Point of Contact:**	[Redacted under FOI exemption]
Task Title:	Troposcatter Propagation Tool		
Required Start Date:	12/07/21	**Required End Date:**	28/02/22
Requisition No:	1000164592	**Budget Range**	£120k
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)

Introduction

The emerging threat to SATCOM (through natural and hostile means) has resulted in a need to understand and exploit other long range Beyond Line Of Sight (BLOS) propagation options such as tropospheric scatter. While technological issues such as the large size, weight and power (SWaP) profile have been overcome in recent years, the lack of accurate propagation tools for deployment planning and operations have not.

Modern troposcatter systems tend to operate in [Redacted under Military sensitive technical information exemption']. These systems can potentially offer high bandwidths in excess of 100Mbps over geodesic distances in excess of 160km dependent upon climatic conditions.

The propagation mechanism for troposcatter systems depends on the operational scenario. Short range Beyond Visual Line of Sight (BVLOS) paths may rely on atmospheric ducting, diffraction, or refraction, whilst long range Beyond Line of Sight (BLOS) paths will be dominated by troposcatter i.e. scattering from refractive-index in-homogeneities.

Whilst the Troposcatter systems have benefitted from technological advances, the tropospheric propagation prediction tools have not developed to the same extent and most tools still use long term atmospheric data. In

order to fully utilise troposcatter communications, therefore, it is imperative that deployed systems are supported by accurate propagation tools for mission planning and operations.

New propagation tools to support troposcatter systems must use novel data fusion methods and exploit real-time data to provide useful now-casts and forecasts information. In particular, they must correctly predict the performance of modern troposcatter modems in terms of quality of service and available bandwidth to ensure operational efficiency.

Importantly, for any propagation planning or analysis tools to work accurately, they must not only just consider troposcatter but incorporate other propagation modes such as; ducting and diffraction as well as the impact of terrain and ideally rain and sand side-scatter to provide a complete solutions.

Benefits

The expectation of the task is that it will:

- Increase Technical Readiness Level
- Increase Operational Readiness Levels

It is expected that the task will take as inputs:

- General theory or concepts such as general COTS methods and techniques and models
- Previous work
- Other research (Research products from many sources).

It is expected that the task exploitation will be via:

- Knowledge or capability in UK industrial base
- Improved decision making to enhance knowhow in FLC and Dstl
- Development of exploitable algorithms

The research undertaken in this task will be able to calibrate its findings against data provided by a modern troposcatter system.

Task Requirement

This task continues the work carried out under the AII14 task (detailed reports can be found in the Issue Of Equipment/Material/Information section 1 – 5 below) which presents the next steps for developing the next-generation troposcatter prediction tool that will ultimately be suitable for land and maritime operations in both static and on the move operations.

It is intended that this task is carried out under DEFCON 703. However, if there is background IP associated with any aspect of this task then it should be declared from the outset.

The aim of the task is to investigate through model testing, the performance and enhancement needed to modelling tools and the modelling of system performance using artificial propagation mechanisms.

Activities should include (but not limited to) :

1. Through testing, determine and report if the existing models, namely i) Advanced Propagation Model (APM) and ii) TERrain Parabolic Equation Method (TERPEM) can be enhanced to provide a complete propagation solution e.g. use real-time tropospheric scatter data, include the effects such as rain and sand scatter, as well as diffraction and the effects of terrain, or if a new model needs to be developed.
2. Demonstrating how Met office and terrain data can be used to simulate system performance in three agreed scenarios (e.g. long range troposcatter only path, Beyond Visual Line of Sight (BVLOS) path

and a long range littoral path) over a 24 hour period for the most appropriate model. This may require engagement with the UK Met Office for the provision of refractivity profiles in the correct format.

3. [Redacted under Military sensitive technical information exemption]

4. Show how modelling can be used to assess system threats (e.g. LPI/LPD).

5. Show how modelling can be used to illustrate the impact of LPI/LPD and system performance based on for example system alignment errors, environment errors etc.

6. Deploying a [Redacted under Military sensitive technical information exemption] small form factor troposcatter system (provided as GFx) to obtain system performance data.

7. Comparing modelled predicted/nowcast performance data with measured data obtained from a deployed COMET small form factor troposcatter system data.

Task Output

This task outputs are expected to be:

1. Advancements in the TRL and development of a modern Troposcatter Propagation Tool.
2. Identify specific external data sources that are required to enable accurate propagation near-casts and forecasts for tropospheric systems and evaluate their significance, how they should be integrated to the tool, their advantages and disadvantages.
3. Provide the blueprint design for an Enhanced Propagation Model (EPM).
4. Demonstrate the effectiveness of the EPM in the three agreed scenarios.
5. Demonstrate how the EPM could inform the management of the Electro-Magnetic (EM) footprint for operational deployments.
6. Reports with analysis results and recommendations that shall provide the authority with sufficient information and detail to enable them to judge the merits of this potential capability and to inform the decision that takes this task to the next stage logical stage.

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.

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	
It is intended that this task is carried out under DEFCON 703. However, if there is background IP associated with any aspect of this task then it should be declared from the outset.	

DELIVERABLES

- Demonstrations
- Analysis results
- Measurement data
- Reports

Note:

1. The format of the reports can follow the previous studies format (publication by work package with a capping/summary) report.

Any background IP associated with this task must be understood and clearly stated

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*

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	Very Low
Risk Assessment Reference	RAR-DD3V8MAH

ADDITIONAL TERMS AND CONDITIONS APPLICABLE TO THIS CONTRACT

Please ensure all completed forms are copied to [Redacted under FOI exemption] **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 **Please see below** **(attached)**

Delivery of the requirement:

This proposal includes one technical proposal from QinetiQ, which encompasses the work to be performed by Plextek and Montvieux as follows:

- QinetiQ Technical Proposal: Serapis Lot 4 Task AII62: Modern Troposcatter Prediction Tool, QINETIQ/21/03074 Version 1.0

PRICE BREAKDOWN

The Firm Price offer is shown below.

Please refer to the pricing breakdown below.

COMMERCIAL

[Redacted under FOI exemption]

Total Proposal Price in £	£159,841.87		(ex VAT)
Start Date:	06/09/2021	**End Date:**	31/03/2022

Lot Leads Representative	Name	[Redacted under FOI exemption]
	Tel	[Redacted under FOI exemption]
	Email	[Redacted under FOI exemption]
	Date	13th August 2021
Position in Company	[Redacted under FOI exemption]	
Signature	[Redacted under FOI exemption]	

Core Work – Breakdown

[Redacted under FOI exemption]

[Redacted under FOI exemption]

[Redacted under FOI exemption]

[Redacted under FOI exemption’

Core Work – Milestone breakdown costs

Proposed Milestones Payments

[Redacted under FOI 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 FOI exemption]
	Tel	[Redacted under FOI exemption]
	Email	[Redacted under FOI exemption]
	Date	13/09/2021
Requisition Number		1000164592
Contractor's Proposal Number		QINETIQ/21/03074
Purchase Order Number		1000162681
Signature		[Redacted under FOI 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.		