Statement of Requirement (SoR)

Reference Number	**RQ0000017406**
Version Number	**0.5**
Date	**07/10/2022**

1.	**Requirement**
1.1	**Title**
	Space-Based Space Domain Awareness (SDA) Mission Concepts – Phase 0
1.2	**Summary**
	The Authority wishes to identify and explore generation-after-next (GAN) space-based SDA mission concepts for launch in the 2030s. This work should use literature review, horizon scanning and similar approaches to identify sensing modalities of utility to SDA in a defence context. It shall then explore different concepts of operations for Space-Based SDA mission system concepts, including a consideration of novel platforms, and allow Dstl to compare the benefit of space-based mission concepts versus ground-based activities.
1.3	**Background**

	As outlined in the UK Defence Space Strategy (February 2022), the Ministry of Defence (MOD) has a desire to develop a comprehensive understanding of the space environment to “deliver accurate information at the speed of relevance and drive agile decision-making” and to enhance its ability to provide SDA in order to “seek out, identify, analyse, attribute and thus understand threats”. This could be delivered through a combination of ground and on-orbit assets. SDA typically encompasses the military need(s) and techniques for tracking, identification and characterisation of resident space objects; as well as other methods (such as the detection of emissions or transmissions) for gaining awareness of an adversary’s overall space operations. Work is currently already underway to develop and deliver possible next generation operational capability demonstrators to deliver on MOD SDA aspirations in the near term. The Space Science Project (within the MOD S&T Programme delivered by Dstl) is focussed on understanding technologies and concepts for the subsequent generation-after-next SDA operational system of the 2030s and beyond. One aspect of this work lies in understanding how space-based sensors can contribute to this future system and evaluating the relative merits of different approaches.
1.4	**Requirement**

	This work will identify and explore space-based SDA mission concepts that could be launched in the 2030s timeframe. It is anticipated that, through literature review, horizon scanning and similar techniques, the Contractor shall identify sensing modalities and technologies of utility to space-based SDA (SB-SDA) in a defence context. The Contractor shall carry out a study to: • Understand current state-of-the-art existing space-based SDA sensing techniques, for consideration as a baseline. • Understand how existing technologies are anticipated to progress over the timeframe of relevance. • Identify novel sensing modalities and technologies that could be used for space-based SDA within the timeframe of relevance, and develop these as mission concepts. This should include a consideration of electro-optical, radio frequency and other sensing modalities. • Understand to what extent the EM spectrum is utilised by existing and suggested systems. This should include a consideration of the detectability of space objects in those bands. • Estimate current Technology Readiness Level (TRL) and time to mature for different sensing modalities. • Understand potential Size, Weight and Power (SWaP) requirements as applied in a space-based setting. Having identified potentially relevant sensing modalities and technologies the Contractor shall explore different concepts of operations for space-based SDA mission concepts. The Contractor shall be able to: • At a high level, understand potential CONOPs for different SB-SDA mission concepts to assess operational utility. • Understand novel platform capabilities that could support mission concepts. • Understand what a cohesive mission concept could look like incorporating platform and sensor considerations. This should include a consideration of key systems engineering required to accommodate said concepts or employ the flight CONOPs. • Understand the ground architecture and up/down links required to deliver the concept.

	• Understand vehicle operational constraints and trade-offs in terms of orbit choice, data generation, latency, size etc. • Understand high-level Defence Lines of Development (DLOD) considerations around development and sustainment. • Understand current capabilities for satellite on-board data processing as applied to SDA sensing. • Understand how on-board processing could be utilised for data reduction within future systems. The Contractor shall then carry out a comparison of the benefits and relative affordability of different space-based mission concepts versus ground-based activities. The Contractor shall be able to: • Estimate ROM costs of different space-based SDA systems. • Estimate performance metrics versus similar ground-based systems. • Understand Unique Selling Points (USPs) of any proposed space-based SDA systems. The Contractor shall provide a report of these undertakings to the Authority that shall include: • A description of the methodology and techniques used in carrying out the study. • A record of activities undertaken to identify, explore and compare different space-based sensing modalities and systems as outlined above. • At least three high-level case studies of proposed mission concepts. The case studies to be chosen shall be presented to the Authority at a mid-term review • Recommendations of technologies and concepts to pursue based on a consideration of the trade space of performance, cost and TRL. This report's high level findings shall be summarised and presented to the Authority. The Contractor shall provide project management support to the work including developing a delivery plan and consideration of any risks and issues related to delivery. The Contractor shall share progress, some initial findings and proposed case studies at a suitable midpoint review and a consideration of ongoing risks to delivery.
1.5	**Options or follow on work**

	Not applicable

1.6	Deliverables & Intellectual Property Rights (IPR)						
Ref.	**Title**	**Due by**	**Format**	**TRL***	**Expected classification (subject to change)**	**What information is required in the deliverable**	**IPR DEFCON/ Condition**
D - 1	*Kick off Meeting Slides*	*Kick Off Meeting*	*Presentation (.pptx)*	*n/a*	*O*	*Presentation pack to include but not limited to:* • *Summary of proposed plan.* • *Review of risk management plan.* • *Risks/issues.*	As per framework T&CS
D - 2	Mid-point Review Slides	t0 + 2 months (or as proposed)	*Presentation (.pptx)*	n/a	O	*Presentation pack to include but not limited to:* • *Summary of progress against the plan* • *High-level findings to date* • *Identification of proposed case studies* • *Review of risk management plan.* • *Risks/issues.*	As per framework T&CS

D - 3	Final Report Presentation Slides	t0 + 4 months (or as proposed)	Presentation (.pptx)	n/a	O	Presentation pack to include but not limited to: • A high-level overview of the methodology and techniques used • A summary of any case studies explored as found in the final report deliverable. • A summary of the recommendations as found in the final report deliverable.	As per framework T&CS
D - 4	Final Report	t0 + 4 months (or as proposed)	Report (.pdf)	n/a	O	The report to include but not limited to: • A description of the methodology and techniques used in the study. • A record of activities undertaken to identify, explore and compare different space-based sensing modalities and systems as outlined above. • A number of high-level case studies of proposed mission concepts. • Recommendations of technologies and concepts to pursue based on a	As per framework T&CS

						consideration of the trade space of performance, cost and TRL.	

*__Technology Readiness Level required__

1.7	**Standard Deliverable Acceptance Criteria**
	As per Framework T&C's
1.8	**Specific Deliverable Acceptance Criteria**
	The kick-off meeting and mid-point review slides shall presented to Authority personnel at the Contractor's premises. Acceptance shall be by Authority technical partner and project manager recommendation that they cover the individual aspects identified in table 1.6 with a criteria of met/not met. This shall occur within 30 days of the meeting. The Final Report deliverable will be delivered alongside the Final Report presentation. This presentation shall be provided to Authority personnel at the Contractor's premises. Acceptance shall be by Authority technical partner and project manager recommendation that they cover the individual aspects identified in table 1.6 with a criteria of met/not and are fit-for-purpose. This shall occur within 30 days of receipt of the final report.

2.	**Quality Control and Assurance**
2.1	**Quality Control and Quality Assurance processes and standards that must be met by the contractor**
	☒ **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 below)

2.2	**Safety, Environmental, Social, Ethical, Regulatory or Legislative aspects of the requirement**
	N/A

3.	Security	
3.1	**Highest security classification**	
	Of the work	REDACTED FOR PUBLICATION
	Of the Deliverables/ Output	REDACTED FOR PUBLICATION
3.2	**Security Aspects Letter (SAL)**	
	Not applicable If yes, please see SAL reference- *Enter iCAS requisition number once obtained*	
3.3	**Cyber Risk Level**	
	Not applicable	
3.4	**Cyber Risk Assessment (RA) Reference**	
	Click or tap here to enter text.REDACTED FOR PUBLICATION If stated, this must be completed by the contractor before a contract can be awarded. In accordance with the Supplier Cyber Protection Risk Assessment (RA) Workflow please complete the Cyber Risk Assessment available at https://www.gov.uk/guidance/supplier-cyber-protection-service	

4.	Government Furnished Assets (GFA)
GFA to be Issued - No	

5.	Proposal Evaluation criteria
5.1	Technical Evaluation Method

To enable your proposal to be fairly assessed, please submit two response versions; Version 1 being a technical response containing only technical information/responses (ie redacting any pricing information) and Version 2, a full Commercial response to the proposal including technical and price/cost information.

Proposals that pass the mandatory commercial requirements will be scored according to value for money: Total Score = Technical Score ÷ Proposal Price.

Each individual criterion will be evaluated against the following scoring mechanism, with specific examples as to what the Authority is expecting for the individual lots detailed below. Proposals with a technical score of less than 50 will not be considered. The proposal with the highest Total Score will be awarded the contract. The technical evaluation will be carried out by 3 technical subject matter experts and the average score will be taken. In the event of tie the highest technical scoring bid will win.

Scoring Guide:

0 – Unacceptable or no answer	Has demonstrated inadequate experience or provided inadequate supporting evidence which gives no confidence of the Potential Tenderer's competence and an unacceptably high level of risk to the project
1 – Poor response with Very High risk	Has demonstrated narrow experience or provided minimal supporting evidence which gives low confidence of the Potential Tenderer's competence and a very high level of risk to the project.
4 – Satisfactory with Medium to High risk	Has demonstrated some experience and provided adequate supporting evidence which gives some confidence of the Potential Tenderer's competence and a medium to high level of risk to the project.
7 – Good with Low to Medium risk	Has demonstrated broad experience and provided adequate supporting evidence which gives confidence of the Potential Tenderer's competence and a low to medium level of risk to the project.
10 – Excellent with Very Low risk	Has demonstrated considerable and detailed experience and provided sound and relevant supporting evidence which gives high confidence of the Potential Tenderer's competence and a very low level of risk to the project.

Technical Score will be calculated as follows:

Technical Score = Sum of (Markings x Weightings) for Each Technical Criteria.

The total technical score available is 100

5.2	**Technical Evaluation Criteria**

Proposal evaluation criteria will be based on the proposed plan for the study and the expertise of the bidders.

The bid documentation shall include a summary of the expertise available to the Contractor including previous relevant work, CVs and other evidence of expertise.

The bid documentation shall include a plan for delivery outlining the technical approach to addressing the requirements. This proposed approach shall provide evidence that the study and any case studies will be sufficient in detail and number to understand and explore the breadth of the trade space as outlined in the requirements section.

Technical Responses	Criteria	Score	Weighting
1	Technical capability of contractor that provides evidence and confidence in the ability to deliver, covering: – Expertise in the development of space mission concepts – Expertise in relevant sensing technologies that could be applied in space-based setting – Expertise in sensing systems and relevant applications – Description of previous work of relevance	0-10	3
2	Viability of the delivery plan including a detailed methodology of how the supplier is going to conduct the task in the format of a work breakdown supported by a project Gantt chart.	0-10	2
3	Proposed methodology for study of literature and horizon scanning, including scope of survey and approach to collation of findings and assessment of trends. Proposed methodology for the development of mission concepts.	0-10	2
4	Technical proposals. Factors to include: • Understand current state-of-the-art existing space-based SDA sensing	0-10	3

			techniques, for consideration as a baseline. • Identify novel sensing modalities and technologies that could be used for space-based SDA within the timeframe of relevance, and develop these as mission concepts. This should include a consideration of electro-optical, radio frequency and other sensing modalities. • Understand what a cohesive mission concept could look like incorporating platform and sensor considerations. This should include a consideration of key systems engineering required to accommodate said concepts or employ the flight CONOPs. • See requirement above for other factors to include.		

5.2 Commercial Evaluation Criteria

The commercial response must contain unqualified acceptance of the terms and conditions as per the tasking order form. The commercial element of the requirement will be assessed against the following Pass/Fail criteria.

Commercial Responses	Criteria	Score
C1	Compliance with the R-Cloud Framework and Statement of Requirement Terms and Conditions.	Pass / Fail
C2	Submit your full firm price breakdown for all costs to be incurred to fulfil this requirement as per R-Cloud TOF Part C and in line with agreed R-Cloud rates.	Pass / Fail

	C3	The supplier's proposal must be valid for Acceptance by the Authority for a minimum of 30 days.	Pass / Fail
	C4	The proposal must clearly identify any background intellectual property (IP) that the Tenderer intends to use in the execution of the contract, and the Authorities rights with respect to that IP. If no background IP is to be used then a 'Nil Response' must be provided.	Pass/Fail