Serapis Tasking Form

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

To:	Lot 4 QinetiQ Plc	**From:**	Dstl

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 0.1 2021-10-27

REQUIREMENT

Proposal Required by:	03/01/2022	**Task ID Number:**	AII87
The Authority Project Manager:	[REDACTED]	**The Authority Technical Point of Contact:**	[REDACTED]
Task Title:	ARA WP2.3 Adaptive Applications – Phase 1		
Required Start Date:	07/01/2022	**Required End Date:**	31/03/2021
Requisition No:	1000169996	**Budget Range**	£150k

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)

Abstract

This requirement is to explore approaches to Adaptive Applications within CIS Architectures. It is an activity within the Autonomous Resilient Architectures (ARA) project which seeks to develop and demonstrate self-discovering, self-connecting, self-coordinating architectures across a multi-domain, multi-classification, multi-national enterprises to provide improved C2, including in Denied, Degraded, intermittent and Low bandwidth (DDIL) environments.

We seek to complete this activity by March 2022 to inform our future plans for this project over the following three years.

1.1. Strategic Review

The strategic framework document, “Global Britain in a competitive age; The Integrated Review of Security, Defence, Development and Foreign Policy”, outlines the following four overarching and mutually supporting objectives which includes:

i. “Sustaining strategic advantage through science and technology: we will incorporate S&T (Science and Technology) as an integral element of our national security and international policy, fortifying the position of the UK as a global S&T and responsible cyber power

ii. Shaping the open international order of the future: we will use our convening power and work with partners to reinvigorate the international system

iii. Strengthening security and defence at home and overseas

iv. Building resilience at home and overseas: we will place greater emphasis on resilience”.

A key S&T challenge is **Multi-domain Command & Control, Communications and Computers (C4)** [1] **–** to develop the capability for multi-domain integration with the ability to coordinate effects globally, enabling us to execute joint operations against adversaries with well-integrated and resilient capabilities.

C4 is a broad, complex, and technically challenging area characterised by rapid advances in technologies. However, it is the connective tissue that provides the information needed to make rapid decisions in a highly mobile and global environment, often with little infrastructure.

1.2. Future C4 challenges

The future challenges in a C4 environment include the need for:

- New techniques and technologies that mitigate against rapidly emerging communications threats
- Resilient and robust communications systems and architectures,
- Connectivity to all mobile/static platforms (underwater, land, sea, air and space),
- Global operations, often infrastructure less environment
- Conducting operations that range from disaster relief, peacekeeping, surveillance to military engagement
- Interoperability with national and international partners
- New architectures/protocols
- Systems that are application aware
- Satisfying convergence of systems and networks.

To meet the challenges of C4, and address the Strategic Review aims, research needs to be conducted into Autonomous Resilient Architectures (ARA) with an aim of demonstrating S&T technologies within the next two years.

The aim of the ARA programme is to exploit advances in S&T to develop self-discovering, self-connecting, self-coordinating architectures across a multi-domain, multi-classification, multi-national enterprises to provide improved C2, including in Denied, Degraded, Intermittent and Low bandwidth (DDIL) environments. To achieve this S&T activities may include:

- Research into Networks, Data & Information; to accelerate & bring together a variety of existing & emerging concepts & technologies. The aim would be to show how they can come together to deliver transformational architectural agility & flexibility. (This may include cross-stack agile resilience approaches)
- Contributing to future collaborations and demonstrations such as: FNC3; replacement to DIAS ITA initiative; other potential collaborations with a view to joint development & experimentation with international partners
- S&T to strengthen our intelligent customer capability in this growing area by development of SQEP.

2. Current Approaches to Application Adaptation

Applications operating in different domains and at different levels in the enterprise vary significantly in their exectations of communications networks, availability of information, and the ability for those applications to

[1] Defence and Security Industrial Strategy: A strategic approach to the UK’s defence and security industrial sectors

provide their critical business functions at times of stress. The chances are that applications will have been developed against a standard set of interfaces where information or services in a pre-defined structure are expected to be available, using protocols which whilst potentially adapted to their environment, may be inflexible. It may also be the case that applications and services will have been instantiated against a pre-determined operational environment, mission goals and communications infrastructure; once these have been established it is difficult to change these parameters and as a result, the effect of the force elements using these capabilities is diminished. Information may also be distributed according to the needs perceived by the chain of command, sometimes only at the point of deperature, and potentially on a reactive basis.

It is recognised that current policies and standards as well as requirements for interoperability may have led to some of the constraints currently faced.

The commercial world does not face the same degree of challenge, but has developed a wide range of sophisticated approaches to deliver information to where it is needed, using adaptive protocols that are able to work with fixed infrastructure as well as devices on the move.

3. Aims

The aim of this task is to investigate approaches that will support the adaptation of applications and information services as a result of changes to:

- Communications status and resource availability
- Operational environment
- Mission goals
- Other conditions not listed above.

Examples of potential adaptations that may be considered include:

- Agile infrastructure that can change posture; for example by:
    - Changing traffic prioritisations
    - Changing which underlying bearers are used
- Information services that can adjust to changing conditions; for example by:
    - Changing codec
    - Adjusting fidelity or transforming information to an alternative format
    - Moving between reactive and proactive content distribution approaches
    - Routing information to alternative points of delivery, even if they are less complete or older
    - Permitting an application to specify a minimal / sparse response
- Application behaviour; for example by:
    - Gracefully degrading behaviour in a fashion that can be understood by a user
    - Using automomous techniques to optimise information load and minimise unnecessary “information overhead”
    - Using alternative decision making or data analysis algorithms, so as to avoid the need to have large datasets local to the process.

It is anticipated that commercial techniques for content distribution and adaptive applications may be a useful point of reference and/or provide valuable tools that may be exploited.

The aim is also to provide initial recommendations on the API required as an interface between the applications and the underlying communications services.

4. Requirements

Whilst it is recognised that there are challenges in the fixed infrastructure, the most significant benefits are expected to be in the deployed and tactical space.

It is expected that this task will reference and/or build upon current and previous SIEi research into Information Brokers as well as Single Information Environment services and protocols. Other tasks within the same Work Package are likely to provide useful input into this task including Self Coordinating CIS Postures and Improved Communications Situational Awareness, although these are not direct dependencies.

The specific requirements of this task are as follows:

R1 Conduct a Literature Review
Knowing that there are a wide range of approaches used in the commercial world, there is a need to identify and consider those that may be of potential benefit. There may also be relevant ongoing work in MOD or industry that is worthy of consideration. The output of this will be used to inform the subsequent outputs and deliverables in this task.

R2 Develop a Taxonomy of Adaptations and Assess Characteristics
Whilst the literature review will provide a starting point, there are likely to be many additional adaptations that may be of benefit. These need to be classified into a taxonomy of application adaptations, alongside an assessment of their characteristics in terms of their suitability and their potential benefits. It is envisaged that as the task progresses (in this and future phases), this taxonomy and the associated assessment will be updated with results and as new information comes to light.

The outcome should be to highlight the potential application of any prior art to this task, or advise where there are gaps on which future activites may need to focus. This will also inform a future evaluation task.

R3 - Identifying the broad considerations for an API to Interact with Communications Services

It is hoped that understanding the needs of the adaptations will lead to the ability to identify the requirements of interfaces with Communications Services in both directions. This needs to be documented in the form of a suitable API which is likely to be evolved during the course of this and subsequent tasks.

This requirement may require closer cooperation with other tasks in this Work Package.

R4 Develop a Plan and Costed Proposal to Evaluate Adaptations

To illustrate the progress of the work and demonstrate its potential, an initial lab-scale demonstration is needed in FY22 of one or more adaptations. The priority for this requirement is to develop a plan and costed proposal to do this. It will to take what has been assessed in R2 and identify what is required to create a demonstration, potentially leveraging collaboration with other tasks in this Work Package or wider MOD activity.

R5 Develop an Innovation Benefits and Exploitation Plan (IBEP)
An IBEP is required, which will include:

1. Innovation – (i.e. what are we building on?)
    a. Network management know-how in a military/civil domain
    b. Previous architectures for system of systems solutions
    c. Previous commercial collaborations
    d. Application of AI and novel configuration management to the DDIL environment.

2. Benefits (i.e. what will the contracted academic stakeholders get from this?)
    a. Novel application of developing technologies for Defence
    b. Access to industrial Defence sector expertise
    c. Development of new capabilities
    d. Closer Defence-sector / commercial collaboration.

3. Exploitation (what are the artefacts that Dstl will get that can be more widely exploited)
    a. Army HQ IR2E (formerly JimmyWorks)
    b. Know-how in the Defence Industrial base (papers, reports, presentations)
    c. Know-how in the Academic supply base
    d. Potential new recruits into the Defence supply chain if UK resources used
    e. Testing of proposed architectures through the ISS Design Pillar.

4. Plan (what's the plan for exploitation)
    a. Input into the wider WP2 ACS initiative
    b. Potential for accelerating know-how (facilities, hardware, configuration) through Industrial exploitation
    c. Briefings to MOD Stakeholders.

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	

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	Literature Review	T0+3 Months	Electronic Document		[REDACTED]		705
D2	Taxonomy and Assessment	End of contract	Living document (e.g. wiki) Electronic document record at delivery date**		[REDACTED]	To include the scenario, conclusions and next steps	705
D3	Initial API	End of contract	Electronic Document	3	[REDACTED]		703

OUTPUTS

Ref	Title	Due by	Format	TRL	Expected classification (subject to change)	Information required	IPR DEFCON
O1	Demonstration Costed Proposal	End of Feb '22	Electronic Document		[REDACTED]		n/a
O2	IBEP	End of Mar '22	Electronic document		[REDACTED]		705

*** This deliverable is expected to be continually updated/ developed to reflect how our understanding changes with time. As such it should be mastered in a format that allows collaboration and incremental updates, such as a wiki. At the end of the task, it should be exported into a formal electronic document deliverable but the focus should be on the content rather than style*

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)

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 [REDACTED]

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 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 _____ **(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)

COMMERCIAL

As per the Serapis Limitation of Liability Discussion Paper Agreement, this task will fall under the band of a cap on liabilities of £500,000.

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 £	199,562.32		(ex VAT)
Start Date:	21/02/2022	**End Date:**	26/04/2022

Lot Leads Representative	Name	[REDACTED]
	Tel	[REDACTED]
	Email	[REDACTED]
	Date	16th February 2022
Position in Company	Assistant Commercial Manager	
Signature	[REDACTED]	

Core Work – Breakdown

Contractor Price Breakdown

[TABLE REDACTED IN ITS ENTIRETY]

Worked Delivered by Subcontractors

[TABLE REDACTED IN ITS ENTIRETY]

Subcontractor Price Breakdown by Work Package

[TABLE REDACTED IN ITS ENTIRETY]

Subcontractor Travel & Subsistence

[TABLE REDACTED IN ITS ENTIRETY]

Core Work – Milestone Breakdown Costs

Proposed Milestones Payments

[TABLE REDACTED IN ITS ENTIRETY]

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	28/02/2022
Requisition Number		RQ0000003739
Contractor's Proposal Number		QINETIQ/22/00658
Purchase Order Number		DSTL0000001223
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.		