Statement of Requirement (SoR)

Purpose

Reference Number	Once iCAS requisition number obtained, enter here
Version Number	**0.2**
Date	**06/06/2024**

1.	**Requirement**
1.1	**Title**
	Software Tools for Chemical and Biological (CB) Hazard Prediction Modelling
1.2	**Summary**
	The CBR Division at Dstl develop and use models to predict and understand the hazards posed by deliberate (malicious) or accidental release of CB material. Software support is required to update and enhance existing tools, and to develop new tools to provide additional functionality. This overarching requirement comprises a number of smaller, discrete software tasks.
1.3	**Background**

	Redacted-FOI Dstl has a number of specific requirements broadly covering: • Updating existing tools/systems to take advantage of the modernisation of software systems and IT infrastructure within Dstl; • Developing tools/scripts to enable the automation of data handling along modelling chains; • The extension of existing tools to add functionality. These are explained in more detail in the following section and form the basis of the requirement. As research and development progresses, it is likely that Dstl have further related requirements for EMR software support that arise during the course of the proposed contract. The requirement is therefore for of a software call-off contract that allows additional tasks to be placed when the need arises. A number of example tasks are provided in the next section.
1.4	**Requirement**

The following sections describe the detail of the discrete elements of this requirement.

Task 1 - CB Software build and test system

The software models owned by the CB Advice Group are written predominantly in C++ and Java. The models use common dependencies in the form of both bespoke and third party libraries. The existing build and test systems for the suite of models are several years old and need modernising.

Dstl requires the ability to manage, develop, build, test and deploy its current and future CBR software efficiently and easily on Dstl infrastructure. This includes:

- Work with Dstl to design a modern build and test system (or systems) that can support existing code and can be used for future software development.
- [redacted]Demonstrate the ability to build and test the key CBR models [redacted] on Dstl infrastructure [redacted]
- The ability to run automated tests and to provide diagnostic information on any issues during the build and test process.
- Ability to work with a range of languages (including C++, Java, C#, python, R, Fortran), IDEs, compilers and software development tools.
- Ability to build and test software to deploy to a range of target environments, including Windows 10 VMs, Windows Server HPC, Linux VM and Linux HPC.
- Compatibility with Dstl version control [redacted] and file storage systems [redacted]
- Where necessary, updating the software and dependencies to a common modern standard. This may include updates to 3rd party libraries.
- Where appropriate, updating the compiler and IDE requirements to reduce the number of different environments.
- Creation and maintenance of documentation and training material.
- The build and test system should be based of commonly available 3rd party components, rather than a bespoke system.

Task 3 - HPAC Runner

To enable the automated running of HPAC, a wrapper is required that can write input files and execute HPAC via the command line. [redacted] This should be reviewed and options for adding the following functionality considered:

1. Additional input data types
    a. Release types: Analytic (Instantaneous, continuous, liquid pool, file, stack, import (.scn))
    b. Meteorology: source (fixed, file, historical), settings (surface type, terrain, landcover)
    c. Parameters/options: output time-steps, temporal domain, spatial domain, sampler file, population, urban (UDM)
2. Additional Output formats

a. Using .hrf files to request: shapefiles (hazard contours), gridded/point data, casualty tables (including compatibility with HPAC Request Builder task above)

3. Compatibility with CBFac Batchrunner (i.e. ability to execute HPAC files generated by the CBFac Batchrunner).

The HPAC runner must be updated to work with HPAC [redacted], including the ability to execute via the JPMS java platform. Options could be extension of the existing bespoke solution or harnessing existing HPAC tools [redacted]

Task 4 - CBFac Batch Runner Input Tool

A tool has previously been developed to enable batch running of the CB Facility (CBFac) sub-module within HPAC. The tool requires updating to extend the range of input parameters that can be defined, specifically location, time and meteorology, within the existing Input Tool user interface. Additional minor updates to the UI are also required.

Task 5 - SLOPS

SLOPS is a tool with a spreadsheet front-end that calculates the spread and evaporation of Spills of Liquid On Porous Surfaces. The current version requires extending in three ways:

[redacted] SLOPS requires extending to account for time-varying meteorology to allow compatibility with HPAC. The tool must read meteorology (such as temperature, wind speed and pressure) from weather data files (e.g. in .sfc, .prf or .FMT format) and apply this to the model, interpolating in space/time as necessary.

A method for executing SLOPS via command line is required, including the ability to pass scenario input, meteorology and material data to the model.

A method is required for automatically outputting data in a format that can be input directly to HPAC, e.g. in .scn format, or series of analytic releases.

Task 6 - Update to UDM validation toolkit

The Urban Dispersion Model (UDM) validation toolkit is a framework to automate the validation of UDM against field trial data. It generates statistical performance measures. Dstl requires the ability to run the toolkit for the most recent development of UDM, as well as previous versions of UDM, in order to assess changes in functionality.

A costed option to also update the UDM visualiser is also requested.

1.5	**Options or follow on work** *(if none, write 'Not applicable')*
	The following elements are examples of potential additional work that may be required over the period of the contract or following completion of the above tasks. **CBR Hazard Model** The CBR Hazard model was developed to predict casualties from exposure to chemical biological and radiological (CBR) materials. [redacted] **Additional requirements** Additional requirements may arise over the course of the contract relating to CB hazard prediction modelling tools and software, such as updating existing HASP suite tools to ensure interoperability and updating existing tools to maintain compatibility with updated versions of HPAC if/when they become available to Dstl.

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** *(Commercial to enter later)*
Example D – 1	*Quarterly Progress and Technical Review (QPTR 1)*	*T0+3 Months*	*Presentation (.pptx)*	*n/a*	[redacted]	*Presentation pack to include but not limited to:* *• Update on technical progress* *• Progress report against project schedule.* *• Review of risk management plan.* *• Commercial aspects.* *• Review of deliverables.* *• Risks/issues.* *• GFA and supplier performance*	*DEFCON 705 shall apply*
D - 2	CB Software build and test system	T0+6	Software	5	[redacted]	• Source code • Software documentation (inc. training material) • Updated software dependencies	
	HPAC Runner	T0+6	Software	5	[redacted]	Software, source code and documentation.	

	Updated CBFac BatchRunner Input Tool	T0+9	Software	5	[redacted]	Software, source code, documentation.	
	Updated SLOPS software	T0+12	Software	3	[redacted]	Software, source code, documentation	
	Updated UDM Validation Toolkit	T0+12	Software	5	[redacted]	Software, source code, documentation.	

***Technology Readiness Level required**

Notes- IPR should be inserted / checked by commercial staff before sharing with the supplier(s) to ensure accuracy.

1.7	**Standard Deliverable Acceptance Criteria**
	This could be 'as per Framework T&C's' once an appropriate framework is later confirmed (links to section 13 of RCA). Consider the timeframe for our review of deliverable(s) (acceptance/rejection).
1.8	**Specific Deliverable Acceptance Criteria**
	Confirmation that software works as expected on Dstl IT systems, produces the expected output and is usable.

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**
	NA

3.	Security	
3.1	**Highest security classification**	
	Of the work	[redacted]
	Of the Deliverables/ Output	[redacted]
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**	
	Choose an item.	
3.4	**Cyber Risk Assessment (RA) Reference**	
	Click or tap here to enter text. 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 - Choose an item. *If 'yes' – add details below. If 'supplier to specify' or 'no,' delete all cells below.*					
GFA No.	**Unique Identifier/ Serial No**				
Task	Title	GFA Required?	What?	Description	

1	CB Software build and test system	Yes	HASP suite (Technology transfer pack) and dependencies. Ability to demonstrate on Dstl infrastructure/ software environment (and information on that infrastructure/environment)	[redacted]	
3	HPAC Runner	Yes	HPAC software	[redacted]	

4	CBFac Batch Runner Input Tool	Yes	HPAC software, CBFac Batch runner tool suite	[redacted]	
5	SLOPS	Yes	SLOPS source code	[redacted]	
6	Update to UDM validation toolkit	Yes	UDM, UDM validation toolkit, UDM Façade, (plus UDM visualiser for option), GEDIS and	[redacted]	

			other dependencies. Data for testing.		

5.	Proposal Evaluation criteria
5.1	**Technical Evaluation Criteria**
	Commercial Assistance needed here before or after a requisition is raised. Framework evaluation criteria as per T&C's may apply. See separate documents related to DOS Framework
5.2	**Commercial Evaluation Criteria**
	Commercial Assistance needed here before or after a requisition is raised. Framework evaluation criteria as per T&C's may apply. See separate documents related to DOS Framework