RCloud Tasking Form – Part B: Statement of Requirement (SoR)

Title of Requirement	Investigate, Integrate & Demonstrate Advanced Autonomy for Future EOD Remote Capability
Requisition No.	RQ0000013691
SoR Version	**0.1**

1.	**Statement of Requirements**
1.1	**Summary and Background Information**
	Tomahawk Robotics previously demonstrated their Kinesis multi-UxV control system on EOD robotic platforms and UAV's under DSTLX-1000145090 & DSTLX-1000152009 work packages. The next stage in this work is to build on the successful work already completed to investigate and explore an increased level of autonomy of the Kinesis multi-UxV control system. As part of the UK's Remote Controlled Vehicle (RCV) Strategy for Explosive Ordnance Disposal & Search (EOD&S) the primary emphasis is on providing a more integrated, common control system and open architecture across all future EOD&S remote controlled assets. The secondary emphasis is to improve and enhance current EOD RCV capability to provide a more flexible and adaptable system whilst reducing the training burden. Achievement of primary and secondary goals are through the interoperability and commonality of key EOD&S RCV elements such as; operator control unit(s), communications systems, power sources, open architecture(s), training and tele-existence solutions.
1.2	**Requirement**
	Base Scope Multi-Domain Urban EOD Scenario Tomahawk Robotics to investigate, integrate and demonstrate additional capabilities to the Kinesis software stack to facilitate increased situational awareness and threat detection within the multi-domain urban EOD scenario to achieve the following capabilities: 3D Mapping/Digital twin creation AI-enabled feature detection 1. Multi-Domain Urban EOD Scenario Using the full-motion video from the Teal Golden Eagle, Tomahawk to integrate Reveal Technology's Farsight product on the KxM to allow for rapid 3D visualization/2D mapping of an urban EOD scenario. This output will be viewable and interactive within the Kinesis User Interface (UI). An approximate location of the robotic ground systems will be placed within the newly created 2D map. A 3D visualization of the scanned environment will be created for the user for increased situational awareness. The User for optimal route planning alongside the 2D Map can analyze 3D visualization. Waypoints should be able to be added to the 2D map once pulled into the Kinesis mission planner to assist in semi-autonomous navigation function of the ground robot. 2. SPOT Waypoint Driver Integration The goal of this work scope is to incorporate SPOT into the simplified Kinesis waypoint driver capability which closes a position loop with spot, sending it to desired waypoints using the Kinesis

	mission planner. The mission will be able to play/paused throughout and SPOT's real-time collision avoidance will avoid local obstacles between desired waypoints. Final report and demonstration.
1.3	**Options or follow on work** *(if none, write 'Not applicable')*
	Optional Scope 1.5.1. Kinesis Integration of L3Harris T7 UGV Tomahawk Robotics proposes to integrate the L3Harris T7 robotic system into Kinesis, allowing Dstl to use their existing common control hardware (Grip, Mimic, KxM) to control the T7 system. Tomahawk proposes to accomplish this work by using Wireshark (network packet capture tool) to investigate the network communications in and out of the T7 radio as the OEM controller is used to send commands to the T7 robot. A report will be generated and provided to Dstl to document findings. Tomahawk Robotics will use the information gained from the above investigation to integrate the T7 platform into Kinesis and provide the following capabilities: □ Manual control □ Camera feeds □ Radio configuration □ Estop □ Video rebroadcast □ Warnings and notifications □ Manipulator gripper open/close □ Manipulator end-effector movement □ Manipulator calibration □ Manipulator poses □ 3D Avatar for "Joint Jogger" Mission Module The performance of this task is dependent on the provision of a T7 robot from the United States Air Force. Tomahawk Robotics may have to include consideration of a purchase of an additional radio to be integrated with the Tomahawk Robotics controller solution, such that the existing T7 controller and radio need not be disassembled or cannibalized. 1.5.2. Kinesis Integration of the IHMC Humanoid Robot IHMC researchers are pushing the envelope of what is possible in the domain of robotics. They have an interdisciplinary group composed of expertise in mechanical engineering, electrical engineering, computer science, mathematics, physics, human factors, and interface design. Tomahawk Robotics to integrate the IHMC humanoid robot into Kinesis as a proof of concept integration to help validate the use of humanoid robots for EOD applications. To accomplish this work, Tomahawk Robotics will need to provide a Kinesis Software Development Kit (SDK) to IHMC for them to integrate into Kinesis. Tomahawk Robotics to also provide Systems Engineering consultation to IHMC to support their use of the Kinesis SDK and to provide technical expertise for the application and integration of the robotic platform into Kinesis. 1.5.3. Spot Stair Climbing Capabilities

	During the initial integration on the previous SOW, Boston Dynamics had issues with their Android SDK, which required Tomahawk to integrate the Spot quadruped robot with Boston Dynamic's C++ SDK. Tomahawk Robotics was the first entity to do so and as such not all features were able to be integrated initially. This task incorporates the now-available stair climb traversability capability.
1.4	**Contract Management Activities**
1.5	**Health & Safety, Environmental, Social, Ethical, Regulatory or Legislative aspects of the requirement**

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)*
D – 1	Monthly Progress and Technical Report as per Dstl Quad chart format.	T0+1 Month & each month until completion .	Presentation (.pptx)	n/a	O	Presentation pack to include but not limited to: • Update on technical progress • Progress report against project schedule. • Review of risk management plan. • Review of deliverables. • Risks/issues.	
D – 2	Final Report & Demonstration	T0+<9 Months	Presentation (ppt.)	n/a	O	Final Report, covering findings & recommendations for alternative sim system options.	

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1.7	Deliverable Acceptance Criteria
	☒ **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	Evaluation Criteria
2.1	Method Explanation
	As the requirement is being offered on a non-competitive basis, the proposal shall be subjected to an informal review, and where required feedback shall be issued to the supplier.
2.2	Technical Evaluation Criteria
	The technical team shall assess how well the proposal demonstrates the ability to meet the Statement of Requirement, and task objectives. Technical proposal should thoroughly show how the supplier intends on meeting the criteria, including timeframes and milestones.
2.3	Commercial Evaluation Criteria
	The commercial evaluation shall consist of the following Pass / Fail questions: 1. Has the proposal been submitted a firm price, using the accepted RCloud rate card for non-competitive tasks? 2. The proposal is fully compliant, and accepts, the RCloud v4 terms in full 3. The proposal has included a Supplier Assurance Questionnaire (SAQ) in response to the specified Cyber Risk Assessment detailed in RCloud Document Part A, and the response has included the DCPP correspondence. 4. The supplier has submitted One (1) Full Technical proposal excluding all commercial and price details, and has submitted One (1) Full Commercial and Technical proposal including all price data.

3.	Government Furnished Assets (GFA)
GFA to be Issued - Yes *If 'yes' – add details below. If 'supplier to specify' or 'no,' delete all cells below.*	

GFA No.	Unique Identifier/ Serial No	Description: *Classification, type of GFA (GFE for equipment for example), previous MOD Contracts and link to deliverables*	Available Date	Issued by	Return Date or Disposal Date (T0+) *Please specify which*
GFA-1		Kinesis Software (PRO Annual Term)			Retain T0+9months
GFA-2		Samsung S9			Retain T0+9months
GFA-3		MPU5 HH			Retain T0+9months
GFA-4		MPU5 key cable			Retain T0+9months
GFA-5		MPU5 key to Mimic			Retain T0+9months
GFA-6		Mimic			Retain T0+9months
GFA-7		Kinesis Embedded			Retain T0+9months
GFA-8		Kinesis Mobile			Retain T0+9months
GFA-9		Sparrowhawk Kit			Retain T0+9months
GFA-10		KxM			Retain T0+9months

GFA-11		Grip			Retain T0+9months
GFA-12		Grip Molle chest mount			Retain T0+9months
GFA-13		Grip to KxM cable			Retain T0+9months
GFA-14		Battery, Vest, Charger, Cables, etc.			Retain T0+9months
GFA-15		Mimic MOLLE holster			Retain T0+9months
GFA-16		Mimic to KxM cable (coiled)			Retain T0+9months
GFA-17		Samsung S20 TE			Retain T0+9months