Contract Title: Synthetic Test and Unified Demonstration System

Contract Reference: ORE/20/69

1   Definitions

ASV	means Autonomous Surface Vessel
UAV	means Unmanned Aerial Vehicle
Human Readable	means the information must be provided in a format or medium that can be quickly and naturally read and understood by humans.
MIMRee	means Multi-Platform Inspection, Maintenance & Repair in extreme environments
MWTBIS	means Moving Wind Turbine Blade Inspection System
O&M	means Operations & Maintenance
STUDS	means Synthetic Test and Unified Demonstration System
User	means the individuals that ORE Catapult permits to use the Services.

2   General Conditions of Contract

2.1   ORE Catapult General Conditions of Contract are shown separately at Section 3 - General Conditions of Contract.

2.2   Any caveats to the General Conditions of Contract must be red line items only, as all caveats will be evaluated as shown in Section 6 - Evaluation Criteria.

2.3   Requests to amend the General Conditions of Contract post Contract award will not be accepted.

3   Scope of Service

3.1   Technical Requirements (the "Service")

3.1.1   ORE Catapult is seeking a Contractor to design, supply, deliver, install, configure, test, and commission a Synthetic Test and Unified Demonstration System (STUDS) for the virtual validation of the MIMRee project robotic and digital solutions, as described in Section 1, Introduction and Background. In the interest of cost and schedule, it is anticipated that the system may be a largely modified off-the-shelf software package, with ORE Catapult owning the IP connected to the modified or bespoke products only.

3.1.2   STUDS shall be licensed such that ORE Catapult may continue to modify and develop it either in-house or with other third party support.

3.1.3   The Service shall also include User testing, User training, guidance material development, system go-live.

3.1.4   The Service must enable connected sub-system testing and validation within at least agreed pre-configured and operationally realistic scenarios.   Each command or alarm shall be passed between each component of the MIMRee system to simulate end to end testing. It must be capable of outputting a visual summary of the communications flowing between the components and the outcome (success/failure) of each exchange. Results must be stored and retrievable. The results must also be able to integrated within a visualisation platform to be determined by the MIMRee consortium before the Contract is awarded.

3.1.5   In addition it must be capable of outputting a detailed summary of the handling of each input and output in a format that can be used by project partners to interrogate and troubleshoot their systems.

3.1.6   The simulated environment shall provide appropriate & realistic virtual stimuli to the connected sub-systems in the following fields:

a   Weather: Wind speed, direction & gusts, luminance, visibility, precipitation, air pressure and temperature.

b   Sea condition: Wave height, frequency & direction, chop, surface current, temperature.

c   Position: Time, GPS position, critical platform attitude (pitch, roll, yaw, surge, sway, heave) and altitude.

d   Asset physics models: Position, height, status, shape for accurate 3D models of at least a launch dock, turbine, blade, and one other "non-MIMRee" vessel. These models shall have appropriate surface contact and collision parameters.

e   Other subsystems: For a single subsystem test scenario, if partner subsystems are not connected to the same simulation event, the appropriate partner system "stimuli" shall be simulated to at least the level required for successful test completion. In that case, Gazebo simulations of partner systems can be utilised.

3.1.7   Examples of functional scenarios to be considered for simulation are:

a   ASV arrival to target location – UAV take off

b   UAV pre-take off checks – BladeBug confirmation of readiness

c   UAV ready to deploy BladeBug to blade – BladeBug confirmation ready for UAV to depart

d   BladeBug ready to be collected – UAV retrieves BladeBug

e   UAV prepares to land – ASV ready for landing

f   Mission Control inputs and outputs from each of these stages

3.1.8   The synthetic environment shall have a usable interface so that the ORE Catapult can run scenarios to validate the decision-making of the nested system. This must include the option of selecting from one or more operational and environmental parameters. The synthetic environment must be capable of stimulation of hardware in the loop to achieve test scenarios and all sub-system validations.

3.1.9   Examples of other testing scenarios that are required for suitability of operation include:

a   Envrionmental scenarios (e.g. changes in individual weather parameters during mission that would affect operational envelope)

b   Operational scenarios (e.g. low battery levels, presence of non-MIMRee vehicles in operational space)

3.1.10   The following integration requirements are shown as either:

- Mandatory requirement – Items listed with an 'M' are a mandatory requirement and the proposed system must meet these criteria; OR.

- Desirable – Items listed with a 'D' are desirable items, the system does not necessarily need to have this functionality but preference may be given to systems that do.

	Integration Requirements	
a	The solution shall provide a virtual test environment for connected hardware-in-the-loop.	M
b	The solution shall consist of software, associated firmware, initial support, and any hardware or hosting requirements identified within an agreed design.	M
c	The solution should support full end-to-end MIMRee system testing in a common environment and scenario.	D
d	The solution shall be able to connect to each of the required subsystems.	M
e	The solution shall be able to send and receive all necessary data and communication with each of the connected subsystems.	M
f	The solution shall contain a common physics simulation engine with sufficient parameters to appropriately stimulate each of the connected subsystems within a realistic end use environment.	M
g	The solution shall enable generation and utilisation of test scenarios for each of the subsystems.	M
h	The solution shall be able to run test scenarios with connected subsystems – stimulating appropriate parameter responses from the connected subsystems.	M
i	The solution shall record the outcomes and simulated parameters of each conducted scenario with connected subsystems.	M
j	The solution shall interpret and display the outcomes of each conducted scenario with connected subsystems.	M
k	The solution shall produce all results in a Human Readable format or medium.	M
l	The solution software should be capable of being hosted and run on ORE Catapult hardware, see 3.2 below for hardware requirements.	D
m	The solution shall be owned by ORE Catapult and shall be of open source construction. However, for the avoidance of doubt, if the solution is a modified off the shelf product, ORE Catapult shall own the IP connected to the modified or bespoke products only.	M
n	The Contractor shall include up to three (3) months of training and support after the MIMRee project deadline.	M
o	The solution shall be available for test and validation of the MIMRee project through a demonstration to project partners and funders by no later than 14th May 2020	M
p	The solution must be capable of supporting at least two (2) system concurrent users.	M
q	The solution shall be compatible with modern web browsers and operating systems.	M

r	The solution should be capable of functioning 24/7, 365	D

3.1.11   The Contractor is encouraged wherever possible, to suggest improved methodology or approaches based on industry best practice and lessons learned, as long as the Service performance meets ORE Catapults requirements and meets the timeline of completion by 14 May 2021.

3.2   Hardware

3.2.1   The Tenderer shall provide detailed hardware and software requirements for the proposed hosting platform, which shall include as a minimum:

a   Detailed hardware requirements including CPU, memory and projected storage requirements for the life cycle of project

b   Detailed software requirements including operating system, and any extra software packages required to run the proposed solution including their costs.

c   Detailed networking requirements including bandwith required and protocols utilised to access the solution

3.2.2   If the Tenderers proposed solution is designed as a cloud hosted solution, the following information must be provided as part of the proposal:

a   Cloud hosting provider either public (e.g. Microsoft Azure or Amazon AWS) or Private. Regardless of provider All data must be hosted within the European Union.

b   Break down of costs for the Cloud hosted provider.

3.2.3   For the avoidance of doubt ORE Catapult will be responsible for providing its own hosting service. whatever the proposed solution.

3.3   Security Protocols

3.3.1   The Contractor shall provide details on security protocols and authentication methods where applicable. For the avoidance of doubt, where the proposed solution is to be hosted on premises by ORE Catapult it must adhere to its network security policy a copy of which can be provided on request.

4   Optional Support

4.1   Software Support

ORE Catapult may consider options for software support and Helpdesk facility   Therefore, the Tenderer is required to provide full details of any support and Helpdesk facility options in their proposal along with associated costs which are to be set out in Section 7 – Offer Worksheet. tender submission.

5   Deliverables and Milestones

5.1   Deliverables

Deliverables shall include:

- System Design philosophy;
- Design, Implementation, migration and training programme;
- User engagement sessions who will provide input to the required features, expected performance and User interface.

- Weekly progress dashboards showing
  - percentage completion
  - main achievements
  - tasks for the following week
  - significant project risk
- Monthly virtual progress reporting;
- Software licences;
- System documentation;
- Training, training materials and User guides.
- Fully functioning STUDS, which is capable of being developed further by ORE Catapult.

5.2   Milestones

5.2.1   The Contractor shall note that ORE Catapult is expecting the Service to be fully complete and commissioned no later than 14 May 2021.

5.2.2   The Tenderer shall provide indicative key milestones within their tender proposal.

6   Implementation

6.1   The Tenderers proposal is to identify and describe the approach to implementing the main elements of the project which should include as a minimum the following:

Scoping → Concept Development → Detailed Development → Testing & Commisioning → Delivery & Support

Figure 1

7   Budget

7.1   It is envisaged that the budget for this piece of work will not exceed two hundred and twenty thousand pounds sterling (£220,000), ex vat.

8   Bidder Conference

8.1   The Contractor shall be deemed to have understood the nature and extent of the Services to be provided and shall make no claims on the failure to do so.

8.2   A virtual Bidder Conference has been arranged for 1500 hrs on Tuesday 17 November 2020 and is expected to last no more than one (1) hour.

8.3   Attendance at the Bidder Conference prior to tendering is highly recommended, although not mandatory and will allow all Tenderers to receive more insight about the project.

8.4   Tenderers who wish to attend the Bidder Conference, are requested to complete Section 8, Bidder Conference Attendance Form, no later than 1630 hrs on Friday 13 November 2020. Further information about how to join the virtual meeting will be provided no later than Monday 16 November 2020.

9   Compulsory Insurance

9.1   In accordance with the ORE Catapult General Conditions of Contract referred to in Section 3, the Contractor shall have affected and shall maintain appropriate levels of insurance as follows:.

Employer's (Compulsory) Liability Insurance	= £5 million
Public Liability Insurance	= £5 million
Product Liability Insurance	= £5 million
Professional Indemnity Insurance	= £5 million

10 Payment Terms

10.1   The Contractor shall be entitled to submit invoices against the following payment stages:

- scoping
- concept development;
- detailed development;
- testing and commissioning;
- delivery, training and support
- acceptance;

98.2   The Tenderer shall indicate in their tender proposal the percentage expectations against each of the payment stages; ORE Catapult reserves the right to agree changes with the Contractor as part of the clarification process.

10.3   All invoices shall be sent electronically to ORE Catapult's Finance email address (finance@ore.catapult.org.uk) quoting the relevant Purchase Order number.

11 Capability and Experience

11.1   The Contractor shall be knowledgeable in their field with significant applicable experience. The inclusion of previous relevant commissions will form part of the Stage 1 Selection Criteria.

11.2   The Contractor shall acknowledge that ORE Catapult is relying and will continue to rely on the professional skill, care and diligence of the Contractor in the performance of the Service and that it owes a duty of care to the ORE Catapult in relation to all aspects of such performance.

12 Contract Term

12.1   The initial Term shall be for a period of four (4) months with an option to extend for up to a further period of twelve (12) months but only if the Optional Support at 4,1 be required. The Contract has an indicative start date of 14 January 2021.

13 Contract Points of Contact

13.1   ORE Catapult Representative

The personnel provided to deliver the Service shall report directly to, and only take instructions from the Alan Wardlaw, Project Manager (and Chief Executive Officer as required).

13.2   Contract Administration

Any notice or other communication which is to be given shall be addressed to the following:

ORE Catapult

Inovo

121 George Street

Glasgow

G1 1RD

For the attention of the Procurement Department

14 ORE Catapult Rights

14.1   ORE Catapult reserve the right to accept any part of the ITT. ORE Catapult is not bound to accept the lowest priced ITT, or any ITT, or part thereof.

14.2   ORE Catapult reserves the right to cancel or withdraw this ITT at any stage.

14.3   ORE Catapult shall not be held liable for any costs associated with your participation in this procurement process including costs associated with the preparation or submission of your tender submissions.

15 Alternative Tenders

15.1   Alternative tenders may be offered involving modifications to the specified requirements. Any alternative tender involving modifications will be assessed on its merits and, if considered valid, may be accepted without recourse to re-tendering. In all instances where alternative tenders are submitted the Consultant must also submit a primary Tender being exactly to the specification and requirements of the Invitation to Tender, in order to see where costs differ. Should an alternative tender be submitted, ORE Catapult General Conditions of Contract referred to in Section 3 shall apply and shall not be affected in any way.