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

Title of Requirement	**Material Characterisation of Aircraft Structures**
Requisition No.	1000168572
SoR Version	**1.0**

1.	**Statement of Requirements**
1.1	**Summary and Background Information**
	Redacted under FOIA exemption Physical testing of threats within OHBs and ULD has already been conducted to understand this difference in response. Supporting FE element modelling has also been conducted, however the representation of the materials, connections and rivets are currently simplified. These need to be improved in order to accurately predict the structural response. ***Objective of the Research:*** Characterisation testing is required to provide appropriate parameters for populating FE material models of 'aircraft furniture'. The Contractor is asked to plan and conduct a series of appropriate characterisation tests, on 'aircraft furniture' material coupons, connections and rivets. And to build, verify and validate FE models of these characterisation tests. All modelling shall be undertaken using the LS-DYNA FE code. On completion of these tasks, the resulting outputs will be incorporated within the FE element modelling by the Authority/Dstl.
1.2	**Requirement**
	This initial RCloud Tasking Order will be Work Package 1 – Procurement of Aircraft Furniture as described below with additional costed options as described in Section 1.3 below to be undertaken if or when exercised by Dstl in accordance with the process described in Section 1.3 below. **Work Package One** Procurement of 'aircraft furniture'. Unit Load Devices: The Contractor shall purchase 3x ULDs – "AKE (LD-3) single base metal door (MD-SB)", new as purchased. • 2x ULD to be shipped to Dstl Porton Down **Redacted under FOIA exemption** • 1x ULD to be retained by the Contractor for characterisation under the follow-on contract options.

	Over Head Bins: The Contractor shall purchase 3x OHBs – Outer cabin side bins (not central bins) from an A330 or B777 (or similar transatlantic aircraft). • 2x OHB to he shipped to Dstl Porton Down **Redacted under FOIA exemption** • 1x OHB to be retained by the Contractor for characterisation under the follow-on contract options. Disposal: The 1x ULD and 1x OHB, retained by the Contractor, shall be disposed of (by the Contractor) 18 months after Work Package One is completed. Delivery timescales • The Contractor shall set up a meeting within 1 month of placement of this RCloud Tasking Order to enable the Authority to monitor progress and confirm that the proposed outputs will fall in line with expectation. • Monthly progress updates are required from the Contractor to the Authority via an e-mail or VTC, after the initial meeting. • The Contractor shall deliver a short technical report/presentation documenting the work package within 12 weeks of commencement • The Contractor shall arrange an "end of work package" wash-up meeting to discuss the work package with the Authority.
1.3	**Options or follow on work**
	In addition to the work to be undertaken under Work Package 1 as described in Section 1.2 above the Contractor hereby grants to the Authority the irrevocable options to undertake the work in Work Packages 2 – 5 below singularly or collectively in accordance with the terms and conditions set out in R-Cloud V4 and this Tasking Order Form, it being agreed that the Authority has no obligation to exercise such options. The Authority shall have the right to exercise any of the options detailed below prior to the completion of the preceding Work Package as the project progresses. Each option will focus on a single element that needs to be tested and developed and may be implemented upon evaluation of the success of prior Work Package and will be completed in order of priority and dependent on time and funding available. The approximate dates that each Work Package may be implemented are as follows: Work Package 2 – Jan 2022 Work Package 3 – April 2022 Work Package 4 - July 2022 Work Package 5 – October 2022 These dates will be reviewed by the Authority/Dstl and the Contractor updated with indicative dates as the project progresses. The Authority shall advise the Contractor via e-mail, if each option is to be exercised within two weeks prior to the stated indicative dates detailed above. The Authority will also provide confirmation of the dates within a 2 week notice period prior to exercising any of the options on the Contract. Should the Authority wish to exercise any of the Firm Priced options below Dstl Commercial Services and the Contractor will discuss and jointly agree dates for completion of the Deliverables. Following agreement, Dstl Commercial Services will issue a formal Task amendment.

No work should be undertaken on any of the Optional requirements without the issue of such an amendment to the Task. Any work undertaken without such amendment being issued will be entirely at the Contractor's own risk.

Work Package Two - Option

Material characterisation testing of ULD (AKE (LD-3) with solid metal door) material coupons.

The Contractor shall undertake material testing of ULD materials, to obtain the required information in order to develop/generate LS-DYNA materials models that are able to replicate the same response.

Characterisation is to include both physical and numerical testing of suitable specimens and subsequent material model development.

The Contractor shall follow steps 1 to 6, as detailed below:

1. Develop an appropriate test plan for the characterisation of each item (incorporating both experimental and modelling aspects)
2. Build, verify and simulate computational models of tests, within LS-DYNA, ahead of physical testing
3. Generate test coupons and fixtures for physical testing
4. Conduct tests to establish the response
5. Validate/improve computational LS-DYNA models of tests
6. Supply generated test data, characterisation parameters and validated FE models

Delivery timescales

- The Contractor shall set up a meeting within 1 month of exercising the option for Work Package two to enable the Authority/Dstl to monitor progress and confirm that the proposed outputs will fall in line with expectation. A brief presentation is to be given by the Contractor to provide an overview of the planned work.
- Monthly progress updates are required by the Authority/Dstl via an e-mail or VTC, after the initial meeting.
- Undertake material testing within 8 weeks of commencement
- The Contractor shall deliver a technical report within 8 weeks of commencement
- An "end of work package" wash-up meeting is required to present and discuss the findings of the technical report

Work Package Three - Option

Characterisation of rivets/riveted connections within a ULD (AKE (LD-3) with solid metal door).
The Contractor is to undertake physical testing of rivets/riveted connections to obtain the required information in order to develop/generate LS-DYNA materials models/modelling approaches (e.g. constraint nodes beam (spot-weld) or contact constraints etc.) that are able to replicate the same response.

Characterisation is to include both physical and numerical testing of suitable specimens and subsequent development of a numerical modelling approach.

The Contractor shall follow steps 1 to 6 as detailed below:

1. Develop an appropriate test plan for the characterisation of each item (incorporating both experimental and modelling aspects)
2. Build, verify and simulate computational models of tests, within LS-DYNA, ahead of physical testing
3. Generate test coupons and fixtures for physical testing
4. Conduct tests to establish the response
5. Validate/improve computational LS-DYNA models of tests
6. Supply generated test data, characterisation parameters and validated FE models.

Delivery timescales

- The Contractor shall set up a meeting within 1 month of exercising the option for Work Package three to enable the Authority to monitor progress and confirm that the proposed outputs will fall in line with expectation. A brief presentation is to be given to by the Contractor to provide the Authority/Dstl with an overview of the planned work.
- Monthly progress updates are required via an e-mail or VTC, after the initial meeting.
- Undertake characterisation testing within 12 weeks of commencement
- Deliver technical report within 16 weeks of commencement
- An “end of work package” wash-up meeting is required to present and discuss the findings of the technical report

Work Package Four - Option

Material characterisation testing of coupons representative of OHB (from Outer cabin side bins (not central bins) from an A330 or B777 (or similar transatlantic aircraft).

The Contractor shall undertake material testing of OHB materials, to obtain the required information in order to develop/generate LS-DYNA materials models that are able to replicate the same response.

Characterisation is to include both physical and numerical testing of suitable specimens and subsequent material model development.

The Contractor shall follow steps 1 to 6, as detailed below:

1. Develop an appropriate test plan for the characterisation of each item (incorporating both experimental and modelling aspects)
2. Build, verify and simulate computational models of tests, within LS-DYNA, ahead of physical testing
3. Generate test coupons and fixtures for physical testing
4. Conduct tests to establish the response
5. Validate/improve computational LS-DYNA models of tests
6. Supply generated test data, characterisation parameters and validated FE models

Delivery timescales

- The Contractor shall set up a meeting within 1 month of exercising the option for Work Package four to enable the Authority/Dstl to monitor progress and confirm that the proposed outputs will fall in line with expectation. A brief presentation is to be given by the Contractor to provide an overview of the planned work.
- Monthly progress updates are required by the Authority/Dstl via an e-mail or VTC, after the initial meeting.

	- Undertake material optimisation within 8 weeks of commencement - The Contractor shall deliver a technical report within 12 weeks of commencement - An “end of work package” wash-up meeting is required to present and discuss the findings of the technical report **Work Package Five - Option** Characterisation of the connections/adhesive used in OHBs (from Outer cabin side bins (not central bins) from an A330 or B777 (or similar transatlantic aircraft). The Contractor shall undertake physical testing of the connections/adhesive material (such as DCB, ENF and mixed mode test coupons), to obtain the required information in order to develop/generate LS-DYNA materials models/modelling approaches (such as cohesive elements, tie-break contact etc.) that are able to replicate the same response. Characterisation is to include both physical and numerical testing of suitable specimens and subsequent material model development. **The Contractor shall follow steps 1 to 6 as detailed below:** 1. Develop an appropriate test plan for the characterisation of each item (incorporating both experimental and modelling aspects) 2. Build, verify and simulate computational models of tests, within LS-DYNA, ahead of physical testing 3. Generate test coupons and fixtures for physical testing 4. Conduct tests to establish the response 5. Validate/improve computational LS-DYNA models of tests 6. Supply generated test data, characterisation parameters and validated FE models. **Delivery timescales** - The Contractor shall set up a meeting within 1 month of exercising the option for Work Package five to enable the Authority/Dstl to monitor progress and confirm that the proposed outputs will fall in line with expectation. A brief presentation is to be given to provide an overview of the planned work. - Monthly progress updates shall be provided by the Contractor via an e-mail or VTC, after the initial meeting. - Undertake characterisation testing within 12 weeks of commencement - Deliver technical report within 16 weeks of commencement An “end of work package” wash-up meeting is required to present and discuss the findings of the technical report
1.4	**Contract Management Activities**
	<u>Acceptance Criteria</u> The final technical report shall include, but not limited to details of all testing undertaken; including documentation of setup and any standards followed; the generated data shall be presented in a clear and concise manner so that it can be used to populate model templates; information surrounding the build, verification and validation computational models.

	The report shall be provided by the Contractor in the form of a written document (MS Word) and be sent to the Technical POCs of the Contract **Redacted under FOIA exemption** A data pack of all generated test data (raw and/or processed) and all developed Finite Element models generated as part of the validation exercises must also be supplied along with the written report. The Authority/Dstl will be responsible for acceptance of the deliverable/s. The outputs will be checked by the Authority for consistency and quality before acceptance. Acceptance will take place at Dstl Porton Down and will be determined by a formal review of the delivered document/reports by the Authority. Acceptance will take place within 30 days of receipt of the deliverable by the Authority/upon completion of the Contract by the Contractor. The Contractor will be advised if and when the deliverable is acceptable. If any deliverables are not accepted, the Contractor shall be required to take remedial action to the satisfaction of the Authority, at no additional cost to the Authority.
1.5	**Health & Safety, Environmental, Social, Ethical, Regulatory or Legislative aspects of the requirement**
	For packaging and sending GFA, the Authority shall take the relevant steps to minimise risks related to COVID-19, as detailed in the Dstl COVID-19 Risk Assessment, dated 16/06/2020. http://home/News/Documents/COVID-19_Risk_Assessment.pdf

1.6	Deliverables & Intellectual Property Rights (IPR)					
Ref.	**Title**	**Due by**	**Format**	**Expected classification (subject to change)**	**What information is required in the deliverable**	**IPR Condition**
1	Work Package 1 – Short technical report and/or presentation documenting the work package	Within 16 weeks of contract placement	MS Word document (.docx) / MS PowerPoint document (.pptx)	OFFICIAL	The final technical report shall include, but not be limited to details documentation of work package and any technical information obtained about the supplied ULDs and OHBs.	DEFCON 705 Full Rights Version
2	Work Package 2 - Final Report	Within 12 weeks of exercising the option	MS Word document (.docx)	OFFICIAL	The final technical report shall include, but not limited to details of all testing undertaken; including documentation of setup and any standards followed; the generated data shall be presented in a clear and concise manner so that it can be used to populate model templates; information surrounding the build, verification and validation	DEFCON 705 Full Rights Version

					computational models. A data pack of all generated test data (raw and/or processed) and all developed Finite Element models generated as part of the validation exercises must also be supplied along with the written report.	
3	Work Package 3 - Final Report	Within 16 weeks of exercising the option	MS Word document (.docx)	OFFICIAL	As per Ref 2 above	DEFCON 705 Full Rights Version
4	Work Package 4 - Final Report	Within 16 weeks of contract placement	MS Word document (.docx)	OFFICIAL	As per Ref 2 above	DEFCON 705 Full Rights Version
5	Work Package 5 - Final Report	Within 16 weeks of contract placement	MS Word document (.docx)	OFFICIAL	As per Ref 2 above	DEFCON 705 Full Rights Version

1.7	**Deliverable Acceptance Criteria**
	All Reports included as Deliverables under the Contract e.g. Progress and/or Final Reports etc. must comply with the Defence Research Reports Specification (DRRS) which defines the requirements for the presentation, format and production of scientific and technical reports prepared for MoD. Interim or Progress Reports: The report should detail, document, and summarise the results of work done during the period covered and shall be in sufficient detail to comprehensively explain the results achieved; substantive performance; a description of current substantive performance and any problems encountered and/or which may exist along with proposed corrective action. An explanation of any difference between planned progress and actual progress, why the differences have occurred, and if behind planned progress what corrective steps are planned. Final Reports: shall describe the entire work performed under the Contract in sufficient detail to explain comprehensively the work undertaken and results achieved including all relevant technical details of any hardware, software, process or system developed there under. The technical detail shall be sufficient to permit independent reproduction of any such process or system. All Reports shall be free from spelling and grammatical errors and shall be set out in accordance with the Statement Of Requirement (1) above. Failure to comply with the above may result in the Authority rejecting the deliverables and requesting re-work before final acceptance, in accordance with DEFCON 524 Rejection.

2	**Evaluation Criteria**
2.1	Method Explanation
	The response from the Contractor will be evaluated by the Senior Technical Lead to ensure the Statement of Requirements have been fully considered and met. The evaluation shall be conducted under the Most Economically Advantageous Tender (MEAT) principles, with the application of an Absolute Method, defined as the Value for Money (VfM) Index. This approach sets out to divide the total score of the non-cost (Technical Quality) criteria by the tender cost (£k); the tenders are ranked on the technical quality (represented by the non-cost score) for each £ (or £k) of cost. **Value for Money Index example** Using a VfM ratio (Non-cost score / Price (£NPV)) gives the following results:

Tender	Non-cost score	Cost £K (NPV)	VFM Index	Rank
A	62	20	3.10	3
B	85	24	3.54	1
C	100	29	3.44	2

The highest VFM Index provides more 'quality'/non-cost score per £ and is therefore the winning tender.

For avoidance of doubt the Value for Money index Score shall be calculated based upon the Technical Score and the Cost for all Work Packages including Optional Work Packages 2 – 5.

2.2 Technical Evaluation Criteria

Proposals which pass the commercial evaluation, shall be assessed against the following technical questions.

The Technical evaluation team will evaluate the unpriced responses only.

A total technical score will be calculated using a weighted sum of the marks awarded for each of the four questions. Each question can be scored on a scale of 0-10 resulting in a maximum achievable score of 40. A pro-rata score is then calculated

The scoring range shall apply the following definitions:

Excellent	The response addresses all elements of the Requirement and provides a comprehensive, unambiguous and thorough explanation of how the Requirement will be fulfilled.	10
Good	The response addresses all elements of the Requirement and provides sufficient detail and explanation of how the Requirement will be fulfilled.	7
Adequate	The response addresses the majority of elements of the Requirement but is weak in some areas and does not fully detail or explain how the Requirement will be fulfilled.	3
Inadequate	The response does not address or explain how the Requirement will be fulfilled and fails to demonstrate the ability to meet the Requirement.	0

Points will be awarded for each question shown in the table below.

ID	Criteria	Score
1	The proposal provides strong evidence that the bidder has the expertise and deep technical knowledge in the relevant areas. Historical reports, papers or similar, demonstrating this, that have been generated by the supplier must be attached to their bid, for scrutiny by Dstl as part of this process.	0, 3, 7 or 10
2	The bidder has provided evidence that the suggested testing methodology and scientific principles will provide the required information. Historical reports, papers or similar, demonstrating this, that have been generated by the supplier must be attached to their bid, for scrutiny by Dstl as part of this process.	0, 3, 7 or 10
3	The bidder has provided a feasible and detailed work plan of activities, with risks and mitigations clearly identified. A project plan in the form of a Gantt chart or similar is expected.	0, 3, 7 or 10
4	The bidder has provided details of their expertise in numerical material model development and the use of the LS-DYNA FE code. Historical reports, papers or similar, demonstrating this, that have been generated by the supplier must be attached to their bid, for scrutiny by Dstl as part of this process.	0, 3, 7 or 10
	Total Available Score	**40**

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<tr><td>2.3</td><td>Commercial Evaluation Criteria</td></tr>
<tr><td></td><td>The commercial evaluation shall assess the proposal on the following questions:
<table>
<tr><th>Serial</th><th>Question</th><th>Marking</th></tr>
<tr><td>1</td><td>Has the proposal been submitted against a Firm Price</td><td>Pass / Fail</td></tr>
<tr><td>2</td><td>Has the bidder provided 1 (One) full technical proposal for Work Package 1 and Optional Work Packages 2 - 5, excluding all price detail.</td><td>Pass / Fail</td></tr>
<tr><td>3</td><td>Has the bidder provided 1 (One) full technical proposal for Work Package 1 and Optional Work Packages 2 - 5, including all price detail.</td><td>Pass / Fail</td></tr>
<tr><td>4</td><td>Has a completed RCloud Part C Task Response Form been completed and submitted</td><td>Pass / Fail</td></tr>
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<tr><td></td><td>Noting that only proposals which pass the commercial evaluation (compliant) shall be considered for Technical Evaluation.

Once a preferred bidder has been identified following the evaluation, Dstl may request the completed Research Worker Forms (PPRW) to be submitted.</td></tr>
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