

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

<b>Title of Requirement</b>	<b>Ionic Wind Demonstrator</b>
<b>Requisition No.</b>	<b>1000169050</b>
<b>SoR Version</b>	<b>0.1</b>

<b>1.</b>	<b>Statement of Requirements</b>
<b>1.1</b>	<b>Summary and Background Information</b>
	<p>Ionic Wind is a term for an electrohydrodynamic effect that may be used to generate thrust, but its efficiency is little studied and the effect remains a matter of academic debate. In the first phase of this research by <span style="color: red;">Redacted under FOIA Section 43 - Commercial Interests</span> it has been shown that while the thrust to provide full lift for aircraft is unlikely in the near future, it may be possible to use the effect for modification of airflow to improve the aerodynamic performance of aircraft. This research intends to show this possibility through a physical demonstrator.</p>
<b>1.2</b>	<b>Requirement</b>
	<p>A demonstrator programme should be described to allow the benefits of the effect to be shown in terms of the aerodynamic efficiency of aircraft. The programme should be based on the plan outlined in in Fluid Gravity Engineering report CR062/21 dated 12 November 2021 and be able to:</p> <ul style="list-style-type: none"> <li>• Identify the most suitable design and arrangement of electrohydrodynamic (EHD) electrodes, dielectrics, other EHD components and electrical generation for those</li> <li>• Identify a suitable platform(s) for testing and demonstration</li> <li>• Measure and take into account drag, turbulence control, reattachment of separated flows, net forces including torque and describe these effects, building up a database if necessary. Suitable control experiments should be carried out.</li> <li>• Ensure that control of orientation can be shown</li> <li>• Ensure that improvement to aerodynamic efficiency can be shown</li> <li>• Include a flight demonstration to show the application of EHD technology</li> </ul> <p>The proposed plan should contain descriptions of work packages, milestones and deliverables with timescales and dates, together with a Gantt chart of activity.</p> <p>Deliverable reports should be spaced at suitable points in the plan, such as, but not limited to:</p> <ul style="list-style-type: none"> <li>• Design of the components include electrical generation and EHD parts, placement on the platform, and identification of the platform</li> <li>• Electrical characterisation and electrohydrodynamic outputs generated</li> <li>• Aerodynamic measurements, as indicated in the bullet points above</li> <li>• Results of flight demonstration</li> <li>• Final summary report with executive summary, conclusions and recommendations.</li> </ul>
<b>1.3</b>	<b>Options or follow on work <i>(if none, write 'Not applicable')</i></b>
	Not applicable at present. Follow on work dependent on outcome from this demonstrator.

<b>1.4</b>	<b>Contract Management Activities</b>
	In addition to a review meeting of following deliverables there should be regular monthly update meetings (virtual or real) with Dstl staff. Dstl staff should be invited to the flight demonstration.
<b>1.5</b>	<b>Health &amp; Safety, Environmental, Social, Ethical, Regulatory or Legislative aspects of the requirement</b>
	N/A

1.6	Deliverables & Intellectual Property Rights (IPR)					
Ref.	Title	Due by	Format	Expected classification (subject to change)	Information required in the deliverable	IPR Condition
D1	Platform and component design	T+2 months	Report	Redacted under FOIA Section 24 - National Security	A description of the ionic wind demonstrator including: most suitable design of platform; most suitable placement of electrohydrodynamic (EHD) components; and arrangements for powering the EHD components. A description of the future tests that will be carried out.	Default RCloud Agreement Terms and Conditions shall apply.  All reports are to be fully distributable to MOD, Government, Industry, Academia, International allies. Dstl require the additional ability to publish at its discretion in the public domain.
D2	Component Testing	T+6 months	Report	Redacted under FOIA Section 24 - National Security	Results of testing the components: both individually and collectively off and on platform as necessary. These should include but not be limited to: measurements and control of drag, turbulence, reattachment of separated flows, net forces including torque. A description of how control of orientation will be achieved and how aerodynamic efficiency can be optimised.	
D3	Flight Demonstrator	T+6 months, 11 days	Demonstration	Redacted under FOIA Section 24 - National Security	A working flight demonstrator should be presented to Dstl staff and other MOD stakeholders.	<b>DEFCON 705</b>

<b>D4</b>	Final Report	T+7 months, 11 days	Report	Redacted under FOIA Section 24 - National Security	<p>The results of the flight demonstrator experiments should be given. A comparison with the expectations in D2 should be reported. The report should contain recommendations on how the research outcomes can be used to improve factors in flight control including orientation, aerodynamic efficiency as well as power efficiency and component placement. Both qualitative and quantitative comparisons with conventional systems should be included. Improvements to platform design should be included, with a prognosis on the feasibility and viability of EHD devices, including the necessary next steps for the realisation of the research outcomes in flying devices.</p>	
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<b>1.6</b>	<b>Deliverables &amp; Intellectual Property Rights (IPR)</b>					
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<b>1.7</b>	<b>Deliverable Acceptance Criteria</b>
	<p>All Reports, including Progress Reports and Final Deliverables must:</p> <ul style="list-style-type: none"> <li>• comply with the <a href="#">Defence Research Reports Specification (DRRS)</a>, which defines the requirements for the presentation, format and production of scientific and technical reports prepared for MOD;</li> <li>• be authoritative and accessible;</li> <li>• not be disproportionately focused on a specific topic or the contractor's particular speciality;</li> <li>• be comprehensive yet concisely written. Technical details (e.g. relating to mathematics, or physics concepts) shall be kept to a sufficient minimum in the main text, but may be expanded upon in annexes;</li> <li>• be free from spelling or grammatical errors;</li> <li>• be fully referenced in accordance with an appropriate referencing standard (using hyperlinks where appropriate);</li> <li>• contain a full glossary;</li> <li>• use frequent graphics and tables at relevant points in the report to aid accessibility;</li> <li>• focus on key messages and novel/ game-changing/ exciting technologies;</li> <li>• be delivered in in both Microsoft Word and pdf format. Note: The contractor's own template may be used.</li> </ul> <p>Failure to comply with the above may result in the Authority rejecting the deliverables and requesting re-work before final acceptance.</p> <p>Draft versions of Final Deliverables will be provided to Dstl by the supplier 20 working days prior to the final deliverable date, for review and acceptance / rejection.</p> <p>Review and acceptance / rejection of final versions will take place at Dstl.</p>

<b>2</b>	<b>Evaluation Criteria</b>
2.1	Method Explanation
	The technical evaluation is based on the scientific and technical merit of the proposal and ability of the proposal to meet the requirement, including the researchers' own expertise, the expertise of any subcontractors, and proposed use of facilities.
2.2	Technical Evaluation Criteria
	<ol style="list-style-type: none"> <li>1. Does the proposal address the statement of requirement?</li> <li>2. Do the deliverables correspond to those requested?</li> <li>3. Is the proposal of sufficient scientific and technical quality to meet the requirement?</li> </ol>

	4. Are the resources and access to facilities aligned to the needs of the proposal, do they allow the measurements and necessary outcomes of the research to be met, including within the timescales proposed?
2.3	Commercial Evaluation Criteria
	<p>The supplier shall provide evidence to demonstrate that they can meet the following commercial requirements;</p> <ul style="list-style-type: none"> <li>• A completed 'Tasking Order Form' confirming a resulting contract will be in accordance with the R-cloud Version 4 Terms and Conditions</li> <li>• The supplier must provide their full FIRM price breakdown for all costs to be incurred to fulfil this requirement, including: What rates are being used for what Grade (using their respective R-Cloud Grades), Quantity of manpower hours per Grade, Materials costs Facility costs, Profit rate applied, Any sub-contractor costs and the level of sub-contracting required, Any other costs applicable to this requirement.</li> </ul> <p>The Authority will assess the proposal to ensure that all costs are fully detailed, in line with the R-Cloud rates and price shall be commensurate with the work to be undertaken.</p> <p>When placing any contract the Authority is required to satisfy itself that the agreed price represents Value for Money (VFM). In single source contracting you must provide to the Authority sufficient information in support of your price proposal and during subsequent price negotiation, to enable the Authority to fulfil its obligation to assure VFM. The Authority approaches all contract pricing on the basis of the NAPNOC principle (No Acceptable Price, No Contract). The Authority reserves the right to not enter into any contract that is unacceptably priced or unaffordable.</p>