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**INTEGRATED AIR AND MISSILE DEFENCE
CENTRE OF EXCELLENCE**



IFB FINCON 22-05

Review paper-report

“Overview of international hypersonic weapons programmes, and potential ways to exploit physical phenomena around Hypersonic Weapons to improve surveillance capabilities (Detection and Tracking)”

PART III

**SPECIAL PROVISIONS & TECHNICAL SPECIFICATIONS
(STATEMENT OF WORK)**

July 2022

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NATO UNCLASSIFIED
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1.1 The current Statement of Work (SOW) covers the special provisions and technical specifications that shall be covered by the Contractor for the services requested.

2. General Specifications

2.1 The requested services include the creation and launch of three (3) deliverable products-services as described below in a specific and defined timeframe:

2.1.1 Writing and delivery of a review paper-report under the subject: "Overview of international hypersonic weapons programmes, and potential ways to exploit physical phenomena around Hypersonic Weapons to improve surveillance capabilities (Detection and Tracking)."

2.1.2 Writing and delivery of an extended abstract of the abovementioned study report.

2.1.3 Publishing of the abovementioned paper-report into a scientific journal or magazine.

3. Technical Specifications - Description of Deliverables**3.1 Deliverable "1": Review paper-report****3.1.1 Subject:**

"Overview of international hypersonic weapons programmes, and potential ways to exploit physical phenomena around Hypersonic Weapons to improve surveillance capabilities (Detection and Tracking)."

3.1.2 Pillars:

The study should be divided into three stages/chapters, which will provide an overview of international known and ongoing Hypersonic Weapons programmes, an analysis of physical phenomena around those (including flow disturbances, temperature rise, chemical reactions, electromagnetic effects, plasma formation, etc.), and what are the possible ways of exploiting them in order to find ways to improve the existing surveillance capabilities (detection and tracking).

3.1.2.1 Stage/Chapter 1

At this stage, a reference should be made to the development of the hypersonic weapons programmes, where an overview of their operational capabilities will be given (e.g. flight characteristics, photos, range, etc.). At the same time, a reference should be made to the ongoing programmes where, in addition to the above, an estimated deliverable of the weapon should also be mentioned.

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3.1.2.2 Stage/Chapter 2

At this stage, reference should be made to the Endo Atmospheric physical phenomena caused by the flight of these weapons. Specifically, a report should be given on how such an object behaves in its flight, and what phenomena it causes (thermal, optical, acoustic, etc.). This report should analyse, as far as possible, the "phenomena" observed in flight at supersonic speeds at different altitudes, such as:

- Low-Medium Altitude (Sea Level - 15km)
- High Altitude (15km - 30km)
- Atmosphere Low Layer (30km - 60km)
- Atmosphere High Layer (60km - 100km)

3.1.2.3 Stage/Chapter 3

At this stage, a summary of the above, and a reference to the existing or ongoing possibilities of detecting the phenomena mentioned above is desirable, with the main objective being the presentation of proposals for the improvement of the existing Surveillance Capabilities (Detection and Tracking).

3.1.3 Structure: Typical scientific/research paper.

3.1.4 Length of paper: Not less than eight thousand (8.000) words (including any bibliographical references).

3.1.5 Language: English Language.

3.1.6 Delivery Date: By 20 December 2022.

3.1.7 Authors: From the side of the IAMD COE, the point(s) of contact as officer(s) of primary responsibility designated by the Director and notified in writing by the Centre may be mentioned in the paper. This/these person(s) will collaborate with the scientific staff of the Turbomachines & Fluid Dynamics Laboratory of the Technical University of Crete in order to carry the project on until its completion.

3.1.8 A written acknowledgement in the paper will clearly state the following: *"This study was funded by the Integrated Air and Missile Defence Centre of Excellence (IAMD COE) and any intellectual property resulting from the work covered by this will be property of the IAMD COE. This paper reflects only the IAMD COE policies and its author(s)' positions and it is not intended to create any legal obligations nor does it reflect NATO's policies or positions, or engage NATO in anyway."*

3.2 Deliverable "2": An extended abstract of the paper-report of par 3.1.

3.2.1 Structure: Typical.

3.2.2 Length of abstract: Not less than one thousand (1.500) words.

3.2.3 Language: English Language.

3.2.4 Delivery Date: By 11 November 2022.

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3.2.5 Authors: As above par. 3.1.7.

3.2.6 A written acknowledgement will be stated in the abstract as above par. 3.1.8.

3.3 Deliverable “3”: Publication of review paper-report (as deliverable “1”) into a scientific journal or magazine.

3.3.1 The selection of the scientific journal or magazine will be under the choice of the competent/responsible professor of the Turbomachines & Fluid Dynamics Laboratory (TurboLab) of the School of Production Engineering & Management of the Technical University of Crete (TUC) (hereinafter “responsible professor”), following the respective approval by the IAMD COE (see below par. 4.5.2.1).

3.3.2 Delivery Date: No later than 30 June 2023.

3.3.3 All costs regarding the publishing will be covered by the Contractor.

3.4 All the required documentation (report, documents for compliance, etc.) shall be written - submitted in English and should be signed by the Contractor.

3.5 Any details required for the above requirements will be provided by the IAMD COE competent official in written.

4. Project Management

4.1 The research project will be undertaken and managed by the responsible professor.

4.2 The responsible professor shall:

4.2.1 Ensure that all his/her associates, who will be working with him/her on this project, understand, respect, and will abide by all conditions of this agreement and all related agreements.

4.2.2 Devote his best endeavor’s to achieve the technical goals meet the reporting/delivering schedule defined herein.

4.2.3 Not assign, discuss, or sub-contract any part of the technical study outside of the scientific personnel of the Turbomachines & Fluid Dynamics Laboratory (TurboLab) without the prior written consent of IAMD COE.

4.3 Non-Disclosure

4.3.1 In the context of the Contract, the IAMD COE may disclose verbally or in writing, information about IAMD COE’s own intellectual property, pending or filed patents or research intensions and directions. This may be necessary to allow the responsible professor to fulfil this contract. The responsible professor shall not

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disclose any of this information to any third party.

4.3.2 The responsible professor shall not make any commercial gains, by the sale of products or information related to any aspects of the Contract.

4.3.3 The responsible professor shall ensure that all project members will respect the commercial confidentiality of information supplied by the IAMD COE in relation to the work described in this agreement. The responsible professor shall obtain all project members' agreement that they will not disclose to any third party any information or results related to this work.

4.4 Intellectual Property

4.4.1 Any intellectual property resulting from the work covered by the Contract will be the property of the IAMD COE. This includes reports, calculations, inventions, discoveries, or otherwise patentable material. Should the responsible professor or his/her team make, during the execution of this project, or at any time thereafter, an invention or inventive step based on or derived from the IAMD COE's disclosures, or work carried out within this project, the responsible professor shall disclose and assign any such inventions to the IAMD COE.

4.4.2 The responsible professor shall:

4.4.2.1 Disclose promptly to the IAMD COE full details of all inventions, discoveries, improvements, or other novel material whether patentable or not, arising from the work covered by this agreement.

4.4.2.2 Make available to the Centre all information required to make and pursue applications for patents arising from the work or related to the Contract, assisting the Centre into this purpose.

4.4.3 The IAMD COE will investigate each disclosure submitted by the responsible professor and, if it elects to file patent application thereon, agrees to pay all expenses in connection with the preparation and pursuance of such patent application or applications which it may decide to file as deemed appropriate. The appropriate research members of the responsible professor's team will be acknowledged as the inventors or co-inventors (as appropriate) for their intellectual contribution in any patent application or publication.

4.4.4 If the responsible professor petitions the IAMD COE in writing to release any of the rights to any inventions, discoveries, novel information or any patent granted thereon, which by this Agreement are assigned to IAMD COE, the latter will consider and act on such petition, but it is not obliged to release any of its rights to the responsible professor.

4.4.5 Any inventions, discoveries, or novel information, within the scope of the Contract and held by the responsible professor prior to the date of the contract award and not included in this or any earlier agreement will not be covered by the Contract.

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4.4.6 The IAMD COE will:

4.4.6.1 Perpetually indemnify the responsible professor against any costs, losses, and expenses arising from the pursuance or future servicing of any patent arising from the work covered by this agreement or from any future commercial exploitation of any information or inventions arising from the work covered by this agreement howsoever those costs, losses, or expenses may arise.

4.4.6.2 Recognize the responsible professor's ownership of any invention or patentable idea, which is outside the scope of the current project. In such cases the IAMD COE will be open to negotiation on patent ownership, royalties etc. as part of a separate agreement. Patentable ideas within the scope of the project remain the property of the IAMD COE with the responsible professor (and the involved members of his team) receiving due acknowledgement.

4.5 Publication and Publicity

4.5.1 Any party may use the other party's name in publication or publicity material after informing in advance, in writing, the last one.

4.5.2 The IAMD COE:

4.5.2.1 Has the sole right to grant permission for publication and such permission must be obtained in writing prior to submission for publication of any information related to the matters covered by this agreement. The manuscript should be submitted to IAMD COE for consideration, at least twenty (20) days prior to the date of submission for publication.

4.5.2.2 Actively encourages and seeks publication but reserves the right to withhold permission if confidentiality is required for security reasons.

4.5.2.3 Agrees not to withhold, unduly, willfully, or unnecessarily, permission for publication.

5. Guarantee

5.1 No special guarantee is required by the Contractor.

6. Delivery - Shipping costs

6.1 All requested projects shall be completed, provided and delivered to the IAMD COE within the abovementioned deadlines (par. 3.1.6, 3.2.4 and 3.3.2).

6.2 Any delivery or shipping costs (e.g. for the publication, etc.) will be borne by the Contractor.

7. Contractor's Standards

7.1 The Contractor shall establish, document and implement a Quality Management System with procedures that satisfy the ISO 9001 standards.

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