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



IFB FINCON 24-05

Study Report
“Counter Bio-inspired Drones”

PART III

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

November 2024

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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 Report under the subject: “Countering Bio-inspired Drones”.

2.1.2 Writing and delivery of an extended abstract of the above – mentioned study report and creation of a technical literature database on Biomimetic Unmanned Aerial Vehicles and Systems (UAV/UAS), with particular emphasis on Biomimetic Unmanned Aerial Vehicles and Systems for Defence. When completed, this literature database will provide a good picture of the state-of-the-art in the above area.

2.1.3 Writing and delivery of a scientific paper, that will categorize and analyse the content of the above technical literature database and lead to conclusions on the potential advantages and disadvantages of the Biomimetics methodology for unmanned aerial vehicles and systems, especially for UAV/UAS in the Defence sector. These conclusions will assist the alliance in finding ways of detecting and countering Unmanned Aerial Vehicles, especially UAV/UAS exploiting the Biomimetics methodology.

2.1.4 Submission of the abovementioned scientific paper for publication into a scientific journal or magazine.

3. Technical Specifications - Description of Deliverables**3.1 Deliverable “1” Extended Abstract:**

It concerns an extended abstract of the above-mentioned report and creation of an initial version of the above-mentioned technical literature database on Biomimetic Unmanned Aerial Vehicles and Systems, with particular emphasis on Biomimetic Unmanned Aerial Vehicles and Systems for the Defence sector. When completed, this literature database will provide a good picture of the state-of-the-art in the above area.

3.1.1 Subject: “Countering Bio-inspired Drones”.

3.1.2 Structure: Typical

3.1.3 Length of paper: Not less than 3.000 words.

3.1.4 Language: English Language.

3.1.5 Delivery Date: NLT 28 February 2025.

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3.1.6 Authors: From the side of IAMD CoE two co-authors will be mentioned in the extended abstract. These persons will cooperate with the scientific staff of the Contractor in order to carry on the extended abstract.

3.2 Deliverable “2” Final Report:

3.2.1 Subject: “Countering Bio-inspired Drones”.

3.2.2 Pillars:

The Report should be divided into three (3) stages/chapters, which will provide: (a) the establishment of a technical literature database on Biomimetic Unmanned Aerial Vehicles (drones) and Systems, with particular emphasis on Biomimetic Unmanned Aerial Vehicles and Systems for the Defence sector. When completed, this literature database will provide a good picture of the state-of-the-art in the above area, (b) categorize and analyze the content of the above technical literature database and lead to conclusions on the potential advantages and disadvantages of the Biomimetics methodology for unmanned aerial vehicles and systems, especially for the Defence sector, (c) a summary of the above findings and conclusions. These conclusions will assist the Alliance in finding ways of detecting and countering Unmanned Aerial Vehicles, especially UAV/UAS exploiting the Biomimetics methodology.

3.2.2.1 Stage/Chapter 1

At this stage, the study proposal has the following main objective. To establish a technical literature database on Biomimetic Unmanned Aerial Vehicles and Systems (UAV/UAS), with particular emphasis on Biomimetic Unmanned Aerial Vehicles and Systems for the Defence sector. The Robotics and AI issues, pertinent to UAV/UAS, that this technical literature will address, include, but are not limited to: biomimetic flapping wing drone flight, biomimetic soft-body drone morphology, morphing drones, bio-inspired sensor-based drone control, bio-inspired sensing and processing, as well as bio-inspired drone behaviors, like autonomous landing, centering, perching, motion camouflage and swarming. When completed, this technical literature database will provide a good picture of the state-of-the-art in the above area. The achievement of this objective will be verified by the satisfaction of the corresponding Key Performance Indicators (KPI): the technical literature database on Biomimetic Unmanned Vehicles and Systems will be composed of a collection of at least 100 technical references, mostly in electronic form, when possible in open-access electronic form. At least half of these technical references will be directly relevant to biomimetic aerial robots and biomimetic UAV/UAS. At least 25 of the technical references will be directly relevant to the Defence sector.

3.2.2.2 Stage/Chapter 2

At this stage, the study proposal has the following main objective. To categorize and analyze the content of the above technical literature database, and to draw conclusions regarding the potential advantages and disadvantages of the Biomimetics methodology for Unmanned Aerial Vehicles and Systems, especially for UAV/UAS in the Defence sector. The main deliverable of this stage will be the final version of the report of the related findings entitled “Countering Bio-inspired Drones”,

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focusing especially on biomimetic UAV/UAS in the Defence sector. The achievement of this objective will be verified by the satisfaction of the corresponding Key Performance Indicators (KPI): the report will be in the form of an electronic document of length of at least 10.000 words and including at least 20 pictures. A draft version of the report will be submitted to IAMD COE for possible comments one month before the due date of the final version of the report (as specified in par. 3.2.6).

3.2.2.3 Stage/Chapter 3

At this stage, a summary of the above findings and conclusions will be compiled, in order to assist the Alliance in finding ways of detecting and countering Unmanned Aerial Vehicles, especially UAV/UAS exploiting the Biomimetics methodology.

3.2.3 Structure: Typical scientific paper.

3.2.4 Length of paper: Not less than 10.000 words (including any bibliographical references).

3.2.5 Language: English Language.

3.2.6 Delivery Date: NLT 29 August 2025.

3.2.7 Authors: From the side of the Integrated Air & Missile Defence Centre of Excellence (IAMD CoE) two co-authors will be mentioned in the report. These persons will cooperate with the scientific staff of the Contractor to carry on the report.

3.2.8 A written acknowledgement in the report will clearly state that: *“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.”*

3.3 Deliverable “3” Scientific Publication:

3.3.1 The study – report of par. 3.2 (Deliverable “2”), properly adapted in a scientific publication format, will be submitted for publication to a scientific journal or magazine.

3.3.2 The selection of the scientific journal or magazine will be under the choice of the Contractor, following the respective approval by the IAMD COE (see below par. 4.5.2.1). Deliverable “3”, will consist of the scientific paper in ready – to – submit form for the selected journal or magazine.

3.3.3 Delivery Date: NLT 16 December 2025.

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

3.4 All the required documentation (report, documents for compliance, etc.)

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shall be written - submitted in English and should be signed by the Contractor.

3.5 On the last Friday of every two-month period the Contractor and his team will provide the IAMD COE with a presentation/update on the progress of the paper and findings so far. These presentations/updates may be used by the IAMD CoE for internal purposes. Additionally, a presentation/update of a similar level can be requested from Contractor at any time, with ten (10) working days' notice.

3.6 Any details required for the above requirements will be provided by the IAMD COE competent official (Concept Development & Experimentation BH) in written.

4. Project Management

4.1 The research project will be undertaken and managed by the Contractor's responsible personnel.

4.2 The Contractor 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 as described in paragraph "3" and meet the reporting/delivering schedule defined herein paragraph "5".

4.2.3 Not assign, discuss, or sub-contract any part of the technical study outside of its scientific personnel 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 Contractor to fulfil this Contract. The Contractor shall not disclose any of this information to any third party.

4.3.2 The Contractor agrees not to make any commercial gains, by the sale of products or information related to any aspects of the current contract.

4.3.3 The Contractor will ensure that all project members will respect the commercial confidentiality of information supplied by IAMD COE in relation to the work described in this agreement. The Contractor will obtain all project member's 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 this agreement will be the property of IAMD COE. This includes reports, calculations, inventions, discoveries, or otherwise patentable material. Should the Contractor make,

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during the execution of this project, or at any time thereafter, an invention or inventive step based on or de-ri-ved from IAMD COE's disclosures, or work carried out within this project, the Con-tractor agrees to disclose and assign any such inventions to IAMD COE.

4.4.2 The Contractor 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 IAMD COE all information required to make and pursue applications for patents arising from the work or related to the Contract, assisting the IAMD COE into this purpose.

4.4.3 The IAMD COE will investigate each disclosure submitted by the Contractor 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 Contractor'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 Contractor 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 Contractor.

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

4.4.6 The IAMD COE will:

4.4.6.1 Perpetually indemnify the Contractor 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 Recognise the Contractor'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

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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. 3.1.5, 3.2.6 and 3.3.3).

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, maintain up-to-date records and documentation and implement a Quality Management System with procedures that satisfy the ISO 9001 standards.