Job Offer - Patrimony of the Royal Military Academy of Belgium
Department of Mechanics/ Unit: Robotics & Autonomous Systems
Research Engineer / Scientist (M/F/X)
iMUGS (integrated Modular Unmanned Ground System) project

Publication: 22 July 2020

Job Description and associated tasks

The Royal Military Academy of Belgium (RMA) is a military institution responsible for the basic academic, military and physical training of future officers and for the continuing advanced training of officers during their active career in the Belgian Defense department (www.rma.ac.be). It is fully recognized as a university, fulfilling the same criteria as civilian universities. The Royal Military Academy is also conducting scientific research at university level for projects funded by the Belgian Defense department or external sources.

In the framework of a research & development iMUGS (integrated Modular Unmanned Ground System) project funded by the European Commission's European Defence Industrial Development Programme (EDIDP) and conducted in collaboration with other major defence, communication and cybersecurity companies and high-tech SME partners, we are looking for a full-time research scientist/engineer with a master's degree in Applied Sciences / Engineering / Physics / Computer Science in the field of Robotics (Unmanned Systems) & Artificial Intelligence (AI).

During the project, a modular and scalable architecture for hybrid manned-unmanned systems will be developed to standardize a European-wide ecosystem for aerial and ground platforms, command, control and communication equipment, sensors, payloads, and algorithms. The prototype system will utilize an existing unmanned ground vehicle and a specific list of payloads. The outcome of the project should be demonstrated in operational environments and relevant climatic conditions as part of participating member states military exercises or at separate testing grounds.

The research engineer / scientist will be a part of the "Robotics & Autonomous Systems - RAS" Unit of the Department of Mechanics (http://mecatron.rma.ac.be/) of the Royal Military Academy. The successful candidate will strongly contribute with its expertise within the iMUGS project.

The goal of the Swarming subproject is to provide advancements of swarming technologies in order to expand the capabilities of a unique robot where heterogeneous assets will have the capability to work as a group with a common mission or multiple mission objectives. The developed work should aim to bridge existing practical gaps between theory and implementation of scalable multi-agent collaboration and optimization which should ensure operations in mission-critical unstructured outdoor environments. In order to execute such complex missions, the challenging existing gaps related to the timely and compact rendering and structuring of data need to be solved. Two types of swarming optimizations are envisaged: local and global optimization. Local optimization relies upon local (edge) limited computational power and local information, where global optimization relies upon many data sources on many different levels (edge-fog-cloud) and virtually unlimited computational resources. The successful candidate will have to, in cooperation with its colleagues and partners, support the development of the swarming algorithms and concepts, implement, evaluate their performance and validate them in real and simulated environments. The swarming/autonomy framework should be developed as platform-agnostic, enabling integration to unmanned ground platforms and adaptation to current manned vehicles. The developed framework should furthermore be capable of expedited deployment and interoperable with existing command and control and manned operations. The candidate is also expected to contribute to

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publish the relevant results in the scientific literature and other dissemination channels while taking the industrial valorization of these results into account.
In addition, the successful candidate will also support the preparation, define requirements and setting up measurement of a large-scale demonstration and test campaigns within a land/coastal environments to test and showcase the capabilities of the iMUGS system, with the goal of performing Beyond Visual Line of Sight ISR reconnaissance missions in a swarming manner (more than one UGV/UAV).

The duration of the iMUGS project is 30 months.

Main tasks

Performing the tasks of the iMUGS project allocated to the Royal Military Academy:

- Support the developments of the subproject "Swarming" within iMUGS;
- Contribute in the development of architectures, methods and algorithms to optimize a swarming multi-agent system against multiple objectives, map possible concepts of swarm operation and identify possible scenarios and strategies;
- Contribute in the development of real-time global and local swarming capabilities for collaborative robotic behavior and rapid rescheduling and re-tasking of robots (unmanned systems);
- Contribute in the process of designing, developing and integrating swarming capabilities/algorithms aiming to operate multiple robots (unmanned systems) by a single operator (within real and simulated environments);
- Contribute in the process of defining and developing a test bench for evaluation of the developed capabilities and algorithms;
- Supporting testing, verification and demonstrations within realistic environments of the implemented designs and joint integrations with other partners;
- Contributing in the process of reporting of the progress results, document operational procedures and best practices to the other members of the consortium and in the scientific literature, in English;
- Participating in reporting of the obtained results at international conferences and write scientific papers in English;
- Contributing in the identification of new research directions, collaborations with research and industrial partners, supporting the process of writing research/project proposals as collaborator of the RAM – RAS team.

More information: Dr. Ir. Haris BALTA (haris.balta@mil.be)

Required skills

Technical skills

- The applicant shall have a master's degree in Applied Sciences / Engineering / Physics / Computer Science in the field of Robotics & AI;
- Experience in technical developments within – Robotics (Unmanned Systems) & AI projects;
- Background in Robotics (Unmanned Systems) & AI (applied in realistic environments);
- Training or experience in developing perception, autonomy, swarming algorithms including AI for Robotics (Unmanned Systems) is highly recommended;

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- Excellent knowledge of a programming language (e.g. C++, Python…);
- Very good understanding of Linux system and open-source development environments;
- Very good understanding of ROS and robotics simulation environments (e.g. Gazebo...);
- Training or experience in integrating and developing HW/SW components in the field of Robotics (Unmanned Systems).

Personal skills

The applicant shall

- demonstrate the ability to conduct scientific research in an independent and upright way within a multidisciplinary environment;
- be able to communicate results in a scientific clear, concise and precise manner, thinking in an innovative and creative way and take initiatives;
- be able to work independently in a multidisciplinary team;
- be able to work well in a team.

Other skills

The applicant shall

- have very good written/oral scientific communication skills in English;
- oral communication skills in French or Dutch are an added asset.

Specific requirements

The successful candidate has to be committed to confidentiality and exclusivity and will therefore have to obtain the required security clearance. The candidate must consent with the background check required to obtain this clearance, which will be executed by the Belgian Defense. Taking into account the confidential nature of the provided information within the work, absolute discretion is to be demonstrated. **This position is only open for EU member states citizens.**

Application

The work is to be performed in a military context and that implies that the candidate will undergo a background check. The application must be accompanied by the filled in document that can be downloaded at http://www.rma.ac.be/nl/aanvraag-veiligheidsverificatie

Applicants shall send

- a motivation letter;
- a complete CV;
- a scan of the master diploma;
- one professional reference;
- a copy of their ID card (front and back);
- the request for background check (see above link);
- copy of one relevant (to the job description) publication (if available),

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referring the subject "**MECA iMUGS project**" to Dr. Ir. Haris Balta (haris.balta@mil.be), Dr. Ir. Geert De Cubber (geert.decubber@mil.be) and Thierry Deprez (erm-deao-rswo@mil.be).

The application deadline is August 22th 2020.
A first pre-selection will be conducted based on the received documents. Preselected applicants meeting the requirements will be invited to a face-to-face interview (optional online; depending on the COVID-19 situation) at the Royal Military Academy, rue Hobbema 8, 1000 Brussels.

Additional information

Contract

- The candidate will be hired ASAP (in consultation with the applicant);
- The candidate will be offered an open-ended contract with the patrimony of the Royal Military Academy. This does not imply that the candidate will be a civil servant;
- Wage scale: A21 (Ir or holders of a Master Degree in Engineering Sciences (Applied Sciences)).

Extra-legal benefits

- Possibility to obtain a bonus for bilingualism (Dutch/French);
- Holiday allocation;
- End-of-year bonus;
- Hospitalization insurance;
- Free public transport (home-work commute);
- Free access to the on-campus sport infrastructure;
- On-campus restaurant and cafeteria with discount on the daily menu;
- Stimulating work environment.

Workplace

- Royal Military Academy - Avenue de la Renaissance 30, 1000 Bruxelles;
- Field tests will need to be executed at the testing premises (different locations);
- Occasional professional trips abroad;
- Meetings at partners' premises.

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