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

Publication: 26 February 2021

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 the research & development project iMUGS (integrated Modular Unmanned Ground System), 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 or PhD/doctoral 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 be integrated in the Swarming subproject team 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 will be developed: 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 his colleagues and partners, participate in the development of the global swarming optimization algorithms and concepts, implement, evaluate their performance and validate them in simulated and real 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

Royal Military Academy
30 av de la Renaissance
1000 Brussels, Belgium

also expected to participate on publishing 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 help to prepare, 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 various types of missions such as Beyond Visual Line of Sight ISR reconnaissance missions in a swarming manner (more than one UGV).

Main tasks

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

- Develop, methods and algorithms to optimize a swarming multi-agent system against multiple objectives, map possible concepts of swarm operation;
- Coordinate and develop real-time global swarming capabilities for collaborative robotic behavior and rapid rescheduling and re-tasking of robots (unmanned systems);
- Design, develop and integrate swarming capabilities/algorithms aiming to operate multiple robots (unmanned systems) by a single operator (within real and simulated environments);
- Define and develop a test bench for evaluation of the developed capabilities and algorithms;
- Develop a testing, verification and demonstrations within realistic environments of the implemented designs and joint integrations with other partners;
- Develop an exploitation plan to optimally valorize the Intellectual Property developed within this project;
- Report the progress results, document operational procedures and best practices to the other members of the consortium and in the scientific literature, in English;
- Report the obtained results at international conferences and write scientific papers in English;
- Participate in identification of new research directions, collaborations with research and industrial partners, writing research/project proposals either as coordinator or collaborator of the RAM – RAS team.

More information: Dr. Ir. Emile LE FLECHER (emile.leflecher@mil.be) & Dr. Ir. Geert DE CUBBER (geert.decubber@mil.be)

Required skills

Technical skills

- The applicant shall have a Master or PhD/doctoral degree in Applied Sciences / Engineering / Physics / Computer Science in the field of Robotics & AI;
- Excellent background in Robotics (Unmanned Systems) & AI (applied in realistic environments);
- Experience in developing swarming algorithms including AI for Robotics (Unmanned Systems);
- Excellent knowledge of a programming language (e.g. C++, Python…);
- Knowledge of edge/fog/cloud architecture.
- Very good understanding of Linux system and open-source development environments;
- Knowledge of ROS and robotics simulation environments (e.g. Gazebo, airSim...);
- Experience in integrating and developing HW/SW components in the field of Robotics (Unmanned Systems).

Royal Military Academy
30 av de la Renaissance
1000 Brussels, Belgium

Personal skills

The applicant shall
- demonstrate the ability to conduct research on a high-level;
- be able to work independently in a multidisciplinary team;
- be able to work well in a team.

Other skills

The applicant shall
- have excellent 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 (indicating also the date when the applicant would be able to start);
- a complete CV;
- a scan of the diploma;
- a copy of their ID card (front and back);
- the request for background check (see above),

referring the subject "**MECA iMUGS project**" to Dr. Ir. Emile LE FLECHER ((emile.leflecher@mil.be), Dr. Ir. Geert DE CUBBER (geert.decubber@mil.be) and Thierry Deprez (erm-deao-rswo@rma.ac.be).

The application deadline is March 26th 2021.
A first pre-selection will be conducted based on the received documents. Preselected applicants meeting the requirements will be invited to an interview (highly likely via tele-conferencing, depending on the COVID-19 situation) at the Royal Military Academy, rue Hobbema 8, 1000 Brussels.

Royal Military Academy
30 av de la Renaissance
1000 Brussels, Belgium

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. The financing of this contract is tied to the iMUGs project, which lasts until May 2023.
- Wage scale:
    - A11 (holders of a Master Degree)
    - A21 (Ir. or holders of a Master Degree in Engineering Sciences (Applied Sciences))
    - A22 (holders of a PhD degree)

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) / bike allowance;
- Free access to the on-campus sport infrastructure;
- On-campus restaurant and cafeteria;
- 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.

Royal Military Academy
30 av de la Renaissance
1000 Brussels, Belgium