Job offer
Royal Military Academy - Patrimony

**Researcher (M/F/X) on Unmanned Ground Systems**
Department of Mechanics
project "**CUGS**"
Publication date: 20/10/2022

## Job description and associated tasks

In the framework of the study CUGS on the development of Unmanned Ground Systems for military applications, we are looking for a full-time researcher with a master degree in Applied Sciences / Engineering / Physics / Computer Science / Informatics and experience in the field of Robotics & Artificial Intelligence (AI). We offer an enticing work environment, where you will work in a multi-national team on a mix of European and Belgian collaborative research projects with real robotic systems and practical applications on the terrain. The Royal Military Academy (RMA) is strongly committed to promoting diversity and gender equality. Therefore, women candidates are strongly encouraged to apply.

Context:

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](http://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.

You work within the multi-national research cell 'Robotics & Autonomous Systems' ([https://mecatron.rma.ac.be/](https://mecatron.rma.ac.be/) ) of the department of Mechanical Engineering of the Royal Military Academy and together with a large consortium of research institutes and companies in the context of a collaborative European research project. You conduct scientific research at university level on a project entitled 'CUGS (Combat Unmanned Ground Systems).

Study:

Unmanned Ground Systems (UGS) are ideally suited to reduce the danger to human personnel and manned platforms, as well as to increase robustness, sustainability and resilience of ground systems. It is the vision that a comprehensive set of combat UGS, will contribute significantly to the future ground combat capabilities in order to ensure advantage in respect to the adversary. Therefore, the European Defence Agency (EDA) has launched the CUGS project, which aims to develop supporting technologies to enable the widespread adoption of combat unmanned ground systems. This study concerns the Belgian contribution to this EDA project and focuses on the aspect of improving the autonomy & navigation capabilities.

Autonomy and navigation of military UGS remains a difficult problem due to the requirement to be able to operate in any environment and under any meteorological conditions. Therefore, this study will develop a terrain traversability estimation capability that enables the combat UGS to understand their environment, using their sensing data, in order to use this data as input for autonomous navigation and for situational awareness modules.

A second development within this study will be an interoperable terrain map interpretation workflow, allowing combat UGS to download maps acquired by drones or by satellite imaging and use and interpret those maps as input for

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autonomous navigation and situational awareness. This is a key critical component that it still missing within current military UGS, which often depend on near-perfect pre-existing terrain knowledge in order to plan their activities, which is never the case in reality.

Finally, this study will develop local swarming capabilities, enabling multiple combat UGS to work together as a coordinated team in a distributed manner, without relying on a central command and control station. In realistic military operations, a centralised command cannot always be ensured (or is unwanted due to radio silence requirements), which means that a decentralised, distributed swarming approach is highly required for combat UGS.

## Main Tasks

- Develop the operational and technical user requirements for the project
- Develop a terrain traversability estimation capability that enables the UGS to understand its environment using its sensing data, in order to use this data as input for autonomous navigation.
- Develop an interoperable terrain map interpretation workflow, allowing UGS to download maps acquired by drones or by satellite imaging and use and interpret those maps as input for autonomous navigation & situational awareness.
- Develop local swarming capabilities, enabling multiple UGS to work together as a coordinated team in a distributed manner, without relying on a central command and control station.
- Integrate the RMA developments into the digital twin architecture of project partners, such that the algorithms can be validated

# Required skills

## Technical skills

The applicant shall have a master degree. This is a multi-disciplinary study, requiring a mix of theoretical skills (conception of novel algorithmic approaches) and more practical skills (implementation and field validation of algorithms on UGS).

- Training or experience in robotics & AI is required;
- Experience in programming is required;
- Training or experience in unmanned ground systems is required;
- Knowledge of ROS (https://www.ros.org/ ) is recommended;
- Training or experience in Perception is recommended;
- Training or experience in Control Engineering is an added value;
- Training or experience in Sensor integration is an added value;
- Knowledge of deep learning algorithms is an added value.
- Training or experience in applied research and or design is an added value;

## Specific requirement

The researcher will be working within the context of an European Defense Agency (EDA) research project. Due to this project framework, this position is only open for NATO / EU citizens.

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## Personal skills

- You conduct scientific research in an independent and upright way within a multidisciplinary environment
- You think in an innovative and creative way. You take initiative, you are involved and result oriented.
- You communicate your results in a clear, concise and precise manner.
- You are honest, loyal toward the institution and respect confidentiality.
- You plan and manage proactively your self-development, while being critical to your own functioning and striving to your self-improvement.
- You improve the team-spirit and solve interpersonal conflicts. You are flexible for change and adapt yourself.
- You solve problems autonomously and find alternatives or solutions.
- You behave in a respectful way toward the others, their ideas and opinions as well as toward procedures.
- You are capable to manage, direct and assist with the composition of deliverables towards the funding authority
- You are capable to write and present scientific papers or technical reports about your work

## Other skills

- The applicant shall have excellent oral & written knowledge of English.
- Minimum knowledge of Dutch or French is an added value for collaboration with peers.

## Application

You will be working in a military environment. That is why everyone is expected to undergo a security verification. Please add to your application the filled out document. The form can be downloaded from: http://www.rma.ac.be/nl/aanvraag-veiligheidsverificatie

Send by email to Mr Geert De Cubber (geert.decubber@mil.be) AND to Mrs Helena BRUYNINCKX (erm-deao-rswo@mil.be):

- a motivational letter;
- a CV
- a scan of your ID card (both sides);
- the filled out security document

Please mention clearly the reference of the project: "CUGS".

Note that the RAS unit is opening up simultaneously four different positions (Maritime Robotics, Ground Robotics, Network Engineer, Optimization & AI Engineer). Please choose the position that matches best your skills and apply only for that one, in order to avoid administrative overhead. If you think that your profile could also suit the other profiles, then you can mention this in the motivation letter and we will fully consider this when performing the candidate selection.

Application deadline: 30/11/2022.

The interviews will take place at the Royal Military Academy, Hobbemastraat 8, 1000 Brussels. In case of access restriction due to COVID-19 or non-Belgian application, on-line interviews will take place. The date and time of the interview will be communicated to the preselected candidates.

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# Miscellaneous

## Contract

- Probable date of recruitment: 01/01/2023, in consultation with the applicant.
- Status: Full-time employment based on an open-ended contract with the Patrimony of the Royal Military Academy (you will not be a civil servant). Please do note that the financing of your contract is tied to the CUGS project (which ends on 31/12/2025).
- Wage scale: class A1 (holders of a Master's degree in Science) / class A2 (Ir ; holders of a Master's degree in Engineering). RMA applies a merit-based research career track, allowing researchers to advance in wage scale based upon annual evaluations.
- Holiday pay.

## Extra-legal benefits

- Possibility to benefit from a bilingualism allowance (Dutch/French) following a SELOR test;
- End-of-year bonus;
- Free DKV hospitalization insurance. Possibility of additional affiliation for one or more persons living under the same roof: spouse, child(ren) (50% of the price per additional member);
- Bike allowance / Free public transport (home-work commute);
- Free access to campus sports facilities outside working hours;
- On-campus restaurant and cafeteria with democratic prices (discount on the daily menu);
- Flexible working hours within the 38-hour week;
- Teleworking possible after 1 year of service at the latest;
- Additional holiday for all staff between Christmas and New Year;
- 26 days holiday / year (then from 45 years: +1 day holiday every 5 years) from the 1st year of contract + 3 days / year dispensation from service offered by the department;
- Advantages and interesting offers thanks to the Benefits@work card (discounts, vouchers...) ;
- Entitlement to services offered by the 'Office Central d'Action Sociale et Culturelle de la Défense' (OCASC): among others holiday centres, discount on travel organised by the tour operator...;
- Possibility of benefiting from the nursery funded by Belgian Defence (subject to availability).

## Workplace

- Royal Military Academy, Avenue de la Renaissance 30, 1000 Brussels;
- Occasional travel abroad for scientific conferences, etc.

## Points of contact

- Concerning the research project: to Mr Geert De Cubber (geert.decubber@mil.be)
- Concerning the recruitment modalities: Mrs Helena Bruyninckx (erm-deao-rswo@mil.be )
- For more information about:
  - the Royal Military Academy, see http://www.rma.ac.be
  - the research cell 'Robotics & Autonomous Systems', see https://mecatron.rma.ac.be/

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