



Job offer  
Royal Military Academy - Patrimony



**Researcher (M/F/X) on AI for human-friendly drone control**  
Departement of Mechanics  
project "HADRON"  
Publication date: 16/05/2022

## Job description and associated tasks

In the framework of the study HADRON on the development of Artificial Intelligence approaches enabling human-friendly control for military drone operations, 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).

### 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 research cell 'Robotics & Autonomous Systems' (<https://mecatron.rma.ac.be/>) of the department of Mechanical Engineering of the Royal Military Academy and in close collaboration with the Belgian company SkyeBase (<https://skyebase.be/>). You conduct scientific research at university level on a project entitled 'HADRON' (Human-friendly Control & Artificial Intelligence for Military Drone Operations).

You work within a multi-national research team and in close collaboration with the Belgian Navy and LAND component and a commercial partner.

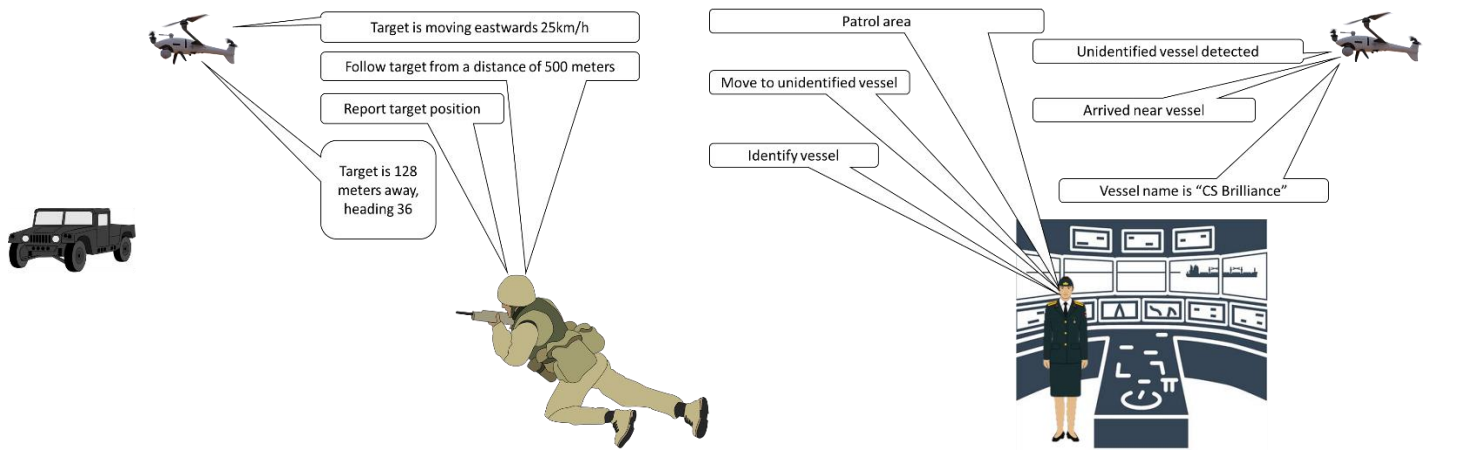
### Study:

The use of unmanned aerial systems or drones, also within Belgian Defence, is exploding in recent years. This poses challenges related to the training of the personnel able to operate these tools. It is the vision that in the future, defence organisations will evolve to a situation where any soldier is a drone operator and the drone becomes just one of the many tools in the toolkit of the individual soldier. However, in order to arrive to such a situation, there are still multiple obstacles to be tackled. One major problem is that both the control and the data interpretation of current advanced military drones are much too complicated to be handled by personnel that has not received an extensive training, whilst it is impossible (or not feasible) to organize such a training for each and every soldier. A solution to this problem would be the augmented use of autonomous capabilities, both for the vehicle control and for the data interpretation aspect.

The global objective of this study is to render the use of military drones easier for the military operator. This is to be achieved through the development of artificial intelligence (AI) capabilities assisting the human operator in controlling the drone and in processing the sensor data, thereby alleviating the need for extensive operator training.

Specific objectives of this study are to:

- Develop AI tools, allowing for safe and human-friendly control and navigation of drones. It is specifically *\*not\** the goal to develop totally autonomous capabilities, but to develop assistive tools & algorithms that enable:
  - a novice pilot to operate a drone safely and effectively
  - an expert pilot to operate multiple drones from a distance.
- Develop AI tools, assisting drone operators with semi-automated real-time data processing. The main goal here is to take the cognitive load on the human operator away from assessing large data streams towards assessing anomalies that have been detected automatically. Based on advice of COMOPSLAND and COMOPSNV, the focus of this study will be on reconnaissance and surveillance operations, in order to maximize the impact.



## Main Tasks

- Develop the operational and technical user requirements for the project, in close collaboration with the Belgian Navy and LAND component.
- Perform a literature and state-of-the-art study and develop use cases for the validation of the tools to be developed, based on the input of the Belgian Defence clients.
- Develop novel multi-modal control interfaces, allowing military personnel without extensive training to control drones for their standard operations.
- Develop a novel control interface, allowing expert military drone operators to control not only one but multiple drones at the same time
- Develop algorithms to select automatically the most relevant parts of the data gathered by drones and to transform this data into information by automatic data interpretation using artificial intelligence approaches.
- Develop training tools enabling Belgian Defence drone operators to work with the developments.
- It is possible to perform a PhD. in the framework of the research study. This is facultative and up to the choice of the applicant. Choosing to pursue a PhD. will add to the task list to follow courses imposed by the doctoral school and write & defend a PhD. thesis about the study.

## 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 AI algorithms on drones).

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

### Personal skills

- You will be working very closely together with the Belgian company SkyeBase and will come into contact with their company IP. The ability to work well in a team and to preserve confidentiality is therefore an absolute must, paired with a practical attitude and willingness to bring novel scientific innovations into practice.
- You conduct scientific research in an independent and upright way within a multidisciplinary environment
- You think in an innovative and creative way.
- You communicate your results in a clear, concise and precise manner.
- You take initiative.
- You improve the team-spirit and solve interpersonal conflicts.
- 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 and instructions.
- You are flexible for change and adapt yourself.
- You are capable of writing qualitative technical reports on your work
- 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 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:

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

to Mr Geert De Cubber ([geert.decubber@mil.be](mailto:geert.decubber@mil.be)) and to Mrs Helena BRUYNINCKX ([erm-deao-rsw@mil.be](mailto:erm-deao-rsw@mil.be)).

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

Application deadline: 10/07/2022.

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.

## Miscellaneous

### Contract

- Probable date of recruitment: 01/09/2022, 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 HADRON project (which ends on 31/08/2026).
- Wage scale: class A1 (holders of a Master's degree in Science) / class A2 (Ir ; holders of a Master's degree in Engineering).
- 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 ;
- Holidays:
  - 26 days holiday / year from the 1st year of contract (then from 45 years: +1 day holiday every 5 years)
  - + 3 extra days-off / year of “service dispensation” offered by the department
  - + 1 week OFF every year between Christmas and New year’s Eve (independent of the annual balance of holidays).
- 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](mailto:geert.decubber@mil.be))
- Concerning the recruitment modalities: Mrs Helena Bruyninckx ([erm-deao-rswo@mil.be](mailto: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/>