Job offer
Royal Military Academy - Patrimony

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

Job description and associated tasks

In the framework of the project SALERNO on the development of Autonomous Unmanned Vessels for Maritime Surveillance Operations, we are looking for a full-time researcher with a PhD. degree in Applied Sciences / Engineering / Physics / Computer Science / Informatics and experience in the field of Unmanned Maritime Systems. 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). 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 dotOcean (https://www.dotocean.eu/). You conduct scientific research at university level on a project entitled 'SALERNO' (Autonomous Unmanned Vessels for Maritime Surveillance Operations).

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

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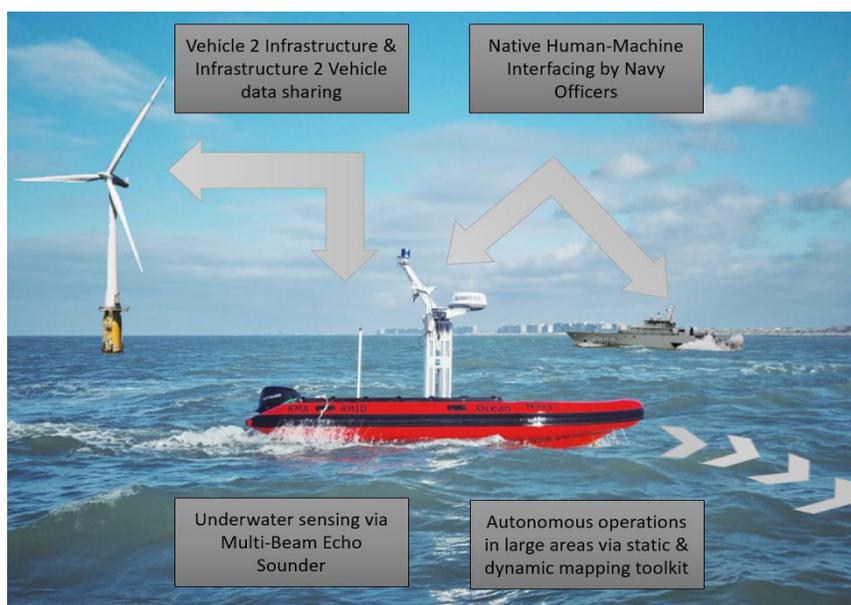
Study:

The maritime environment represents an essential and non-negligible part of the global economy. Therefore, ensuring surveillance and security at sea are significant operations for maritime law enforcement agencies, including Belgian Defence. However, the ocean's surface represents a vast area, which constitutes a problem for efficiently controlling the sea traffic. Performing operations of surveillance and patrolling with traditional techniques is near impossible from an economical and operational point of view. For that reason, Unmanned Maritime Systems (UMS) are designated as major assets to support maritime law enforcement agencies in expanding their monitoring capability. Indeed, autonomous systems capable of self-driving, sensing, and requiring less human intervention are technologies courted by Defence actors in order to increase efficiency. Many studies have attempted to enhance the autonomy of marine vessels, and progress has been made on this subject in recent years. However, the maritime environment is complex for unmanned systems due to the climatic conditions' rapid changes that strongly affect the navigation, and many challenges remain to be overcome.

The complex maritime environment characterized by vast areas, unpredictability, model complexity, and crowdedness, poses multiple constraints concerning the design and deployment of Autonomous Surface Vehicles (USV) for military operations. In order to investigate these aspects, a seaworthy USV has already been developed at RMA. It is intended to operate in a swarm for maritime surveillance applications like patrolling the offshore windmill parks. Within MarSur, the design & development of the vessel has been completed and first trials with respect to autonomous navigation of the vessel have been performed. These trials already show that more research is needed to come to a deployable solution that fits the Navy needs. In response to this observation, SALERNO will address the following activities & research domains:

1. Modular application-specific sensor payloads.
2. Perception, Mapping, AI & Autonomy, to increase the understanding of the environment.
3. Vehicle – to – infrastructure (V2I) and Infrastructure 2 Vehicle (I2V) communication & collaboration.
4. Human-Machine Interfacing and Command & Control.

The intended outcome of the project is to develop a highly autonomous USV that can detect threats above and below water. This will allow the Navy to perform surveillance operations over larger areas with limited personnel. In order to be fully in line with the needs of the Navy end user, the study will run in close collaboration with the Belgian Navy, who will provide expert advice on requirements, will facilitate the yearly field trials at the Zeebruges and the Lombardsijde bases and will act as end-user validators of the SALERNO system performance.

Main Tasks

- Develop the operational and technical user requirements for the project, in close collaboration with the Belgian Navy.
- Develop of a modular sensor payload architecture by integrating a multi-beam echo sounder
- Develop algorithms for long-term vehicle autonomy through the integration of multi-purpose sensors, enabling large area mapping and intelligent navigation capabilities
- Develop a V2I & I2V communication & collaboration framework
- Develop a human-friendly and efficient HMI for USV Command & Control

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Required skills

Technical skills

The applicant shall have a PhD. degree. Specific competencies sought are experience in the domain of perception, AI and autonomy, including multi-agent collaboration. 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 unmanned maritime systems).

- Experience in the development of unmanned maritime systems is required;
- Experience in robotics & AI is required;
- Experience in programming is required;
- Knowledge of deep learning algorithms is recommended.
- Knowledge of ROS (https://www.ros.org/) is recommended;
- Experience with complex software architectures assemblies, deployment and testing (e.g. Docker) is recommended
- Proficiency in technical documents production is recommended
- Training or experience in Control Engineering is recommended;
- Training or experience in Perception is recommended;
- Training or experience in Sensor integration is recommended;
- Training or experience in applied research and or design is an added value;
- Previous experience with EC / EDA project management is an added value for the position

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 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 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
- You will be working very closely together with the Belgian company dotOcean and may/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 commit yourself in your job by giving the best of your aptitudes in striving toward the highest quality standards and persevere when needed.

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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) and to Mrs Helena BRUYNINCKX (erm-deao-rswo@mil.be).

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 take this into consideration when performing the candidate selection.

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

Miscellaneous

Contract

- Probable date of recruitment: 1/1/2023, 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 SALERNO project (which ends on 31/05/2027).
- Wage scale: Wage scale: class A2 (holders of a doctor's degree). RMA applies a merit-based research career track, allowing researchers to advance in wage scale based upon annual evaluations.
- Holiday pay.

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Extra-legal benefits

- Possibility of receiving 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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