

**JOB OFFER**  
**Researcher in Sensing for Robotics (M/F/X)**  
**MECA > Robotics and Autonomous Systems**  
**Project GUIDED**  
**Publication: 05/11/2024**

## **CONTEXT**

The Royal Military Academy (RMA) is a military institution ([Homepage | RMA](#)) and is fully recognized as a university, fulfilling the same criteria as civilian universities. The RMA is also conducting scientific research at university level for projects funded by the Belgian Defence department or external sources.

In the framework of the DEFRA project GUIDED - Goggles-based User Interface for Detection of Explosive Devices, we are looking for a full-time researcher with a Master's or PhD degree in Engineering, Computer Sciences, Electrical Engineering or related disciplines.

We value diversity and equal opportunities. Whether you are a man, a woman or X, or come from any background, we firmly believe that diversity enriches our community, and we encourage all qualified candidates to apply.

## **PROJECT:**

You work within the department of Mechanics in the **Robotics and Autonomous Systems Lab** (<https://mecatron.rma.ac.be/>), of the Faculty of Applied Sciences of the RMA and in close collaboration with your colleagues of the RMA and the partners of the project. You conduct scientific research at university level on a project entitled "**GUIDED - Goggles-based User Interface for Detection of Explosive Devices**".

The **GUIDED** project focuses on helping Explosive Ordnance Disposal (EOD) operators by creating an augmented 3D reconstruction of the scene which provides useful context and 3D awareness during robot operation. The goal is to create a multi-spectral sensor TRL5 demonstrator that can be mounted on an EOD robot. We will develop advanced image processing software which can provide a real-time 3D overview of the scene. The operator can then more easily operate the robot from a third-person or birds-eye-view rather than having to rely on a single 2D camera view. By presenting an overview of the surrounding scene in Head-Mounted Displays, more commonly referred to as VR-goggles, the operator can more easily take in all the information and operate the robot in a more intuitive way. The information from multispectral cameras can provide interesting indicators to the operator which could be vital for successful disposal of improvised explosive devices. One of the challenges is that an operator can only monitor a limited set of spectra at the same time. Swapping between the different views can consume valuable time during operation and the associated cognitive load can distract the operator, potentially causing severe consequences. To reduce the cognitive load for the operator, we will use AI to localise regions in specific spectra which contain useful information that is not obvious from the visible spectrum. Inside the VR-interface, a user-friendly interface will combine the information from the predicted regions of interest and visually present them when the operator's attention is needed.

You will work within a research team and in close collaboration with other university and industrial partners.

#### MAIN TASKS:

- **Collaborate with End-Users:** Work directly with stakeholders to understand operational needs and refine requirements, ensuring solutions align with real-world applications.
- **Advanced Sensor Integration:** Evaluate and integrate diverse sensors (visible, NIR, SWIR, MWIR, lidar, radar) for multi-spectral capability in hazardous environments.
- **Algorithm Development & Optimization:** Design and refine algorithms for sensor fusion, real-time localization, and robust 3D mapping, enhancing reliability in complex scenarios.
- **Innovative 3D Reconstruction:** Research state-of-the-art 3D visualization techniques, enabling real-time rendering in VR and saliency detection for better anomaly identification.
- **Iterative Testing & User Feedback:** Implement feedback-driven development to refine performance, improve user adaptability, and deliver high-impact outcomes for key stakeholders.
- **Data Management Excellence:** Define and manage data and knowledge processes to support project goals and facilitate effective results.

#### SKILLS AND EXPERIENCE:

Degree(s) required / ideal degree(s): Master's Degree in Engineering Sciences, Computer Science, or a related field

This position is open for **junior profiles** (0-3 years of experience – thus, young graduates are also encouraged to apply) or **experienced profiles** (3+ years of experience).

#### “MUST HAVE” skills:

- Proven experience with (multi-spectral) sensor technology, e.g. visible, NIR, SWIR, MWIR, lidar, and radar. Ability to assess sensor performance and select appropriate sensors for specific application needs.
- Strong background in developing, testing, and optimizing algorithms for sensor fusion, localization, and mapping, with a focus on real-time operation and adaptability in dynamic or hazardous environments.
- Proficiency in dense 3D reconstruction techniques (e.g., NeRFs, Gaussian Splatting) and an understanding of their practical constraints.
- Proficiency in C++ and/or Python, with experience in relevant robotics or vision libraries (e.g., ROS2, OpenCV, PCL). Familiarity with software toolchains, version control, and collaborative development practices.

#### “NICE TO HAVE” skills:

- Exposure to VR environments and real-time 3D rendering, particularly for visualizing reconstructed scenes and salient regions.
- Knowledge of best practices in data capture, storage, and management, ensuring compatibility with project goals and robust knowledge transfer.
- Experience in setting up and conducting experiments with robotic platforms.
- Familiarity with creating and working with annotated datasets, e.g. for anomaly detection or using multi-spectral data.
- Exposure to cutting-edge research, with a record of adapting state-of-the-art findings into practical applications, especially in sensor integration, perception, or robotics.

Personal skills:

- You conduct independent and ethical scientific research in a multidisciplinary environment.
- You think creatively and innovatively.
- You communicate your results clearly, concisely, and precisely.
- You commit fully to your work, striving for the highest quality standards, and persevering when necessary.
- You will work closely with both industrial and academic partners, gaining insight into proprietary intellectual property, so maintaining confidentiality is essential.

Other skills:

- The applicant shall have good knowledge of English (oral / written).
- Minimum knowledge of French or Dutch is an added value for collaboration with peers.

## SPECIFIC REQUIREMENTS

- The researcher may be exposed to classified information 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 Belgian Defence.
- **Only applicants with a nationality of a country that is part of NATO OR the EU will be eligible.**
- Working for the Patrimony requires living in Belgium for the duration of the study.

## APPLICATION

Please send by email:

- a CV and motivation letter
- a scan of your ID card (both sides)

to Mr Geert DE CUBBER ([geert.de.cubber@mil.be](mailto:geert.de.cubber@mil.be)) and to [erm-deao-rsw@mil.be](mailto:erm-deao-rsw@mil.be)

Please mention clearly the reference of the project: **“GUIDED”**.

Application deadline: **26/11/2024**.

The interviews will take place on-line. The date and time of the interview will be communicated to the preselected candidates.

## CONTRACT

- Probable date of recruitment: **January 2025**, 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 note that your contract will be open-ended, but the financing of the contract will be tied to the funding project, which is guaranteed until the end of 2027. The financing of your contract beyond that period is therefore not 100% guaranteed. However, the Patrimony has a policy to keep the good elements on board and the research focus of this job offer fits within our core research activities, so there is a high chance that we will be able to offer you follow-up projects beyond that date if you decide to stay.
- Wage scale: class A1 (holder of a Master's degree in Science or equivalent), class A2 (holder of an Ir degree or equivalent Master's in Engineering Sciences, doctor's degree in the same area of expertise). RMA-Patrimony 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);
- Meal vouchers (6€ / day);
- 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 with allowance (2 days / week max);
- Holidays:
  - 29 days holiday / year from the 1st year of contract (then from 45 years: +1 day holiday every 5 years)
  - 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 to benefit from the nursery funded by Belgian Defence (subject to availability).

## WORKPLACE

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