

The departments of Applied Earth Sciences (AES) and Earth Observation Science (EOS) of the Faculty of Geo-Information Science and Earth Observation (ITC)/ University of Twente in Enschede, the Netherlands, have a vacancy for a PhD Candidate m/f, to work on a project entitled

## “Infrastructure monitoring and NaTech disaster response with drones and machine learning”

### Your challenge

The project is part of a large-scale research project funded through the Horizon Europe funding scheme of the European Commission, entitled “Hazard assessment and risk management of natural hazard-triggered Technological (NaTech) emergencies with cross-collaboration opportunities” (HARMONI). The project is led by IDENER (Spain) and has 13 participating organisations from 7 European countries.

The overall aim of HARMONI is to develop a platform for improved prevention, monitoring, and response to NaTech disasters, such as flooding or earthquakes that affect critical infrastructure installations. This will include a detailed assessment of existing methods to address such risks, and on how to achieve a better use and exchange of existing protocols and data. The project includes the use of Digital Twins to simulate cascading disaster effects, as well as satellite and sensor data, looking specifically at 6 different use cases across Europe. In addition to the detailed innovative analysis of existing methods and protocols, **ITC will focus on the monitoring and response parts**, building on many earlier projects revolving around the use of UAV/drones, computer vision and machine learning, change and damage detection, and multi-data integration, such as of UAV-based radar data, which one of the other project partners will acquire. One focus area will be on the role of **reinforcement learning**, also linking to ongoing collaboration with the German Aerospace Centre (DLR). The work builds specifically on earlier FP7 and Horizon 2020 projects (INACHUS, PANOPTIS and INGENIOUS - [www.inachus.eu](http://www.inachus.eu), <https://cordis.europa.eu/project/id/769129> and <https://ingenious-first-responders.eu/>).

It will be your responsibility to:

- lead the comprehensive review of existing infrastructure risk assessment and standard operating procedures, with special focus on NaTech situations;
- develop approaches for the use of UAV with different typologies (very small/simple devices, and drones with more/better sensors) to provide mapping and change detection of varied and complex infrastructure installations, including of interior spaces;
- to develop computer vision and deep/reinforcement learning approaches to combine and integrate imagery from the UAV, but also satellite imagery or data from other environmental sensors;
- work on scene understanding using RGB and possibly thermal and radar images, including based on object detection and semantic image segmentation;
- collaborate effectively with other technical partners who will work with UAV-based radar systems or on system integration and Digital Twins, and on the development of effective decision support systems;
- align with the work of partners from social science & humanities (SSH), such as on decision making or integration of existing human expertise into the technical systems;
- ensure that ITC's developments are appropriately tested and integrated into the HARMONI platform in different pilot experiments.

### Your profile

We are looking for a creative and motivated candidate. You should:

- have an MSc degree, obtained no more than 5 years ago, related to geoinformatics or robotics, with **strong expertise in computer vision and deep/reinforcement learning, and very good programming skills**.
- possess excellent communication skills and a strong command of the English language;
- be at ease engaging with scientists from different fields (engineering, robotics, ICT, SSH, etc.) and cultures, to maximise the results from this research;

- have very good analytical and writing skills;
- Publishing in the peer-reviewed literature will form the basis for the PhD thesis; thus, relevant prior publication experience will be an asset;
- Also prior expertise in disaster risk management, as well as in UAV technology, will be an advantage.

The project is shared between ITC's AES and EOS departments, and requires occasional work in the field (6 field demos are foreseen, and part of the job is to plan and participate in those), and independent participation in project meetings, conferences or teleconferences may be necessary.

### Our offer

We offer you an inspiring multidisciplinary and challenging international and academic environment. The university offers a dynamic ecosystem with enthusiastic colleagues in which internationalization is an important part of the strategic agenda.

You will be fulltime employed for four years. Salary and conditions will be in accordance with the Collective Labour Agreement (CAO-NU) of Dutch Universities. We offer:

- a full-time position for four years with a qualifier examination after 6 – 9 months;
- a professional and personal development programme within Twente Graduate School;
- a gross monthly salary of € 3,059.00 in the first year, which increases to € 3,881.00 in the fourth year;
- a holiday allowance of 8% of the gross annual salary and a year-end bonus of 8.3%;
- excellent research support and facilities for professional and personal development;
- a total of 41 holiday days per year in the case of full-time employment;
- a solid pension scheme;
- excellent working conditions, an exciting scientific environment, and a lively green campus.

For more information, you can contact **Prof. Dr. Norman Kerle** ([n.kerle@utwente.nl](mailto:n.kerle@utwente.nl)) or **Prof. Dr. Francesco Nex** ([f.nex@utwente.nl](mailto:f.nex@utwente.nl)). You are also invited to visit [our homepage](#).

**Please submit your application by 1 October 2025** via the UT vacancy website (<https://utwentecareers.nl/en/vacancies/>), including:

- a motivation letter (maximum 2 pages A4) emphasising your specific interest, qualifications, and motivations to apply for this position.
- a detailed Curriculum Vitae.

The **project will begin on 1 January 2026**, and we would like you to start working as soon as possible to have time to prepare before the project starts. Only applicants who are available to start at short notice will be considered.

### Committee members

Prof. Dr. N. Kerle ([n.kerle@utwente.nl](mailto:n.kerle@utwente.nl))

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