DeSyT-2025 (International workshop on Detection Systems and Techniques for fundamental and applied physics)

Contribution ID: 2

Type: not specified

ROVERLAB: design and development of a ground drone for environmental radioactivity monitoring and field data acquisition

Wednesday, 26 February 2025 15:20 (20 minutes)

This research focuses on the design, development, and deployment of an innovative ground drone, RoverLab, designed for monitoring environmental radioactivity with a particular emphasis on detecting hotspots and radiometric anomalies. The RoverLab system was conceived to improve the safety and accuracy of radiometric control procedures conducted by the Regional Agency for Environmental Protection of Calabria (ARPACAL), particularly in high-risk environments such as landfills, waste treatment and management facilities, and former or active industrial sites where the illegal disposal of radioactive waste or orphan sources is suspected. The RoverLab system integrates:

• advanced radiometric sensors, adhering to geometric efficiency principles, utilizing a polystyrene plastic scintillator with dimensions of 15 cm \times 25 cm \times 2 cm;

• environmental monitoring sensors, capable of measuring temperature, pressure, and humidity;

• real-time video transmission capability, through an integrated camera that facilitates site inspection and remote navigation of the rover;

• georeferenced mapping technology, enabling precise localization of measurement points;

• a centralized control unit, which manages data acquisition and provides an operational interface through a dedicated software platform.

The project involved the development of a control and management software suite that integrates advanced signal analysis, mapping, environmental sensors, and AI, creating a unified system to support decision-making and activity management.

For practitioners in the field of radiometric monitoring, RoverLab offers a novel, cost-effective and efficient radiation monitoring solution, making it ideal for radiometric monitoring in critical, real-world scenarios.

Primary author: Prof. MASTROBERARDINO, Anna (University of Calabria and INFN Cosenza)

Co-authors: Dr GALLO, Alessandro (ETHOSLAB s.r.l. Ricerca e Sviluppo); Dr TALARICO, Filomena (ETHOSLAB s.r.l. Ricerca e Sviluppo); Dr MARCHESE, Rocco (Arpa Basilicata); Dr FREGOLA, Salvatore (ETHOSLAB s.r.l. Ricerca e Sviluppo); Dr PROCOPIO, Salvatore (Arpa Calabria)

Presenter: Prof. MASTROBERARDINO, Anna (University of Calabria and INFN Cosenza)

Session Classification: Day 3 - Session 3