

ARTIFICIAL INTELLIGENCE

DM630 UNIAQ/RADIOLABS - Integration of AI, automation and ICT technologies for application and testing of GNSS-based geolocation systems

Funded By	Università degli Studi dell'Aquila [Piva/CF:01021630668] MINISTERO DELL'UNIVERSITA' E DELLA RICERCA [Piva/CF:97429780584] Consorzio Radiolabs [Piva/CF:06428501008]
Supervisor	DI CARLO STEFANO - stefano.dicarlo@polito.it
Contact	D'INNOCENZO ALESSANDRO - alessandro.dinnocenzo@polito.it
Context of the research activity	<p>The topic of this grant focuses on the integration of artificial intelligence, automation and ICT technologies for application and testing of GNSS-based geolocation systems. The research activities will benefit from a long-term collaboration with Radiolabs, with expected periods of exchange of visits at the L'Aquila headquarters, as part of the ESA-funded P-CAR project (http://www.radiolabs.it/p-car/), focused on the creation of a laboratory for the testing and validation of Connected Autonomous Driving functions.</p> <p>Progetto finanziato dal PNRR a valere sul DM 630/2024 - CUP: E14D24002330004</p>
Objectives	<p>In line with the objectives of the P-CAR project (ESA NAVISP-3), the activity at the company consists of the exploratory investigation and implementation development of advanced AI/ML techniques for the testing and validation of driving functions connected and automated and intelligent roads.</p> <p>Using the implementation resources (HW/SW) available at the host industrial partner, the activity will focus mainly on the integration of an analysis platform, equipped with a set of AI/ML algorithms and aimed at achieving the following objectives:</p> <ul style="list-style-type: none">- estimate the class to which the PVT measurements belong (in terms, for example, of sensor fault detection and/or inaccuracies, processing bugs, noisy channel, etc.);- statistically model the PVT error using appropriate stochastic processes, considering (i) the PVT measurements output from the GNSS receiver and (ii) the output measurements from the Data Fusion Processor. In this regard, the platform must be designed considering the most innovative augmentation services as well as the entire on-board equipment including sensors such as

radar, cameras, V2X communications, IMU, etc.

The developed platform will allow the analytical evaluation of the safety level of the system under test, providing the possibility of detecting and observing the presence of rare events thanks to the application of importance sampling and OED (Optimal Experimental Design) techniques. More generally, the work will focus on the possibility of exploiting the advantages of the use of artificial intelligence algorithms applied to the heterogeneous context of intelligent and connected transport systems with particular attention to the context of safety integrity and performance analysis for connected and automated driving functions.

**Skills and
competencies
for the
development of
the activity**

Due to the interdisciplinary nature of this PhD project, the ideal candidate should have a strong background in Mathematics and in at least one of the following disciplines:

1. Machine learning and Control Theory
2. GNSS-based geolocation systems

The ideal candidate is expected to have the willingness to improve her/his knowledge in the aforementioned disciplines.

A good knowledge of Python and/or MATLAB programming languages is also expected.