POLITECNICO DI MILANO

PhD in SCIENCE, TECHNOLOGY AND POLICY FOR SUSTAINABLE CHANGE - 38th cycle

THEMATIC Research Field: PRECISE POSITIONING IN REAL TIME BY HYBRIDIZING GNSS AND 5G¿

Monthly net income of PhDscholarship (max 36 months)
€ 1300.0 In case of a change of the welfare rates or of changes of the scholarship minimum amount from the Ministry of University and Reasearch, during the three-year period, the amount could be modified.

Context of the research activity	
Motivation and objectives of the research in this field	The objective of the PhD program is the study, the implementation and the experimentation of positioning and navigation methods in real time with an improved accuracy with respect to the present standards. This will be explored by the joint exploitation of GNSS, the state-of-the-art technology for positioning applications, and 5G, the future of communication networks, with the aim of overcoming the limits and enhancing the advantages that characterize the two technologies taken individually. A specific focus will be given to precise positioning and navigation in urban scenario. This objective significantly contributes to the new idea of smart cities: just to mention one example, it helps the development of techniques for autonomous navigation of vehicles, even unmanned, both individual and for fleets. A collaboration on this topic with ESA-ESTEC is already active and will be furtherly deepened during the PhD program. On the same topic, a contract under the ESA NAVISP program involves the research director.
Methods and techniques that will be developed and used to carry out the research	State of the art GNSS algorithms will be adopted and their integration with 5G signals will be studied for positioning purposes: the study will concern both the presently available and the planned for future 5G signals. Software will be developed, at a first level to simulate scenarios, then to process data.

	Computational tools and coding languages: GNSS software, both commercial and academic (Bernese GNSS SW 5.2), Matlab, Python, C/C++
Educational objectives	The doctoral program offers advanced training organized in three pillars: - Basic Research, which includes methodological courses related to key aspects of theoretical and applied research in science, policy, and technology of sustainable change; - Specific Research, designed to strengthen candidates' knowledge on specific topics aligned with their research interests and increase their presence in the international scientific community through participation in conferences and presentation of their scientific work in academic contexts. - Development of the Doctoral Thesis, which allows candidates to develop leading-edge research competencies and produce original scientific work on atopic that contributes to scientific debate and has societal impacts. A period of study in worldwide most recognized research institutions is supported by the doctoral school and the supervisor.
Job opportunities	Specifically, industries and agencies involved in georeferencing and navigation problems and applications; more generally, industries and agencies involved geospatial information. Academic career.
Composition of the research group	1 Full Professors 3 Associated Professors 2 Assistant Professors 0 PhD Students
Name of the research directors	Prof Ludovico Giorgio Aldo Biagi

Contacts
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Additional support - Financial aid per PhD student per year (gross amount)	
Housing - Foreign Students	--
Housing - Out-of-town residents (more than 80Km out of Milano)	--

Scholarship Increase for a period abroad	
Amount monthly	650.0 €
By number of months	6

Additional information: educational activity, teaching assistantship, computer availability, desk availability, any other information
A desk in the lab offices and computing facilities and dedicated software will be provided over the duration of the PhD programme. Teaching assistantship opportunities might be available over the triennium.