



PhD in INGEGNERIA MECCANICA / MECHANICAL ENGINEERING - 38th cycle

Research Area n. 3 - Engineering Design and Manufacturing for the Industry of the Future

PNRR_352 Research Field: ROBOTICS APPLIED TO THE WORLD OF UTILITIES

Monthly net income of PhDscholarship (max 36 months)

€ 1400.0

In case of a change of the welfare rates during the three-year period, the amount could be modified.

Context of the research activity

Motivation and objectives of the research in this field

Robotics is conquering increasingly diversified application sectors. The world of utilities still represents a challenge for robotics as it is characterized by countless applications that cannot be satisfied by a single robotic platform as well as by a considerable variability of operating conditions. The challenge therefore consists in the development of a platform (possibly hybrid, both mobile, flying and multi-legged) as transversal as possible and as adaptable as possible. The objectives of the research are therefore:

- evaluation of the different applications typical of the world of utilities;
- definition of the characteristics of a robotic platform that can satisfy most of the applications identified;
- development of a control logic that can adapt to different scenarios without compromising performance in terms of costs and intervention times;
- field testing of the main scenarios identified;

This research is coherent with missions M2C2: ENERGIA RINNOVABILE, IDROGENO, RETE E MOBILITÀ SOSTENIBILE and M4C2: DALLA RICERCA ALL'IMPRESA of PNRR.



<p>Methods and techniques that will be developed and used to carry out the research</p>	<p>The research will develop hybrid and multi-platform robotic design techniques capable of facing the main challenges posed by utility companies (from field inspections to waste separation, to humanoid robotics at the service of the cities of the future) as well as adaptive control logics to ensure adequate performance in different application scenarios. Field tests will also be carried out in order to verify the effectiveness of the platforms and of the developed logic.</p>
<p>Educational objectives</p>	<p>The candidate will gain expertise in the field of robotic design as well as adaptive and robust control logics. The research activity can be broken down into the following steps: definition of design criteria and requirements, design and construction of a hybrid multiplatform robot, adaptive and robust control design, outdoor testing.</p>
<p>Job opportunities</p>	<p>The main job opportunity is within A2A. However, the acquired competences will allow the candidate to be employed by companies in the field of robotics, mobility, aerospace, civil engineering, etc. Moreover, also an academic career can be pursued after this PhD. Our last survey on MeccPhD Doctorates highlighted a 100% employment rate within the first year and a 35% higher salary, compared to Master of Science holders in the same field.</p>
<p>Composition of the research group</p>	<p>1 Full Professors 1 Associated Professors 3 Assistant Professors 4 PhD Students</p>
<p>Name of the research directors</p>	<p>Prof. Francesco Braghin</p>

<p style="text-align: center;">Contacts</p>	
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<p style="text-align: center;">Additional support - Financial aid per PhD student per year (gross amount)</p>	
<p>Housing - Foreign Students</p>	<p style="text-align: center;">--</p>
<p>Housing - Out-of-town residents (more than 80Km out of Milano)</p>	<p style="text-align: center;">--</p>



Scholarship Increase for a period abroad	
Amount monthly	700.0 €
By number of months	6

National Operational Program for Research and Innovation	
Company where the candidate will attend the stage (name and brief description)	A2A S.p.A.
By number of months at the company	6
Institution or company where the candidate will spend the period abroad (name and brief description)	German Aerospace Center (DLR)
By number of months abroad	6

Additional information: educational activity, teaching assistantship, computer availability, desk availability, any other information
<p>Financial aid is available for all PhD candidates (purchase of study books and materials, funding for participation in courses, summer schools, workshops and conferences) for a total amount of euro 5.707, 13.</p> <p>Teaching assistantship: availability of funding in recognition of supporting teaching activities by the PhD candidate. There are various forms of financial aid for activities of support to the teaching practice. The PhD student is encouraged to take part in these activities, within the limits allowed by the regulations.</p>