



# PhD in INGEGNERIA DELL'INFORMAZIONE / INFORMATION TECHNOLOGY - 39th cycle

Research Area n. 3 - Systems and Control

**PNRR 117 Research Field: DEVELOPMENT OF A SEMI-AUTONOMOUS VEHICLE FOR  
OPTIMIZATION OF ELECTRIC MAAS**

**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**

The Mobility As A Service is the new paradigm that will revolutionize personal mobility models. It will be constituted mainly by electric vehicles, that fit perfectly (for the range, the easy of use, the recharge models, etc.) with this mobility model. However, the full-scale development and deployment of mass-market MAAS will require the ability of the shared cars to reconfigure their position autonomously, and to reach the customer un-manned. This technology must be developed with a focus on the specific features of the city layout, topology and circulation rules. The objective of the research is to develop a working prototype of an autonomous un-manned car capable of reconfiguring autonomously its position within the city (to reach a customer; to reach a charging station, etc.)

**Methods and techniques that will be developed and used to carry out the research**

- Review and assessment of the reference literature and available design/experimental data.
- Development of control strategies and algorithms.
- Validation of different case studies in simulation.
- Elaboration of Papers/Articles to be published in the appropriate Journals.

**Educational objectives**

- Knowledge and understanding. The Ph.D. candidate will learn the principles of vehicle dynamics and control of



|                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                          | <p>autonomous vehicles.</p> <ul style="list-style-type: none"> <li>- Applying knowledge and understanding. The Ph.D. candidate will be able to apply autonomous-vehicles control systems to different case studies.</li> <li>- Critical assessments. The Ph.D. candidate will learn how to identify crucial aspect of autonomous cars.</li> <li>- Communication: the PhD Candidate will learn how to communicate the results of the Ph.D. research presenting results analysis in a scientific context and policy brief to decision-makers.</li> </ul> |
| <b>Job opportunities</b>                 | This research activity will qualify the candidate for future academic and research positions, as well as for a highly qualified professional career in industries or organizations.                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Composition of the research group</b> | 0 Full Professors<br>3 Associated Professors<br>0 Assistant Professors<br>30 PhD Students                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Name of the research directors</b>    | Proff. Savaresi; Corno; Panzani                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |

| <b>Contacts</b>                                                                                           |  |
|-----------------------------------------------------------------------------------------------------------|--|
| E-mail: Sergio.savaresi@polimi.it;<br>E-mail: matteo.corno@polimi.it;<br>E-mail: giulio.panzani@polimi.it |  |

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

| <b>Scholarship Increase for a period abroad</b> |         |
|-------------------------------------------------|---------|
| <b>Amount monthly</b>                           | 700.0 € |
| <b>By number of months</b>                      | 6       |

| <b>National Operational Program for Research and Innovation</b>                                             |                       |
|-------------------------------------------------------------------------------------------------------------|-----------------------|
| <b>Company where the candidate will attend the stage (name and brief description)</b>                       | A2A S.p.A.            |
| <b>By number of months at the company</b>                                                                   | 6                     |
| <b>Institution or company where the candidate will spend the period abroad (name and brief description)</b> | Ohio State University |
| <b>By number of months abroad</b>                                                                           | 6                     |



**Additional information: educational activity, teaching assistantship, computer availability, desk availability, any other information**

EDUCATIONAL ACTIVITIES (purchase of study books and material, including computers, funding for participation in courses, summer schools, workshops and conferences): financial aid per PhD student.

TEACHING ASSISTANTSHIP: availability of funding in recognition of supporting teaching activities by the PhD student.

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.

COMPUTER AVAILABILITY: individual use.

DESK AVAILABILITY: individual use