



**UNIVERSITÀ
DI TRENTO**

**Department of
Information Engineering and Computer Science**

**Università degli Studi di Trento
Dipartimento di Ingegneria e Scienza dell'Informazione**

Scholarship reference	D-Elixe SRL
Company	ELIXE SRL, Via dell'Ora del Garda 99, 38121 Trento
Type of Scholarship	Professional Training
Title of Scholarship	Control system for a magnetic robot for coating steel surfaces such as inside pipes or vertical surfaces of ships and tanks.
Industrial Tutor	ALESSANDRO CONDINI - a.condini@elixe.com
Academic Supervisor	LUIGI PALOPOLI - luigi.palopoli@unitn.it

Short Description of Internship and Thesis Activities and Expected Outcome:

MPR srl and ELIXE srl are mechanical companies that study and manufacture machines for applying a polymeric coating for metals inside pipes and cylinders, operating in domestic and foreign markets.

Within the field of metal protection, robotic applications have developed mainly in surface cleaning and internal vision of pipes. Automation in the application of painting is still a little-studied field. Artificial intelligence still needs to be addressed.

In the realization of remote systems that apply protective paint, there are two areas in which MPR is interested in studying new solutions: 1) inside tubes even of small diameter (up to 40mm) and 2) on large vertical surfaces such as ships or tanks.

In both cases, it is necessary to define a system that analyzes the surface to determine the level of cleanliness and suitability for the application of the paint, then applies the paint, and finally verifies the quality of the protective coating.

The system must be autonomous based on existing magnetic robots. Still, it must be scaled and adapted to be battery-powered, equipped with a motor for moving, a vision system, and a tank connected to the paint dispenser. The process must be controlled to make the processing and the return to the charging and resting station.

The company can supply the mechanical part while the electronics and software architecture must be defined. Coordinating a mechanical study for the actuating device would also be interesting to optimize the weight and dimensions.

Required Candidate Skills and Prerequisites:

The candidate should be a student in the AIS Master, who is taking the intelligent robot specialization. He/she should have a good background in robotics from the previous education levels, or includes at least the following courses: 1. Introduction to robotics, 2. Robot Planning and its applications, 3. Optimisation and learning for robot control.

Moreover, the candidate will have to deal with the vision and control system of the machining operations together with the movement of the machine. A certain practicality is required to contribute to the execution of the electronics and the realization of the mechanics.



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