Master student's work placement offer

Development of navigation solutions independent of GPS and 5G on the TAUR300 robotic platform

Key words: polarization pattern, polarized camera, mobile robotics, field robotics, bioinspiration, GPS-denied navigation.

This internship is part of the **CarBot** project. It aims to establish initial collaboration between the Institut des Sciences du Mouvement (joint research unit: Aix Marseille University/CNRS, ISM UMR7287)[1] in Marseille and TAUR Robotic[2] in Lyon, France. This project will involve estimating the position of the sun from the skylight polarization pattern in various visible spectral bands (RGB) for navigation purposes. Studies have shown that certain animals, such as insects like ants, use the skylight polarization pattern for heading detection to home or follow a route. Off-the-shelf and waterproof polarized cameras are now available for outdoor robotic experiments (Fig. 1a). This kind of camera is relevant to fit a robotic platform to robotize it (Fig. 1b) and navigate in GPS-denied environments because polarized patterns computation is embedded directly on board it. The first task of this internship will be to integrate our polarimetric camera fitted with a fish-eye lens on board the robotic platform TAUR300 in order to access all available visual information (each RGB pattern: intensity, angle of polarization, degree of polarization). The second task will be to test the robotic platform tested in real scenario in outdoor conditions by rolling around our building, firstly in open-loop by remotely controlling it, secondly in closed-loop. A GPS-RTK (Global Positioning System - Real-Time Kinematic) receiver will be also mounted on board the robotic platform for ground truth data acquisition for tracking it outdoors.



Figure 1. (a) LUCID Vision Labs Triton™ TRI050S1-QC color polarimetric camera, Sony IMX264MYR, 5.0 MP equipped with a fish-eye lens. (b) TAUR300 robotic platform, size: 150x95 cm.

Duration: 5~6 months from March to August 2026
Address: Institut des Sciences du Mouvement – Etienne-Jules Marey, Systèmes Bio-Inspirés Team, 163 Avenue de Luminy, 13009 Marseille, France (South of France). At the heart of the Calanques National Park of Marseille.

Net gratuity: €630 per month (regulatory minimum set at €4.50 per hour in 2026 in France)

Profile required:
Engineering school or specialized master's degree
Knowledge of control engineering, electrical engineering, analogue electronics and image processing,
Taste for robotic experimentation,
Listening and teamworking,
Python programming
Knowledge of OpenCV and Machine vision toolboxes for Python would be a plus
Good level of English

Please send a CV, covering letter and Master's transcripts to:
Supervision:
Prof. Julien Serres, University Professor AMU, ISM, https://serres-lab.com/

Application to be sent to: julien.serres@univ-amu.fr

[1] https://ism.univ-amu.fr/
[2] https://www.linkedin.com/company/taur-robotique/