Internship: **Multi-instrumentation for pose estimation of UAVs**

Keywords: Pose estimation, GPS, LIDAR, visual œdometry
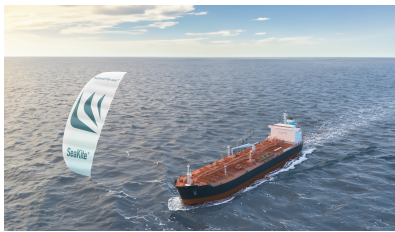
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Duration: 6 months

Context

This offer is part of the ESKIF project, funded by the ANR and lead by J.-E. Dufour at the Institut Clément Ader, in collaboration with the University of Montpellier and the company Beyond the Sea.

The goal of this project is to develop algorithms and methods to analyze in situ deformations of kite wings installed on boats using the capabilities of unmanned aerial vehicles (UAV) and digital image processing techniques. Such an effort would greatly improve the understanding of the mechanics of wind-based propulsion by providing experimental data regarding the behavior of such flexible structures in real conditions. This project aims to use a drone to move a camera close to the kite itself to obtain well resolved kinematic fields, which in turn will provide important mechanical information about the state of the wing.

Work package

The internship will take place within the Pose Estimation workpackage of the project and will focus on the estimation of the drone position and orientation with respect to a reference frame using a multi-instrumented setup. By using multiple sources of informations such as GPS, LIDAR or visual œdometry, the candidate will aim to show the faisability of such positioning on-shore and to quantify the associated uncertainties during flight. To do so, several experiments will be conducted with multi-instrumented drones. Measured quantities will then be analyzed using post-processing algorithms to be developped during the internship.

Environment

The work will be conducted at the Institut Clément Ader, in Toulouse. Experiments regarding the wing will take place in the facility of the University of Montpellier at the Laboratoire de Mécanique et Génie Civil (LMGC). The intership will be directed by J-E Dufour and a post-doctoral researcher from the project.

Required skills

The candidate must own or follow a Master degree in a field relevant to the project (mechanics, robotics, electronics, computer vision...). We are seeking for an higly motivated individual interested in working on an original project, solid analytical skills and independance. Strong communication skills both written and verbal (at least in English) will be essential for the collaboration in a multi-disciplinary environment. Proficiency with the relevant software tools (Python, C and the relevant libraries) would be a great addition.

In order to apply for this position, please send a CV and a motivation letter to **john-eric.dufour@insa-toulouse.fr**