

Research Grants for PhD students from the China Scholarship Council

Information Form (please read the guidelines carefully on the website www-csc.utt.fr)

Supervisor's name : Given names :

Status (prof., assistant prof., ...) :

Laboratory : Website address :

Institution : Website address :

Scientific competence of the supervisor:

Pedro Castillo is the Deputy Head of the SyRI research team and the responsible of the Drones activities at Heudiasyc. He received the Best Ph.D. Thesis of Automatic Control Award from club EEA in 2005. In 2014, he obtained his HDR from the University of Technology of Compiègne. He has held a visiting position at the LAFMIA UMI CNRS 3175 CINVESTAV -IPN, from 12/2012 to 11/2014. His research topics cover: non-linear dynamics and control, aerospace vehicles, vision and underactuated mechanical systems, real-time control applications. He has published 2 books, 39 international journal papers and more than 70 international conference papers.

Two major publications in the field proposed for the PhD :

1.
2.

Website address of the personal page :

Supervisor's email :

Description of the research work proposed for a PhD **Topic # (see list) :**

Title :

Subject :

Fleets of drones are powerful autonomous and collaborative systems that can accomplish complex missions such as surveillance, monitoring, target tracking and simultaneously support multimedia communications. For achieving this, drones are equipped with communications facilities, such as WiFi transceivers, which allow them to communicate for exchanging position and control information. However, these communication facilities may experience loss of data and low quality data exchange, which lead to system instability, crashing the drones and compromising the mission. Another major issue is represented by the low autonomy of drone batteries, which typically allow a drone to fly for a few tens of minutes and then require to return to a station for recharging. As a remedy, drones have started to be equipped with solar cells that allow recharging while flying. However, the angle by which the drone receives solar beams on the cells may greatly influence the amount of energy received. Therefore, it is really important to control the flight of the drone so to offer the best angle for recharging. In this Ph.D. Thesis, we propose to study the new resulting complex control problems, which should be suitably integrated with new optimization models and algorithms for managing the missions of the drone fleets, while tackling location uncertainty and its impact on accurate flight and solar recharge.

Keywords :

Expected collaborations :

- 1) Prof. L. Chiaraviglio, Department of Electronic Engineering, University of Rome Tor Vergata (Rome, Italy)
- 2) Prof. Enrico Natalizio, Lorraine Research Laboratory in Computer Science and its Applications (LORIA, UMR 7503) and Université de Lorraine (Nancy, France)

Background required from the applicant :

We are looking for highly motivated, proactive candidates, who will be fully involved in the project and in the international research activities of the project proposers and will be integrated in the academic life of the Laboratory Heudiasyc. Candidate's profile: 1) knowledge of control and optimization theory and applications; 2) good programming skills (C++, Java or Python; knowledge of Matlab is appreciated); 3) proficiency in English; 4) good communications skills. Knowledge of Robotics, in particular aerial vehicles, is strongly appreciated.

Existence of a PDF file detailing the proposal ("yes" or "no") :

(see guidelines on the website www-csc.utt.fr)