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Open Invited Track on Mini-Unmanned Aerial Vehicles Demonstrators

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Abstract:

The use of Unmanned Aerial Vehicles (mini-drones and micro-drones) has known for several years a growing success in a large variety of applications such as infrastructure surveillance, inspection, search and rescue missions, security, mapping, shooting reports. Yet UAVs remain the object of a wide spectrum of research activities, that ranges from innovative designs and flight control to fleets of cooperating systems.

The proposed Open Invited Track aims at showcasing scientific contributions on UAVs, in a dedicated flying arena equipped with a motion capture system.

IFAC Technical Committee for evaluation:

TC 7.3. Aerospace

TC 4.3. Robotics

Detailed description:

In the UAV Demonstrator Open Invited Track, an emphasis is made on demonstrations through:

- Demonstrations of new aerial robots
- Cooperation of aerial vehicles
- Choreography showing new methodologies/technologies
- Demonstrations of applications using UAV

Scientific fields and topics of interest include but are not limited to:

- Design and modelling
- Control
- Navigation
- Flapping wings
- Path planning and trajectory tracking
- Fault-tolerant control
- UAV swarms, formation flight
- Localization
- Sense and avoidance
- Bio-inspired UAVs
- Vision-based sensing
- Failsafe systems

This is an outstanding opportunity for worldwide technology showcase on unmanned aerial vehicles applications. This is also the opportunity to meet world experts and researchers in the domain.

Associated scientific demonstrator papers will have the same status as any other IFAC 2017 contribution. A specific international scientific committee will be in charge of evaluation of these contributions.

They can be submitted as “contributed paper” or “contributed extended abstract”. Papers that fall in the demonstrator category will be presented in dedicated sessions.

If you intend to bring your demonstrator device to the world congress, please provide an additional document describing your technical specifications that will be examined by the organizers of the Open Invited Track.

You can also contact us: demonstrators@ifac2017.org

Indoor UAVs demonstration facility:

UAV demonstrations will take place in a 6x6x6 m flying arena equipped with a motion capture system. The arena will be installed in a sport hall (see Figure 1) and will be surrounded by a protecting net. The floor will be made of soft foam mattresses to avoid damages in cases of unexpected strong landings.

Some objects can be put within the arena on demand, e.g. a table to take-off and land, obstacles to avoid or openings to fly through: do not hesitate to ask for specific accessories you would like to have for your demonstration.

The motion capture system is an [Optitrack](#) system, which provides 3D positioning information at 200 Hz of any system equipped with a set of four reflective spheres located within the arena. The positioning information will be provided according to a simple protocol via an Ethernet cable on a table located close to the arena, and also through a dedicated Wifi network.

Demonstrations in front of the conference public will take place on Friday July the 14th. Access to the arena and its infrastructure will be provided the day before, for calibration, tuning and rehearsals.



Figure 1: The flying arena will be installed in a Sport Hall

Organizers

Isabelle Fantoni is a researcher at Heudiasyc laboratory, University of Technology of Compiègne, in France, employed by the French National Foundation for Scientific Research (CNRS) since October 2011 and CNRS Research Director since October 2013. She is the head of the research group Automation, Embedded Systems and Robotics at Heudiasyc Laboratory since 2014. She has been the co-animator of the national French working group on UAVs in the GdR MACS and Robotics between 2007 and 2014.

Her research interests include non-linear control, modelling and control for Unmanned Aerial Vehicles (UAVs), fault-tolerant control for UAVs, vision for navigation of aerial vehicles, cooperation of UAVs, heterogeneous robotic systems in cooperation.

Simon Lacroix is a research scientist at LAAS/CNRS, where he animates the field robotics activities. He was mainly involved in planetary robotics during the 90's, and has initiated aerial robotics activities in the lab in the beginning of the 2000's. Since then, his research is focused on the deployment of teams of multiple heterogeneous autonomous robots for exploration, surveillance or intervention missions. His main interests originally concerned perception and navigation for

autonomous aerial and terrestrial robots (environment perception and modeling, localisation, perception control and autonomous navigation strategies), and have evolved towards decisional processes required by the cooperation within multi-robot teams.

Angela Schoellig is an Assistant Professor at the University of Toronto Institute for Aerospace Studies (UTIAS) and heads the Dynamic Systems Lab. She is also an Associate Director of the newly founded Center for Aerial Robotics Research and Education (CARRE) at the University of Toronto. With her team, she conducts research at the interface of robotics, controls and machine learning. Her goal is to enhance the performance and autonomy of robots by enabling them to learn from past experiments and from each other. Angela has been working with aerial vehicles for the past six years and, more recently, has applied her motion planning, control and learning algorithms to large, outdoor ground vehicles.