UNIVERSITÀ DEGLI STUDI DI NAPOLI FEDERICO II
DIPARTIMENTO DI INGEGNERIA ELETTRICA E TECNOLOGIE DELL'INFORMAZIONE
PROF. VINCENZO LIPPIELLO

SEMINAR ANNOUNCEMENT

WHO: **DR. MARTIN SASKA**
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WHAT: **Groups of autonomous micro aerial vehicles cooperating in real-world conditions: from theory to swarm applications**

WHEN: **Tuesday, 15 October 2019, 10:30–12:30**

WHERE: Via Claudio 21, Bldg 3/a, Aula Softel, I floor

Abstract — Large teams of Micro Aerial Vehicles (MAVs) deployed in real-world (outdoor and indoor) environments without precise external localization or motion capture systems will be presented in this talk. The latest results of our endeavor towards fully autonomous compact flocks of MAVs with onboard artificial intelligence, which was achieved by the Multi-robot Systems group at the Czech Technical University in Prague together with Vijay Kumar Lab at the University of Pennsylvania, will be shown.
Stabilization, control, and motion planning techniques for steering swarms and formations of unmanned MAVs will be discussed. I shall focus on biologically inspired techniques that integrate swarming abilities of individual particles with a Model Predictive Control (MPC) methodology respecting the fast dynamics of unmanned quadrotors. Besides the basic principles of formation flying and swarm stabilization, examples of real-world applications of the introduced methods will be shown in complex indoor and outdoor experiments. I will be talking about using MAVs for indoor documentation of large historical objects (cathedrals) by formations of cooperating MAVs, where one MAV carries a camera and its neighbors carry light sources with the possibility to set a relative angle between the camera axis and the lights as required. A cooperative manipulation of large objects by a pair of MAVs developed for the international MBZIRC competition and inspection of underground mines for DARPA competition will be presented. And finally, a fully autonomous flying robot, Eagle.one hunting for unauthorized drones will be shown.

Biosketch — **Dr. Martin Saska** received his MSc. degree at the Czech Technical University in Prague, 2005, and his Ph.D. degree at the University of Wuerzburg, Germany, within the PhD program of the Elite Network of Bavaria, 2009. Since 2009 he has been a research fellow at the Czech Technical University in Prague, where he founded and heads the Multi-robot Systems group (http://mrs.felk.cvut.cz/), consisting of 20+ young researchers, and co-founded the Center for Robotics and Autonomous Systems with more than 40 researchers cooperating in robotics (https://robotics.fel.cvut.cz/cras/). He was a visiting scholar at the University of Illinois at Urbana-Champaign, USA, in 2008, and at the University of Pennsylvania, USA, in 2012, 2014, 2016 and 2018, where he worked with Vijay Kumar's group within the GRASP lab. He is an author or co-author of more than 100 papers in proceedings of peer-reviewed conferences and more than 20 articles in major journals, including IJRR, AURO, RAS, ASC or EJC, with more than 2000 citations indexed by Google Scholar (H-index 26).