



Editorial: Special Issue on Aerial Robotics

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Aerial robots have gathered a wealth of interest for the potential advantages in information gathering. Although aerial robots have been widely used in the defense industry, very few technologies exist for civilian applications because of the lack of regulations for civilian aerial robots. With FAA's deadline to integrate Unmanned Aerial Vehicles (UAVs) in the domestic airspace, there is an urgent need for novel civilian UAV technologies. Aerial robots have been used in applications such as remote sensing of agricultural products, forest fire monitoring, search and rescue, transmission line inspection, border patrol, etc. This special issue captures some recent developments in civil aerial robotics.

This special issue of *Unmanned Systems* includes two invited papers from the *Canadian Society for Mechanical Engineering (CSME) 2016 International Congress*, along with three additional submissions to the journal.

CSME International Congress is a biennial event that facilitates the networking of academia, industries, government agencies and research groups, as well as showcases cutting-edge research findings and new technologies. The Congress provides technical sessions and discussion opportunities for researchers in various engineering disciplines and serves as a platform for national and international experts to meet, exchange ideas, and explore various aspects of mechanical engineering. The 2016 edition of *CSME International Congress* was held in Kelowna, BC, Canada, and received considerable attention from Canadian and international researchers and scientists, with symposia spanning from Thermo-Fluids, Control and Robotics, Mechatronics, Micro/Nano Systems, Biomechanics, Advanced Energy Systems, Multiscale Simulation and Multifunctional Materials and Structures, Materials Science and Engineering, and Transportation Systems to Environmental Engineering.

Two papers for this special issue were selected from *CSME International Congress 2016* accepted papers by this

special issue's guest editors based on the relevance to *Unmanned Systems*' scope and reviews of the congress papers. The congress papers were extended for this special issue. The revised papers were fully reviewed by independent reviewers in accordance with journal policy. A separate Call for Paper was also issued and internationally distributed amongst various research groups to attract high-quality research papers for the special issue, resulting in a highly-competitive selection of the final three papers. At this point, we would like to appreciate the co-operation and efforts of the authors to make this special issue possible.

The five papers in the special issue cover aerial 3D mapping, aerial manipulation, tilt-rotor UAVs, UAV propulsion, and also theoretical results in observability conditions for cooperative localization. In "3D Mapping for Autonomous Quadrotor Aircraft," 2D and 3D mappings with target localization were proposed for autonomous navigation of a quadrotor helicopter. In "UKF-Based LQR Control of a Manipulating Unmanned Aerial Vehicle," modeling, state estimation, and LQR control of a quadcopter equipped with a 2-DoF robotic manipulator were formulated. The authors of "Design and Modeling of a Quadcopter with Double Axis Tilting Rotors" proposed an overactuated quadrotor platform with double axes tilting propellers, resulting in novel stable configurations with respect to traditional quadrotors. In "Dynamic Characterization of Brushless DC Motors and Propellers for Flight Applications," accurate, yet simple, models were proposed to assist with the selection of appropriate motor and propeller combinations for aerial applications. Finally, in "Observability Conditions for Switching Sensing Topology for Cooperative Localization," a centralized EKF was employed to estimate position and heading of a team of ground robots.

Unmanned Systems is actively covering various areas of research in the field of autonomous systems, ranging from theoretical findings to subsystems and overall autonomous

products. This is an indication of a thriving journal platform and gives us the hope for further progress and success.

We hope that our readers will enjoy this special issue and find its content relevant and helpful.

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Special Issue Editors