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Editorial IJMAV: Special issue IMAV 2017

**Jean-Marc Moschetta, Gautier Hattenberger, Henry de Plinval
and Thierry Jardin**

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The International Micro Air Vehicle Conference and Competition (IMAV) is a yearly event that aims at fostering key technologies for the development of micro-air vehicles. It combines a scientific conference and a flight competition intended to all research groups around the world. The conference part aims at presenting innovations in different areas related to drones: design, fluid mechanics, navigation and control, sensors, data processing, simulation, etc. On the other hand, the flight competition showcases novel and/or efficient designs through a set of challenges, while different prizes recognize different possible achievements. After Delft, The Netherlands (IMAV 2014), Aachen, Germany (IMAV 2015) and Beijing, China (IMAV 2016), the 9th edition IMAV 2017 has been held in Toulouse, France, from 18 to 21 September 2017.

IMAV 2017 has gathered more than 280 participants from 30 different countries including Asia, North, Central and South America, Europe, and Australia. As for the conference part, the 2017 edition featured 60 submitted papers, among which 26 were accepted as scientific papers, 14 as technical papers, 6 as posters, and 14 were rejected. All nominated papers received a score higher than 2 over a scale ranging from -3 to 3. During the two-day flight competition, 30 international teams have taken part to the indoor or the outdoor event. The teams were competing over different challenges with rules aiming at emphasizing the following achievements: aircraft efficient and innovative designs; small and light MAVs; autonomy and image processing; multi-UAV cooperation. The competition itself included an outdoor and an indoor part, as well as special challenges: the Treasure Hunt Challenge (finding “camouflage” objects on the ground, which are invisible from a video camera), the Drone Team Parade (UAVs patrol flying in formation), and the Record Breaking Trophy (lifting a 500-gram load during 1 minute). There was also a Virtual Drone Challenge, where teams could carry out a virtual recognition mission using Matlab simulation environment.

This edition was, again, an occasion to put forward the methodological and technological advances in this

rapidly growing field. The impressive variety of application cases, related needs, and breakthroughs has been represented through the selected papers gathered in this special issue.

The papers selected in this special issue have been nominated for the “Best Paper Award” which has been given to the paper entitled “Quad-thopter: Tailless Flapping Wing Robot with 4 Pairs of Wings”, by C. De Wagter et al. They went through a double review process before the conference and after the oral presentation. They received the highest scores through this process and were thus selected to be part of this special issue.

The 2017 edition of the IMAV conference and flight competition was intended to emphasize different aspects of drones. In particular, the conference intended at setting forward novel designs: the papers selected illustrate this aspect with designs dedicated to challenging environments such as the windy urban environment (R. Gigczaz et al., “Exploring Tandem Wing UAS designs for Operation in Turbulent Urban Environments”) or the Martian atmosphere (T. Désert et al., “Numerical and Experimental investigation of Airfoil design for a Martian micro rotorcraft”).

Following the example provided by natural flyers, with flapping-wing configurations or bioinspired aerodynamic sensors have been considered to extend the flight envelope of drones and to enhance their endurance by dynamic soaring (N. Gavrilovic et al., “Bioinspired wind field estimation-part 1: Angle of attack measurements through surface pressure distribution”).

Finally, the issue of acoustic covertness has attracted the interest of the scientific community and is also addressed in the present special issue (N. Gourdain et al., “Application of a Lattice Boltzmann Method to some challenges related to Micro Air Vehicles”).

IJMAV Guest Editors

Corresponding author:

Jean-Marc Moschetta, ISAE-SUPAERO, 31400 Toulouse, France.
Email: jean-marc.moschetta@isae-supaeo.fr

