Unmanned Aerial Vehicles

I am pleased to welcome you to this special issue on the application of control technologies to unmanned aerial vehicles (UAVs). The variety of new UAV designs is fascinating, with some UAVs looking like palm-sized helicopters, others remarkably like hummingbirds, and others like they came from the notebooks of Leonardo da Vinci. Guest Editor Kingsley Fregene summarizes four contributions to the control of UAVs by

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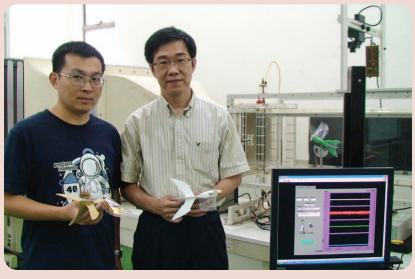
» Fu-Yuen Hsiao, Lung-Jieh Yang, Sen-Huang Lin, Cheng-Lin Chen, and Jeng-Fu Shen on "Autopilots for Ultra Lightweight Robotic Birds: Automatic Altitude Control and System Integration of a Sub-10 g Weight Flapping-Wing Micro Air Vehicle," which describes the control of a UAV that flaps its wings
» Enric Xargay, Vladimir Dobrokhodov, Isaac Kaminer, António M. Pascoal, Naira Hovakimyan, and Chengyu Cao, on "Time-Critical Cooperative Control for Multiple Autonomous Vehicles: Robust Decentralized Strategies for Path-Following Control and-Time-Coordination over Dynamic Communications Networks," which describes the control of multiple UAVs while avoiding collisions
» N. Kemal Ure and Gokhan Inalhan, on "Autonomous Control of Unmanned Combat Air Vehicless: Design of a Multimodal Control and Flight Planning

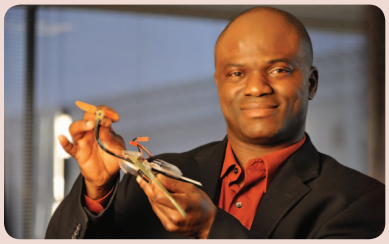
Contributors

Chengyu Cao at the Airborne Subscale Transport Aircraft Research (AirSTAR) Simulator Development facility at NASA Langley Research Center.



The prototype of a full-size Golden Snitch is placed in a small wind tunnel to measure its force and moment coefficients. Fu-Yuen Hsiao (left) and Lung-Jieh Yang (right) are holding different versions of the Golden Snitch.

Enric Xargay at Camp Roberts, California, during flight tests at the Naval Postgraduate School.



Kingsley Fregene holding a version of the Samarai nano air vehicle.

Naira Hovakimyan and Isaac Kaminer at the Naval Postgraduate School in Monterey, California.

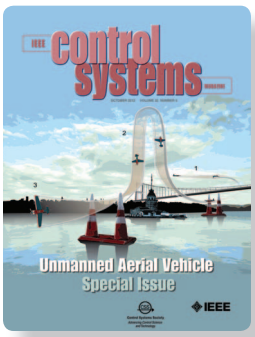
N. Kemal Ure and some helicopters.

Gokhan Inalhan.

Framework for Agile Maneuvering," which describes the generation of trajectories for large UAVs while satisfying constraints in the operating environment

» Luca F. Bertuccelli, Albert Wu, and Jonathan P. How, on "Robust Adaptive Markov Decision Processes: Planning with Model Uncertainty," which describes a methodology for optimized decision making by teams of UAVs in the presence of uncertainties.

Among the columns in this issue, the "President's Message" discusses open access publishing. "CSS News" includes an announcement of videotaped lectures that have been added to the IEEE Control Systems Society's (CSS's) Online Lecture Library and an announcement of a Web site that provides reports on projects that have been completed that were funded by the CSS Outreach Fund. "Feedback" includes 1) the answer to a question on why the characteristic equation is not sufficient for analyzing closed-loop stability and 2) comments by Robert Kosut on the definition and nature of control engineering. "Member Activities" summarizes the results of CSS-sponsored workshop on the application of control engineering to address societal problems.



"Focus on Education" by Andrew J. Fleming discusses the training of students in the quantification of noise sources and prediction of the spatial resolution in precision mechatronics applications by using a laboratory experiment in which a controller is designed for a piezoelectric device to obtain submicron spatial resolution in the presence of periodic and random sensor noise.

"People in Control" has interviews with IEEE Fellows Jozsef Bokor, Le Yi Wang, Mayuresh V. Kothare, and Mathukamalli Vidyasagar. The life and contributions of Russian control pioneer Nikolai Nikolaevich Krasovskii are summarized by Alexander B. Kurzhanski.

In "Book Reviews," Chee-Yee Chong reviews a recently published book by Yaakov Bar-Shalom, Peter K. Willett, and Xin Tian titled *Tracking and Data Fusion: A Handbook of Algorithms*. "Conference Reports" summarizes the activities and results of a student-organized symposium on the control of cyberphysical systems. Other columns in this issue of *IEEE Control Systems Magazine* include "25 Years Ago," "Book Announcements," and "Conference Calendar."

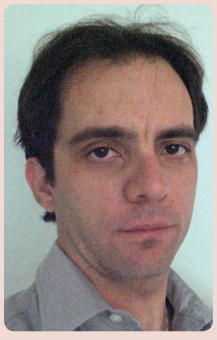
If you have ideas for contributing to the magazine, please let me know.

Richard D. Braatz


Jeng-Fu Shen.


António M. Pascoal.


Cheng-Lin Chen.


Luca F. Bertuccelli.


Vladimir Dobrokhodov.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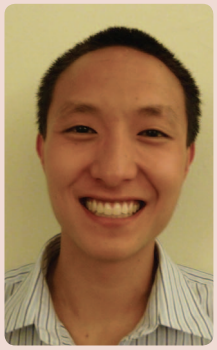
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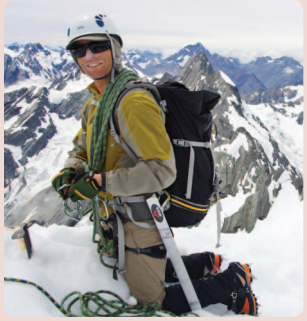
Andrew J. Fleming climbing Mt. Cook in New Zealand.