

GNC 2.0: From Flying Vehicles to Smart Remote Sensing Drones – A Personal Journey

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Abstract

In this talk I start by sharing my research experience in GNC in conventional sense for flying vehicles in late 1980s. Small UASs (aka drones) as a personal remote sensing platform (PRS) for various applications have been my next phase efforts since 2005. The GNC problem can be considered mostly well solved in sUAS and it is time to call for GNC 2.0 where application driven and mission oriented GNC 2.0 should be promoted. I will provide a smart remote sensing scenario in the sense of optimal observation in a cyber-physical system (CPS). New research opportunities around GNC 2.0 will be briefly discussed to make our physical system more intelligent in the sense of the 6 attributes: cognizant, taskable, reflective, ethical, and knowledge-rich.

About the speaker...



YangQuan Chen earned his Ph.D. from Nanyang Technological University, Singapore, in 1998. He had been a faculty of Electrical Engineering at Utah State University from 2000-12. He joined the School of Engineering, University of California, Merced in summer 2012 teaching “Mechatronics”, “Engineering Service Learning” and “Unmanned Aerial Systems” for undergraduates; “Fractional Order Mechanics” and “Nonlinear Controls” for graduates. His research interests include mechatronics for sustainability, cognitive process control, small multi-UAV based cooperative multi-spectral “personal remote sensing”, applied fractional calculus in controls, modeling and complex signal processing; distributed measurement and control of distributed parameter systems with mobile actuator and sensor networks.

Dr. Chen serves as a Co-Chair for IEEE Robotics and Automation Society Technical Committee (TC) on Unmanned Aerial Vehicle and Aerial Robotics (12-18). He recently served the TC Chair for the ASME DED Mechatronics Embedded Systems Applications (2009-10); Associated Editor (AE) for IEEE Trans. on Control Systems Technology (00-16), ISA Trans. (12-17), IFAC Control Engineering Practice (12-17) and Journal of Dynamics Systems, Measurements and Control (09-15). He now serves as Topic Editor-in-Chief of International Journal of Advanced Robotic Systems (Field Robotics), Section AE (Remote Sensors) for Sensors, Senior Editor for International Journal of Intelligent Robotic Systems, Topical AE for Nonlinear Dynamics (18-) and AE for IFAC Mechatronics, Intelligent Service Robotics; IET Control Theory and Applications, and Fractional Calculus and Applied Analysis. He is a member of IEEE, ASME, AIAA, ASPRS, AUVSI and AMA. He relies on Google citation page to keep track of his publications at <https://scholar.google.com/citations?user=RDEIRbcAAAAJ>

Dr. Chen started some new investigations, published some papers and books, graduated some students, hosted some visiting scholars and also received some awards including the IFAC World Congress Best Journal Paper Award (Control Engineering Practice, 2011), First Place Awards for 2009 and 2011 AUVSI SUAS competitions, and most importantly, the “Relationship Counselor” award from IEEE Utah State University Student Branch for “explaining human relationship using control theory.”