W2: Swarm Intelligence: Autonomous and Connected Unmanned Aircraft Systems

Sunday 22 September 2019 • 09:00 – 16:30 • Salon A (3rd floor)

As small Unmanned Aircraft Systems (UAs) are integrated into the National Airspace (NAS) around the world, there is a need for enhanced situational awareness, traffic management, autonomy, human-autonomy teaming, safety and security of people and infrastructure. The UAS Science and Research Panel (SARP) has emphasized the importance of vehicle-to-vehicle communications and human-machine teaming in the operational context of multiple UAS deployment.

Standardization efforts and regulations are in progress to support UAS Traffic Management (UTM), over-the-air communications between UAs, Beyond Radio Line-of-Sight (BRLOS) communications, and UAS navigation and command and control using satellite, cellular, and ad hoc networks. NASA leads the standardization efforts for UTM, and IEEE leads the standardization efforts for Self-organized Aerial Communications and Networking of UAs. IEEE VTS recently created an ad hoc committee on drones to promote research in this important discipline, which is working towards a roadmap for promoting research in related topics including UAS connectivity, navigation, command and control, autonomy, reliability, safety, security, and regulatory aspects.

General Chair: *Kamesh Namuduri*, University of North Texas, USA

Organizing Committee

Helka-Liina Määttänen, Ericsson, Finland
Rui Zhang, National University of Singapore, Singapore
Ismail Guvenc, North Carolina State University, USA

David W. Matolak, University of South Carolina, USA
H. Jin Kim, Seoul National University, Korea
Uwe-Carsten Fiebig, German Aerospace Center (DLR), Germany

09:00 Workshop Opening

09:05 Keynote: From the Ground Up: Physical Layer and Reliability Considerations for Air-Ground and Air-Air Networking
David Matolak, University of South Carolina

09:50 Session I

Secure mmWave Cellular Network for Drone Communication (Invited Paper)
Arupjyoti Bhuyan, Idaho National Laboratory; Ismail Guvenc, Huaiyu Dai, Yavuz Yapıcı, Ali Rahmati, Sung Joon Maeng, North Carolina State University

Drone Swarms, Communications Performance and Big Data (Invited Paper)
Alistair Munro, Gary Clayton, Wyenor Ltd.

10:40 Refreshments break

11:00 Session II

Decentralized Control Strategies for Unmanned Aircraft System Pursuit and Evasion (Invited Paper)
Gilbert Peterson, Air Force Institute of Technology

Caching and D2D Sharing for Content Delivery in Software-Defined UAV Networks (Invited Paper)
Gurkan Gur, Zurich University of Applied Sciences

An Experimental Research Platform Architecture for UAS Communications and Networking
Vuk Marojevic, Mississippi State University; Ismail Guvenc, Mihail L. Sichitiu, Rudra Dutta, North Carolina State University

Inclination of Flying Drones in Aerial Wireless Relay Networks
Hiraku Okada, Jyo Suzuki, Hiroki Yanai, Kentaro Kobayashi, Masaaki Katayama, Nagoya University

12:40 Lunch (on your own)

13:40 Session III

Interference Mitigation Scheme in 3D Topology IoT Network with Antenna Radiation Pattern
Sung Joon Maeng, Mrugen Deshmukh, Ismail Guvenc, North Carolina State University; Arupjyoti Bhuyan, Idaho National Laboratory

A Novel Method for Non-Stationary CFO Estimation and Tracking in Inter-UAV OFDM Links
Subhankar Banerjee, Giridhar.K, IIT Madras

Trajectory Optimization for Physical Layer Secure Buffer-Aided UAV Mobile Relaying
Lingfeng Shen, Zhengyu Zhu, Ning Wang, Xiang Ji, Xiaomin Mu, Zhengzhou University; Lin Cai, University of Victoria

Impact of Mobility on Consensus Building in the Leader-Follower Model
Roya Norouzi Kandalan, Sindhu Alla, Nima Hassan Rezaeian, Student

15:50 Session IV

A Game Approach for Distributed Channel Selection in UAV Communication Networks
Na Xing, Qing Wang, Liping Teng, Tianjin University, China

Wrap-up