

Call for Papers

IEEE/CIC ICC 2018 Workshop on “Integrated Aerial and Terrestrial Communication Systems”

Scope

The past few years have witnessed a tremendous increase in the use of unmanned aerial vehicles (UAVs), especially drones, in a wide range of applications, such as for surveillance, video streaming, weather monitoring, traffic control, aerial imaging, rescue and search, precision agriculture, cargo delivery, and communication relaying. In June 2016, the Federal Aviation Administration (FAA) finalized the operational rules for routine commercial use of small unmanned aircraft systems (UAS), which is expected to further spur the growth of global UAV industry in the future. It is projected that by the year 2025, unmanned aerial systems will contribute over \$80 billion U.S. Dollars to the U.S. economy alone. However, existing UAS mainly rely on the simple point-to-point communication over the unlicensed band (e.g., ISM 2.4 GHz), which is of low data rate, unreliable, insecure, vulnerable to interference, difficult for legitimate monitoring and management, and can only operate over limited range.

To meet the explosive increase on the number of UAVs as well as their demanding new applications in the coming years, there is an increasing interest in integrating UAVs into terrestrial communication systems. On one hand, those UAVs with their own missions could be connected into cellular networks as new aerial users. Thanks to the almost ubiquitous accessibility and high authentication of today's LTE (long-term evolution) and the future 5G-and-beyond networks, **cellular-connected UAVs** have the potential to achieve significant performance improvement over the existing UAV systems, in terms of throughput, operation range, reliability, and security. On the other hand, dedicated UAVs such as drones, helikite, balloons, could be deployed as aerial mobile base stations (BSs) or access points (APs) to assist the terrestrial communications from the sky. **UAV-assisted wireless communications** have several promising advantages, such as the ability for swift and on-demand deployment, high flexibility in network reconfiguration, high chance of having short-distance line-of-sight (LoS) communication links. These appealing benefits make UAV-assisted wireless communication a new integral component of future terrestrial systems, with numerous possible use cases including BS offloading, information dissemination and data collection for Internet of Things (IoT), fast service recovery after natural disasters, etc.

The integration of aerial and terrestrial communications systems brings both new opportunities and challenges, due to the significantly higher altitude of aerial users than conventional ground users, the unique channel characteristics associated with the UAV-to-ground links, the stringent design constraints imposed by size, weight, and power (SWAP) limitations of UAVs, as well as the additional design degree freedom of joint UAV mobility control and communication resource allocation. This

workshop will focus on theoretical and practical design issues for seamlessly integrating aerial and terrestrial systems, including both paradigms of cellular-connected UAVs and UAV-assisted wireless communications. We aim to bring together researchers, industry practitioners, and individuals working on the related areas to share their new ideas, latest findings, and state-of-the-art results.

Topics of interest (include, but are not limited to)

- Channel modeling for UAV-ground and UAV-UAV communications
- New architecture and communication protocols for cellular-connected UAVs
- Spectrum management and multiple access schemes for cellular-connected UAVs
- Interference mitigation for cellular-connected UAVs
- Cellular systems with coexisting aerial and ground users
- 3D beamforming for cellular-connected UAVs
- Massive MIMO/Millimeter wave communications for cellular-connected UAVs
- 3D aerial BS placement
- Trajectory optimization of UAV-mounted BSs/APs
- Joint trajectory design and resource allocation for UAV-assisted wireless communication
- Spectrum sharing and coordination between aerial and ground BSs
- Energy consumption model of UAVs
- Energy-efficient UAV communications
- UAV-enabled IoT
- UAV meets wireless power, caching, edge computing...
- Field measurement and prototype results for UAV systems

Workshop organizers

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Important dates

- Deadline for workshop paper submission: 7 June 2018
- Acceptance/rejection announcement: 7 July 2018
- Final workshop papers due: 15 July 2018