MDAS PROVIDES ANALYTICS COUNTERS FOR DIFFERENT NETWORK COMPONENTS BY MONITORING LOAD LEVELS AND RESOURCE STATUS.

provides a systematic view of the state of the art for RoC and its deployment challenges. The authors further propose a nonconfigurable distributed antenna unit with a related resource mapping scheme and nonconfigurable air-to-cable to achieve higher throughput and low power consumption for large-scale deployments. The simulation results demonstrate that the proposed RoC meets the 5G KPIs of peak data rate, peak spectrum efficiency, and latency.

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Communication Support for Unmanned Air Transportation

During the past few years, unmanned air transportation has come to the forefront of aviation research. Aviation authorities around the world have been making progress toward integrating drones or unmanned aerial vehicles (UAVs) or unmanned aircraft systems (UAS) into their national airspaces. In parallel, private industry has been developing innovative applications such as transportation of people and goods, medicine delivery, pipeline monitoring systems, and disaster-area aerial surveys. Projects such as UAS traffic management (UTM) and urban air mobility demonstrate the industry's great enthusiasm for unmanned air transportation. Before unmanned air transportation becomes a reality, there is a need to improve the reliability and security of UAV communications, as they impact human safety.

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Communication support for unmanned air transportation comes from three levels:

1) satellites operating at the geostationary and low-Earth-orbit levels
2) dedicated ground stations or 4G/5G cellular networks operating on the ground
3) ad hoc aerial networks operating in midair.

Today, with the support of a constellation of communication satellites, minute-by-minute global tracking of an aircraft is possible. In parallel, global standards for UAV communications and networks are also evolving. The Global UTM Association is leading the standardization efforts for UAS traffic management globally. The IEEE recently initiated the P1920.1 and 1920.2 standards for aerial communications and networks and aerial vehicle-to-vehicle communications, respectively. The IEEE Vehicular Technology Society (VTS) and the IEEE Communications Society are jointly sponsoring these standards activities. In addition, the VTS also created an ad hoc committee on drones to promote research, development, and educational initiatives within the IEEE community. Further, the IEEE Communications Society established an emerging technology initiative on aerial connectivity.

TOGETHER, THESE FOUR ARTICLES HIGHLIGHT SOME OF THE MOST IMPORTANT CHALLENGES IN PROVIDING COMMUNICATION SUPPORT FOR UNMANNED AIR TRANSPORTATION AND SOLUTIONS TO ADDRESS THEM.

This special issue aims to share the progress and efforts being made by researchers, practitioners, and regulators toward the communication support for unmanned air transportation. *IEEE Vehicular Technology Magazine* called for novel concepts that are currently being pursued or transformative ideas envisioned for the future of unmanned air transportation. Among the many submissions received, the editorial team selected four articles for publication. The selected articles address several important challenges involved in deploying UAVs for civilian applications and present effective solutions for tackling these challenges. They offer viable and effective strategies for collision avoidance, aerial surveillance, spectrum sharing and detection, and tracking malicious UAVs.

The first article addresses collision avoidance in traffic management. It outlines strategies for defining the interdrone separation distances and technologies for ensuring the safe operation of UAVs. With UTM architecture as a reference, this article presents a Wi-Fi-based messaging solution for collision avoidance.

The second article focuses on energy and mobility management and the challenges involved in aerial surveillance by UAV swarms. It proposes PERCEIVE, a UAV-enabled framework for persistent video surveillance along with an energy-management strategy through mobile charging stations.

The third article addresses spectrum sharing for UAV communications. It introduces the fundamentals, challenges, applications, and open-research problems for realizing UAV spectrum sharing. It outlines many spectrum-sharing strategies, including dynamic spectrum access for UAV networks, artificial intelligence-enabled UAV spectrum access, blockchain-based UAV spectrum access, multichannel access for UAVs, and the integration of UAVs into cellular networks.

Finally, the fourth article presents the idea of a dynamic radar network composed of UAVs capable of adapting their formation and navigation strategies to track malicious UAVs in real time. It describes methods for target detection and tracking, as well as an optimized navigation scheme based on information-seeking. It highlights the advantages of dynamic and reconfigurable networks over static ones.

Together, these four articles highlight some of the most important challenges in providing communication support for unmanned air transportation and solutions to address them. We hope that you enjoy reading these articles and benefit from the new perspectives they present.

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