Table of Contents

Cover
Title Page
Copyright
Editor Biographies
List of Contributors

1 Introduction

2 Channel Model for Airborne Networks
   2.1 Introduction
   2.2 UAV Classification
   2.3 UAV-Enabled Wireless Communication
   2.4 Channel Modeling in UAV Communications
   2.5 Key Research Challenges of UAV-Enabled Wireless Network
   2.6 Conclusion

Bibliography

3 Ultra-wideband Channel Measurements and Modeling for Unmanned Aerial Vehicle-to-Wearables (UAV2W) Systems
   3.1 Introduction
   3.2 Measurement Settings
   3.3 UWB-UAV2W Radio Channel Characterization
   3.4 Statistical Analysis
   3.5 Conclusion

Bibliography
Notes
4 A Cooperative Multiagent Approach for Optimal Drone Deployment Using Reinforcement Learning

4.1 Introduction
4.2 System Model
4.3 Reinforcement Learning Solution
4.4 Representative Simulation Results
4.5 Conclusions and Future Work
Acknowledgments
Bibliography

5 SWIPT-PS Enabled Cache-Aided Self-Energized UAV for Cooperative Communication

5.1 Introduction
5.2 System Model
5.3 Optimization Problem Formulation
5.4 Numerical Simulation Results
5.5 Conclusion
Acknowledgments
Appendix 5.A Proof of Optimal Solutions Obtained in (P1)
Bibliography
Notes

6 Performance of mmWave UAV-Assisted 5G Hybrid Heterogeneous Networks

6.1 The Significance of UAV Deployment
6.2 Contribution
6.3 The Potential of mmWave and THz Communication
6.4 Challenges and Applications
6.5 Fronthaul Connectivity using UAVs
6.6 Communication Model
6.7 Association of SCBs with UAVs
6.8 Results and Discussions
6.9 Conclusion
Bibliography
Notes

7 UAV-Enabled Cooperative Jamming for Physical Layer Security in Cognitive Radio Network

7.1 Introduction
7.2 System Model
7.3 Proposed Algorithm
7.4 Numerical Results
7.5 Conclusion
Bibliography

8 IRS-Assisted Localization for Airborne Mobile Networks

8.1 Introduction
8.2 Intelligent Reflecting Surfaces in Airborne Networks
8.3 Localization Using IRS
8.4 Research Challenges
8.5 Summary and Conclusion
Bibliography

9 Performance Analysis of UAV-Enabled Disaster Recovery Networks

9.1 Introduction
9.2 UAV Networks
9.3 Benefits of UAV Networks
9.4 Design Consideration of UAV Networks
9.5 New Technology and Infrastructure Trends
9.6 Research Trends
9.7 Future Insights
9.8 Conclusion
Bibliography

10 Network-Assisted Unmanned Aerial Vehicle Communication for Smart Monitoring of Lockdown
10.1 Introduction
10.2 UAVs as Aerial Base Stations
10.3 UAV as Relays for Terrestrial Communication
10.4 Conclusion
Bibliography
Note

11 Unmanned Aerial Vehicles for Agriculture: an Overview of IoT-Based Scenarios
11.1 Introduction
11.2 The Perspective of Research Projects
11.3 IoT Scenarios in Agriculture
11.4 Wireless Communication Protocols
11.5 Multi-access Edge Computing and 5G Networks
11.6 Conclusion
Bibliography
Notes

12 Airborne Systems and Underwater Monitoring
12.1 Introduction
12.2 Automated Image Labeling
12.3 Water/Land Visual Differentiation
12.4 Offline Bathymetric Mapping
List of Tables

Chapter 2

Table 2.1 Regulation for LAP deployment of UAVs in different countries.

Table 2.2 Measurement campaigns to characterize the path loss and large-scale...

Table 2.3 Measured small-scale fading of AG propagation in different environm...
Table 3.1 The measurement apparatus with their specifications.

Table 3.2 Path loss measurement and path loss exponent for nine different body locations.

Table 3.3 Combined path loss measurement and path loss exponent for four different body locations.

Table 3.4 Path loss measurement and path loss exponent for four different body locations.

Table 3.5 Time dispersion analysis in the case of LoS for nine body locations.

Table 3.6 Time dispersion analysis in the case of NLoS for four body locations.

Table 3.7 Path loss values in the indoor and outdoor environments for four locations.

Table 3.8 Delay analysis values in nanoseconds for two body locations considered.

Table 3.9 AIC score for all the distributions considered for modeling the fading.

Chapter 4

Table 4.1 State-of-the-art UAV positioning solutions using RL.

Table 4.2 Simulation parameters.

Chapter 5

Table 5.1 Definitions of mathematical symbols and variables.

Table 5.2 Rate at the users for different UAV's trajectories.

Chapter 6
Table 6.1 Impact on the characteristics of signals at THz and mmWave frequencies.

Table 6.2 Simulation parameters [2,39].

Chapter 7
Table 7.1 Simulation parameters

Chapter 9
Table 9.1 Critical review on state of the art.

Chapter 10
Table 10.1 Fitting parameters for receiver threshold $-120$ dBm.
Table 10.2 Fitting parameters for receiver threshold $-100$ dBm.
Table 10.3 Fitting parameters for receiver threshold $-120$ dBm.
Table 10.4 Fitting parameters for receiver threshold $-100$ dBm.
Table 10.5 Fitting parameters for receiver threshold $-120$ dBm.
Table 10.6 Fitting parameters for receiver threshold $-100$ dBm.
Table 10.7 5G air interface simulation parameters.
Table 10.8 Download maximum throughput.

Chapter 11
Table 11.1 The most relevant EU-funded R&I projects exploiting UAV technology...
Table 11.2 Surveyed literature in the field of SF, especially considering the...
Table 11.3 Agricultural scenarios covered by the described works and the use ...

Chapter 12

Table 12.1 Automated point selection simulation results

Table 12.2 Best case interpolation decision table

List of Illustrations

Chapter 2

Figure 2.1 Aerial user equipment and aerial base station.

Figure 2.2 Air-to-ground propagation in UAV-assisted cellular network.

Figure 2.3 Multipath air-to-ground propagation in urban setting.

Chapter 3

Figure 3.1 The UWB measurement communication setup.

Figure 3.2 The UWB antenna and the IRIS+ quadcopter used in the measurement ...

Figure 3.3 The UWB antenna patch locations on the human body for the UWB mea...

Figure 3.4 The sketch plan of the measurement campaign with the 10 distinct ...

Figure 3.5 Different environments considered for the measurement campaign. (...)

Figure 3.6 Path loss factor determination from linear regression for a wirel...
Figure 3.7 Averaged PDP at different distances.
Figure 3.8 Normalized averaged path loss delay comparison.
Figure 3.9 Statistical test (AIC) to determine the best distribution for fad...
Figure 3.10 Empirical and predicted CDF for radio channel between forehead a...

Chapter 4

Figure 4.1 Manhattan grid urban layout.
Figure 4.2 UAV path loss in urban environment.
Figure 4.3 MARL framework for multi-drone networks.
Figure 4.4 Available action sets. (a) Basic strategy action space. (b) All s...
Figure 4.5 Basic strategy..
Figure 4.6 ALL strategy.
Figure 4.7 New strategy.
Figure 4.8 User density areas. (a) Low density. (b) Medium density. (c) High...
Figure 4.9 Single frequency: Number of users in outage. (a) Low density. (b)...
Figure 4.10 Single frequency: Global system backhaul. (a) Low density. (b) M...
Figure 4.11 Single frequency: Number of active drones. (a) Low density. (b)...
Figure 4.12 Three frequencies: Number of users in outage. (a) Low density. (...
Figure 4.13 Three frequencies: Global system backhaul. (a) Low density. (b)...

Figure 4.14 Three frequencies: Number of active drones. (a) Low density. (b)...

Figure 4.15 Six frequencies: Number of users in outage. (a) Low density. (b)...

Figure 4.16 Six frequencies: Global system backhaul. (a) Low density. (b) Me...

Figure 4.17 Six frequencies: Number of active drones. (a) Low density. (b) M...

Chapter 5

Figure 5.1 Reference system model of self-energized UAV-assisted communicati...

Figure 5.2 Block diagram of the decode-and-forward (DF) relaying for the sel...

Figure 5.3 Time block diagram of the proposed system model.

Figure 5.4 System layout for the proposed communication network.

Figure 5.5 Achievable rate at the user versus $P_s$ for various values of cachin...

Figure 5.6 Comparison of achievable rate at the user for different caching c...

Figure 5.7 Transmission SNR versus achievable rate at the user for different...

Figure 5.8 User requested rate $r_0$ versus optimal values of $\rho$ and $\tau$ : (a) when ...

Figure 5.9 Optimized trajectory of the UAV for the given communication setup...
Chapter 6

Figure 6.1 An illustration of mmWave/THz and UAVs integrated hybrid communic...

Figure 6.2 Pictorial representation of UAV-enabled wireless network.

Figure 6.3 Stochastic geometry for the communication between an SCB and a UA...

Figure 6.4 A snapshot of 3D placement of child-UAVs and the association of S...

Figure 6.5 Comparison of sum rate by varying the constraint (6.15) and (6.16)...

Figure 6.6 A comparison of unassociated SCBs and the sum rate with constrain...

Figure 6.7 Performance of sum rate by varying the constraint (6.16) and havi...

Figure 6.8 Sum rate's performance when the number of child-UAVs and $L_{\text{max}}$ are va...

Chapter 7

Figure 7.1 The UAV-enabled cooperative jamming in cognitive radio system.

Figure 7.2 Average secrecy rate versus flight time period.

Figure 7.3 Trajectories of UAV with different methods.

Figure 7.4 Distance between UAV and Eve.

Figure 7.5 Convergence behavior. (a) Convergence behavior at $\epsilon = -20$ dBm. (b) Aver...
Figure 8.1 Localization using IRS model with two IRSs and one SC.
Figure 8.2 Localization of a UAV using multiple IRSs.

Chapter 9
Figure 9.1 Flow chart explaining different architectures of UAV systems.
Figure 9.2 UAV system's different topologies.
Figure 9.3 UAV system's benefits in different applications.

Chapter 10
Figure 10.1 Cellular Network-assisted low-altitude aerial base station (ABS)...
Figure 10.2 Ray tracing simulation in urban environment.
Figure 10.3 Variation of number of ABSs required with its altitude.
Figure 10.4 Variation of number of ABSs required with its transmitting power...
Figure 10.5 Variation of number of ABSs required with geographical area to be...
Figure 10.6 TBS path loss and transmission power.
Figure 10.7 Master UAV transmission power and line of sight.
Figure 10.8 System for channel measurement.
Figure 10.9 Received power by ground users from SUAVs cluster.
Figure 10.10 64-QAM throughput coverage area.
Chapter 11

Figure 11.1 Qualitative comparison of the most diffused wireless communicati...

Figure 11.2 Plausible network architectures, highlighting the use of MEC in

Chapter 12

Figure 12.1 Complete system on UAV.

Figure 12.2 Worst overall classification accuracy simulation result. (a) Ori...

Figure 12.3 Worst false negative simulation result. (a) Original image. (b)...

Figure 12.4 Field experiment results for automated point labeling. (a) Origi...

Figure 12.5 Winch and Raspberry Pi.

Figure 12.6 Sensor payload.

Figure 12.7 Spline results. (a) RMSE. (b) Maximum difference.

Figure 12.8 IDW results. (a) RMSE. (b) Maximum difference.

Chapter 13

Figure 13.1 Tier-1 of satellite networks: It includes the connection of a sa...

Figure 13.2 Tier-2 of satellite networks: It includes the inter-satellite li...

Figure 13.3 Tier-3 of satellite networks: It includes the communication of t...
Autonomous Airborne Wireless Networks

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1 Introduction

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Airborne networks (ANs) are now playing an increasingly crucial role in military, civilian, and public applications such as surveillance and monitoring, military, and rescue operations. More recently, airborne networks have also become a topic of interest in the industrial and research community of wireless communication. The 3rd Generation Partnership Project (3GPP) standardization has a study item devoted to facilitating the seamless integration of airborne wireless networks into future cellular networks. Airborne wireless networks enabled by unmanned aerial vehicles (UAVs) can provide cost-effective and reliable wireless communications to support various use cases in future networks. Compared with high-altitude platforms or conventional terrestrial communications, the provision of on-demand communication systems with UAVs has faster deployment time and more flexibility in terms of reconfiguration. Further, UAV-enabled propagation can also offer better communication channels due to the existence of the line-of-sight (LoS) links, which are of short range.

Despite the several benefits of airborne wireless networks, they suffer from some realistic constraints such as being energy constrained because of the limited battery power, safety concerns, and the strict flight zone. Hence, developing new signal processing, communication, and optimization framework for autonomous airborne wireless networks is essential. Such networks can offer high data