

## Wireless Communications and Networking for Unmanned Aerial Vehicles

A thorough treatment of UAV wireless communications and networking research challenges and opportunities. Detailed, step-by-step development of carefully selected research problems that pertain to UAV network performance analysis and optimization, physical layer design, trajectory and path planning, resource management, multiple access, cooperative communications, standardization, control, and security is provided. Featuring discussion of practical applications including drone delivery systems, public safety, IoT, virtual reality, and smart cities, this is an essential tool for researchers, students, and engineers interested in broadening their knowledge of the deployment and operation of communication systems that integrate or rely on unmanned aerial vehicles.

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“This book, written by the most prominent experts in the field, provides a complete in-depth analysis of UAV wireless communications. It should become a reference material for all the students, engineers, and researchers who are building our next-generation wireless communication networks.”

*Merouane Debbah, CentraleSupélec*

“This is the most comprehensive book on the rapidly evolving field of wireless communications and networking for UAVs. The authors are among the researchers who have made the most profound contributions to this emerging field. Their impressive command of the subject matter results in a thorough presentation taking theory, practice, and industrial standards into account. A must-read for researchers and engineers working in this field.”

*Halim Yanikomeroglu, Carleton University*

# Wireless Communications and Networking for Unmanned Aerial Vehicles

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**Walid Saad:**

*To Mary, Karim, Raphael, and everyone who believes the sky is not the limit*

**Mehdi Bennis:**

*To my beloved family*

**Mohammad Mozaffari:**

*To my family*

**Xingqin Lin:**

*This book is dedicated to my grandfather and father, Zuojiang Lin and Yuluan Lin,  
with love*

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Contents

	<i>Acknowledgments</i>	<i>page xii</i>
<b>1</b>	<b>Wireless Communications and Networking with Unmanned Aerial Vehicles: An Introduction</b>	<b>1</b>
	1.1 Brief Evolution of UAV Technology	1
	1.2 UAV Types and Regulations	2
	1.2.1 Classification of UAVs	3
	1.2.2 UAV Regulations	4
	1.3 Wireless Communications and Networking with UAVs	5
	1.3.1 UAVs as Flying Wireless Base Stations	6
	1.3.2 UAVs as Wireless Network User Equipment	8
	1.3.3 UAVs as Relays	9
	1.4 Summary and Book Overview	10
<b>2</b>	<b>UAV Applications and Use Cases</b>	<b>12</b>
	2.1 UAVs for Public Safety Scenarios	12
	2.2 UAV-Assisted Ground Wireless Networks for Information Dissemination	13
	2.3 Three-Dimensional MIMO and Millimeter-Wave Communication with UAVs	14
	2.4 Drones in Internet of Things Systems	16
	2.5 UAVs for Virtual Reality Applications	16
	2.6 Drones in Wireless Backhauling for Ground Networks	18
	2.7 Cellular-Connected UAV UEs	19
	2.8 UAVs in a Smart City	20
	2.9 Chapter Summary	21
<b>3</b>	<b>Aerial Channel Modeling and Waveform Design</b>	<b>22</b>
	3.1 Fundamentals of Radio Wave Propagation and Modeling	23
	3.2 Overview of Aerial Wireless Channel Characteristics	27
	3.3 Large-Scale Propagation Channel Effects	30
	3.3.1 Free-Space Path Loss	30
	3.3.2 Ray Tracing	31
	3.3.3 Log-Distance Path Loss Models	37
	3.3.4 Empirical Path Loss Models	40

3.3.5	Shadowing	42
3.3.6	Line-of-Sight Probability	44
3.3.7	Atmospheric and Weather Effects	50
3.4	Small-Scale Propagation Effects	51
3.4.1	Time Selectivity and Doppler Spread	52
3.4.2	Frequency Selectivity and Delay Spread	54
3.4.3	Spatial Selectivity and Angular Spread	56
3.4.4	Envelope and Power Distributions	58
3.5	Waveform Design	60
3.5.1	Waveform Basics	60
3.5.2	Orthogonal Frequency Division Multiplexing	62
3.5.3	Direct Sequence Spread Spectrum	64
3.5.4	Continuous Phase Modulation	65
3.6	Chapter Summary	67
4	<b>Performance Analysis and Tradeoffs</b>	68
4.1	UAV Network Modeling: Challenges and Tools	68
4.2	Downlink Performance Analysis for UAV BS	70
4.2.1	System Model	70
4.2.2	Network with a Static UAV	73
4.2.3	Mobile UAV BS Scenario	79
4.2.4	Representative Simulation Results	83
4.3	Chapter Summary	89
5	<b>Deployment of UAVs for Wireless Communications</b>	90
5.1	Analytical Tools for UAV Deployment	91
5.1.1	Centralized Optimization Theory	91
5.2	Deployment of UAV BSs for Optimized Coverage	94
5.2.1	Deployment Model	94
5.2.2	Deployment Analysis	96
5.2.3	Representative Simulation Results	99
5.2.4	Summary	100
5.3	Deployment of UAV BSs for Energy-Efficient Uplink Data Collection	100
5.3.1	System Model and Problem Formulation	101
5.3.2	Ground-to-Air Channel Model	102
5.3.3	Activation Model of IoT devices	102
5.3.4	UAV BS Placement and Device Association with Power Control	103
5.3.5	Update Time Analysis	106
5.3.6	Representative Simulation Results	107
5.3.7	Summary	111
5.4	Proactive Deployment with Caching	112
5.4.1	Model	112
5.4.2	Optimal Deployment and Content Caching for UAV BSs	116



	Contents	ix
	5.4.3 Representative Simulation Results	118
	5.4.4 Summary	122
	5.5 Chapter Summary	122
<b>6</b>	<b>Wireless-Aware Path Planning for UAV Networks</b>	<b>123</b>
	6.1 Need for Wireless-Aware Path Planning	123
	6.2 Wireless-Aware Path Planning for UAV UEs: Model and Problem Formulation	124
	6.2.1 Problem Formulation	126
	6.3 Self-Organizing Wireless-Aware Path Planning for UAV UEs	128
	6.3.1 Path Planning as a Game	128
	6.3.2 Equilibrium of the UAV UE Path Planning Game	130
	6.4 Deep Reinforcement Learning for Online Path Planning and Resource Management	131
	6.4.1 Deep ESN Architecture	131
	6.4.2 Deep ESN-Based UAV UE Update Rule	133
	6.4.3 Deep RL for Wireless-Aware Path Planning	134
	6.5 Representative Simulation Results	136
	6.6 Chapter Summary	144
<b>7</b>	<b>Resource Management for UAV Networks</b>	<b>145</b>
	7.1 Cell Association in UAV-Assisted Wireless Networks under Hover Times Constraints	145
	7.1.1 System Model	146
	7.1.2 Optimal and Fair Cell Partitioning for Data Service Maximization under Hover Time Constraints	149
	7.1.3 Extensive Simulations and Numerical Results	153
	7.1.4 Summary	158
	7.2 Resource Planning and Cell Association for 3D Wireless Cellular Networks	159
	7.2.1 A Rigorous Model for 3D Cellular Networks	159
	7.2.2 3D Deployment of a Cellular Network with UAV BSs: A Truncated Octahedron Structure	161
	7.2.3 Latency-Minimal 3D Cell Association	164
	7.2.4 Representative Simulation Results	166
	7.2.5 Summary	168
	7.3 Managing Licensed and Unlicensed Spectrum Resources in Wireless Networks with UAVs	169
	7.3.1 Model of an LTE-U UAV BS Network	170
	7.3.2 Models for Data Rates and Queuing	172
	7.3.3 Resource Management Problem Formulation and Solution	174
	7.3.4 Representative Simulation Results	176
	7.3.5 Summary	179
	7.4 Chapter Summary	180

x	<b>Contents</b>	
<b>8</b>	<b>Cooperative Communications in UAV Networks</b>	<b>181</b>
8.1	CoMP Transmission in Wireless Systems with Cellular-Connected UAV UEs	183
8.1.1	A Model for CoMP in Networks with Aerial UAV UEs	183
8.1.2	Probabilistic Caching Placement and Serving Distance Distributions	183
8.1.3	Channel Model	185
8.1.4	Analysis of Coverage Probability	186
8.1.5	Representative Simulation Results	189
8.1.6	Summary	191
8.2	Reconfigurable Antenna Arrays of UAVs: UAV BS Scenario	192
8.2.1	UAV-Based Antenna Array in the Sky: A Basic Model	193
8.2.2	Transmission Time Minimization: Optimizing UAV Positions within the Array	195
8.2.3	Control Time Minimization: Time-Optimal Control of UAVs	199
8.2.4	Representative Simulation Results	202
8.2.5	Summary	204
8.3	Chapter Summary	205
<b>9</b>	<b>From LTE to 5G NR-Enabled UAV Networks</b>	<b>207</b>
9.1	Mobile Technologies-Enabled UAVs	208
9.1.1	Connectivity Aspects	208
9.1.2	Services beyond Connectivity	209
9.2	Introduction to LTE	210
9.2.1	Design Principles	211
9.2.2	System Architecture	212
9.2.3	Radio Interface Protocols	213
9.2.4	Physical Layer Time-Frequency Structure	215
9.3	UAV as LTE UE	216
9.3.1	Coverage	216
9.3.2	Interference	217
9.3.3	Mobility Support	220
9.3.4	Latency and Reliability	223
9.4	UAV as LTE BS	226
9.5	3GPP Standardization on Connected UAV	227
9.5.1	3GPP Release-15 Study Item on LTE-Connected UAV	228
9.5.2	3GPP Release-15 Work Item on LTE-Connected UAV	231
9.5.3	3GPP Release-16 Study Item on Remote UAV Identification	232
9.6	Towards 5G NR-Enabled UAVs	234
9.6.1	A Primer on 5G NR	234
9.6.2	Superior Connectivity Performance	236
9.6.3	Service Differentiation with Network Slicing	237
9.6.4	Network Intelligence	238
9.7	Chapter Summary	238

	Contents	xi
<b>10</b>	<b>Security of UAV Networks</b>	240
	10.1 Overview on UAV Security Problems	240
	10.2 Security of UAV UEs in Delivery Systems	243
	10.2.1 Modeling the Security of a UAV Delivery System	244
	10.2.2 UAV Security as a Network Interdiction Game	246
	10.2.3 Security of UAV Delivery Systems in Presence of Human Decision Makers	250
	10.2.4 Representative Simulation Results	253
	10.2.5 Summary	256
	10.3 Concluding Remarks on UAV Security	257
	<i>References</i>	258
	<i>Index</i>	279

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