

## DRONES

### Journey from First to Fifth Generation and Beyond

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Unmanned aerial vehicles (UAVs), or drones, are among the most transformative technologies of the 21st century, reshaping defense, industry, research, and everyday life. This comprehensive volume offers a global, interdisciplinary examination of drone technology, charting its progression from early radio-controlled aircraft to today's intelligent, autonomous systems.

Across nine concise chapters, the book delivers a clear, step-by-step understanding of UAV evolution, core engineering principles, and real-world applications. It spans the full arc of the drone revolution—from manually controlled prototypes of the early 1900s to fifth-generation, AI-driven swarms that define modern aerospace innovation. Each chapter integrates historical context, technical foundations, and forward-looking insights.

#### Key topics include:

- A chronological overview of UAV generations and their defining capabilities
- Aerodynamics, propulsion, control systems, and sensor integration
- Applications in defense, agriculture, logistics, environmental monitoring, and smart cities
- Advances in autonomy, artificial intelligence, swarm coordination, and quantum navigation
- Global perspectives on policy, ethics, sustainability, and emerging research.

Drawing on contributions from leading international experts, this book serves as a valuable reference for engineering students, researchers, UAV designers, policymakers, and industry practitioners. Authoritative and forward-thinking, it captures not only how drones have transformed the skies, but how they continue to shape the future of mobility, security, and sustainable technology.

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#### KEYWORDS:

Unmanned aerial vehicles (UAVs), drone technology and applications, autonomous and intelligent systems, aerial robotics and control engineering, artificial intelligence and swarm autonomy, smart cities and urban air mobility (UAM), defense, agriculture, and environmental drones, sustainable and emerging aerospace technologies.

