Training Course on Remotely Piloted Aircraft Systems (RPAS) Integration in Air Traffic Management (ATM)

Professional Development Training Course Outline

Category	Aviation and Airport Management	**Duration**	10 Days
Base Fee	$3,000 USD	**Delivery Mode**	Online / On-site Hybrid

Course Introduction

The rapidly evolving landscape of aviation is witnessing an unprecedented surge in the deployment of Remotely Piloted Aircraft Systems (RPAS), commonly known as drones. Their diverse applications, from critical infrastructure inspection and precision agriculture to logistics and public safety, necessitate their seamless and safe integration into existing Air Traffic Management (ATM) systems. Training Course on Remotely Piloted Aircraft Systems (RPAS) Integration in Air Traffic Management (ATM) is meticulously designed to equip aviation professionals with the essential knowledge and practical skills required to navigate the complexities of RPAS operations within controlled and uncontrolled airspace, ensuring airspace safety, operational efficiency, and regulatory compliance in this transformative era of aerial innovation.

The integration of RPAS into ATM presents both significant opportunities and intricate challenges. This program delves into the regulatory frameworks, technological advancements, and operational procedures crucial for harmonizing manned and unmanned aircraft operations. Participants will gain a comprehensive understanding of **U-space concepts**, **detect-and-avoid technologies**, **communication requirements**, and **contingency procedures**, fostering a proactive approach to **airspace integration** and **risk mitigation**. By focusing on best practices and emerging trends, this course prepares professionals to contribute effectively to the future of integrated airspace.

Programme Curriculum

Training Course on Remotely Piloted Aircraft Systems (RPAS) Integration in Air Traffic Management (ATM)

Introduction

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Course Duration

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Course Objectives

1. Understand current and evolving national and international regulations, including ICAO SARPs and EASA/FAA guidelines, for safe RPAS integration.
2. Analyze the core principles and methodologies for integrating RPAS into segregated and non-segregated airspace.
3. Explore the architecture, services, and operational implications of U-space for low-altitude drone traffic management.
4. Gain in-depth knowledge of DAA technologies, their capabilities, limitations, and future developments for collision avoidance.
5. Understand the criticality of secure and reliable C2 links for RPAS operations and contingency management.
6. Learn to design and implement robust standard operating procedures (SOPs) for various RPAS missions.
7. Recognize the necessary adaptations and upgrades to existing ATM infrastructure for efficient RPAS handling.
8. Apply advanced safety management system (SMS) principles to identify, assess, and mitigate risks associated with RPAS operations.
9. Investigate the impact of **AI**, **machine learning**, **autonomous operations**, and **5G connectivity** on future RPAS integration.
10. Review the requirements and best practices for remote pilot certification and ongoing proficiency.
11. Identify and address potential cybersecurity vulnerabilities in RPAS and ATM systems.
12. Develop effective responses to lost link, system failures, and other critical RPAS emergencies.
13. Promote the importance of standardized protocols and interoperable systems for seamless RPAS-ATM interaction.

Organizational Benefits

- Reduces risks of mid-air collisions and incidents through comprehensive RPAS integration knowledge.
- Streamlines RPAS operations within ATM, leading to increased productivity and optimized resource utilization.
- Ensures adherence to national and international aviation laws, minimizing legal and financial penalties.
- Prepares organizations for the inevitable expansion of RPAS, maintaining competitive advantage.
- Equips staff with the ability to effectively manage diverse airspace users, including manned and unmanned aircraft.
- Optimizes RPAS deployment and management, leading to cost savings in various applications.
- Fosters an environment of technological adoption and opens new avenues for aviation services.

Target Audience

1. Air Traffic Controllers (ATCOs)
2. Air Navigation Service Providers (ANSPs) Personnel
3. RPAS Operators and Remote Pilots
4. Aviation Regulators and Policy Makers
5. Airport Operations Managers
6. Aerospace Engineers and Developers
7. Safety and Compliance Officers in Aviation
8. Aviation Training Organizations and Instructors

Course Outline

Module 1: Introduction to RPAS and ATM Fundamentals

- Definitions and Classifications of RPAS (RPA, RPAS, UAS, Drones)
- Overview of the Global Air Traffic Management System
- Historical Context and Evolution of RPAS Operations
- Key Stakeholders in RPAS Integration (ICAO, ANSPs, Operators, Manufacturers)
- **Case Study**: Evolution of military drone operations and their impact on civilian airspace discussions.

Module 2: International and National RPAS Regulations

- ICAO SARPs for RPAS (Doc 10019)
- EASA Regulations (e.g., U-space regulatory framework)
- FAA Regulations (e.g., Part 107, Remote ID)
- National Variations and Harmonization Efforts
- **Case Study**: Analysis of a country's regulatory challenges in adopting new drone delivery services.

Module 3: Airspace Integration Concepts

- Segregated vs. Non-segregated Airspace Operations
- Principles of Integration: Equivalent Safety, No Undue Burden
- Challenges of Mixed Airspace Operations
- Strategic and Tactical Integration Strategies

- **Case Study**: A controlled airspace integration trial involving large RPAS and commercial airliners.

Module 4: U-space: Managing Low-Altitude Airspace

- U-space Services: Network ID, Geo-awareness, Traffic Information, Flight Authorization
- U-space Service Providers (USSPs) and their Role
- Interoperability with Traditional ATM Systems
- Policy and Implementation Challenges of U-space
- **Case Study**: A city implementing U-space for urban air mobility and drone logistics.

Module 5: Detect-and-Avoid (DAA) Technologies

- Principles of DAA: See-and-Avoid vs. Sense-and-Avoid
- Types of DAA Sensors (Radar, Electro-Optical, Acoustic, ADS-B)
- Performance Requirements and Certification of DAA Systems
- Human Factors in DAA System Design
- **Case Study**: Evaluation of a DAA system's performance in a simulated near-miss scenario.

Module 6: Command and Control (C2) Links

- Types of C2 Links: Line-of-Sight (LOS) and Beyond Line-of-Sight (BLOS)
- Frequency Spectrum Management for RPAS
- Resilience and Redundancy of C2 Links
- Impact of C2 Link Loss on Operations
- **Case Study**: Analysis of a lost-link incident and the subsequent contingency procedures.

Module 7: RPAS Navigation and Surveillance

- GPS/GNSS Dependency and Alternatives
- Automatic Dependent Surveillance-Broadcast (ADS-B) for RPAS
- Primary and Secondary Radar Detection of RPAS
- Non-cooperative Target Detection
- **Case Study**: Challenges of tracking small RPAS in busy airport environments using existing surveillance infrastructure.

Module 8: RPAS Flight Planning and Operations

- Mission Planning and Risk Assessment for RPAS
- Flight Authorization and Airspace Access Procedures
- Pre-flight, In-flight, and Post-flight Procedures
- Weather Considerations for RPAS Operations
- **Case Study**: Planning and executing a complex industrial inspection mission requiring multiple RPAS.

Module 9: Communication Procedures for RPAS in ATM

- Standard Air-to-Ground Communication for RPAS
- Voice and Data Communication Protocols
- Phraseology and Communication Etiquette
- Contingency Communications
- **Case Study**: A scenario demonstrating effective communication between a remote pilot and an air traffic controller during an RPAS emergency.

Module 10: Contingency and Emergency Procedures

- Lost Link Procedures and Protocols
- Emergency Landing and Recovery Operations
- Mid-air Collision Avoidance Procedures for RPAS
- Accident and Incident Reporting for RPAS
- **Case Study**: Analyzing an RPAS fly-away incident and the measures taken to prevent future occurrences.

Module 11: Human Factors in RPAS Operations

- Remote Pilot Workload and Situational Awareness
- Crew Resource Management (CRM) for RPAS Crews
- Ergonomics of Remote Pilot Stations
- Training and Licensing of Remote Pilots
- **Case Study**: Examining the human factors implications in a long-endurance RPAS surveillance mission.

Module 12: Cybersecurity in RPAS and ATM

- Vulnerabilities in RPAS Systems and C2 Links
- Threats to ATM Systems from RPAS
- Cybersecurity Best Practices for RPAS Operations
- Regulatory Requirements for Aviation Cybersecurity
- **Case Study**: A simulated cyberattack scenario on an RPAS system and its potential impact on ATM.

Module 13: Emerging Technologies and Future Trends

- Autonomous RPAS Operations and AI Integration
- Advanced Air Mobility (AAM) and Urban Air Mobility (UAM)
- Counter-UAS (C-UAS) Technologies
- Future Concepts for Integrated Airspace Management
- **Case Study**: Development of a drone taxi service and the regulatory/technological hurdles.

Module 14: Safety Management Systems (SMS) for RPAS

- Applying SMS Principles to RPAS Operations
- Hazard Identification and Risk Assessment for RPAS
- Safety Performance Indicators (SPIs) for RPAS
- Safety Culture in the RPAS Ecosystem
- **Case Study**: Implementing an SMS framework within an RPAS operating organization.

Module 15: Practical Applications and Case Studies

- RPAS in Search and Rescue (SAR) Operations
- RPAS for Infrastructure Inspection and Monitoring
- RPAS in Logistics and Delivery Services
- RPAS in Border Surveillance and Security
- **Case Study**: A multi-agency response using RPAS during a natural disaster.

Training Methodology

This course employs a blended learning approach, combining:

- **Interactive Lectures and Presentations**: Engaging theoretical sessions with expert instructors.
- **Case Study Analysis**: In-depth discussion and problem-solving based on real-world RPAS incidents and successes.
- **Simulations and Practical Exercises**: Hands-on experience with RPAS operational scenarios and ATM integration challenges (e.g., tabletop exercises, simulator demonstrations where applicable).
- **Group Discussions and Collaborative Workshops**: Fostering peer-to-peer learning and knowledge exchange.
- **Q&A Sessions with Industry Experts**: Opportunities to address specific challenges and gain insights from seasoned professionals.
- **Regulatory Document Review**: Guided analysis of key international and national aviation regulations.
- **Multimedia Resources**: Videos, animations, and interactive diagrams to enhance understanding of complex concepts.

Register as a group from 3 participants for a Discount

Send us an email: info@fineskilltrainingcenter.org **or call** *+254769199797*

Certification

Upon successful completion of this training, participants will be issued with a globally- recognized certificate.

Tailor-Made Course

We also offer tailor-made courses based on your needs.

Key Notes

a. The participant must be conversant with English.

b. Upon completion of training the participant will be issued with an Authorized Training Certificate

c. Course duration is flexible and the contents can be modified to fit any number of days.

d. The course fee includes facilitation training materials, 2 coffee breaks, buffet lunch and A Certificate upon successful completion of Training.

e. One-year post-training support Consultation and Coaching provided after the course.

f. Payment should be done at least a week before commence of the training, to Fineskill Training Center account, as indicated in the invoice so as to enable us prepare better for you

Upcoming Scheduled Sessions

Start Date	End Date	Location	Price
21 Sep 2026	02 Oct 2026	Online	$2,000
21 Sep 2026	02 Oct 2026	Physical	$3,000
21 Sep 2026	02 Oct 2026	Physical	$0
21 Sep 2026	02 Oct 2026	Physical	$0
21 Sep 2026	02 Oct 2026	Physical	$0
21 Sep 2026	02 Oct 2026	Physical	$0
21 Sep 2026	02 Oct 2026	Physical	$0
21 Sep 2026	02 Oct 2026	Physical	$0

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