Executive Certificate in Unmanned Aerial Vehicle Management

Introduction to Unmanned Aerial Systems

Unmanned Aerial Systems (UAS), also known as drones, are aircraft without a human pilot onboard. They are operated remotely by a pilot on the ground or autonomously using onboard computers and sensors. UAS include various types, such as fixed-wing, rotary-wing, and hybrid. This explanation will cover key terms and vocabulary for an Introduction to Unmanned Aerial Systems course in an Executive Certificate in Unmanned Aerial Vehicle (UAV) Management program.

1. UAS Components

Airframe: The physical structure of a UAS, including the fuselage, wings, and landing gear.

Propulsion System: The components responsible for generating thrust, such as engines and propellers.

Control System: The components that allow the UAS to be steered and maneuvered, including the flight controller, remote control, and communication systems.

Payload: The equipment or cargo carried by a UAS, such as cameras, sensors, or packages.

Navigation System: The components that enable a UAS to determine its position, speed, and altitude, such as Global Positioning System (GPS) receivers and inertial measurement units (IMUs).

2. UAS Types

Fixed-Wing: UAS with rigid wings that generate lift, similar to traditional aircraft. They typically have longer endurance and higher speeds than rotary-wing UAS.

Rotary-Wing: UAS that use rotating blades to generate lift, such as multirotors or helicopters. They are highly maneuverable and can hover in place, but typically have shorter endurance and lower speeds than fixed-wing UAS.

Hybrid: UAS that combine the advantages of fixed-wing and rotary-wing designs, such as tilt-rotors or tilt-wings.

3. UAS Operations

Visual Line of Sight (VLOS): The ability of the UAS pilot to maintain direct and unaided visual contact with the UAS throughout the entire flight.

Beyond Visual Line of Sight (BVLOS): Operations in which the UAS is flown beyond the visual range of the pilot, requiring remote monitoring and communication systems.

Autonomous Flight: Operations in which the UAS is programmed to fly a predetermined route or mission without real-time human input.

Teleoperation: Operations in which the UAS is remotely controlled by a pilot on the ground.

4. UAS Regulations

Part 107: Federal Aviation Administration (FAA) regulations for small UAS (sUAS) operations in the United States, which outline requirements for pilot certification, aircraft registration, and operational limitations.

Visual Observer (VO): A person who assists the UAS pilot by maintaining visual contact with the UAS during VLOS operations.

Section 333: An FAA exemption that allowed certain commercial UAS operations before the adoption of Part 107.

5. UAS Applications

Aerial Photography and Videography: The use of UAS-mounted cameras to capture still or moving images from the air.

Surveying and Mapping: The use of UAS-mounted sensors to collect geospatial data for mapping, terrain modeling, and infrastructure inspection.

Crop Monitoring and Management: The use of UAS to monitor crop health, detect pests or diseases, and optimize irrigation and fertilization.

Search and Rescue: The use of UAS to locate missing persons, assess damage, and deliver supplies in emergency situations.

6. UAS Challenges

Safety: Ensuring the safe operation of UAS, especially in congested areas or near other aircraft.

Privacy: Balancing the privacy concerns of individuals with the benefits of UAS technology.

Regulation: Navigating complex and evolving UAS regulations at the local, national, and international levels.

Public Perception: Overcoming negative perceptions of UAS, especially related to privacy and security concerns.

Understanding these key terms and concepts is essential for success in an Introduction to Unmanned Aerial Systems course and the broader UAV management field. By mastering these concepts, students will be well-equipped to navigate the complex and rapidly evolving world of UAS technology.