

EFFECTIVE FEBRUARY 2023

THE ULTIMATE PRODUCTION HOUSE

UAS STANDARD OPERATING PROCEDURES





INTRODUCTION

These standard operating procedures (SOP) will serve as a guide for flight operations using unmanned aerial systems (UAS). This document provides best practices and internal processes for safe and effective flight operations including roles, responsibilities, mission phases, and emergency procedures.

The goal of this document is to standardize the process for safely conducting UAS flight operations. These operations must be conducted in compliance with 14 CFR § 107.

Not all of the guidelines contained in this document will apply to all situations. Therefore, it is vital that all participating parties use their best judgment to safely complete each operation.

PERSONNEL

REMOTE PILOT-IN-COMMAND (RPIC)

The RPIC must be certified and current in accordance with 14 CFR § 107 and is responsible for the overall safety of UAS operations.

Additional responsibilities include:

- Ensuring that the UAS is registered and in an airworthy condition prior to engaging in UAS operations.
- Ensuring that the UAS is operated in accordance with the manufacturer's specifications, Federal Aviation Administration (FAA) regulations, and local requirements.
- Ensuring that all involved parties are mentally and physically prepared to engage in UAS operations.
- Requesting airspace authorizations (i.e., LAANC) and ensuring compliance with waivers to 14 CFR § 107, when required.
- Coordinating with air traffic control (ATC) facilities, when required.
- Securing additional insurance coverages, when required.

VISUAL OBSERVER (VO)

The use of a VO is optional and may be used at the discretion of the RPIC. A VO's primary duty is to maintain visual line of sight (VLOS) with the UAS at all times and assist the RPIC with locating and avoiding other aircraft.

Communications between the RPIC and VO may be conducted through direct, radio, or cellular means.

TRAINING

INITIAL TRAINING

- The RPIC must obtain a small UAS remote pilot certificate in accordance with 14 CFR § 107.

- The RPIC must demonstrate understanding of the applicable rules and responsibilities contained in 14 CFR § 107, 14 CFR § 91, and Aeronautical Information Manual.
- The RPIC must demonstrate understanding of the criteria for Basic Visual Flight Rules (VFR) weather minimums.
- The RPIC must demonstrate understanding of air band radio communications techniques including approved ATC/pilot phraseology.
- The RPIC must gain familiarity with the UAS system and its operating modes and limitations.

RECURRENT TRAINING

- The RPIC must complete the Part 107 Small UAS Recurrent course at <https://faasafety.gov>. Completion of this course satisfies the 24 month recency of aeronautical knowledge requirement for a Part 107 remote pilot with a sUAS rating.
- The RPIC must maintain proficiency in their RPIC abilities which is not limited to actual operating skills but also includes aeronautical knowledge.

VO TRAINING

- A VO must be provided with sufficient training to be able to communicate clearly with the RPIC. Communications will be used to issue instructions for remaining within VLOS, to locate and avoid other aircraft, or to provide any other pertinent information.

SAFETY MANAGEMENT SYSTEM (SMS)

The SMS is a proactive approach to safety. It directly supports the mission to operate UAS in a safe and orderly manner. The SMS consists of Safety Policy contained within this section, Safety Assurance through voluntary safety reporting using NASA's Aviation Safety Reporting System (ASRS) and post-flight debriefings, Safety Promotion using recurrent training, and Safety Risk Management (SRM).

SAFETY POLICY

- All operations must be conducted in a manner that holds the safety of individuals in the highest regard.
- Pre-planning to mitigate hazards and reduce risk to individuals and property is required for all operations.

SAFETY ASSURANCE

- The RPIC must conduct a post-flight debriefing.
- Voluntary safety reports may be submitted to the NASA ASRS system at <https://asrs.arc.nasa.gov/>.

SAFETY PROMOTION

- Recurrent training must be completed in accordance the requirements contained within this document.
- Individuals may review governmental and industry UAS websites for additional safety best practices and general information.

SRM

- SRM is composed of a five-phase process called the DIAAT.
 - Describe the system
 - Define the scope, objectives, and stakeholders.
 - Define the environment and parameters.
 - Identify hazards
 - Use a structured approach to identify hazards.

- Be comprehensive and do not dismiss hazards prematurely.
- Employ lessons learned and experience.
- Analyze Risk
 - Identify controls
 - Determine risk based upon the severity and likelihood of the outcome.
- Assess Risk
 - Assign risk level for each hazard based upon severity and likelihood.
- Treat Risk
 - Identify risk management strategies.
- SRM will be completed for all operations within LAANC “zero” grids or for any operation that requires a waiver.

INSURANCE

Insurance will be secured at the amount and duration that is required by an involved third party (i.e., property owner, local authorities, etc.).

ACCIDENT REPORTING

An accident must be reported to the Federal Aviation Administration (FAA) within ten (10) days of the occurrence in accordance with 14 CFR § 107.9. Accident reports must be filed using the FAA DroneZone website (<https://faadronezone-operator.faa.gov/#/part107>).

OPERATIONS NEAR UNCONTROLLED AIRPORTS

FAA Advisory Circular (AC) 107-2 states, “Unless the flight is conducted within controlled airspace, no notification or authorization is necessary to operate at or near an airport.”

The RPIC must comply with the following requirements contained in FAA AC 107-2:

- Be aware of all traffic patterns and approach corridors to runways and landing areas.
- Avoid operating anywhere that the presence of the sUAS may interfere with operations at the airport, such as approach corridors, taxiways, runways, or helipads.
- Yield right-of-way to all other aircraft, including aircraft operating on the surface of the airport.

The RPIC should monitor the applicable common traffic advisory frequency, monitor aircraft using an ADS-B application, be familiar with airport operations, and understand radio communications techniques.

UAS OPERATIONS

PRE-FLIGHT

Pre-flight activities are the duty of the RPIC and are conducted before the start of UAS operations. These activities include inspection of the UAS, assessment of the operating location, assessment of the weather, review of Notice to Air Missions (NOTAMs) and Temporary Flight Restrictions (TFRs), and briefing individuals involved in the operation.

CHECKLIST

The pre-flight checklist is contained in Appendix A.

WEATHER

The RPIC is required to gather enough information about the existing and forecast weather conditions throughout the area where the operation will be conducted. At a minimum, the RPIC must review Meteorological Terminal Aviation Weather Reports (METARs) and Terminal Area Forecasts (TAFs).

Limitations:

- UAS operations may only be conducted in VFR weather conditions.
- Wind speed may not exceed 21 knots sustained or 25 knot gusts.

NOTAMS AND TFRS

NOTAMS and TFR information must be obtained from an FAA-authorized source and must be reviewed immediately before commencement of the UAS operation.

AIRSPACE AUTHORIZATIONS AND WAIVERS

The RPIC will request airspace authorizations through an approved LAANC provider and request waivers through the FAA UAS website.

IN-FLIGHT

In-flight activities are a team effort and must be conducted in a safe and orderly manner. However, the RPIC is the final authority regarding UAS operations and must exercise good judgment while the UAS is airborne.

CHECKLIST

The in-flight checklist is contained in Appendix A.

LIGHTING

Anti-collision lighting will be used when required by 14 CFR § 107 and for any operations within a LAANC grid with a maximum altitude of less than 300ft above ground level.

COMMUNICATIONS

The RPIC and VO must be in continuous communications through direct, radio, or cellular means. The VO will maintain VLOS with the UAS and will communicate regarding the location of the UAS, the location of obstacles, and the location of other observed aircraft. The VO will immediately advise the RPIC if VLOS is lost.

“RETURN TO HOME POINT” FUNCTIONALITY

In the event that VLOS is lost or a failure of the hardware occurs, the RPIC will activate the “Return to Home Point” functionality. If VLOS is regained as the UAS returns to the home point, the operation may be resumed if the RPIC determines that it is safe to do so. If the “Return to Home Point” is activated because of a failure, the RPIC should allow the UAS to land and assess the situation before making the decision to continue or cancel the operation.

LANDING

The RPIC should complete the following steps as part of the landing process:

- Assess the weather conditions.
- Scan the landing area for potential obstructions and other hazards.
- Announce when the aircraft is inbound to land and is on final approach.
- Be prepared to execute a “go-around” or hold if a landing cannot be made safely due to unexpected weather conditions, an emergency, a hazard, or a miscalculation.
- Carefully land the aircraft away from obstructions or people.

POST-FLIGHT

CHECKLIST

The post-flight checklist is contained in Appendix A.

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APPENDIX A: CHECKLISTS

PRE-FLIGHT CHECKLIST

Off-site	On-site
Check Weather Conditions, NOTAMs, and TFRs	Check Weather Conditions
Check Local Regulations	Verify UAS is airworthy
If applicable: Ensure Receipt of Airspace Authorizations or Waivers	Install Battery Ensure SD Card is Installed
Verify Charge Level on All Batteries	Check Camera Settings
Pack Kit for Travel	Ensure GPS Lock
	Scan Area for Obstacles
	Complete Safety and Mission Briefing

IN-FLIGHT CHECKLIST

After Takeoff	Before Landing
Climb to a Safe Altitude and Hover	Ensure that All Necessary Flying is Completed
GPS Check	Scan Landing Area for Obstacles
Update Home Point	Check Weather Conditions
No Red Indications on RC Unit	Announce UAS Inbound for Landing
Check Battery Time and Percentage Remaining	Announce UAS on Final Approach
	Initiate Autoland
	Approach UAS after the Propellers have Stopped

POST-FLIGHT CHECKLIST

On-site	Off-site
Power Down UAS	Transfer and Backup Data
Remove and Store Batteries	Charge Batteries
Inspect Airframe	Store UAS
Pack Kit for Travel	

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