Oregon Department of Transportation

Unmanned Aircraft Systems Operations Manual

Delivery & Operations Division | Engineering Automation Section

September 2024

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Oregon Department of Transportation

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LIVING DOCUMENT

In 2016, the Federal Aviation Administration (FAA) issued Part 107 to Title 14 of the Code of Federal Regulations allowing the use of unmanned aircraft for civil commercial uses. This document in conjunction with Part 107 will build the regulatory framework under which all UAS operations will be conducted by the Oregon Department of Transportation.

We acknowledge that more federal, state, and local regulations relating to unmanned aircraft will continue to emerge, and this document will be updated as often as necessary to keep up with those changes.

SIGNIFICANT DATES

29 Aug., 2016	FAA issues Part 107
31 May, 2018	Low Altitude Authorization and Notification Capability (LAANC)
06 April, 2021	Change of remote pilot recurrent requirements from testing to training
21 April, 2021	Updated Part 107 Final Rules including flights at night and over people
16 Sept., 2023	Remote ID requirements effective

REVISION HISTORY

December 2016	Initial publication.
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April 2017	Incorporate revisions from Oregon Department of Aviation. Incorporate revisions from ODOT safety.
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July 2017	Incorporate revision from ODOT executive policy review.
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September 2018	Major adjustment to format and content to align with other agency documents and to incorporate lessons learned. Removed references to expired COA. Added authority structure. Added suspension or revocation. Added Low Altitude Authorization and Notification Capability (LAANC).
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August 2021	Updates related to FAA Advisory Circular AC 107-2A. Added references to enterprise system for equipment, pilot, and flight information.

	Changed ODOT flight currency standards.
	Added process for program exceptions.
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April 2023	Added remote ID requirements.
	Added ODOT pilot annual currency requirements.
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September 2023	Updated landowner airspace to reflect federal and state regulations.
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September 2024	Updated for accessibility and branding.

This document is formatted for double sided printing.

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1 GENERAL

1.1 SCOPE

The purpose of this document is to provide guidance specific to the operation and management of Unmanned Aircraft Systems (UAS) for the Oregon Department of Transportation.

These rules apply to ODOT employees, contractors, and consultants operating ODOT owned or leased UAS aircraft for, or on behalf of, ODOT. No ODOT employees may operate privately-owned UAS for the purpose of conducting ODOT business. No ODOT contractor or consultant may operate an ODOT UAS without written permission of the UAS program manager.

This document summarizes information contained in many publications relating to the operation of UAS in the United States National Airspace System. An ODOT remote pilot in command (PIC) is expected to know all pertinent regulations governing their work. Simply reading this document does not fulfill that requirement.

For information relating to contracting unmanned aircraft services, see "Contracting for UAS Services," located later in this document. Additional definitions and references used throughout this document are included in the Appendix.

1.2 AUTHORITY

All ODOT UAS operations will be conducted under the authority of ODOT's UAS program manager. ODOT's UAS program manager is the Engineering Automation Section manager & state surveyor and can be reached at *971-304-4164*.

1.3 UAS PROGRAM AUTHORITY STRUCTURE

1.3.1 UAS Program Manager

ODOT's UAS program manager is responsible for the compliance of the program. They have final authority on program decisions and logistics. The UAS program manager roles and responsibilities are:

- UAS policies and procedures, including this document.
- Approve ODOT UAS pilot certification training curriculum.
- Authorize and certify ODOT UAS pilots.
- Approval of equipment prior to procurement to ensure capability and compatibility.
- Provide current pilots and equipment to risk management for insurance coverage.

- Provide annual flight records to the Oregon Department of Aviation.

1.3.2 UAS Flight Operations Coordinator

ODOT's UAS flight operations coordinator is responsible for the implementation of ODOT's UAS program and policies. The UAS flight operations coordinator roles and responsibilities are:

- Updating UAS Operations Manual.
- Creating and maintaining UAS pilot certification training curriculum.
- Maintain enterprise system containing pilot, equipment, and flight data.
- Provide equipment and workflow recommendations.
- Liaison to other agencies with UAS.
- Technical representative for UAS program manager.

The UAS flight operations coordinator will receive communications from all chief pilots and report on a regular basis to the UAS program manager.

1.3.3 Chief Pilot

ODOT's chief pilots are responsible for their discipline's compliance with this document and any other regulation which might affect the agency. The chief pilot's roles and responsibilities are:

- Have awareness of flight activities within their discipline.
- Asset management including equipment registration, maintenance, and usage tracking.
- Monitor and ensure discipline pilot's flight currency.
- Maintain enterprise system records of discipline flights and airframe maintenance.
- Provide guidance for waivers and authorizations for discipline operations.
- Maintain and train discipline pilots on applicable standard operating procedures (SOP) and/or flight checklists.
- Point of contact for contractor/consultant.

The chief pilots will receive communications and reports from their discipline's pilots and report on a regular basis to the UAS flight operations coordinator.

1.3.4 Pilot

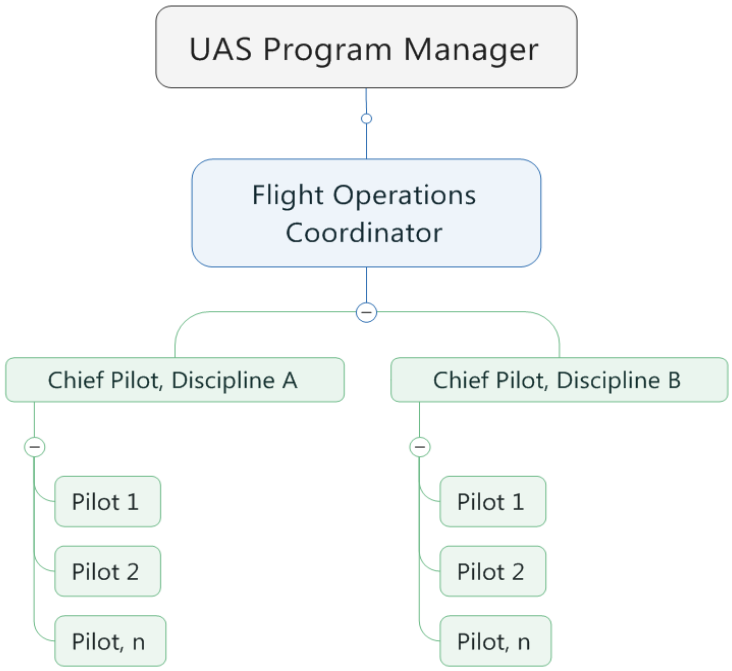
ODOT's pilots are responsible for ensuring missions flown are compliant with all applicable regulations. The pilot's roles and responsibilities are:

- Maintain ODOT flight currency.

- Record and maintain flight logs in enterprise system and field logbook.
- Record and maintain maintenance logs in field logbook.
- Maintain FAA Part 107 currency.
- Follow checklists and SOPs.
- Request waivers and authorizations relating to missions.

Pilots report directly to their discipline's chief pilot.

Figure 1: ODOT UAS Program Structure



1.4 ADHERENCE

ODOT operates UAS under FAA Part 107 in conjunction with this document.

The FAA has determined that Advisory Circular (AC) 91-57A, Model Aircraft Operating Standards, shall not be used as basis of approval for commercial or government UAS operations and is applicable to recreational and hobbyists use only. All ODOT UAS operations are considered public aircraft operations and may not be operated under AC 91-57A.

All ODOT employees engaged in the operation of UAS must read and comply with the overall guidance of this document and the direction provided by the UAS program manager.

Specific ODOT units may develop procedures to supplement this manual. However, these supplemental procedures shall not supersede ODOT's UAS policy and operating procedures described herein.

This document does not supersede or waive any Code of Federal Regulations, state law, or local ordinance. ODOT staff or its contractors/consultants must be familiar with and comply with all pertinent regulations relating to UAS operations.

Any discrepancies discovered between the regulations and the guidance provided in this document should be reported to the ODOT UAS program manager.

1.5 PROGRAM EXCEPTIONS

Requests for exceptions to program requirements stated in this document should be directed to the UAS program manager and flight operations coordinator. The request must include the program requirement, proposed change, and exception justification focused on safe operations. Exceptions will be granted for a period of up to two years and can be revoked at the discretion of the UAS program manager.

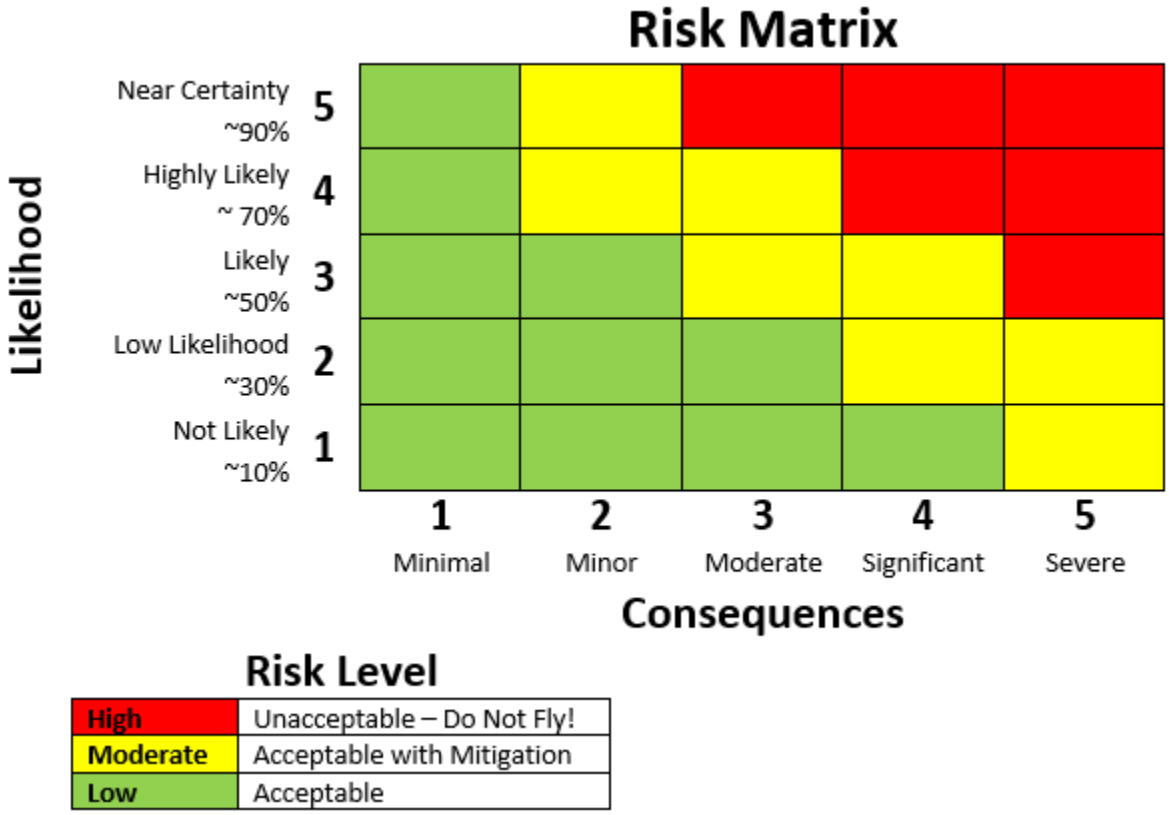
1.6 SAFETY

The use of UAS exposes ODOT to a new set of risks that may not be typical of other ODOT operations. These risks relate to third party damage, injury and liability caused by UAS aircraft collision with the ground, structures, people, vehicles and other aircraft.

ODOT employees involved with UAS operations should always have safety as their highest priority and should consider the probability **(likelihood)** and severity **(consequences)** of accidents and ways to mitigate them while planning their flights.

The PIC is expected to exercise due diligence in identifying significant and reasonably foreseeable hazards related to their operations. These hazards should be identified, documented, and controlled. A job hazard assessment (JHA) should be developed and used to document the hazards and mitigations used for each mission. Specifically, battery charging and handling is one hazard that should be addressed with a JHA and appropriate personal protective equipment (PPE) should always be worn.

Figure 2: Risk Matrix



Risk Level

High	Unacceptable – Do Not Fly!
Moderate	Acceptable with Mitigation
Low	Acceptable

1.7 PRIVACY

The use of UAS with the ability to carry on-board cameras and other recording sensors has raised privacy concerns. In situations where there is a reasonable expectation of privacy, flights should not be conducted without first notifying the occupants, even if the planned flight is not over, but adjacent to the occupant's property.

All UAS flights by ODOT staff or its consultants must be conducted in a responsible, ethical, and respectful way. This should include a commitment of transparency, privacy and accountability. All requirements for use, storage, access, sharing, and retention of data gathered by UAS operations must comply with ADM 4-24.

1.8 LANDOWNER AIRSPACE

Although the National Airspace System (NAS) consists of the entire United States airspace from the ground up, landowners presume ownership of the airspace over their property from the ground to some yet legally undetermined height. Prior court cases have concluded that land

ownership does include "at least as much of the space above the ground as he can occupy or use in connection with the land…"

Current Oregon law (ORS 837) states the following regarding UAS operations over private property:

ORS 837.37 Operation of privately owned premises

(1) Except as provided in subsection (2) of this section, a person may not operate an unmanned aircraft system over the boundaries of privately owned premises in a manner so as to intentionally, knowingly or recklessly harass or annoy the owner or occupant of the privately owned premises.

The following Oregon law has been preempted by the Federal Government in the Updated Fact Sheet (2023) on State and Local Regulation of Unmanned Aircraft Systems published July 14, 2023.

ORS 837.380 Action by owner of real property

(1) Except as provided in subsections (2) and (3) of this section, a person who owns or lawfully occupies real property in this state may bring an action against any person or public body that operates an unmanned aircraft system that is flown over the property if:

(a) The operator of the unmanned aircraft system has flown the unmanned aircraft system over the property on at least one previous occasion; and

(b) The person notified the owner or operator of the unmanned aircraft system that the person did not want the unmanned aircraft system flown over the property.

1.9 FEDERAL AVIATION ADMINISTRATION

The FAA is responsible for the control and use of navigable airspace within the United States. The agency regulates the operation of all aircraft in NAS, including UAS aircraft.

The FAA addresses aviation safety in three key areas: personnel, equipment and operations. The FAA assesses each of these areas both independently to meet current regulations and standards, as well as collectively to ensure no conflicts exist overall that would create an unsafe condition.

FAA UAS Helpdesk

- Phone: 877-369-4636
- Email: UAShelp@faa.gov

Portland Flight Standards Office

- Phone: 503-615-3200
- Site: https://www.faa.gov/about/office_org/field_offices/fsdo/

Northwest Mountain Regional Office

- Phone: 206-231-2393
- Site: https://www.faa.gov/about/office_org/headquarters_offices/arc/northwest_mountain/

2 REMOTE PILOT IN COMMAND (PIC)

2.1 RESPONSIBILITIES

The FAA considers the UAS PIC to be directly responsible for and the final authority on the operation of that UAS. In ODOT's organizational structure, it is highly likely the PIC does not have authority over the project utilizing the UAS. This dichotomy needs to be discussed and resolved between the manager and PIC with clear roles and responsibilities established prior to the UAS flight.

The PIC is responsible for maintaining and inspecting the UAS to ensure that it is in a condition for safe operation.

2.2 CERTIFICATION

Any ODOT employee operating a UAS as the PIC must hold a current FAA issued remote pilot certificate with a small UAS rating (< 55lbs).

Each ODOT PIC must complete each of the following steps:

1. Pass FAA Part 107 aeronautical knowledge test.
2. Provide documentation of successful completion of FAA Part 107 Recurrent training and/or initial Part 107 licensure within 6 months prior of scheduled ODOT operations standards training.
3. Complete ODOT-administered or approved flight training that includes ODOT operations standards and hand-on flight skills evaluation.
4. Complete ODOT insurance form.
5. Receive authorization from ODOT UAS program manager to fly on behalf of ODOT.

Information on becoming an FAA certified remote pilot can be found at www.faa.gov/uas

2.3 MEDICAL CONDITION

The PIC and visual observer(s) may not participate in the operation of an UAS if they know or have reason to know that they have a physical or mental condition that could interfere with the safe operation of the UAS. This includes the effects of an illness or medication that renders the PIC or visual observer unable to perform UAS operational duties.

2.4 REQUIRED KNOWLEDGE

Any ODOT employee operating a UAS as the PIC is expected to be proficient in:

- FAA regulations relating to UAS rating privileges, limitations and flight operation.

- Basic aeronautical knowledge as it relates to UAS:
    - Airspace classification and operating requirements and flight restrictions affecting UAS operation.
    - Aviation weather sources and effects of weather on UAS performance.
    - UAS loading and performance.
    - Emergency procedures.
    - Crew resource management.
    - Radio communication procedures.
    - Determining the performance of UAS.
    - Physiological effects of drugs and alcohol.
    - Aeronautical decision-making and judgment.
    - Airport operations.
    - Maintenance and preflight inspection procedures.
- UAS aircraft:
    - Principles of flight.
    - Performance and limitations.
    - Controls and on-board systems.
    - Manual and autonomous flight.
    - Power management.
    - Failsafe systems and emergency procedures.
    - Calibration and maintenance.
- All training will be retained in training records maintained by ODOT's UAS program manager.

Information relating to the FAA regulations and basic aeronautical knowledge can be found at www.faa.gov/uas.

2.5 PIC CURRENCY AND PROFICIENCY

The FAA remote pilot certificate currency is valid for two years. Certificate holders must pass a recurrent knowledge test every two years in order to maintain their UAS rating.

PIC must conduct a minimum of three flights within the past 45 days. The pilot will need to do so at a low-risk, controlled training site before assuming PIC flight responsibilities for work performed outside of the training site. Currency requirements that differ from the above will be

specified in the individual Standard Operating Procedure (SOP) document. Where differences exist, the UAS-specific syllabus will take precedence, as long as the minimum number of flights is greater.

PIC must conduct a minimum of 10 flights or two hours of flight time in a calendar year, except the year of initial training, to be considered an active ODOT remote pilot. If these requirements are not met, all PIC activities are considered suspended until FAA recurrent training and ODOT recertification training is successfully completed.

Pilots shall be current and proficient in the UAS being operated.

2.6 RECORDKEEPING

Each PIC must keep a field logbook, which may be either hardcopy or digital. Pilots will be responsible for maintaining and retaining these logs.

Entries should include the following:

- Date.
- Project location.
- UAS make and model.
- UAS registration number or agency ID.
- Number of flights.
- Weather.
- Airspace and authorization number if required.

A UAS flight is defined by an aircraft launch and recovery. Each flight entry should include the following:

- Time range.
- Operator.
- Visual observer.
- Remarks (accidents, events, damage, etc.).

All flights will also be recorded in the enterprise system. Uploading of flight logs files with telemetry data are required when compatible UAS are operated.

2.7 SUSPENSION OR REVOCATION OF PIC PRIVILEGES

The UAS program manager may revoke an ODOT PIC's flight authorization at any time for just cause. Any proposed actions will be sent to the individual in writing along with the individual's

right to appeal the proposed action. A proposed action is effective upon receipt by the pilot and will be affirmed, modified, or vacated following any appeal. The appeal will be held in front of a panel consisting of the UAS program manager, UAS flight coordinator, and the pilot's manager.

The UAS program manager may disqualify pilots for just cause, which may or may not be specifically defined herein following the due process procedures outlined herein. Employees engaging in unauthorized flight activities are also subject to this process when considering their ability to become authorized in the future.

2.7.1 Negligence

Negligence is unintentional deviations from approved procedures that may or may not cause erroneous results. The following are guidelines for findings of negligence:

1. The first incident will result in the UAS program manager discussing the issue with the individual and their chief pilot to establish a corrective action plan. Depending on the nature of the infraction, the UAS program manager could impose up to a 30 day suspension.
2. The second infraction will result in a letter being sent to the employee, chief pilot, and the pilot's manager. Depending on the nature of the incident, up to a 180-day suspension could be imposed.
3. A third instance may result in permanent revocation of flight privileges.

2.7.2 Abuse

Abuse is knowingly deviating from approved procedures or when the pilot should have known they were deviating from approved procedures. There are two levels of severity for abuse.

- Level 1 abuse is defined as: An ODOT pilot knowingly deviating from approved procedures, but acknowledges abuse.
    - The first finding may result in up to a 180-day suspension of pilot authorization.
    - A second instance would result in a minimum of 180-day suspension.
- Level 2 abuse is defined as: An ODOT pilot knowingly deviating from approved procedures and attempting to cover up abuse. The abuse and deception is only found through investigation.
    - The first finding will result in a 1-year suspension of pilot authorization.
    - A second finding will result in permanent revocation.

Allegations of negligence or abuse are made to the UAS program manager in writing. The allegations will contain the name, address, and signature of the individual(s) making the allegation. The UAS program manager will investigate all allegations. Within a 60-day period,

all involved parties will receive a written determination of the findings. Any warranted sanctions will be imposed in accordance with guidance contained herein. Decisions regarding allegations of negligence or abuse may be appealed in writing. All final decisions regarding suspension of a pilot's authorization will be up to the UAS program manager.

3 VISUAL OBSERVER (VO)

The visual observer (VO) is a trained person who assists a UAS pilot in the duties associated with collision avoidance and situational awareness through electronic or visual means. Situational awareness includes, but is not limited to, safety assessment, distraction mitigation, maintaining a sterile cockpit, avoidance with other traffic, clouds, obstructions, terrain and navigation. Observers are considered flight crewmembers and must not perform crew duties for more than one UAS at a time. Observers are not allowed to perform concurrent duties both as a UAS pilot and observer.

VOs must be used at all times and must maintain continuous communication with the PIC. The VO is only permitted to engage in activities related to flight operations or safety concerns during flight.

VOs must be able to see the UAS and the surrounding airspace throughout the entire flight. They should be able to provide the PIC with the UAS's flight path and proximity to all aviation activities and other hazards (e.g., terrain, weather, structures, ground activities) sufficiently for the PIC to exercise effective control of the UAS and prevent a collision hazard. **The use of multiple successive visual observers (daisy chaining) is prohibited.**

All VOs must demonstrate sufficient knowledge to communicate to the PIC any information required to remain clear of conflicting traffic, terrain and obstructions, maintain proper cloud clearances, and provide navigational awareness. This knowledge, at a minimum, must include knowledge of:

- Their responsibility to assist the PIC in complying with the requirements of 14 CFR:
    - Section 107.31, Visual line of sight aircraft operation.
    - Section 107.37, Operation near aircraft; right-of-way rules.
    - Section 107.39, Operation over human beings.
- Air traffic and radio communications when applicable, including the use of approved air traffic phraseology.

4 UAS AIRCRAFT

4.1 PUBLIC AIRCRAFT

All UAS operated by or on behalf of ODOT are public aircraft as defined by Title 49 USC 40102(a)(41). No ODOT employees may operate privately owned UAS for the purpose of conducting business for ODOT. No contractor or consultant may operate an ODOT-owned UAS without written permission of the UAS program manager. All UAS operated by ODOT must meet the FAA criteria for small UAS (< 55lbs).

4.2 PURCHASE

ODOT units interested in acquiring a UAS may do so providing they coordinate and confer with the agency UAS program manager. They would need to make the business case and secure funding and approval from their management structure. The proposed equipment will be evaluated for business capability and program compatibility. The UAS program manager has final approval on the need to increase the ODOT UAS fleet. Purchase of a UAS must follow current ODOT procurement policies.

4.3 REGISTRATION AND MARKING

All UAS owned (or leased) by ODOT must be registered with the FAA in accordance with 14 CFR part 48 and with the Oregon Department of Aviation (ODA) in accordance with ORS 837.360. Registration documents will be stored in the enterprise system.

ODOT units that own and operate UAS are responsible for the registration and renewal of UAS. Report all registration and renewal information to ODOT's UAS program manager and maintain current records in the enterprise system.

The registration forms and fees can be found at the links below:

FAA (valid for 3 years) – https://faadronezone-access.faa.gov/

ODA (valid for 1 year) – ODA_FORMS_001.pdf (oregon.gov)

The UAS must be marked with the FAA registration number visible on the outside surface of the aircraft.

4.4 REMOTE ID

Remote ID is the ability of a drone in flight to provide identification and location information that can be received by other parties. All UAS operations are required to meet the FAA remote ID requirements through built in capability and a FAA Declaration of Compliance; or with a FAA approved Remote ID Broadcast Module.

4.5 INVENTORY

The ODOT UAS program manager will maintain an inventory of all ODOT owned UAS aircraft with at least the following information:

- Year.
- Make.
- Model.
- Serial number.
- Type (fixed wing/rotor).
- Weight.
- FAA registration number and expiration date.
- ODA expiration date.
- Organization unit.

4.6 MAINTENANCE AND AIRWORTHINESS

The PIC will ensure the aircraft has been inspected and maintained in accordance with the manufacturer's maintenance procedures; overhaul, replacement, inspection and life limit requirements for the UAS and components. If no manufacturer maintenance guidance exists, industry recognized best practices shall apply.

Flight critical parts will be inspected at least once per day prior to flight activities, normally accomplished during the first preflight of the day.

A preflight inspection must be performed by the PIC per the manufacturer's guidelines.

Software and hardware changes should be documented as part of the normal maintenance procedures. Software changes to the UAS and controller are classified as major changes and should be recorded in UAS's logbook at the time of occurrence.

All previously flight proven systems, which include payloads, may be installed or removed as required, and that activity must be recorded in the UAS logbooks by persons authorized to conduct UAS maintenance. Installing or removing a sensor under normal operations, defined in an SOP, doesn't constitute an activity to be recorded.

UAS maintenance logs shall be made to certify compliance with all inspection and maintenance requirements and demonstrate continued airworthiness including:

- Date.
- Remote PIC responsible for maintenance.
- Maintenance performed (software, firmware, hardware, etc.).

- Remarks (malfunctions, accidents, lost link events, damaged parts, serial numbered parts which require replacement, etc.).

A test flight in a controlled environment must be conducted after any maintenance that could affect the flight performance of the UAS. The test flight must be recorded in the aircraft logbook.

When a firmware update is installed for the UAS (UAV, controller, monitor, battery) or a software update is installed, conduct the following:

1. Review the release notes for the update and evaluate the impact to the UAS.
2. Record the version information, date, and equipment to which the update was applied in the UAV maintenance log.
3. Review custom flight controls to evaluate if they are still applied (if applicable).
4. Conduct a test flight in a safe environment away from potential hazards in case the UAS does not respond as expected.
5. Record any variations from expected performance in the flight log notes.
6. Make necessary adjustments and repeat steps 3-5 until PIC is satisfied with performance.

4.7 MISHAPS

A mishap is any event that that requires reporting to the FAA or NTSB and any operations or behavior that deviates from the mission SOP.

Death or serious injury (loss of consciousness or hospital visit)

1. Call 911
2. Call NTSB 844-373-9922
3. Be prepared to fill out NTSB form 6120.1 within 10 days
4. Report to FAA within 10 days of accident: 425-227-1999 or https://asrs.arc.nasa.gov/uassafety.html

Accident

Report to FAA within 10 days of accident: 425-227-1999 or https://asrs.arc.nasa.gov/uassafety.html

An accident is defined as:

- Damage to any property other than the sUAS that exceeds $500.

Serious Incident

Call NTSB immediately 844-373-9922 and be prepared to fill out 6120.1.

A serious incident entails one or more of the following:

- Flight control system malfunction or failure: For an unmanned aircraft, a true "fly-away" would qualify. A lost link that behaves as expected does not qualify.
- Inability of any required flight crew member to perform normal flight duties as a result of injury or illness. Example of required flight crewmembers include the pilot, remote pilot; or visual observer if required by regulation. This does not include an optional payload operator.
- Inflight fire, which is expected to be generally associated with batteries.
- Aircraft collision in flight.
- More than $25,000 in damage to objects other than the aircraft.
- Release of all or a portion of a propeller blade from an aircraft, excluding release caused solely by ground contact.

In the event of required reporting to the FAA and/or NTSB, the PIC is required to provide immediate notification of the event to ODOT risk management and UAS program manager. The report should include the following information:

- PIC's name and contact information.
- PIC's FAA airman certificate number.
- Registration number issued to the aircraft.
- UAS make and model.
- Ground Control Station (i.e. monitors, transmitters, etc. separate from controller).
- Location of the incident.
- Date of the incident.
- Time of the incident.
- Person(s) injured and extent of injury, if any or known.
- Property damaged and extent of damage, if any or known.
- Description of what happened.
- Investigation plan.

Deviation from SOP

In the event of a deviation from the SOP including but not limited to software crashes, software/hardware warnings, sensor malfunctions, and emergency maneuvers, complete the ODOT Mishap Checklist and record in the enterprise system.

4.8 REPORTING

Annual maintenance reports for each aircraft shall be generated for ODOT's UAS program manager from the enterprise system. The chief pilots are responsible for ensuring the following information up to date:

- UAS registration number.
- UAS type and model.
- Number of flights.
- Total UAS operation hours.
- Takeoff or landing damage.
- Equipment malfunction. Required reports include, but are not limited to, failures or malfunctions to the:
    - Control station.
    - Electrical system.
    - Fuel system.
    - Navigation system.
    - On-board flight control system.
    - Power plant.

Annual reports [ORS 837.360(1) & (6)] shall be provided to the ODA by the UAS program manager summarizing the following:

1. The frequency of use of the unmanned aircraft systems by the public body during the preceding calendar year.
2. The purposes for which the unmanned aircraft systems have been used by public body during the preceding calendar year.

5 OPERATIONS

5.1 LIMITATIONS

The aircraft must be operated in accordance with Part 107.

5.2 SITE SUITABILITY

5.2.1 Airspace

Operations in Uncontrolled Airspace (Class G) are generally allowed.

Operations in Controlled Airspace (Class B, C, D or E designated for an airport) are not allowed unless the remote pilot has prior authorization from air traffic control (ATC).

- A remote pilot may penetrate Class E airspace if flying a tall structure into Class E airspace not designated for an airport.
- Operations within a class E extension of a Class D airport are allowed without ATC authorization.

UAS flights must not be conducted in restricted, prohibited, or special flight rule areas. Such areas are depicted on charts available at: http://www.faa.gov/air_traffic/flight_info/aeronav/. Additionally, the PIC should beware of and avoid other areas identified in Notices to Airmen (NOTAMS) that restrict operations in proximity to power plants, electric substations, dams, wind farms, oil refineries, industrial complexes, national parks, stadiums, emergency services, military or other federal facilities unless approval is received from the appropriate authority prior to the UAS mission.

The PIC is responsible for the coordination with military training routes (MTR). When identifying an operational area, the PIC must evaluate whether an MTR will be affected. In the event the UAS operational area overlaps an MTR, the PIC will contact the military in advance to coordinate and resolve any conflicts.

5.2.2 Communications Frequency Spectrum

A ground operational check to verify that the UAS controller can communicate with the UAS must be conducted prior to the launch of the UAS to ensure any electromagnetic interference does not adversely affect control of the aircraft.

5.2.3 NOTAM Review

The PIC must review all NOTAMs for the area of their UAS operations and remain clear of all temporary flight restrictions. Information on how to obtain NOTAMs can be found at https://pilotweb.nas.faa.gov/PilotWeb/.

5.3 SAFETY

The PIC must conduct a preflight briefing with the on-site team. The briefing should include team member's roles and responsibilities, flight mission, roadway traffic control and emergency procedures.

The on-site crew leader should develop and document a JHA and conduct an on-site safety meeting before beginning the UAS flight. Appropriate PPE should be worn at all times during the flight.

5.4 TEAM

Every UAS flight must be conducted under the responsibility of the ODOT manager in direct charge of the work utilizing the UAS. Any employee operating a UAS must hold a remote UAS pilot certificate and be an ODOT pilot.

For training purposes, an employee may operate a department UAS under the direct supervision of an ODOT pilot in a controlled environment. Prior to training, please confer with agency flight operations coordinator.

All personnel engaged in the operation of the UAS in accordance with this authorization must read and comply with the appropriate conditions, limitations, and provisions of Part 107, and this document.

5.5 MISSION PLANNING

In addition to the normal mission planning for the project or task, prior to flight, the PIC must:

- Conduct an assessment of the proposed operating environment. The assessment must include at least the following:
    - Local weather conditions expected.
    - Local airspace and any flight restrictions.
    - The location of persons and property on the surface.
    - Other ground hazards.

5.6 CONDUCTING FLIGHTS

5.6.1 Preflight Checks

Prior to each flight, the PIC must conduct a pre-flight inspection and determine the UAS is in a condition for safe flight. The pre-flight inspection must account for all potential discrepancies (e.g. inoperable components, items or equipment). If the inspection reveals a condition that affects the safe operation, the UAS is prohibited from operating until the necessary maintenance

has been performed and the UAS is found to be in a condition for safe flight. Perform an on-site JHA prior to the flight.

The PIC must ensure:

- All UAS flight systems are working properly.
- Control links between the UAS controller and UAS are working properly.
- There is sufficient power to continue flight operations to a normal landing.
- Any object attached or carried by the UAS is secure and does not adversely affect the flight characteristics or controllability of the UAS.
- There is no adverse electromagnetic/radio spectrum interference that could cause loss of control of the UAS.
- All necessary documentation is available for inspection including:
    - Part 107 pilot certificate and proof of Part 107 currency.
    - Government issue photo ID.
    - Aircraft registration.
    - Flight operations checklist.
    - Field logbook.
    - Maintenance logs.
    - Airspace authorizations, and Certificate of Waiver (CoW) (if applicable).
- Pilots must have a copy of a current FAA Sectional Chart (original, dated printout, or electronic image) that depict the flight area on site.
- The weather is suitable for flight.
- The airspace is clear.
- The visual observer is in place.
- Any roadway traffic control necessary is in effect.

Pilots should obtain an area briefing from the pilot web (https://www.1800wxbrief.com/) no more than two hours prior to the proposed flight. Items to be noted and documented are: METAR from nearest station(s), flight restrictions, and other UAS operating notices.

5.6.2 Checklists

The PIC must utilize aircraft specific checklists for all phases of UAS flight (from startup to shutdown).

5.6.3 Sterile Cockpit Procedures

The PIC must not engage in any activity not directly related to the operation of the aircraft.

No flight crewmember (PIC, visual observer or other flight support) may perform any duties during a flight not required for the safe operation of the UAS. No UAS crewmember may engage in, nor may any PIC permit, any activity during a flight which could distract from the performance of their duties, or interfere in any way with the proper conduct of those duties.

The flight includes all ground operations involving take-off and landing (launch or recovery), and all other flight operations in which safety or mission accomplishment might be compromised by distractions.

The use of cell phones or other electronic devices is restricted to communications pertinent to the operational control of the UAS and any required communications with air traffic control.

5.6.4 See and Avoid

The PIC is responsible to remain clear of, and give way to, all manned aviation operations and activities at all times. This is done for the safety of persons or property on the surface with respect to the UAS operation, and to ensure there is a safe operating distance between aviation activities and the UAS at all times.

5.6.5 Situational Awareness

Situational awareness is being aware of what is happening around you. Everyone's situational awareness is based on their knowledge, education and experience and therefore is generally individual and different from others. It may be only as accurate as your own perception and may not accurately reflect reality. In the context of operating UAS, it is vital to maintain a high level of situational awareness of your working environment to be able to conduct safe, productive flights. Before each flight consider:

- Anything in the area that could pose a threat to the safety of the flight.
- The threat significant enough to postpone the flight.
- Anything that can be done to minimize the threat and continue with the flight safely.

Utilize the SLAM technique: **Stop > Look > Assess > Manage.**

5.6.6 Observers

Limit the number of observers to that which can be adequately monitored and protected by personnel and resources onsite. Non-participating observers must be provided with a safety briefing and be directed to, and contained within, a specific observation area that minimizes the risk of injury and ensures they do not interfere with the UAS operation.

5.7 RESPONSIBLE CHARGE

If any of the work performed or products developed from the UAS flights are construed to be surveying, photogrammetry or engineering as defined in ORS 672.002 through 672.007, the work must be performed under the responsible charge of a professional engineer, professional land surveyor or professional photogrammetrist registered in the state of Oregon.

5.8 WAIVERS

Several of the terms and provisions contained in Part 107 may be waived by the FAA through the issuance of a certificate of waiver. Some of the regulations subject to waiver include:

- Operation from a moving vehicle.
- Visual line of sight aircraft operation.
- Operation of multiple small unmanned aircraft systems.
- Yielding the right of way.
- Operation over people.
- Operation in certain airspace.
- Operating limitations for small unmanned aircraft.

If the PIC finds it necessary to deviate from the stipulated provisions and believes they can conduct those flights safely, they must submit an application to the FAA for a waiver. The request must contain a complete description of the proposed operation and justification showing that the operation can be conducted safely under a new set of terms. The justification must be "performance based" and clearly demonstrate how (FAA concerned) safety will be maintained.

Waivers are typically issued for a period of six months to two years.

If approved, the FAA will issue a certificate of waiver authorizing the deviation and may include additional terms. **Retain a copy of all approved waivers in the enterprise system.**

The application can be found at the following site: https://faadronezone-access.faa.gov/

5.9 AUTHORIZATIONS

The FAA may issue an authorization to operate within a controlled airspace. The request must contain a complete description of the proposed operation and justification showing that the operation can be conducted safely within the controlled airspace. Authorizations are short term and are typically issued for a period of one to six months.

The application can be found at the following site: https://faadronezone-access.faa.gov/

5.10 LOW ALTITUDE AUTHORIZATION AND NOTIFICATION CAPABILITY (LAANC)

Another method to achieve an airspace authorization is LAANC. LAANC is a collaboration between FAA and industry. It directly supports UAS integration into the airspace. LAANC provides access to controlled airspace near airports through near real-time processing of airspace authorization below approved altitudes. LAANC authorizations and related flight records will be recorded and retained by the PIC.

6 CONTRACTING FOR UAS SERVICES

The UAS contractor/consultant must follow FAA Part 107, state and local regulations. The contractor/consultant will be required to register their UAS with the FAA and ODA and provide that registration information, proof of pilot certification, insurance, and currency upon request.

If any of the work performed or products developed from the UAS flights are construed to be surveying, photogrammetry or engineering as defined in ORS 672.002 through 672.007, the work must be performed under the responsible charge of a professional engineer, professional land surveyor or professional photogrammetrist registered in the state of Oregon.

7 REFERENCES/SOURCES

Aeronautical Information Manual (AIM): http://www.faa.gov/air_traffic/publications/

Aeronautical Charts (Digital):
http://www.faa.gov/air_traffic/flight_info/aeronav/digital_products/

Certificate of Waiver applications: https://faadronezone-access.faa.gov/

FAA UAS Declaration of Compliance (Remote ID/Operations Over People):
https://uasdoc.faa.gov/listDocs

FAA General UAS Information: www.faa.gov/uas

FAA Remote Pilot Part 107 Currency Course:
https://www.faasafety.gov/gslac/ALC/course_content.aspx?pf=1&preview=true&cID=677

FAA On-Line COA Application and Reporting: https://ioeaaa.faa.gov/oeaaa/

LAANC Facility Map:
https://faa.maps.arcgis.com/apps/webappviewer/index.html?id=9c2e4406710048e19806ebf6a06754ad

National Transportation Safety Board: www.ntsb.gov

NOTAM Information: https://pilotweb.nas.faa.gov/PilotWeb/

NOTAM Issuance: www.1800wxbrief.com

Pilot/Controller Glossary: https://www.faa.gov/air_traffic/publications/

Pilot's Handbook of Aeronautical Knowledge:
https://www.faa.gov/regulations_policies/handbooks_manuals/aviation/phak/

Restricted, Prohibited, or Special Flight Rule Area Charts:
http://www.faa.gov/air_traffic/flight_info/aeronav/

UAS Registration:

FAA - https://faadronezone-access.faa.gov/

ODA - https://www.oregon.gov/aviation/admin/Documents/Form/ODA_FORMS_001.pdf

Aviation Weather Guide: https://www.faa.gov/nextgen/programs/weather/

8 APPENDIX

8.1 ABBREVIATIONS AND ACRONYMS

AC	Advisory Circular
AGL	Above Ground Level
ATC	Air Traffic Control
CFI	Certificated Flight Instructor
CFR	Code of Federal Regulations
COA	Certificate of Authorization
DPE	Designated Pilot Examiner
FAA	Federal Aviation Administration
FSDO	Flight Standards District Office
ICAO	International Civil Aviation Organization
METAR	Aviation Weather
NAS	National Airspace System
NOTAM	Notice to Airmen
NTSB	National Transportation Safety Board
PIC	Remote Pilot in Command
sUAS	Small Unmanned Aircraft System (UAS' under 55lbs)
TFR	Temporary Flight Restriction
TSA	Transportation Security Administration
UAS	Unmanned Aircraft System
VLOS	Visual Line of Sight
VO	Visual Observer

8.2 DEFINITIONS

Flight	An individual operation of the UAS from takeoff to landing.
Mission	A series of UAS flights conducted at a single location each day.
Project Site	The area of flight operations.

Visual Observer	Person designated by the PIC to assist to see and avoid other air traffic or objects.
Control Station	A device used by the remote pilot to control the flight path of the UAS.
Nautical Mile	1 nautical mile = 1.1508 mile = 6076.1 feet

8.3 REFERENCE DOCUMENTS

Much of the information contained in this document was obtained from the following sources:

- 14 CFR Part 107 (Small Unmanned Aircraft Systems).
- Public Law PL 112-95, Title III, Subtitle B - Unmanned Aircraft Systems.
- Advisory Circular (Small Unmanned Aircraft Systems) AC 107-2A.
- Federal Aviation Administration website: www.faa.gov/uas.
- Oregon Department of Aviation website: www.oregon.gov/aviation.

ODOT provides a safe and reliable multimodal transportation system that connects people and helps Oregon's communities and economy thrive.

www.oregon.gov/ODOT