

Waiver Request Information

Uncrewed Aircraft Systems (UAS) applicants may request permission from the Federal Aviation Administration (FAA) to waive certain regulations. This information is intended to improve those requests to decrease processing time and increase approval rates.

Background:

UAS operating under Part 91 cannot satisfy some of the regulatory requirements in that Part. Nevertheless, 14 Code of Federal Regulations 91.903 allows the FAA to waive certain regulatory requirements after finding that the proposed operation can be safely conducted under the terms and conditions of a certificate of waiver (COA). Given that two operational scenarios will rarely be identical in all material respects, the required finding that a proposed operation can be safely conducted under the terms and conditions of a COA almost always will require a case-by-case analysis. Please also note that certain regulations are not subject to waiver or authorization by the Air Traffic Organization (ATO) and instead require a petition for exemption to be submitted under 14 CFR part 11 or a waiver to be issued by Flight Standards (AFS) under parts 91 or 107. The mitigations presented below are intended to address, for example, waivers or authorizations issued by ATO for relief from §§ 91.113, 107.41, or 107.43.

Set forth below are hazards arising in certain proposed scenarios (i.e., location, size of UAS, etc.), that the FAA may address under the terms and conditions of the COA or for which an applicant may propose mitigations in its waiver request. Not every operational scenario, even if similar, will give rise to the same hazard(s), if any. In addition, the applicant is not required to include mitigations in its waiver request and doing so will not guarantee a finding that the operation can be safely conducted.

Also, adopting any of the mitigation(s) below does not alleviate the operation from (1) meeting the requirement that they must not impose undue risk to the other National Air Space (NAS) operators (see §§ 91.111 and 107.23), (2) complying with the regulations that cannot be legally waived (see § 91.905), and (3) addressing any Federal Communication Commission (FCC) spectrum requirement.

Hazards and Mitigations:

- a. **Increased Air Traffic Control (ATC) Workload:** Certain mitigations to hazards significantly increase ATO's workload including, but not limited to:
 - Radio Communication with ATC
 - NAS Accommodation (Sectional Chart Change / Temp Flight Restriction (TFR) / runway closure)
- b. **Inability to see:** Does the operation have the capability to detect other aircraft in the airspace? Mitigation may include, but is not limited to:
 - Visual Line of Sight (VLOS)
 - Extended VLOS
 - Chase Plane
 - Detect and Avoid (DAA) system
 - Ground based Radar

c. **Inability to Avoid:** Does the operation have the capability to avoid other aircraft in the airspace? Avoidance performance must be sufficient to support the performance of the “Inability to see” mitigation so the UAS can maneuver and avoid the collision. (The inability to avoid hazard is in addition to Emergency Navigation.)

d. **Inability to be Seen:** Is the operation able to be detected by other aircraft in the airspace? Mitigations include, but are not limited to:

- Large size
- High visibility paint
- High intensity lighting

e. **Lack of Visibility:** Windshields are used for many things besides See and Avoid. Is the operation able to identify these other things? [weather, obstacles, taxiways, airport trucks, lawn mowers, etc.] Mitigations include, but are not limited to:

- VLOS
- Visual Observers
- Extended VLOS Visual Observer network
- First Person View Camera
- Inspection Camera can be used in abnormal situations.
- AI Optical recognition System
- Detect Local Weather Conditions

f. **Lack of Surveillance-Real Time Surveillance:** Can the operation broadcast information so ATC and the NAS are informed of the aircraft’s position and altitude? Mitigations include, but are not limited to:

- Transponder
- ADS-B
- Radio Position Broadcast
- Network Remote ID (RID)

Note: Network RID was removed from the final 15 Jan 2021 RID rule but may be developed independently by industry.

- Broadcast RID with a receiver network

Note: Employs low wattage Bluetooth v4.0 or v5.0 or greater or Wi-Fi 2.4 or 5 GHz bands and thus yield short range transmissions. Broadcast RID fixed receivers for airports are currently under discussion but no fixed receiver solution has yet been identified.

- Uncrewed Traffic Management system (UTM)

g. **Lack of Surveillance-Non-Real Time Surveillance:** Are ATC and the NAS given advance notification of the operations presence and location? Mitigations include, but are not limited to:

- Restricted to Limited Operating Area (UAS will be somewhere within the area)
- Submitted Flight Plan / Letter of Agreement
- NOTAM
- UAS Facility Map (UASFM) Authorizations

h. **Lack of Communication-Real Time:** Is the operation capable of actively communicating with the NAS? Mitigations include, but are not limited to:

- Broadcast (CTAF)

- Phone Call to ATC / Ops
- ATO Broadcast (ATIS)

i. **Lack of Communication-Non-Real Time:** Has the NAS/ATC been informed of the operation? Mitigations include, but are not limited to:

- NOTAM
- Advance ATC coordination
- Outreach to local operators
- Communications Plan

j. **Insufficient Navigational Performance:** Does the operation meet required navigational performance to stay within vertical and lateral flight boundaries to avoid neighboring airspace, obstacles and other aircraft? Mitigations include, but are not limited to:

- Certified Performance
- Geofence
- Operating Limitations based on UAS capability (wind, electromagnetic interference, etc.)
- Tether

k. **Lack of Emergency Navigation:** Is the operation able to perform navigational maneuvers in case of an emergency? Mitigations include, but are not limited to:

- Ability to execute Ad Hoc ATO navigation instructions (manual flight capable)
- Auto return to safe location
- Documented Emergency Procedures

Hazards Chart:

Below is a chart identifying potential hazards based upon the operational parameters. This chart was developed by reviewing approved waivers and the hazards they addressed.

Use the size of the drone to identify the major row applicable to your operation:

- Large > 55lbs
- Small < 55lbs
- Micro < 0.55lbs

Use the type of airspace the drone will operate within to identify the minor row applicable to your operation:

- Class High E
- Class A
- Class B
- Mode C Veil
- Class C
- Class D
- Class E
- Class G

Use the operational altitude to identify the major column applicable to your operation:

- On the airport
- Below the UAS Facility Maps in controlled airspace at or below 400ft
- Above the UAS Facility Maps in controlled airspace above 400ft

- Above 1200ft AGL

The minor columns represent the letters a thru k corresponding to the above listed hazards. An “X” in the box suggests that prior approved operations had this hazard represented in their proposal.

This chart is not an exhaustive list of hazard(s) that may arise in each operational scenario. Addressing each hazard is not required and will not guarantee approval. Moreover, the mitigation list above is not an exhaustive list and using such mitigation will not guarantee approval. Again, given that two operational scenarios will rarely be identical in all material respects, the required finding that a proposed operation can be safely conducted under the terms and conditions of a COA almost always will require a case-by-case analysis.

TLS values represent the Target Level of Safety ATO uses as a minimum likelihood that a UAS Operation will collide with a crewed vehicle.

The shaded section of micro drones operating under the UAS facility maps represent the minimum set of hazards/mitigations.

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