



**U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION**

**ORDER
8130.34D**

National Policy

09/08/2017

SUBJ: Airworthiness Certification of Unmanned Aircraft Systems and Optionally Piloted Aircraft

This order establishes procedures for issuing special airworthiness certificates in the experimental category to unmanned aircraft systems (UAS), optionally piloted aircraft (OPA), and aircraft intended to be flown as either a UAS or an OPA under the designation "OPA/UAS". This order also establishes procedures for issuing special flight permits to UAS for the purpose of production flight testing. The procedures in this order apply to Federal Aviation Administration (FAA) aviation safety inspectors (ASI) and private persons delegated authority to issue special airworthiness certificates.

A handwritten signature in blue ink, reading "Michael J. Kaszycki".

Michael J. Kaszycki
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Table of Contents

<i>Paragraph</i>	<i>Page</i>
Chapter 1. Introduction	1-1
1. Purpose of This Order.....	1-1
2. Audience.....	1-1
3. Where Can I Find This Order?.....	1-1
4. Explanation of Policy Changes.....	1-1
5. Cancellation.....	1-2
6. Effective Date.....	1-2
Chapter 2. Airworthiness Certificates, Authorized Personnel, and Coordination	2-1
Section 1. Airworthiness Certificates	2-1
1. FAA Form 8130-7, Special Airworthiness Certificate.....	2-1
2. Replacement or Amendment of Airworthiness Certificates.....	2-3
3. Surrendered Airworthiness Certificate.....	2-5
4. Safeguarding FAA Airworthiness Certificates.....	2-5
Section 2. Authorized Personnel.....	2-5
1. Personnel Authorized to Issue Special Airworthiness Certificates to UAS, OPA, and OPA/UAS.....	2-5
2. Original Certification.....	2-5
3. Recurrent Certification.....	2-6
4. Exceptions.....	2-6
Section 3. Coordination with FAA Offices.....	2-6
1. Coordination of Original Airworthiness Certificates.....	2-6
2. Coordination of Recurrent Airworthiness Certificates.....	2-7
Chapter 3. Special Airworthiness Certification	3-1
Section 1. Certification of UAS, OPA, and OPA/UAS	3-1
1. “Certificated as a system.”	3-1
2. UAS Certification.....	3-1
3. OPA Certification.....	3-1
4. OPA/UAS Certification.....	3-2
Section 2. Policies and Procedural Requirements.....	3-3
1. General.....	3-3
2. Registration.....	3-3
3. FAA Form 8130-6, Application for U.S. Airworthiness Certificate.....	3-3
4. UAS Risk Index.....	3-3
5. Program Letter.....	3-4
6. Safety Checklist.....	3-5
7. Flight Areas.....	3-5
8. Flight Test Plan.....	3-6
9. UA Operating Policy.....	3-7

Table of Contents

<i>Paragraph</i>	<i>Page</i>
10. Contingency Planning.....	3-7
11. Spectrum Authorization.....	3-7
12. Automation in UA Operations.....	3-7
13. UAS Crewmembers.....	3-7
14. Maintenance and Inspection.....	3-7
15. Aircraft Markings.....	3-7
16. Safety Evaluation.....	3-8
17. Operating Limitations.....	3-9
18. FAA Form 7711-1, Certificate of Waiver or Authorization (COA).....	3-10
19. Possession and Display of Documentation.....	3-10
20. Onsite Inspection.....	3-10
21. Recording of Inspections.....	3-11
22. Major Program or Configuration Changes.....	3-11
23. Transfer of Ownership.....	3-11
24. Records Retention.....	3-11
 Section 3. Exhibition Certification of Unmanned Aircraft.....	 3-11
1. General.....	3-11
2. UA Aviation Event/Air Show Safety Case and Waiver.....	3-11
3. Difference with Certification Phases in FAA Order 8130.2.....	3-11
4. Home Base Changes or Ownership Transfers.....	3-12
 Section 4. Inspection Activities.....	 3-12
1. Supporting Documentation.....	3-12
2. Additional Documentation.....	3-13
3. Aircraft, Control Station, and Associated Elements Inspection.....	3-14
4. Certificate Issuance.....	3-15
5. Flight Activity.....	3-15
6. Post-Certification.....	3-15
Figure 1. Overview of the Airworthiness Certification Process.....	3-16
 Chapter 4. Administrative Information.....	 4-1
1. Distribution.....	4-1
2. Background.....	4-1
3. Authority to Change This Order.....	4-1
4. Forms.....	4-1
5. Deviations.....	4-1
6. Suggestions for Improvement.....	4-1
7. Records Management.....	4-1
 Appendix A. Sample Operating Limitations for UAS.....	 A-1
Table A-1. FAA Regional Operations Centers.....	A-6
 Appendix B. Sample Operating Limitations for OPA and OPA/UAS.....	 B-1
1. Applicability.....	B-1

Table of Contents

<i>Paragraph</i>	<i>Page</i>
2. Opting Out of the Safety Evaluation.....	B-1
3. The OPA System.....	B-1
Appendix C. Program Letter.....	C-1
1. The Intended Operation and How It Meets the Desired Purpose.	C-1
2. Description of Past Flight History.	C-2
3. Definition of Flight Areas.....	C-2
4. Aircraft and Support Equipment Configuration.	C-3
5. Safety and Risk Mitigation.	C-3
6. Certification Category.....	C-3
Appendix D. Safety Checklist.....	D-1
1. Introduction.....	D-1
2. Aircraft Segment.....	D-1
3. Command and Control Segment.....	D-2
4. Ground Support Equipment.	D-3
5. Software Development Process.	D-3
6. Operations.....	D-3
7. Organizational Considerations.....	D-7
Appendix E. UAS Risk Index.....	E-1
Table E-1. Risk Categories.....	E-1
Table E-2. Special Considerations.....	E-1
Table E-3. Group Categories.....	E-2
Table E-4. Applicant Tasks.....	E-2
Appendix F. Definitions.....	F-1
Appendix G. FAA Form 1320-19, Directive Feedback Information.....	G-1

Chapter 1. Introduction

1. Purpose of This Order. This order establishes procedures for issuing special airworthiness certificates in the experimental category or special flight permits to unmanned aircraft systems (UAS) and manned aircraft integrated with UAS technology. For the purposes of this directive, manned aircraft integrated with UAS technology are referred to as optionally piloted aircraft (OPA). For an OPA, the method of controlling the aircraft is optional. This means control may either be through the pilot onboard the aircraft or from a remote station via control link. In either case, the pilot in command always remains onboard the aircraft. Aircraft intended to be flown as either an OPA or UAS will be given the designation “OPA/UAS.” The terms “UAS” and “OPA” are further defined in appendix G to this order.

Note: The use of the word “should” throughout this order refers to a recommended practice. The associated activity is not a requirement; therefore, a record of completion is not required.

2. Audience. All Aircraft Certification Service (AIR) offices, Flight Standards District Offices (FSDO), and Air Traffic Organization (ATO) offices involved in UAS, OPA, and OPA/UAS operations. The procedures contained in this order also apply to private persons delegated authority to issue special airworthiness certificates to UAS, OPA, and OPA/UAS.

3. Where Can I Find This Order? You can find this order on the internet at http://www.faa.gov/regulations_policies/orders_notices/ or at http://rgl.faa.gov/Regulatory_and_Guidance_Library/rgPolicy.nsf/MainFrame?OpenFrameset.

4. Explanation of Policy Changes. This revision—

a. Removes AIR-6C3 from the role of coordinating the issuance of original airworthiness certificates.

b. Expands the role of FSDO airworthiness aviation safety inspectors (ASI) in the certification process. Airworthiness ASIs are authorized to issue special airworthiness certificates to UAS, OPA, and OPA/UAS and have primary responsibility for recurrent certifications.

c. Expands the purposes for which special airworthiness certificates may be issued to UAS, OPA, and OPA/UAS. New purposes for experimental certificates include showing compliance with regulations and exhibition.

d. Addresses the role of designees at UAS test sites as covered in Federal Aviation Administration (FAA) Order 8000.372, *Unmanned Aircraft Systems (UAS) Designated Airworthiness Representatives (DAR) for UAS Certification at UAS Test Sites*.

e. Revises operating limitations for UAS, OPA, and OPA/UAS and identifies the office of primary responsibility (OPR) for each limitation.

f. Revises maintenance related operating limitations and references new maintenance and inspection guidance in FAA Order 8900.1, *Flight Standards Information Management System*.

g. Addresses the issuance of FAA Form 7711-1, Certificate of Waiver or Authorization (COA), to UAS and OPA/UAS.

h. Removes aircraft registration information. The [aircraft registry](#) information on the FAA website provides the most up-to-date information.

i. Adds a risk assessment process that allows the FAA to determine the applicability of certification tasks for UAS programs. Allowances are given to programs that exhibit less risk.

j. Revises the program letter template in appendix C.

k. Revises the safety checklist template in appendix D.

l. Adds small unmanned aircraft marking guidance from Title 14 of the Code of Federal Regulations part 48.

m. Removes references to supplemental pilots.

n. Authorizes the use of the fillable PDF format FAA Form 8130-7, Special Airworthiness Certificate.

5. Cancellation. The following are cancelled upon the effective date of this order:

a. FAA Order 8130.34C, *Airworthiness Certification of Unmanned Aircraft Systems and Optionally Piloted Aircraft*, dated August 2, 2013.

b. All clarification or deviation memorandums issued for the original version of FAA Order 8130.34 or any subsequent revision that are dated prior to the effective date of this order.

6. Effective Date. This order is effective 09/08/2017.

Chapter 2. Airworthiness Certificates, Authorized Personnel, and Coordination

Section 1. Airworthiness Certificates

1. FAA Form 8130-7, Special Airworthiness Certificate.

a. Purpose. A special airworthiness certificate may be issued for an aircraft that does not meet the airworthiness requirements for a standard airworthiness certificate. FAA Form 8130-7 may be issued to UAS, OPA, and OPA/UAS, pursuant to Title 14 of the Code of Federal Regulations (14 CFR), for the following:

(1) An experimental certificate may be issued for the purposes of research and development (R&D), showing compliance with regulations, crew training, exhibition, and/or market survey, as defined in [14 CFR 21.191](#). Previous versions of this order only provided for the issuance of experimental certificates for the following purposes under [§ 21.191](#): R&D, crew training, and market survey. Exhibition was added based on requests from the UAS industry. Showing compliance with regulations was added to facilitate the type certification process. The FAA will continue to evaluate the need to further expand the purposes for which experimental certificates will be issued to UAS, OPA, and OPA/UAS under [§ 21.191](#). Air racing was not included in this order because of the increased risk involved with unmanned aircraft performing such operations under other than 14 CFR part 107. Operating amateur-built aircraft was not included in this order because unmanned aircraft used for hobby or recreational purposes may be developed and operated as model aircraft without an experimental certificate if they meet the requirements of [14 CFR part 101, Subpart E](#). Operating a primary kit-built aircraft was not included in this order because no UAS, OPA, or OPA/UAS manufacturer has obtained a type certificate or production certificate for a UAS, OPA, or OPA/UAS kit. Finally, the purpose of operating a light-sport aircraft (LSA) was not included in this order because consensus standards have not been developed to allow for remote control of an LSA.

(2) A special flight permit may be issued for production flight testing new production aircraft as stated in [§ 21.197](#), even though a type certificate has not been issued for the aircraft. The aircraft may not currently meet applicable airworthiness requirements, but must be capable of safe flight. The manufacturer must hold ownership of the aircraft during production flight testing. The FAA will continue to evaluate the need to further expand the purposes for which special flight permits will be issued to UAS, OPA, and OPA/UAS under [§ 21.197](#). Issuance of a special flight permit for the purposes of delivering or exporting an aircraft and flying the aircraft to a base where repairs, alterations, or maintenance are to be performed, or to a point of storage were not included in this order because this order restricts civil UAS, OPA, and OPA/UAS to a well-defined flight area during remote control operations. This is also why the [§ 21.197](#) purpose of operating an overweight aircraft for flight beyond the normal range over areas where adequate landing facilities or fuel is not available was not included in this order. The purpose of evacuating aircraft from areas of impending danger was not included in this order due to the length of the certification process. For example, exemptions for UAS operations typically take approximately 180 days to process. Finally, the purpose of conducting customer demonstration flights in new production aircraft that have successfully completed production flight tests was not included in this order because type certification procedures of UAS, OPA, or OPA/UAS that

carry passengers or cargo are still in development. OPA and OPA/UAS that deactivate or render their remote control system inoperative are no longer eligible for OPA or OPA/UAS certification but may be able to obtain a special flight permit for these purposes using the procedures in FAA Order 8130.2, *Airworthiness Certification of Products and Articles*.

b. Experimental Airworthiness Certificates, Multipurpose. An experimental certificate may be issued for more than one of the purposes specified in [§ 21.191](#). The FAA may use its discretion in determining whether to issue a multipurpose certificate or not allowing the aircraft to be used concurrently for more than one purpose. The FAA representative should consider how the aircraft configuration may change and how the operation of the aircraft may change from one purpose to another. This information must be included in the applicant's program letter because it may impact the aircraft's operating limitations. Some operations under an R&D certificate may preclude the aircraft's use for the purpose of exhibition. For example, if the holder of an experimental certificate for the purpose of exhibition seeks an experimental certificate for the purpose of R&D for the installation of external fuel tanks, the aircraft will require modifications; and, therefore, the aircraft should only be issued an experimental certificate for the purpose of R&D.

c. Filling Out FAA Form 8130-7. The blocks on FAA Form 8130-7 must be completed using all applicable information obtained from a completed FAA Form 8130-6, Application for U.S. Airworthiness Certificate, or from the manufacturer's identification (ID) plate. When completing block A of FAA Form 8130-7, Category/Designation, include the words "Experimental" or "Special Flight Permit," as appropriate. When completing block A, Purpose, include the words "Research & Development," "Crew Training," "Market Survey," "Exhibition," and/or "Showing Compliance," as appropriate, for an experimental certificate, or "Production Flight Testing" for a special flight permit.

d. Effective Period.

(1) As set forth in [§ 21.181](#), an experimental certificate for R&D, showing compliance with regulations, crew training, or market survey is effective for one year after the date of issuance or renewal unless the FAA prescribes a shorter period.

(2) A special flight permit issued for production flight testing is effective for the period of time specified in the permit.

(3) An experimental certificate for exhibition may be effective for an unlimited amount of time unless the FAA finds good cause to establish a specific period. If a new flight area is subsequently added to the program letter, the FAA must evaluate the impact to the operating limitations and the need for an amended certificate. Also, the addition of a new flight area will require the reissuance of the FAA Form 7711-1.

e. Fillable PDF Form. The FAA Form 8130-7 may be a Government Printing Office (GPO) preprinted paper form or a fillable PDF. The fillable PDF format may be found on the MyFAA employee web site at https://employees.faa.gov/tools_resources/forms/. The date on the form defaults to the "DD MMM YYYY" format. Also, there is a pull-down menu in front of the date to allow entering a letter, such as an "R" for a replacement certificate. When printing a

certificate, set the page scaling to none, or actual size. Use white 8½” x 11” paper. It is recommended to use a heavy weight paper. There were minor format changes made to FAA Form 8130-7. The top half of the first page has an image that resembles the old preprinted form, followed by the conditions and limitations. The A through E limitations that were printed on the back of the old preprinted form are now printed below the front of the certificate. The operating limitations date field was removed because the certificate and limitations are now printed together. A change to the limitations is accomplished by either issuance of a new certificate or an amendment. When issuing a replacement certificate and the original operating limitations are available, you may delete conditions and limitations and replace them with a statement such as, “The attached operating limitations dated DD MMM YYYY are part of this certificate.”

(1) The category/designation block has a pull-down menu prepopulated with the following: restricted, limited, primary, light-sport, experimental, provisional, and special flight permit. For the purposes of this order, only select experimental or special flight permit.

(2) The purpose block also has a pull-down menu that is prepopulated based upon the selection made in the category/designation block. All of the blocks, including the blocks with a pull-down menu are editable and, when necessary, should be modified per this order.

(3) Small unmanned aircraft may be registered under [14 CFR part 48](#) with the FAA’s [online web-based process](#) and marked with the unique identifier as described in [§ 48.200](#). Enter the unique identifier in the box to the right of “SERIAL NO.” rather than the aircraft’s actual serial number.

(4) The conditions and limitations section of the form will expand to allow for any number of limitations and pages.

(5) If the certificate is not for production flight testing, delete the flight test paragraph.

(6) If the certificate is not for a special flight permit, delete the line authorizing the flight specified.

f. Electronic Signatures. The signature of the ASI or designee on any FAA certificate or form must be made on the original and required copies. The signature must be in blue or black ink. A digital signature that meets the requirements of FAA Order 1370.104, *Digital Signature Policy*, is also acceptable.

2. Replacement or Amendment of Airworthiness Certificates. Changes to the current airworthiness certificate require specific actions and the issuance of a new FAA Form 8130-7. Each form will be completed in accordance with this order.

a. Replacement.

(1) The FAA may issue a replacement airworthiness certificate when a certificate is declared lost, has been mutilated, is no longer legible, or contains inaccurate and/or erroneous information. The replacement airworthiness certificate must carry the original issue date of the certificate being replaced, preceded by a capital “R” in the Date block of the certificate.

Replacement certificates also will be issued when the aircraft registration number has been changed.

(2) A request for a replacement certificate is made to the issuing office. The registered owner must make this request in writing by submitting a signed statement containing the registration number, serial number, make, and model of the aircraft, and a reason the replacement certificate is needed.

(3) A replacement airworthiness certificate may be issued without supporting documentation from the Aircraft Registry if the date of issuance and the airworthiness classification and/or category of the lost or mutilated certificate can be positively established from the aircraft records, or from the remains of the certificate. If there is insufficient data on which to base issuance of the replacement certificate, the FAA will request copies of the appropriate data (such as the application form or previously issued airworthiness certificate) from the Aircraft Registration Branch.

(4) Before issuing a replacement certificate, the FAA must review the aircraft records and, if necessary, inspect the aircraft to ensure that the applicant's request is justified and that the aircraft is eligible for a special airworthiness certificate. The records review should include, but is not limited to, items such as registration, exemptions, maintenance records, replacement parts, weight and balance, manuals, and flight testing. A complete aircraft records inspection is not required.

(5) When issuing a replacement for a special airworthiness certificate, the operating limitations must match the operating limitations on the original certificate verbatim. Only modifications to the operating limitations for correcting administrative mistakes are allowed.

b. Amendment.

(1) A special airworthiness certificate may be amended when there is a change in the operating limitations.

Note: Changes to any system, component, software, operating airspace, or program objective may affect the operating limitations. The FAA must discuss changes with the applicant to understand how the proposed change could impact the operating limitations. Major program changes will require coordination with other FAA offices.

(2) When a certificate is amended, the issuance date will be the current date, and the capital letter "A" will be placed in front of the date.

(3) Any amendment of an airworthiness certificate will require submission of an FAA Form 8130-6 to the responsible certification office. An appropriate record entry will be made in the aircraft records documenting the issuance of the amended certificate.

(4) A copy of the FAA Form 8130-6 and the amended certificate must be forwarded to the Aircraft Registration Branch.

3. Surrendered Airworthiness Certificate.

a. Written Authorization. An aircraft owner may voluntarily surrender an airworthiness certificate. An authorized representative of the aircraft owner may also surrender an airworthiness certificate by written authorization. The authorization and certificate must be forwarded to the Aircraft Registration Branch for retention in the permanent airworthiness files for that aircraft.

b. Selling or Leasing to Foreign Persons. When an aircraft owner sells a U.S.-owned aircraft to a purchaser in another country, or registers a leased aircraft in another country, the aircraft is removed from the U.S. registry and the airworthiness certificate is no longer effective. The owner must surrender the airworthiness certificate to the FAA.

4. Safeguarding FAA Airworthiness Certificates. Airworthiness certificates are official forms and must be safeguarded by those who are charged with their issuance. Scanned, photocopied, or other reproduced versions of the FAA Form 8130-7 cannot be issued. Every measure must be taken to ensure these certificates are not obtained by persons not authorized to issue airworthiness certificates. At no time may a blank certificate be given to any unauthorized individual. Blank airworthiness certificates must be secured in a locked container when left unattended.

Section 2. Authorized Personnel

1. Personnel Authorized to Issue Special Airworthiness Certificates to UAS, OPA, and OPA/UAS.

a. FAA ASIs. Manufacturing ASIs have primary responsibility for the issuance of original special airworthiness certificates to UAS, OPA, and OPA/UAS. Airworthiness ASIs have primary responsibility for the issuance of recurrent special airworthiness certificates.

b. UAS DARs Authorized to Issue Certificates at UAS Test Sites. FAA Order 8000.372 contains policy and procedures for the selection, appointment, orientation, training, oversight, suspension, and termination of UAS DARs affiliated with UAS test sites. Order 8000.372 also provides the process to appoint UAS DARs who may then be authorized to issue special airworthiness certificates in the experimental category at UAS test sites.

2. Original Certification. For the purpose of this order, the term “original certification” applies to the issuance of special airworthiness certificates for the following:

a. UAS, OPA, or OPA/UAS that have never held a U.S. airworthiness certificate, except for a special flight permit.

b. UAS, OPA, or OPA/UAS involved in a certification project such as developing a type certificate or supplemental type certificate.

3. Recurrent Certification. For the purpose of this order, the term “recurrent certification” applies to the issuance of special airworthiness certificates that do not meet the original certification criteria listed above.

4. Exceptions.

a. Any requests, original or recurrent, for a special airworthiness certificate authorized under this order may be coordinated by a manufacturing ASI or an airworthiness ASI. If the responsible office cannot support the certification request, an appropriate delegation should be coordinated with an alternate office.

b. If a FSDO receives an application for an original airworthiness certification, that FSDO must coordinate with the responsible Manufacturing Inspection District Office (MIDO) to determine if the MIDO will process the application or hand-off this responsibility to the FSDO. Similarly, if a MIDO receives an application for a recurrent airworthiness certification, the MIDO must coordinate with the responsible FSDO to determine if the FSDO will process the application or hand-off this responsibility to the MIDO.

c. Processing an application for a special airworthiness certificate in the experimental category for the purpose of showing compliance with the regulations is the primary responsibility of the MIDO. In remote areas or under special circumstances, the MIDO may request that an airworthiness ASI perform these duties if it is established that the person has had experience with UAS, OPA, or OPA/UAS certification of a type and complexity comparable to the certificate requested.

d. If certification responsibility is handed-off to another office, certain operating limitations may be modified, as required, to identify the responsible office.

Section 3. Coordination with FAA Offices

5. Coordination of Original Airworthiness Certificates. A manufacturing ASI or airworthiness ASI will coordinate the original airworthiness certification of a UAS, OPA, or OPA/UAS with the FAA offices included in this section. The ASI acts as a single point of contact between the applicant and the FAA offices. The ASI ensures the program letter, safety checklist (if determined to be necessary to meet the pertinent regulatory standards; see appendix E, UAS Risk Index, to this order), documents, manuals, and communications from the applicant are provided to the appropriate FAA offices. The ASI also provides the operating limitations document to the FAA offices. Adequate time must be provided for review of all documentation. The FAA offices that are involved with the original certification of a UAS, OPA, or OPA/UAS include—

a. The Technical Support Branch (AUS-420) of the UAS Safety and Integration Division (AUS-400). This office provides risk assessments and hazard analysis. Responsibilities include, but are not limited to, review of the program letter, major program and configuration changes, safety cases, and operating limitations. AUS-420 will also review the safety checklist and flight test plan, which are specified in appendix E to this order.

b. The General Aviation Operations Branch (AFS-830) of the General Aviation and Commercial Division (AFS-800). This office consists of operations ASIs who provide guidance for operational procedures and aircrew issues. Responsibilities include, but are not limited to, review of program letters, operations manuals, aircrew training manuals, major program and configuration changes, crewmember qualification and training documents, safety cases, and the operating limitations. AFS-830 will also review the safety checklist and flight test plan, as specified by the UAS Risk Index. An operations ASI has primary responsibility for the flight portion of the onsite inspection. AFS-830 may request support from the geographically responsible FSDO.

c. The Emerging Technologies Team, (AJV-115) of the Air Traffic Organization. This office consists of air traffic specialists that determine feasibility of flight areas. AJV-115 provides air traffic procedures which consist of lost link procedures, flight termination procedures, and alternate means of compliance with the right-of-way requirements of [14 CFR 91.113](#). These air traffic procedures are documented on an FAA Form 7711-1. The applicant's program letter and safety checklist will assist in formulating air traffic procedures. This office must be notified of major program or configuration changes that impact airspace or air traffic procedures. This office also reviews the operating limitations.

d. The geographically responsible FAA office (MIDO, Manufacturing Inspection Satellite Office (MISO), or FSDO) performing the certification. The manufacturing ASI or airworthiness ASI is responsible for completing the coordination requirements, as described in this section, with other FAA offices and ensuring the certification requirements in chapter 3 of this order are complete.

e. The geographically responsible airworthiness ASI. Responsibilities regarding the inspection and maintenance program are specified in [FAA Order 8900.1](#). Pursuant to the UAS Risk Index, FSDO participation is not required for the original certification of Group I or Group II UAS programs.

2. Coordination of Recurrent Airworthiness Certificates.

a. If requested by an applicant, an experimental certificate may be reissued. For recurrent certification, the airworthiness ASI acts as a single point of contact between the applicant and AUS-420, AFS-830, and AJV-115. The airworthiness ASI conducting the recurrent certification must coordinate major program or configuration changes and certification documents, as detailed in chapter 3 to this order, with AUS-420, AFS-830, and AJV-115. AUS-420, AFS-830, and AJV-115 responsibilities will continue as described above.

b. When the review and acceptance of a maintenance and inspection program is required, any changes to the maintenance and inspection program will be coordinated with the geographic airworthiness ASI.

Chapter 3. Special Airworthiness Certification

Section 1. Certification of UAS, OPA, and OPA/UAS

1. “Certificated as a system.” UAS, OPA, and OPA/UAS are certificated as a system. The system includes the aircraft and other associated elements that are required to safely operate the aircraft. Examples of associated elements may include items such as a control station, launch rail, recovery net, or communication datalinks.

a. For the purpose of this order, the term “certificated as a system” does not require that each aircraft be operated by a specific control station with a specific datalink antenna. That is, if an applicant has seven aircraft, then it does not mean that seven control stations, seven sets of datalink antennas, and seven launch platforms are also required. In this instance, it is acceptable to certificate all seven aircraft with a single control station, even if the aircraft are different models. Each aircraft’s program letter must include the control station model that is needed for operations. Operationally, this order specifies that each aircraft be controlled by only one control station at a time. A control station may not be used to simultaneously operate multiple aircraft.

b. Just as a single control station can be certificated with multiple aircraft, this order also allows an aircraft to be certificated with multiple control station models. This is a fairly common occurrence, especially for UAS programs. For example, programs that use a laptop computer as their primary control station may use a hand-held control station as a back-up. If the primary control station loses link with the aircraft, the back-up control station may be able to re-establish a datalink with the aircraft since back-up control stations typically operate on a different frequency. When multiple models of control stations are used with an aircraft, each control station model must be included in the program letter, safety checklist, and maintenance and inspection program.

2. UAS Certification. FAA inspectors will use the procedures in this order to issue special airworthiness certificates to UAS. Operating limitations will be composed of the applicable limitations in appendix A to this order. Operating limitations in appendix A to this order were designed to permit unmanned aircraft (UA) to conduct initial flight test and subsequent flight operations without the need to reissue an airworthiness certificate between these phases.

3. OPA Certification. OPA receive experimental certificates and special flight permits using a combination of the certification process in FAA Order 8130.2 and the OPA procedures in this order. Comply with the following:

a. AUS-420, AFS-830, and AJV-115 will be included in the coordination of original and recurrent certificates, pursuant to this order.

b. To meet [§ 21.193](#) requirements, the applicant should submit a program letter using the guidance in FAA Order 8130.2 and supplement the program letter with any additional information specified in appendix C, to this order. The applicant should submit a safety checklist that contains information in appendix D, to this order.

- c. A safety evaluation will be conducted using the process in this order.
- d. Operating limitations will be comprised of those specified by FAA Order 8130.2 and supplemented with the applicable limitations in appendix B to this order.
- e. When a maintenance and inspection program is required by [§ 21.195](#), the control station and other associated elements required for remote pilot operations will be included.
- f. The control station and other associated elements necessary for remote operations will be inspected during the onsite inspection. During the inspection, the applicant must demonstrate control link and control station functionality by performing procedures such as turning on/off the aircraft lights, deflecting flight controls, and/or conducting an engine run. The FAA inspector must verify proper movement of the control station instrumentation. For additional details, reference section 4 of this chapter.
- g. Civil aircraft operators who choose not to undergo a safety evaluation for their OPA-designed aircraft must remove any onboard equipment that enables a remote control station to control the aircraft. In this case, the aircraft cannot be certificated or operated as an OPA.

4. OPA/UAS Certification. For the purpose of this order, aircraft that intend to fly as either an OPA or a UAS will be given the designation of OPA/UAS. OPA/UAS receive experimental certificates and special flight permits using a combination of the certification process in FAA Order 8130.2 and the OPA/UAS procedures in this order. Comply with the following:

- a. AUS-400 and AJV-115 will be included in the coordination of original and recurrent certificates, pursuant to this order.
- b. To meet [§ 21.193](#) requirements, the applicant should submit a program letter using the guidance in FAA Order 8130.2 and supplement the program letter with any additional information specified in appendix C, to this order. The applicant should submit a safety checklist that contains information in appendix D, to this order.
- c. A safety evaluation will be conducted using the process described in this order. The safety evaluation must include manned and unmanned configurations. If the unmanned configuration was not included in the safety evaluation, the aircraft may only be certificated as an OPA. A subsequent safety evaluation must then be conducted to address the unmanned configuration before the aircraft may receive an airworthiness certificate as an OPA/UAS.
- d. Operating limitations will be comprised of those specified in FAA Order 8130.2 and supplemented with the applicable limitations in appendices A and B to this order. Eliminate duplicative operating limitations. The FAA may impose additional operating limitations as deemed necessary. The ASI must identify which operating limitations apply to certain configurations and conditions, such as when the aircraft is flown by the pilot without inputs from a ground control station, or during OPA or unmanned operations. Slight modification of each operating limitation may be necessary to ensure these distinctions are clear. It is also acceptable to assemble the limitations in sections specific to a particular configuration. For example, one section could be for limitations that apply to both manned and unmanned configurations, another

section could be for the OPA configuration, and a third section could include those limitations that are only applicable during unmanned flight.

e. The control station and other associated elements required for remote pilot operations will be included in the maintenance and inspection program.

f. The control station and other associated elements required for remote operations will be inspected during the onsite inspection. During the inspection, the applicant must demonstrate control link and control station functionality by performing procedures such as turning on/off the aircraft lights, deflecting flight controls, and/or conducting an engine run. The FAA inspector must verify proper movement of the control station instrumentation. For additional details, reference section 4 of this chapter.

g. An operating limitation must prescribe that an aircraft maintenance record entry be made each time the aircraft is converted between OPA and UAS configurations.

Section 2. Policies and Procedural Requirements

1. General. The procedures in this chapter provide guidance material associated with airworthiness certification and the issuance of an FAA Form 8130 7. The FAA must conduct any inspections necessary to verify proper completion of the certification procedures listed in this chapter.

2. Registration. The procedures for [aircraft registration](#) and issuance of registration numbers are contained in 14 CFR [part 47](#) and [part 48](#). Aircraft registration is not a function of airworthiness certification; however, U.S. registration is a prerequisite for issuance of an airworthiness certificate. The FAA must ensure an aircraft presented for airworthiness certification is registered. This order does not apply to UAS that meet the model aircraft criteria specified in 14 C.F.R. part 101.

3. FAA Form 8130-6, Application for U.S. Airworthiness Certificate. FAA Form 8130-6 is required whenever a special airworthiness certificate is issued or amended. The application for a U.S. airworthiness certificate must be made by the registered owner or an authorized agent who has a notarized letter of authorization from the registered owner. For an experimental airworthiness certificate, an applicant must complete sections I, II, and III (blocks A, B [when applicable], C, and D). As an example, if an OPA/UAS was being used to conduct R&D in both OPA and UAS configurations, then block 1 and block 9A should be checked in block B\$ of section II. For a special flight permit to conduct production flight testing, an applicant must complete sections I, II, and VI. The applicant must sign the application. Advisory Circular 21-12, *Application for U.S. Airworthiness Certificate, FAA Form 8130-6*, provides guidance and information on how to prepare and submit an FAA Form 8130-6.

4. UAS Risk Index. Because UA have large variances in size, weight, technology, and flight envelopes, the airworthiness certification process used in this order is based on assessed risk. The baseline parameters of this order—the use of FAA certificated pilots, the use of visual observers, visual line of sight operations, daytime operations in visual meteorological conditions (VMC) to permit VFR flight as required by [§ 91.319\(d\)\(2\)](#), and the avoidance of densely

populated areas—provide a high degree of risk mitigation. Use appendix E, UAS Risk Index, to assist in determining the appropriate certification tasks for a particular UA. The risk index indicates that programs deemed to have lower risk can satisfy the pertinent regulatory standards by completing fewer airworthiness certification tasks than programs deemed to have higher risk. Previous policy specified that applicants complete all certification tasks regardless of UA size, weight, technology, and flight envelopes.

a. Risk Categories and Elements. Table E-1 in appendix E identifies four categories that are used to assess risk. The categories are composed of operational and performance parameters. Each category is broken down into incremental elements that are assigned points. Higher risk elements are assigned more points. Use the applicant's response to item #6, Certification Category, of the program letter to assign points to each element. Add all the point values in the right-hand column of table E-1 to determine the total score.

b. Risk Index. Use the total score from table E-1 to determine the risk group. The degree of risk increases from Group I to Group III; therefore, a Group I aircraft can meet the pertinent regulatory standards by completing fewer tasks than aircraft in higher risk groups. Some certification tasks were not included in table E-4 because they will apply to all risk categories. These items include the FAA Form 8130-6, program letter, aircraft registration, aircraft markings, and certificated pilots. Early in the certification process, notify the applicant and FAA team members which Group applies.

c. Program Changes. The FAA inspector must reevaluate the risk group when program changes occur. For example, if the applicant/operator proposes changes such as the addition of external fuel tanks, flying at a higher altitude, or flying at a new operating area that is closer to a towered airport, then any of these program changes may result in a higher risk score and subsequently a higher risk group. The certification requirements for the new risk group must be complete before the FAA authorizes the program changes.

5. Program Letter.

a. The program letter outlines the program objectives and describes the purpose of the flight operation. Minute details are not required, however, the program letter must be detailed enough to permit the FAA to prescribe the conditions and limitations necessary to ensure safe operation of the aircraft. The program letter must not contain information that is proprietary, confidential, company-sensitive, subject to International Traffic in Arms Regulations (ITAR) ([22 CFR, subchapter M](#)), subject to Export Administration Regulations (EAR) ([15 CFR part 734](#)), or otherwise restricted from public or foreign disclosure. The program letter must be provided to all FAA offices involved in the certification process.

b. Appendix C to this order is a program letter template that includes information required by [14 CFR 21.193](#) or [14 CFR 21.199](#), as applicable. The program letter must be submitted to the responsible office. The program letter must be reviewed to ensure the requirements of [§ 21.193](#) or [§ 21.199](#) (as applicable) have been met. The program letter template was designed to aid in completing the UAS Risk Index.

c. While OPA and OPA/UAS applicants primarily follow the program letter guidance in FAA Order 8130.2, they must supplement their program letter with any additional items that are included in appendix C, to this order, that do not appear in Order 8130.2. An example is the requirement for the applicant to provide information regarding the control station.

6. Safety Checklist.

a. The applicant should provide the responsible office with a completed safety checklist that reflects the configuration of the aircraft at the time of certification. All requested information in appendix D to this order should be provided. The FAA inspector must distribute the safety checklist to all FAA offices involved in the certification process.

b. For certification of multiple aircraft, an applicant does not need to provide a safety checklist for each aircraft as long as they are of the same model. If there are minor (i.e. non-major) configuration differences within a particular model, then these differences may be addressed in an attachment to the safety checklist.

c. After original certification, if the applicant proposes major configuration or operational changes, then the applicant must update the safety checklist and provide it to the responsible office. Major configuration changes cause an appreciable effect on the weight, balance, structural strength, reliability, operational characteristics, or other characteristics affecting the safe operation of the aircraft. Major operational changes include items that conflict with or differ from the requirements stated in the FAA Form 7711-1 or operating limitations. Examples include, but are not limited to, changes to operating altitudes, air traffic control provisions, or lost link procedures.

d. Compliance with the pertinent certification requirements for UAS applicants that operate aircraft in the Group I category in the UAS Risk Index can be evaluated without the need for the applicant to submit a safety checklist. Questions or clarifications required by FAA offices regarding a Group I applicant's program should instead be handled through email or via teleconference.

7. Flight Areas.

a. AJV-115 must be provided with a chart and the boundary coordinates of any flight test areas or operating areas that are being proposed by an applicant. AJV-115 will assess the proposed area for feasibility. The proposed flight test and/or operating area must be plotted on an aeronautical chart, topographical map, or satellite image and included in the program letter. The applicant must also include latitude and longitude coordinates that identify the corners of the airspace boundary in degrees:minutes:seconds format. If the area is circular, the applicant must provide the coordinates of the center point and the radius length. The applicant must also provide the proposed maximum operating altitude.

b. [14 CFR 91.319](#) requires that an unproven aircraft be assigned to a flight test area. The assigned flight test area is prescribed pursuant to [§ 91.305](#). Flight testing must be conducted over open water or sparsely populated areas, having light air traffic, until the aircraft is shown to be controllable throughout its normal range of speeds and maneuvers, and has not displayed any hazardous operating characteristics or design features. The FAA is required to determine that

the proposed flight test area does not exceed that which is reasonably required to accomplish the flight purpose. In some cases, assigning multiple flight test areas may be required to accommodate various aircraft configurations, types of operations, or safety hazards.

c. Typically, the flight test area is smaller, restricted in altitude, and in closer proximity to the operator's control station when compared to the operating area. The flight test area may be a subpart of the operating area, or for some programs, the flight test area and the operating area may be the same. For exhibition aircraft, the flight test area and the operating area where the aircraft is exhibited are not likely to be the same. Both of these areas should be evaluated during the initial certification. If the flight test area is different from the operating area, these areas should be clearly identified in the program letter. For UAS, the operating limitations in appendix A to this order were designed to allow the aircraft to be flown in the operating area after completion of initial flight testing without the need for reissuing the airworthiness certificate. The addition of new flight areas will require the FAA Form 7711-1 to be revised and may require revision of the operating limitations.

d. In the case of the first flight of an aircraft from an airport surrounded by a densely populated area, but with at least one acceptable approach/departure route of flight, ensure a route of flight is selected which subjects the fewest number of persons and least amount of property to possible hazards. This routing must be included in the operating limitations or in FAA Form 7711-1. In addition, upon leaving such an airport, the aircraft must be required to operate from an outlying airport until its controllability and safety are established, after which the aircraft may return to its base and use the established route for subsequent operations. An acceptable approach/departure corridor exists when the routing provides reasonable opportunities to execute an off-airport emergency landing that will not jeopardize other persons or property.

e. In the case where a proposed takeoff or recovery location is surrounded by a densely populated area and lacks an acceptable approach/departure route to the flight area, the FAA may deny issuing the airworthiness certificate until a suitable site is agreed upon and authorized.

f. [FAA Order 8900.1](#) contains additional information regarding UAS operations in Class A, B, C, D, E, or G airspace.

8. Flight Test Plan. Flight test plans should be developed to show that the aircraft is controllable throughout its normal range of speeds and throughout all the maneuvers to be executed. The aircraft must have no hazardous operating characteristics or design features. Flight test plans are required for initial flight testing and also before conducting market survey, crew training, and exhibition operations following a major configuration change. AUS-420 and AFS-830 must be provided adequate time to review an applicant's flight test plan.

Note: Flight test plans are not required for UAS that fall in Group I of the UAS Risk Index.

9. UA Operating Policy. General UA operating policy can be found in [FAA Order 8900.1](#).

10. Contingency Planning. Policy for UA lost link procedures, divert/contingency points, and flight termination procedures can be found in [FAA Order 8900.1](#).

11. Spectrum Authorization. Advise the applicant that radio frequencies used for uplink and downlink of control, telemetry, and payload information must be authorized by the Federal Communications Commission (FCC) or the National Telecommunications and Information Administration (NTIA).

12. Automation in UA Operations. UA must have the ability to avoid hazards in a timely manner. This may be accomplished by a change of speed, altitude, heading, or routing. UA that fly a preprogrammed profile without the ability of the pilot to subsequently change the speed, altitude, heading, or routing of the aircraft, are prohibited outside of active restricted or warning areas designated for aviation use. This restriction does not apply to UA operating under lost link procedures, even though the pilot may be technically considered out-of-the-loop.

13. UAS Crewmembers. UA pilots must meet the requirements of 14 CFR [parts 61](#) and [67](#), as appropriate, during operation. See [FAA Order 8900.1](#) for information regarding UAS crewmembers, to include visual observers (VO). The FAA Form 7711-1 may include additional VO information that is unique to a specific program.

14. Maintenance and Inspection. Maintenance and inspection information for UAS, OPA, and OPA/UAS are specified in [FAA Order 8900.1](#).

15. Aircraft Markings.

a. Markings for Small Unmanned Aircraft.

(1) A small unmanned aircraft is an unmanned aircraft weighing less than 55 pounds on takeoff, including everything that is on board or otherwise attached to the aircraft. Small unmanned aircraft may be registered with the FAA's [online web-based process](#) and marked with the unique identifier as described in [§ 48.200](#). Alternatively, [§ 48.1\(b\)\(2\)](#) states that if an applicant uses the [part 47](#) registration process to obtain an N-number, then the small unmanned aircraft must be identified and marked using subparts A and C of [14 CFR part 45](#).

(2) According to [§ 48.205](#), the unique identifier must be maintained in a condition that is legible and affixed to the aircraft by any means necessary to ensure that it will remain affixed for the duration of each operation. The unique identifier must be readily accessible and visible upon inspection of the aircraft. Unlike [part 45](#), [part 48](#) does not contain requirements for size, contrast, ornamentation, or specific location of marks. Furthermore, [part 48](#) does not require a mark consisting of the Roman capital letter "N" (denoting United States registration), the word "experimental", or a fireproof identification plate.

b. Markings for OPA, OPA/UAS, and UAS that Operate at 55 Pounds or Greater

(1) Identification and markings must comply with [part 45](#). Marks must be painted on the aircraft or affixed by any other means that ensures a similar degree of permanence.

The nationality and registration marks may be affixed with readily removable material if the aircraft is intended for immediate delivery to a foreign purchaser or if it bears a temporary registration number.

(2) Requirements for the height, width, thickness, spacing, uniformity, and size of nationality and registration numbers are addressed in [§ 45.29](#). If authorized surfaces listed in [§ 45.25](#) or [§ 45.27](#) are not large enough for full-sized marks, then marks as large as practicable must be made on the largest authorized surface pursuant to [§ 45.29\(f\)](#).

(3) Pursuant to [§ 45.22\(d\)](#), when it is impossible for an applicant to mark their aircraft in accordance with [§§ 45.21 and 45.23 through 45.33](#), the applicant will contact the AIR Policy and Innovation Division (AIR-600) with a letter requesting approval for alternate sizes and/or locations for their markings. The letter must contain a diagram or picture of where the proposed markings will be located on the aircraft. If approved, AIR-600 will provide an alternate marking approval letter to the applicant.

16. Safety Evaluation.

a. After review of an applicant's program letter and safety checklist, if the program is deemed feasible by the FAA offices involved with the certification, then the applicant will be invited to participate in a safety evaluation. The safety evaluation may be conducted in person or via other means, such as a teleconference, at a location determined by the FAA. The UAS Risk Index notes that compliance with 21.193 can be determined without a safety evaluation for UAS in Group I or Group II.

b. ASIs and specialists from AUS-420, AFS-830, AJV-115, the geographically responsible FSDO, and the geographically responsible MIDO or MISO typically participate in the safety evaluation. Pursuant to the UAS Risk Index, FSDO participation in the safety evaluation is not required for the original certification of UAS programs where the maintenance and inspection program does not have to be reviewed and accepted. For original certifications where a UAS DAR is involved, the UAS DAR must participate in the safety evaluation. If a manufacturing or airworthiness ASI or a UAS DAR did not attend the safety evaluation for the original certification but is needed for a recurrent certification, then the applicant must brief the safety checklist to these individuals prior to the onsite inspection.

c. The applicant is expected to present a detailed explanation of the information provided in the safety checklist. The applicant must be prepared to discuss detailed system descriptions and explain how the system operates. The applicant must also discuss the proposed flight area and the planned flight operations. Complex proposals regarding major configuration or operating changes that are planned to occur after original certification may also be discussed.

d. The FAA will determine if the applicant's system is safe to operate in the national airspace system based on compliance with 14 CFR. The FAA will also consider the applicant's risk mitigation strategies and safety features. The applicant must provide the FAA with a complete description of the specifics of its program.

e. During a safety evaluation, the FAA may identify items that require applicant action. At the conclusion of the safety evaluation, provide a summary list to the applicant of any “action items” that must be accomplished.

f. After the safety evaluation is complete, explain to the applicant how the onsite inspection will be conducted. Confirm the location and any equipment requirements, such as the availability of a copier or printer. Explain to the applicant how the documentation review, aircraft and control station inspection, control link demonstration, operating limitations review, and certificate issuance will be conducted. The FAA operations ASI may want to discuss the flight profile. Advise the applicant that radio frequencies require approval from the FCC or NTIA. If major problems were discovered during the safety evaluation and a timely onsite inspection is questionable or doubtful, this discussion may be delayed to a later date.

g. After a special airworthiness certificate has been issued, the certification process for subsequent aircraft of the same model does not need to include a safety evaluation as long as no major changes have been made to the system configuration or flight operations. If major changes have been made, and a safety evaluation is warranted, the safety evaluation may be modified to only address the major changes.

17. Operating Limitations. Operating limitations generally applicable to aircraft with special airworthiness certificates are printed on the reverse side of the FAA Form 8130-7 (GPO pad only). Any additional operating limitations will be enumerated on a separate sheet, dated, signed, and attached to the FAA Form 8130-7 (GPO pad only). The first page of the operating limitations is prepared on FAA letterhead. When using the [fillable PDF FAA Form 8130-7](#), the certificate and limitations are now printed together.

a. As authorized by [§ 91.319](#), the FAA may recommend additional limitations for experimental aircraft as deemed necessary. Operating limitations must be designed to fit the specific situation encountered, which may vary depending on the aircraft type, its condition, operating environment, operator capabilities, and intended use.

b. UAS operating limitations are in appendix A to this order. Appendix B contains operating limitations for OPA. The applicability of a [§ 21.191](#) purpose authorized pursuant to this order, for example R&D, is identified for each operating limitation. If an operating limitation is not applicable for the purpose for which certification is being sought, then it should be omitted. Questions about a specific limitation should be directed to the OPR identified for each limitation. Notes have been added to provide clarification and additional information to the ASI. For the operating limitations provided to the applicant, do not include the applicability, OPR, and notes that follow the limitation.

c. Allow all FAA offices involved in the certification process to review the operating limitations prior to the onsite inspection. After FAA review, forward the operating limitations to the applicant to allow sufficient time for the applicant to prepare for the flight portion of the onsite inspection.

d. During the onsite inspection, the FAA inspector must review each imposed operating limitation with the applicant to ensure the operating limitations are understood. For recurrent

inspections with the same applicant, only changes need to be reviewed. A program manager, chief pilot, operations supervisor, or equivalent should be present during this review. Do not place the operator's or applicant's name on the limitations.

18. FAA Form 7711-1, Certificate of Waiver or Authorization (COA).

a. AJV-115 must be notified of any flight test areas or operating areas that are proposed by the applicant. The FAA office that conducts the airworthiness inspection must receive an FAA Form 7711-1 from AJV-115 prior to the onsite inspection. The FAA Form 7711-1 serves as a waiver from the see and avoid requirements of [§ 91.113](#). This form must be provided to the applicant even if a chase aircraft will be used. During OPA/UAS operations, the FAA Form 7711-1 will be in effect during UAS operations. The FAA Form 7711-1 addresses items that impact airspace and air traffic procedures. Examples of items included in the FAA Form 7711-1 are ATC provisions, instructions for visual observers and chase aircraft, filing of Notices to Airmen (NOTAM), and emergency procedures for lost link, lost sight, and lost communications. A chart and a description or coordinates of the authorized flight test or operational area are also included in the FAA Form 7711-1. The applicant should receive a copy of the FAA Form 7711-1 early enough to ensure they have time to prepare for the flight portion of the onsite inspection. An FAA Form 7711-1 will not be issued to an OPA.

b. Unmanned aircraft flight operations are not authorized outside the flight area boundaries identified in the FAA Form 7711-1.

c. An FAA Form 7711-1 will not be issued when an applicant's operating area is only within active restricted airspace.

19. Possession and Display of Documentation. For UA operations, the aircraft registration, airworthiness certificate, FAA Form 7711-1, and aircraft operating manual must be maintained at the control station. These documents do not need to be carried on board an aircraft when flown in the unmanned configuration. By [legal interpretation](#), the FAA determined that for an unmanned aircraft, maintaining these documents at the pilot's control station would meet the intent of §§ [47.3\(b\)\(2\)](#) and [47.31\(c\)](#), as well as §§ [91.9\(b\)](#) and [91.203 \(a\) and \(b\)](#), as the PIC would be able to produce the documents for his or her own information or to an FAA inspector.

20. Onsite Inspection. AUS-420 and AFS-830 normally attend the onsite inspection for original certifications. During the onsite inspection, the FAA will review the applicant's documentation and inspect the aircraft, control station, and other associated elements prior to issuing the special airworthiness certificate. For original certifications, an operations ASI from AFS-830 will then oversee the flight portion of the onsite inspection. AFS-830 may hand-off this responsibility to another geographically located operations ASI. Weather permitting, operators of experimental aircraft are expected to perform a simple flight demonstration from their flight test plan. If a flight test plan is not necessary (see appendix E for guidance), then a basic profile or simple maneuvers should be flown. Operators who receive a special flight permit for the purpose of production flight testing are expected to conduct a production flight test profile. The flight will allow the FAA to validate the flight test area and observe operational procedures. The flight portion of the onsite inspection is not required if an operations ASI elects to not attend. An

operations ASI may elect to attend a recurrent certification and have the operator conduct a flight.

21. Recording of Inspections. FAA Form 8100-1, Conformity Inspection Record, is used to document airworthiness certification. FAA Form 8100-1 must be prepared in accordance with the instructions shown on the back of the form.

22. Major Program or Configuration Changes. When an applicant proposes major changes after an airworthiness certificate has been issued, the FAA must determine the impact to the operating limitations and the FAA Form 7711-1. For UAS, verify that certification items in the UAS Risk Index have not changed. Major program and configuration changes will be coordinated with the FAA offices identified in chapter 2 of this order.

23. Transfer of Ownership. The geographically responsible FSDO will be notified when a transfer of ownership occurs.

24. Records Retention. A copy of all certification documents are to be retained in the files of the issuing office as required by FAA Order 8130.2. FAA Form 8100-1 must be retained in accordance with the current version of FAA Order 1350.14, *Records Management*.

Section 3. Exhibition Certification of Unmanned Aircraft

1. General. Under the provisions of § 21.191(d), experimental aircraft certificated for the purpose of exhibition are defined as aircraft that exhibit the aircraft's flight capabilities, performance, or unusual characteristics at air shows, fly ins, and aviation events; for motion picture, television, and similar productions; and for the maintenance of exhibition flight proficiency, including (for persons exhibiting aircraft) flying to and from such events and productions.

2. UA Aviation Event/Air Show Safety Case and Waiver. See [FAA Order 8900.1](#) for information on UA participation in aviation events and air shows. The UA operator may need to submit a [safety case](#) to the FAA. The operator must receive a separate [aviation event/air show waiver](#). UA exhibition operations are restricted to airports or locations that are within class C, D, E, or Gairspace unless otherwise authorized in the aviation event/air show waiver.

3. Difference with Certification Phases in FAA Order 8130.2. Manned aircraft, including OPA, that receive experimental certificates for the purpose of exhibition undergo two certification phases. Phase I involves flight testing of a newly assembled aircraft to ensure compliance with [§ 91.319\(b\)](#). Phase II begins after Phase I testing is complete as long as the aircraft configuration remains the same. For a UAS, the experimental certification process uses a combination of both phases rather than two distinct phases. The reason for this difference is that experimental UA always operate within a well-defined, sparsely populated area as authorized in FAA Form 7711-1. The procedures in this order, and the operating limitations in appendix A to

this order, were written to permit both initial flight testing and subsequent exhibition flight operations under the same certificate.

4. Home Base Changes or Ownership Transfers. When an aircraft's home base is changed or there is a transfer of ownership, the owner must submit a new program letter and a copy of the FAA-accepted maintenance and inspection program, if required, pursuant to [FAA Order 8900.1](#), to the geographically responsible FSDO within 30 days. The gaining FSDO should accept the previously accepted program, but may review it to ensure adequacy.

Section 4. Inspection Activities

Note: While OPA and OPA/UAS primarily follow inspection procedures in FAA Order 8130.2, FAA inspectors must supplement those procedures with applicable items in this section, such as coordinating with other FAA offices, checking the connectivity between the aircraft and control station, and inspecting the control station.

1. Supporting Documentation.

a. Supporting documents must be reviewed by the appropriate FAA office. For example, operational documents such as the flight test plan, operating manual, training manual, and crewmember qualification documents must be reviewed by the operations ASI. All FAA offices participating in the certification must review the safety checklist.

b. All documentation must have been written in or translated into the English language. Unless otherwise stated in table E-4 of appendix E to this order, for an original certification the following items should be submitted by the applicant prior to the onsite inspection to meet the pertinent regulatory requirements:

(1) Safety Checklist.

(2) Operating Manuals and Checklists. All operating manuals, including limitations and checklists for normal, abnormal, and emergency procedures must be provided.

(3) Training Manuals and Documentation. If an application states that crewmembers will complete a safety program, then applicants must provide documentation that shows crewmembers have successfully completed all necessary training.

(4) Exemptions and Waivers. Applicants must establish that their proposed operation will comply with the pertinent operating regulations. If an applicant's proposed operation would not comply with the applicable regulations, the applicant must obtain an exemption or waiver to permit the conduct of the proposed operation and should provide these documents as part of their application. Ensure that the operating limitations do not conflict with the provisions of any exemption and FAA Form 7711-1.

(5) Alternate Marking Approval Letter. If the aircraft is of unusual size or shape and cannot be marked in accordance with applicable subpart C procedures in [part 45](#), the applicant must propose an alternate marking procedure to AIR-600 pursuant to the aircraft marking

guidance in this chapter. Alternatively, small unmanned aircraft may be marked using the procedures in [part 48](#).

(6) Flight Test Plan. If necessary, (see appendix E to this order for guidance), the flight test plan should address initial flight test objectives and flight profiles.

(7) Safety Evaluation Action Items. Ensure all action items identified during the safety evaluation have been completed. Action items may have been tasks assigned to the applicant or the FAA.

c. Once a special airworthiness certificate has been issued, an applicant should submit, at the discretion of the FAA, the supporting documents listed above for the original certification of subsequent aircraft of the same model. As a general rule, if changes have been made, then the document should be reviewed by the FAA. For instance, an applicant does not have to submit another copy of the safety checklist as long as the system configuration and flight operations have not changed. Regardless, these documents, if applicable, must be available for review during the onsite inspection.

d. For a recurrent certification, submission of the supporting documents listed above is at the discretion of the FAA. Based upon identifiable risk, a safety checklist should be submitted if operational or configuration changes have been made. These documents must be available for review during the onsite inspection.

2. Additional Documentation. For original and recurrent certifications, the following items must be inspected prior to or during the onsite inspection:

a. **Aircraft Registration.** Review the documentation provided by the applicant to determine that the registration requirements of [part 47](#) or [part 48](#) have been met. FAA employees can look up [part 48](#) registration information by contacting an FAA Law Enforcement Assistance Program (LEAP) agent or an FAA Operations Center. The regional phone numbers and email addresses can be found in the links on the [Law Enforcement](#) website.

b. **FAA Form 8130-6.** Ensure the form is properly completed.

c. **Program Letter.** Each aircraft requires a program letter.

d. **Denial Letter.** Check with the Aircraft Registration Branch to determine if an application for airworthiness certification denial letter exists for the particular aircraft.

e. **Maintenance Records.** If necessary, review the maintenance records to determine that a condition inspection and any other required inspections and maintenance have been accomplished. See [FAA Order 8900.1](#) for additional information.

f. **Maintenance and Inspection Program.** If necessary, verify the maintenance and inspection program has been reviewed and accepted by the airworthiness ASI. See [FAA Order 8900.1](#) for additional information.

g. Self-Certifying Statement of Compliance with Maintenance Program. If necessary, the applicant should provide a written, self-certifying statement that they will comply with the maintenance and inspection program for the particular model designation. See [FAA Order 8900.1](#) for additional information.

h. Airworthiness Directives (AD). Ensure the applicant has complied with all applicable airworthiness directives. If the experimental aircraft has a type-certificated product or article installed, any applicable ADs for that product or article must be complied with for the purpose of “show compliance.”

i. Weight and Balance Report. Review the weight and balance to verify it reflects the current configuration of the aircraft.

j. Inspection or Technical Data. Review any inspection or technical data needed to establish conformity to type design.

3. Aircraft, Control Station, and Associated Elements Inspection. At the time of certification, the aircraft, control station, data link equipment, and other associated elements must reflect the configuration as stated in the program letter and safety checklist. The applicant should make these items available for inspection to determine—

a. The aircraft markings are in accordance with [part 45](#) or [part 48](#).

b. Instruments are properly marked. All measurements should be expressed in the English language and converted to standard U.S. units of measure for those instruments necessary for operation in the U.S. air traffic system.

c. Datalink connectivity between the aircraft and the control station. Control link checks should also be accomplished with a backup control station, if one exists. If the system configuration permits, the check the following:

(1) The flight controls operate properly.

(2) Engines, propellers, and associated instruments operate properly.

(3) Instrumentation, gauges, levers, switches, controls, and other elements of the control station functions properly.

d. Major configuration changes have been inspected and recorded and are in a condition for safe operation.

e. The correct software version is being used at the control station. Document the software version on the FAA Form 8100-1. It may not be possible to determine the software version with some configurations.

4. Certificate Issuance.

a. Review the operating limitations with the applicant to ensure the requirements and procedures are understood.

b. If the aircraft meets the requirements for the certification requested, the FAA must—

(1) Make an entry in the aircraft logbook. The following or a similarly worded statement must be entered:

I find this aircraft meets the requirements for the certification requested and have issued a special airworthiness certificate dated (MM/DD/YYYY). The operation of this aircraft is contingent upon (applicant's name) compliance with (title of the submitted program letter), the operating limitations of this airworthiness certificate, and the FAA Form 7711-1.

(ASI signature)

Aviation Safety Inspector, (Office Code)

(2) Issue FAA Form 8130-7.

(3) Ensure the applicant has received the FAA Form 7711-1.

5. Flight Activity. After the applicant has received the special airworthiness certificate and FAA Form 7711-1, an operations ASI will oversee the flight portion of the onsite inspection, weather permitting. If an operations ASI does not attend the onsite inspection, then the flight demonstration should not be conducted.

6. Post-Certification.

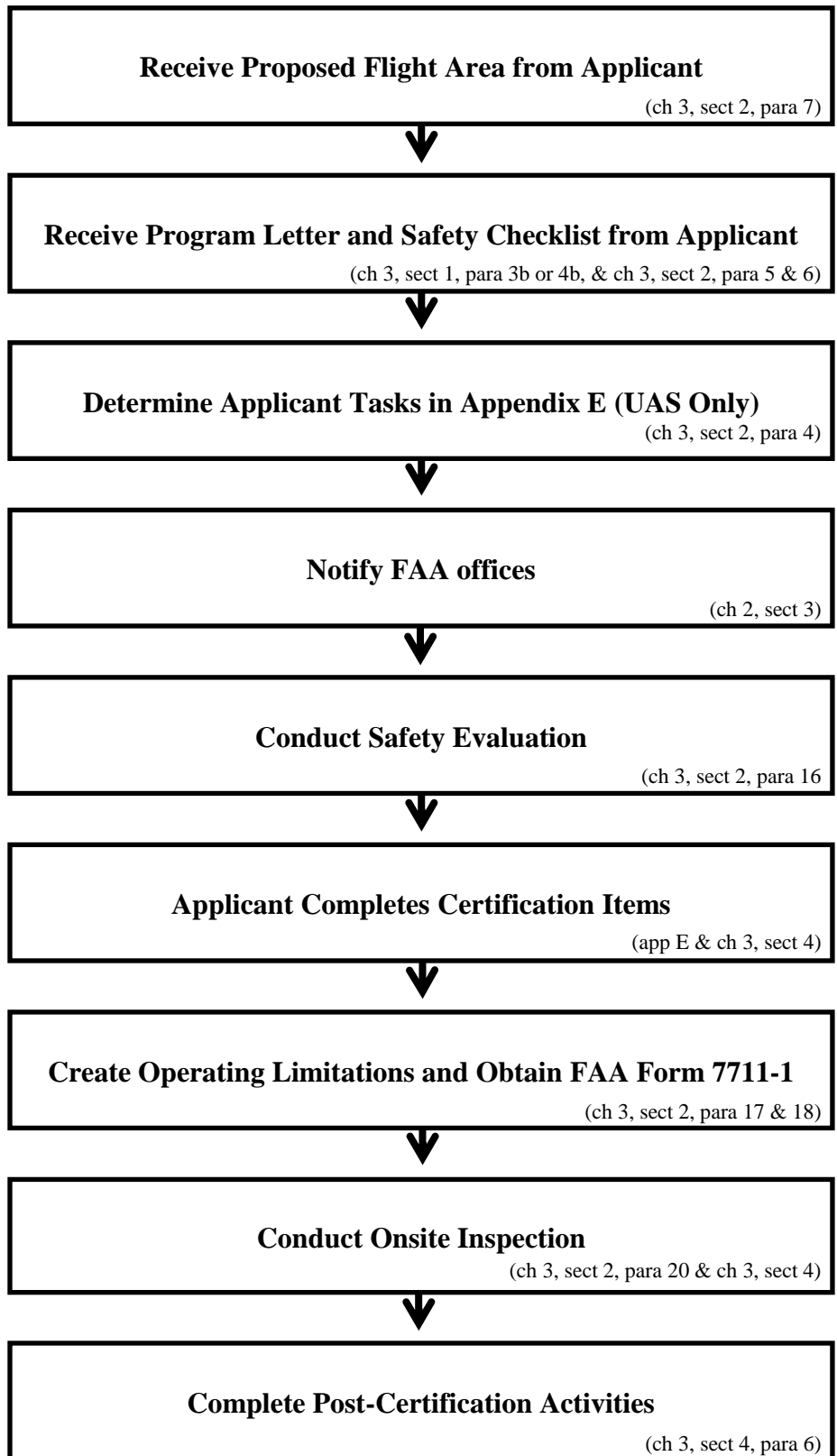
a. Examine, review, and route the certification file to the Aircraft Registration Branch according to the instructions contained in FAA Order 8130.2. Do not include a copy of the safety checklist or the FAA Form 7711-1 in the certification file. Do not send any documents to the Aircraft Registration Branch that are labeled as proprietary, confidential, company-sensitive, subject to ITAR or EAR, or contain any other label indicating the document is restricted from public or foreign disclosure.

b. If the aircraft does not meet the requirements for the certification requested, and the airworthiness certificate is denied, the FAA must—

(1) Write a letter to the applicant stating the reasons for denying the certificate.

(2) Attach a copy of the denial letter to FAA Form 8130-6 and forward it to the Aircraft Registration Branch to be made part of the aircraft record.

Figure 1. Overview of the Airworthiness Certification Process



Chapter 4. Administrative Information

1. Distribution. This order is distributed to the Washington Headquarters division and office levels of the Aircraft Certification Service (AIR), Flight Standards Service (AFS), and Air Traffic Organization (ATO); to the branch levels in AIR; to the branch levels in the regional AFS divisions and AIR Directorates; to all Flight Standards District Offices and International Field Offices; to all Aircraft Certification Offices; to all Certificate Management Offices and all Manufacturing Inspection District/Satellite Offices; and to the Aircraft Certification and Airworthiness Branches of the FAA Academy.

2. Background. In 2005, the Associate Administrator for Aviation Safety determined that unmanned aircraft systems (UAS) could be given limited access to the National Airspace System (refer to Title 14 of the Code of Federal Regulations (14 CFR) [21.191](#)). The Director of the Aircraft Certification Service, with concurrence from the Director of the Flight Standards Service, stipulated that this process be managed by the office of primary responsibility for [14 CFR 21.195](#). If there are any questions regarding this order, please contact a member of the Airworthiness Certification Section, AIR-6C3, at (202) 267-1575. More information on unmanned aircraft can be found on the FAA website at www.faa.gov/uas.

3. Authority to Change This Order. The AIR Policy and Innovation Division (AIR-600) is responsible for administrative changes to the material in this order.

4. Forms. Examples of forms referenced in this order are found in FAA Order 8130.2, *Airworthiness Certification of Products and Articles*.

5. Deviations. Adherence to the procedures in this order is necessary for uniform administration of this directive material. All deviations from this guidance material must be coordinated with and approved by AIR-600. Some deviations may require initial coordination and approval from other FAA offices, such as AFS or ATO, prior to AIR-600 approval. If a deviation becomes necessary, the FAA employee involved should ensure the deviations are substantiated, documented, and concurred with by the appropriate supervisor. The deviation must be submitted to AIR-600 for review and approval. Section 2627 of Title 28 of the United States Code defines the limits of Federal protection for FAA employees.

6. Suggestions for Improvement. Please forward all comments on deficiencies, clarifications, or improvements regarding this order to: 9-AWA-AVS-AIR-DMO@faa.gov or complete the form online at <https://ksn2.faa.gov/avs/dfs/Pages/Home.aspx>. FAA Form 1320-19, Directive Feedback Information, is located as Appendix H to this order for your convenience. If you require an immediate interpretation, please contact AIR-600 at (202) 267-1575; however, you should also complete Form 1320-19 as a follow-up.

7. Records Management. Refer to FAA Order 0000.1, *FAA Standard Subject Classification System*; FAA Order 1350.14B, *Records Management*; or your office Records Management Officer (RMO)/Directives Management Officer (DMO) for guidance regarding retention or disposition of records.

Appendix A. Sample Operating Limitations for UAS

(Name of issuing office)

(Issuing office address)

**Operating Limitations for the (*Model Designation*) UAS:
Experimental Certificate or Special Flight Permit (*select one*)**

<p>Aircraft Model Designation: [Insert Model Designation]</p> <p>Aircraft Serial Number: [Insert Serial Number]</p> <p>Aircraft Registration: [Insert Registration Number]</p>	<p>Aircraft Builder: [Insert Builder Name]</p> <p>Year Manufactured: [Insert Year]</p> <p>Engine Model: [Insert Model Designation]</p>
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The following operating limitations are applicable to operations in the National Airspace System (NAS):

(1) The (*model designation*) unmanned aircraft (UA), control station(s), and communication equipment [*include if applicable*] comprise the UAS.

Applicability: All

OPR: AFS-800

Note: Some configurations may include additional associated elements to be included in this limitation such as takeoff and recovery equipment, navigation equipment, and telemetry equipment. The limitation may be modified to describe the proper configuration of the UAS.

(2) No person may operate this UAS for other than the purpose of research and development (R&D), showing compliance with regulations, crew training, exhibition, market survey, and/or production flight testing new production aircraft [*select appropriate purpose(s)*] as specified on the front of the FAA Form 8130-7, Special Airworthiness Certificate. These operating limitations do not provide any relief from any applicable law or regulation. This aircraft must be operated in accordance with the applicable regulations and the additional limitations prescribed herein. These operating limitations are a part of the FAA Form 8130-7 and are to be available to the pilot in command (PIC) of the aircraft.

Applicability: All

OPR: AIR-600

(3) The airworthiness certificate, aircraft registration certificate, aircraft manuals, and FAA Form 7711-1, Certificate of Waiver or Authorization (COA), must be located at the control station.

Applicability: All

OPR: AFS-800

(4) Market surveys, sales demonstrations, and customer crew training cannot be performed until the flight hour requirements of Title 14 of the Code of Federal Regulations (14 CFR) [21.195\(d\)\(2\)](#) have been accomplished. An entry in the aircraft records is required as evidence of compliance.

Applicability: Market survey only

OPR: AIR-600

Note: Pursuant to [§ 21.195](#), the applicant may provide justification to the FAA to get the flight hour requirement reduced. Coordinate any flight hour reduction with AUS-420 and AFS-830. If reduced, include the new flight hour requirement in the operating limitation. For recurrent certifications, the inspector may remove this limitation when the aircraft has achieved the required flight hours and the hours are documented in the aircraft records.

(5) When changing between operating purposes, the operator must determine that the UAS is in a condition for safe operation and appropriate for the operational purpose intended. A record entry will be made in the maintenance records to document the operational purpose change and that the UAS is in a condition for safe operation.

Applicability: All, except production flight testing

OPR: AFS-300

Note: This limitation applies only when two or more [§ 21.191](#) operational purposes are listed on the FAA Form 8130-7.

(6) This UAS must be operated in accordance with the applicable air traffic and general operating rules of [14 CFR part 91](#), and all additional limitations herein prescribed.

Applicability: All

OPR: AFS-800

(7) No person may operate this UAS to carry persons or property for compensation or hire.

Applicability: All

OPR: AFS-800

(8) Each UA must be controlled by only one control station at a time. A control station may not be used to operate multiple UA.

Applicability: All

OPR: AFS-800

(9) UA flight operations must be conducted in visual meteorological conditions (VMC), day only.

Applicability: All

OPR: AFS-800

Note: If night operations are approved, the authorization will be prescribed by selecting operating limitation (10) and omitting this limitation.

(10) UA flight operations must be conducted in VMC, day and/or night.

Applicability: All
OPR: AFS-800

Note: Reference [FAA Order 8900.1](#), *Flight Standards Information Management System (FSIMS)*, to verify that a [safety case](#) for night operation of a UA is necessary. The aircraft must meet the appropriate lighting requirements in [§ 91.209](#).

(11) UA flight operations must be conducted within visual line of sight of the PIC or visual observer.

Applicability: All
OPR: AJV-115

Note: Flight beyond the visual line of sight of the pilot will require a ground-based visual observer (VO) or an airborne VO on board a dedicated chase aircraft to ensure VO responsibilities listed in the FAA Form 7711-1 are fulfilled during all flight phases. Flight in active restricted or warning area designated for aviation use does not require a VO. Reference [FAA Order 8900.1](#) to verify that a [safety case](#) for daisy-chaining visual observers is necessary. Reference [FAA Order 8900.1](#) for VO responsibilities and chase aircraft operations. This provision is different from 14 C.F.R. part 107, which requires the pilot to always maintain the capability for direct visual line of sight because small UAS operated under part 107 are not required to be certificated.

(12) Flight over a densely populated area or in a congested airway is prohibited.

Applicability: All
OPR: AFS-800

Note: When avoiding populated areas, aircraft speed and weight must be considered. The information in [FAA Order 8900.1](#) regarding show-line distances from spectator areas for aviation events may assist in determining a suitable space to fly the aircraft.

(13) All flight operations must remain within the lateral and vertical boundaries of the designated flight area as provided in the FAA Form 7711-1.

Applicability: All
OPR: AJV-115

Note: If the FAA Form 7711-1 does not include a chart of the flight test and/or operating area, include the chart with this limitation and modify this limitation to include a brief description of the flight area and the authorized altitude limits. If necessary, identify a separate area for the flight test that complies with [§ 91.305](#).

(14) UA exhibition operations require an aviation event/airshow waiver.

Applicability: Exhibition only
OPR: AJV-115

Note: Airshow and aviation event operations are restricted to airports or locations that are within airspace class C, D, E, or G, unless otherwise authorized under an aviation event/air show waiver.

(15) UA operations in Reduced Vertical Separation Minimum (RVSM)-designated airspace may be allowed pursuant to [§ 91.180\(b\)](#) for aircraft certification and development purposes.

Applicability: R&D and showing compliance only
OPR: AFS-800

Note: Refer to [part 91](#) and the [Aeronautical Information Manual \(AIM\)](#) for information on RVSM operations and requirements. This limitation is only for RVSM certification purposes. If the flight test airspace in the program letter or in the FAA Form 7711-1 does not include RVSM airspace, then this limitation should be replaced by limitation (17).

(16) UA operation in RVSM-designated airspace may be allowed pursuant to [§ 91.180\(b\)](#) for climbing/descending through RVSM flight levels without intermediate level-off to or from flight levels above RVSM airspace.

Applicability: All

OPR: AFS-800

Note: Refer to [part 91](#) and the [AIM](#) for information on RVSM operations and requirements. This limitation is only for UA capable of non-stop climb to flight level (FL) 430. If the operating airspace in the program letter or in the FAA Form 7711-1 does not include RVSM airspace, this limitation should be replaced by limitation (17).

(17) UA flight in RVSM-designated airspace is prohibited.

Applicability: All

OPR: AFS-800

Note: This limitation is for UA capable of flight above FL280. Include this limitation if the applicant does not request to operate in RVSM airspace or if the FAA Form 7711-1 does not include RVSM airspace. If the UA is not capable of flight near or above FL280, then omit this limitation.

(18) Following satisfactory completion of initial flight testing, the operations manager or chief pilot must certify in the aircraft records that the UA has been shown to comply with [§ 91.319\(b\)](#) with the following, or a similarly worded, statement:

I certify that the prescribed flight test has been completed and the aircraft is controllable throughout its normal range of speeds and throughout all maneuvers to be executed, has no hazardous operating characteristics or design features, and is safe for operation. The following aircraft operating data has been demonstrated during the flight testing: speeds Vx _____, and Vy _____, and the weight _____ and CG location _____ at which they were obtained.

Applicability: All, except production flight testing

OPR: AFS-800

Note: This limitation is not applicable to UAS in the Group I category in appendix E to this order. For UAS without an airspeed indicator or airspeed display, the last sentence should be omitted from the operating limitation since there is no means to determine Vx and Vy. Following the successful completion of initial flight testing, this limitation may be omitted for recurrent certifications.

(19) The UA is prohibited from aerobatic flight, that is, an intentional maneuver involving an abrupt change in the UA's attitude, an abnormal acceleration, or other flight action not necessary for normal flight.

Applicability: All

OPR: AFS-800

Note: If aerobatic flight is anticipated, the maneuvers, configuration of external stores, initial aerobatic test flight, and subsequent performance locations must be thoroughly discussed during the safety evaluation. If approved, these items must be appropriately described in this operating limitation or in the FAA Form 7711-1.

(20) The UA is prohibited from formation flight as a wingman, that is, flight by reference to another aircraft.

Applicability: All

OPR: AFS-800

(21) This UA must not be used for towing, including, but not limited to, gliders, banners, targets, or electronic receivers or transmitters.

Applicability: All

OPR: AFS-800

(22) UA flight operations may not involve carrying hazardous material, as defined in Title 49 of the Code of Federal Regulations (49 CFR) [171.8](#), or the dropping of any objects or external stores.

Applicability: All

OPR: AFS-800

Note: Carrying hazardous materials or dropping objects or external stores is prohibited unless all operational risks have been sufficiently mitigated as required by [§ 91.15](#), and the hazmat requirements in [49 CFR](#) have been met, if hazmat will be carried. The operator/applicant must provide to the FAA acceptable procedures for hung stores and loss of control link while carrying stores. A similar case must be made for hazmat carried aboard the aircraft and, if approved, will be listed in the special provision section of the COA, or in the operating limitations.

(23) No weapons may be added to the UA.

Applicability: All

OPR: AFS-800

(24) This UA is prohibited from flight with any externally mounted equipment that is not properly mounted and secured in a manner that will prevent in-flight detachment. The aircraft must be configured as documented in the aircraft's flight test records or as allowed in the original manufacturer's aircraft data. If relying on the manufacturer's data, the aircraft must conform to the manufacturer's design and be maintained with existing manufacturer's maintenance and inspection instructions.

Applicability: Exhibition only

OPR: AFS-300

Note: This limitation is only for other than former military aircraft.

(25) This UA is prohibited from flight with any externally mounted equipment unless the equipment is mounted in a manner that will prevent in-flight jettison or detachment. Installation of external stores (pylon and equipment) or external fuel tanks not approved by the manufacturer or the original military operator is prohibited. No change in external loading for the aircraft (for example, a change in pylon, rack, or external store) from configurations approved by the manufacturer or original military operator is allowed, except to prevent jettison or detachment.

Applicability: Crew training and exhibition only

OPR: AFS-300

Note: This limitation is only for former military aircraft.

(26) Any incident or accident, or any flight operation that transgresses the lateral or vertical boundaries of a flight test area, restricted airspace, or other operational boundary, must be reported to the UAS Safety and Integration Division (AUS-400) within 24 hours, and to the Emerging Technologies Team (AJV-115). AUS-400 can be reached by phone at (202) 267-8272 or by fax at (202) 267-8249. AJV-115 can be notified via email at 9-AJV-115-UASOrganization@faa.gov. If this is an emergency, contact the local law enforcement, an FAA Regional Operations Center (ROC), or the Washington Operations Center (WOC). Accidents and incidents must be reported to the National Transportation Safety Board (NTSB) per instructions contained on the [NTSB web site](#). Further flight operations must not be conducted until the incident or accident is reviewed by AUS-420 and AFS-830. AFS-830 will provide the authorization to resume operations.

Table A-1. FAA Regional Operations Centers

Location Where Accident Occurred:	Telephone:
DC DE MD NJ NY PA VA WV	404-305-5150
AL CT FL GA KY MA ME MS NC NH PR RI SC TN VI VT	404-305-5156
AK AS AZ CA CO GU HI ID MP MT NV OR UT WA WY	425-227-1999
AR IA IL IN KS LA MI MN MO ND NE NM OH OK SD TX WI	817-222-5006
Washington Operations Center (WOC)	202-267-3333

Applicability: All

OPR: AFS-800

Note: This limitation may be modified to include only the ROC telephone numbers for the flight area location(s). Include the WOC telephone number for all locations.

(27) Visual observers (VO) must assist the PIC in not allowing the UA to operate beyond the visual line of sight limit. VOs must be able to see the aircraft and the surrounding airspace sufficiently to assist the PIC with determining the UA's proximity to all aviation activities and other hazards, and prevent the UA from creating a collision hazard. The VO must assist the PIC with exercising effective control of the UA and with complying with §§ [91.111](#) and [91.113](#). The VO must also inform the PIC before losing sufficient visual contact with the UA or a previously sighted collision hazard.

Applicability: All

OPR: AFS-800

(28) All crew positions must maintain two-way communications with each other during all operations. If unable to maintain two-way communication, the PIC will expeditiously return the UA to its base of operations while remaining within the flight area and conclude the flight operation.

Applicability: All

OPR: AFS-800

(29) In the event of a transponder failure on the UA, the UA must conclude all flight operations and expeditiously return to its base of operations. If a chase aircraft is used and

equipped with an operable transponder, the mission may continue with proper coordination with air traffic control (ATC).

Applicability: All

OPR: AFS-800

Note: This limitation is only required for programs where the UA has an operable transponder and a chase aircraft is required due to planned flight beyond the visual line of sight of the ground-based PIC or VO. If this limitation conflicts with, or is a duplicate of an FAA Form 7711-1 requirement, then omit this limitation. If the flight operation is solely within airspace in which a transponder is not required, then omit this limitation.

(30) When filing a flight plan, the experimental nature of this UA must be listed in the remarks section. The pilot will notify the control tower of the experimental nature of the UA when operating the UA into or out of airports with operating control towers.

Applicability: All

OPR: AFS-800

Note: This limitation is only required for programs where a flight plan is required and transitions are permitted at airfields with a control tower. Reference the FAA Form 7711-1 to verify these requirements. Due to equipment and operational constraints of some UAS, this limitation will not always be required.

(31) This UA must be marked with its U.S. nationality and registration marks pursuant to [14 CFR part 45](#).

Applicability: All

OPR: AIR-600

Note: This limitation is not applicable to small unmanned aircraft registered with the FAA's online web-based process and marked with a unique identifier as described in [14 CFR part 48](#). This limitation is applicable to all aircraft, including small unmanned aircraft, that are registered in accordance with [14 CFR part 47](#).

(32) This UA must be marked with its unique identifier as described in [14 CFR part 48](#).

Applicability: All

OPR: AIR-600

Note: This limitation is only applicable to small unmanned aircraft registered with the FAA's online web-based process and marked with the unique identification number as described in [part 48](#).

(33) This UA must display the word EXPERIMENTAL pursuant to [§ 45.23](#) or an alternative marking approval issued pursuant to [§ 45.22\(d\)](#) by the FAA's Policy and Innovation Division (AIR-600).

Applicability: All, except production flight testing

OPR: AIR-600

Note: This limitation is not applicable to small unmanned aircraft registered with the FAA's online web-based process and marked with a unique identification number as described in [part 48](#). This limitation is applicable to all experimental UA, including small unmanned aircraft, that are registered in accordance with [part 47](#).

(34) The UAS must not be operated unless it is inspected and maintained in accordance with the *(title)* maintenance and inspection program *(rev #)* *(date)* or later revision. Maintenance and inspection records must be established and maintained. Maintenance record entries must include a description of the work performed, the date of completion for the work, the UAS's total time-in-service, and the name and signature of the person performing the work. Inspection entries must contain the following, or a similarly worded, statement:

I certify that this UAS was inspected on (date), in accordance with the scope and detail of the maintenance and inspection program, and was determined to be in a condition for safe operation.

Applicability: Market survey and previously qualified 14 CFR part 43 aircraft

OPR: AFS-300

(35) No person may operate this UAS unless it has had a condition inspection performed within the preceding 12 calendar months in accordance with the current maintenance and inspection program. This inspection will be recorded in the UAS maintenance records.

Applicability: Market survey and previously qualified part 43 aircraft

OPR: AFS-300

Note: This limitation is not applicable to small unmanned aircraft.

(36) The UAS manufacturer and their representatives may perform the maintenance and inspections required by these operating limitations. Representatives of a manufacturer must have written authorization from the manufacturer. The use of FAA certificated maintenance providers is encouraged, which may include repair stations, holders of mechanic and repairman certificates, and other persons working under the supervision of these mechanics and repairman. An FAA certificated maintenance provider performing maintenance and/or inspection on UAS that are not applicable to 14 CFR part 43 requirements, [§ 43.1\(b\)\(1\)](#), does not constitute at this time the exercising of certificate holder privileges.

Applicability: All

OPR: AFS-300

(37) If any aircraft, engine, or propeller operating limits are exceeded during ground or inflight operations, the exceeded operating limit will be addressed to ensure the aircraft is in a continued condition for safe operation. An appropriate maintenance entry will be made in the aircraft records describing the maintenance and/or inspection actions taken to address the exceeded operating limit and that the aircraft is determined to be in a condition for safe operation, prior to further flight.

Applicability: Market survey and previously qualified part 43 aircraft

OPR: AFS-300

(38) The aircraft may not be operated unless the owner complies with the replacement of life-limited articles specified in the applicable maintenance and inspection program and/or technical publications.

Applicability: Market survey and previously qualified part 43 aircraft

OPR: AFS-300

Note: This limitation is only applicable to type certificated aircraft or aircraft having an FAA approved airworthiness limitation section in its instructions for continued airworthiness.

(39) Minor configuration changes to the UAS are those that have no appreciable effect on the weight, balance, structural strength, reliability, operational characteristics, or other characteristics affecting the condition for safe operation of the UAS. Changes that do not meet the definition of a minor change are classified as “major changes.” For UAS Risk Index Group I UAS, the owner or operator must provide major configuration change documentation to the geographically responsible Flight Standards District Office (FSDO). For UAS Risk Index Group II and III UAS, major configuration changes require the owner or operator to update the safety checklist and provide it to the geographically responsible FSDO. A written response must be received from the FSDO indicating FAA concurrence before flying this aircraft after incorporation of a major configuration change, whether the aircraft is operating under a special airworthiness certificate, public aircraft COA, or other authorization.

Applicability: All, except for R&D and showing compliance

OPR: AFS-300

Note: Notify the applicant which UAS Risk Index Group (I, II, or III) is applicable. This operating limitation may be modified to only include the applicable Group.

(40) Crew training, market survey, sales demonstrations, customer crew training, or exhibition (*select, as applicable*) operations cannot be performed immediately following software and major configuration changes. The aircraft must first be flight tested. Following the flight test, the operations manager, chief pilot, or other person acceptable to the Administrator must make the following, or a similarly worded, statement in the aircraft records:

I certify the prescribed flight test has been completed and the aircraft is controllable throughout its normal range of speeds and throughout all maneuvers to be executed, has no hazardous operating characteristics or design features, and is safe for operation.

Applicability: Crew training, market survey, and exhibition

OPR: AFS-800

(41) Application to amend these operating limitations must be made to the geographically responsible FSDO or Manufacturing Inspection District Office (MIDO).

Applicability: All

OPR: AFS-300

(42) When an aircraft’s home base is changed or there is a transfer of ownership, the owner will submit a new program letter to the geographically responsible FSDO within 30 days.

Applicability: All

OPR: AFS-300

(43) The owner must submit an annual program letter to the geographically responsible FSDO where the aircraft is based.

Applicability: Exhibition only

OPR: AFS-300

(44) This special airworthiness certificate is not in effect during public aircraft operations (PAO). Concurrent public/civil operations are not permitted. The FAA makes the distinction between the authorized flights for the purposes described in the program letter and PAO. Before operating this aircraft under this special airworthiness certificate following a PAO, the aircraft must be returned, via an approved method, to the condition and configuration appropriate for civil operations. The aircraft records and entries must clearly differentiate between a civil flight,

pursuant to this certificate, and any other flights. When PAO are concluded, an entry will be made in the aircraft records to document that the aircraft has been returned to the civil aircraft configuration and is in a condition for safe operation.

Applicability: All

OPR: AFS-800

(45) This special airworthiness certificate is not in effect during operations conducted under [14 CFR part 107](#) and model aircraft operations conducted under [14 CFR part 101](#). Before operating this aircraft under this special airworthiness certificate following a [part 107](#) operation or a [part 101](#) model aircraft operation, the aircraft must be returned, via an approved method, to the condition and configuration appropriate for operations under the special airworthiness certificate. The aircraft records and record entries must clearly differentiate between any flights for which this certificate was required and any other flights. When [part 107](#) operations or [part 101](#) model aircraft operations are concluded, an entry will be made in the aircraft records to document that the aircraft has been returned to the aircraft configuration appropriate for operations in accordance with this special airworthiness certificate and is in a condition for safe operation.

Applicability: All

OPR: AFS-800

(46) [14 CFR 47.45](#) requires that the FAA Aircraft Registry be notified within 30 days of any change in the aircraft registrant's address. Such notification is to be made by submitting Aeronautical Center Form 8050-1, Aircraft Registration Application, to the FAA Aircraft Registration Branch (AFS-750) in Oklahoma City, Oklahoma.

Applicability: All

OPR: AFS-750

Note: This limitation is only for UA registered under [part 47](#).

(47) [14 CFR 48.105](#) requires that the web-based small unmanned aircraft registration system be updated within 14 days of any change in the aircraft registrant's physical address, mailing address, or email address, and any change to the aircraft manufacturer, model, or serial number.

Applicability: All

OPR: AFS-750

Note: This limitation is only applicable to small unmanned aircraft registered with the FAA's online web-based process as described in [part 48](#).

(48) Immediately after the certificate is issued, the applicant must forward a copy of the program letter, special airworthiness certificate, operating limitations, and FAA Form 7711-1 to the attention of: FAA Headquarters, Unmanned Aircraft Systems, Tactical Operation Section, at the email address 9-AJR-36-UAS@faa.gov, or via fax at (202) 267-8249.

Applicability: All

OPR: AJV-115

/s/

(Name)

Aviation Safety Inspector

(Name of Issuing Office)

Date:

Appendix B. Sample Operating Limitations for OPA and OPA/UAS

1. Applicability. For OPA and OPA/UAS, the following limitations will be issued, as required, to supplement operating limitations issued under an experimental certificate or special flight permit, as applicable, as described in FAA Order 8130.2, *Airworthiness Certification of Products and Articles*.

2. Opting Out of the Safety Evaluation. Civil aircraft operators who choose not to undergo a safety evaluation for their OPA-designed, or OPA/UAS-designed aircraft must remove any onboard equipment that enables a pilot at a remote control station to control the aircraft. The aircraft cannot be certificated or operated as an OPA or OPA/UAS.

3. The OPA System. “The OPA system” is a term used in the operating limitations below that refers to the onboard and off-board equipment that enables the aircraft to be flown or controlled from a location not onboard the aircraft.

The following are additional operating limitations for OPA and OPA/UAS:

(1) When the aircraft is flown in an OPA configuration, the pilot in command (PIC) is always onboard and must have the ability, using normal control input forces, to immediately override any installed system that can be operated remotely or by automation.

Applicability: All

OPR: AFS-800

(2) Flights with the OPA system engaged must not be conducted outside the authorized geographical area(s).

Applicability: All

OPR: AFS-800

(3) The OPA system may only be engaged or used while the aircraft is at or above (*altitude*) feet above ground level (AGL). The system must be turned off or otherwise rendered inoperative below (*altitude*) feet AGL.

Applicability: All

OPR: AFS-800

Note: The applicant should propose the altitude limits for this limitation and provide justification during the safety evaluation. After completion of successful flight testing above the altitude restriction, the operator may provide the FAA with a flight test plan to lower the altitude restriction. Lower altitudes may be incrementally approved to include automatic takeoff and/or landing operations. If automatic takeoff and/or landing operations were not discussed during the original safety evaluation, a supplemental safety evaluation will be held. If approved, this limitation will be rewritten to permit the OPA system to be engaged during automatic takeoff and/or landing operations.

(4) The OPA system may be engaged to permit remote pilot operations during daylight hours in visual meteorological conditions (VMC) with minimum flight visibility no less than 3 statute miles (SM) below 10,000 feet mean sea level (MSL) and 5 SM at or above 10,000 feet MSL. The OPA system is not authorized for use under special visual flight rules (SVFR).

Applicability: All
OPR: AFS-800

Note: If night operations are approved, the authorization will be prescribed by selecting operating limitation (5) and omitting this limitation.

(5) The OPA system may be engaged to permit remote pilot operations during daylight hours or at night in visual meteorological conditions (VMC) with minimum flight visibility no less than 3 statute miles (SM) below 10,000 feet mean sea level (MSL) and 5 SM at or above 10,000 feet MSL. The OPA system is not authorized for use under special visual flight rules (SVFR).

Applicability: All
OPR: AFS-800

Note: This limitation may be applicable if the applicant requested that the OPA system be engaged during night operations in the program letter and safety checklist. A limitation authorizing night operations per FAA Order 8130.2 must also be included in the operating limitations. For the OPA system to be approved for night operations, all switches or mechanisms onboard the aircraft used to disable or disconnect the OPA system must be illuminated unless they are located on a throttle, yoke, control column, control wheel, control stick, cyclic stick, or collective lever.

(6) The OPA system may be engaged to permit remote pilot operations during instrument meteorological conditions (IMC).

Applicability: All
OPR: AFS-800

Note: A limitation authorizing IMC operations per FAA Order 8130.2 must also be included in the operating limitations. If IMC operations are not authorized, omit this limitation.

(7) All software changes and major modifications, as defined by [14 CFR 21.93](#), performed under this certificate, public aircraft certificate of waiver or authorization (COA), or other authorizations that could potentially affect the safe operation of the OPA must be documented and provided to the geographic Flight Standards District Office (FSDO) before operating under this certificate. All software changes and major modifications must be flight tested in accordance with a flight test plan before conducting crew training, market surveys, sales demonstrations, customer crew training, and exhibition flights. The successful completion of the flight tests must be recorded in the aircraft records. All requested information must be provided to the geographic FSDO prior to any flights after major modifications or software changes.

Applicability: All, except for R&D and showing compliance
OPR: AFS-300

(8) When converting the aircraft between OPA and UAS configurations, the person making the conversion must make a maintenance record entry. After each conversion, the aircraft must be inspected to determine it is in a condition for safe operation. This condition for safe operation determination must also be documented in the aircraft maintenance records.

Applicability: All
OPR: AFS-300

Note: This limitation only applies to OPA/UAS.

(9) The aircraft manufacturer and its representatives may perform the maintenance and inspections required by these operating limitations. Representatives of a manufacturer must have written authorization from the manufacturer. For continued airworthiness of OPA or OPA/UAS not requiring part 43 compliance, the use of FAA certificated maintenance providers is encouraged, which may include repair stations, holders of mechanic and repairman certificates, and other persons working under the supervision of these mechanics and repairman. An FAA certificated maintenance provider performing maintenance and/or inspection on aircraft that are not subject to 14 CFR part 43 requirements, per [§ 43.1\(b\)\(1\)](#), is not considered to be exercising certificate holder privileges.

Applicability: All

OPR: AFS-300

Note: This limitation takes precedence and replaces any similar limitation specified in FAA Order 8130.2.

(10) The aircraft must be operated by only one remote control station at a time. A control station may not be used to operate multiple OPA.

Applicability: All

OPR: AFS-800

Appendix C. Program Letter for the (*Model Designation*) Unmanned Aircraft System, Optionally Piloted Aircraft, or OPA/UAS (*select one*) Experimental Certificate or Special Flight Permit (*select one*)

<p>Registered Owner Name: [Enter Owner Name]</p> <p>Registered Owner Address: [Enter Owner Address]</p> <p>Aircraft Description: [Enter Description]</p> <p>Aircraft Registration: [Enter Registration Number]</p> <p>Year Manufactured: [Enter Year]</p>	<p>Aircraft Builder: [Enter Builder Name]</p> <p>Aircraft Serial Number: [Enter Serial Number]</p> <p>Aircraft Model Designation: [Enter Model Designation]</p> <p>Engine Model: [Enter Model Designation]</p> <p>Propeller Model: (<i>if applicable</i>) [Enter Model Designation]</p>
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Note: The program letter must not contain information that is proprietary, confidential, company-sensitive, subject to International Traffic in Arms Regulations ([22 CFR subchapter M](#)), Export Administration Regulations ([15 CFR part 734](#)), or otherwise restricted from public or foreign disclosure.

1. The Intended Operation and How It Meets the Desired Purpose. The applicant must identify the purposes for which they are seeking an experimental certificate or special flight permit (*select one*) and provide sufficient detail for the FAA to understand the scope of operations. For multiple purpose use, describe any configuration changes that will occur between each purpose, such as adding external stores or disabling systems.

a. Research and Development (R&D) (*if applicable*). Describe each project in sufficient detail to demonstrate it meets the regulatory requirements of [14 CFR 21.191\(a\)](#). Provide the estimated time or number of flights required for the experiment.

b. Showing Compliance with Regulations (*if applicable*). Identify the airworthiness regulations with which the flight tests will show compliance to meet the regulatory requirements of [§ 21.191\(b\)](#).

c. Crew Training (*if applicable*). Describe the training of the applicant's flight crews to show that it meets the regulatory requirements of [§ 21.191\(c\)](#). Provide the estimated number of pilots to be trained and the flight hours needed to train each pilot. Identify any airports or off-airport locations, other than the home field, where the training will be conducted.

d. Market Survey (*if applicable*). Describe each market survey in sufficient detail to demonstrate it meets the regulatory requirements of [§ 21.191\(f\)](#). Identify intended customers and any known dates for market survey activity.

e. Exhibition (*if applicable*). Provide a list of the event names and dates at which the aircraft will be exhibited to demonstrate it meets the regulatory requirements of [§ 21.191\(d\)](#). If flight to an event is planned, provide the proposed routes of flight to and from the events and the cruise altitude. Flight to or from an event will likely require a chase aircraft. For proficiency and/or maintenance flights, include the estimated number of flight hours the aircraft will be operated. Include the name of the person responsible for the operation and maintenance of the aircraft.

f. Production Flight Testing under a Special Flight Permit (*if applicable*). Provide the information required by [§ 21.199](#). Describe—

- (1) The proposed itinerary;
- (2) The crew required to operate the aircraft and associated equipment;
- (3) The ways, if any, in which the aircraft does not comply with the applicable airworthiness requirements;
- (4) Any restriction the applicant considers necessary for the safe operation of the aircraft and associated equipment; and
- (5) Any other information considered necessary by the FAA for prescribing operating limitations.

2. Description of Past Flight History. Provide a brief summary of the aircraft's past flight history.

3. Definition of Flight Areas. Insert aeronautical charts or aerial photographs of the flight area in which the experimental flights or production flight testing (*select one*) will be conducted. Identify a flight test area that is over open water or sparsely populated and has light air traffic, pursuant to [14 CFR 91.305](#). Include the following:

- a.** Address of the home field or the location of the launch and recovery operations.
- b.** Latitude and longitude of the proposed flight areas in degrees:minutes:seconds format. If the perimeter of the proposed flight area is in the shape of a rectangle, the latitude and longitude of the corners must be stated. If the proposed flight area is in the shape of a circle, provide the latitude and longitude of the center point and the radius.
- c.** Proposed ceiling and floor altitude in mean sea level (MSL) for each flight area.
- d.** Proposed flight rules (for example, visual flight rules (VFR)).
- e.** For OPA, will the OPA system be engaged during night operations? Are the disconnect switches for the OPA system illuminated?
- f.** Whether the aircraft will perform any aerobatic maneuvers as defined by [§ 91.303](#).

4. Aircraft and Support Equipment Configuration. Provide the following:

- a. Three-view drawings or three-view dimensioned photographs of the aircraft, except for aircraft converted from a previously certificated type without appreciable change to the external configuration.
- b. Provide the model name, a description, and a diagram or picture of the control station and, if used, the back-up control station.
- c. Identify and describe required ground support equipment (for example, power carts, air carts, towing equipment, or launch and recovery equipment).

5. Safety and Risk Mitigation. Provide system information on the safety features of the aircraft to include lost link or flight termination capabilities. Describe how lost link or flight termination procedures will be used operationally for the planned flights. Describe any risk mitigation strategies that will be used in operational procedures. Information must be sufficient in detail to allow the FAA to determine appropriate operating limitations.

6. Certification Category. Provide responses to the following:

- a. What is the aircraft's maximum takeoff weight?
- b. What is the aircraft's maximum speed?
- c. What is the aircraft's proposed maximum operating altitude?
- d. Is this the first flight of the aircraft? If no, how many flight hours has it logged?
- e. Are you requesting night operations?
- f. Are you requesting operations in instrument meteorological conditions (IMC)?
- g. Are flights beyond the visual line of sight of the ground-based pilot or visual observer planned?
- h. What is the distance between the operating area and a towered airport?

Appendix D. Safety Checklist

1. Introduction. The safety checklist is designed to help the FAA evaluate those hazards that are unique to UAS, OPA, or OPA/UAS in support of issuing a special airworthiness certificate. Some safety items only require brief responses and others may not be applicable to a specific program. Additional information and supporting documentation may be required during the evaluation process.

Note: The applicant must identify all responses that contain information deemed proprietary, confidential, company-sensitive, subject to International Traffic in Arms Regulations ([22 CFR subchapter M](#)), Export Administration Regulations ([15 CFR part 734](#)), or subject to any other classification that would restrict or prevent the information from public or foreign disclosure.

2. Aircraft Segment.

a. Airframe.

(1) Describe in detail the physical configuration and characteristics of the aircraft, including size and weight. Include diagrams and schematics, as necessary.

(2) Describe the various materials and where they are used in the construction of the aircraft. Include details of the fabrication and construction processes and procedures.

(3) Describe the process used to determine that the airframe structure can withstand expected flight loads throughout the flight envelope. Include any test data or stress analysis that demonstrates positive structural margins of safety during flight.

(4) Describe any unique sub-systems or design characteristics such as a hydraulic system, environmental control system, parachute, or brakes.

b. Aircraft Performance Characteristics. Identify the following items:

(1) Maximum altitude,

(2) Maximum endurance,

(3) Cruise airspeed,

(4) Maximum airspeed,

(5) Any performance limitations due to environmental and meteorological conditions such as wind speed or min/max temperature limitations, and

(6) If the aircraft is designed for operations in icing conditions, any icing detection or icing protection capability.

c. Propulsion System.

(1) Describe in detail the propulsion system design and performance.

(2) For fuel-powered propulsion systems, describe the type of fuel and the maximum fuel capacity.

(3) Describe how the propulsion system performance is monitored, including any status indicators and warning messages provided to the pilot.

(4) Describe the most critical propulsion-related failure modes and their impact on system operation.

d. Fuel System (if applicable). Describe the fuel storage and distribution system and how it allows for adequate control of the fuel delivery to the engine, and provides for aircrew determination of fuel remaining.

e. Electrical System.

(1) Describe the electrical system and how it distributes adequate power to meet the requirements of the receiving systems. Provide a system-level diagram showing electrical power distribution throughout the aircraft.

(2) If a life-limited power source such as batteries is used, describe what the useful life of the power source is during normal and emergency conditions and how it was determined.

(3) Describe how electrical power status and power remaining information is displayed to the pilot.

(4) Describe the sources of backup power in the event of loss of the primary power source, including what systems are powered during backup power operations.

(a) Describe any automatic or manual load shedding capabilities.

(b) Identify how much operational time the backup power source provides. Include the assumptions used to make this determination.

f. Flight Control Surfaces and Actuators. Describe the design and operation of the flight control surfaces and servos/actuators. Include a diagram showing the location of the control surfaces and servos/actuators.

g. Payloads. Describe the payload equipment that is installed or is planned to be installed on the aircraft. Describe all payload configurations that significantly change weight and balance, electrical loads, or flight dynamics.

3. Command and Control Segment.

a. Avionics. Describe in detail the avionics system and provide an overall system diagram of the avionics architecture. Include the location of all air data sensors, antennas, radios, and navigation equipment.

b. Navigation. Describe in detail the navigation system, system backups, and how the system identifies and responds to a loss of the navigation capability.

c. Flight Control and Autopilot System Describe in detail the flight control system, including how the flight control computer and the autopilot system operates. Indicate whether the systems are unique designs or commercial off-the-shelf (COTS) products.

d. Command and Control Datalink.

(1) Describe the design and performance of the command and control link connecting the UA and the control station. Identify any redundant and/or independent control links, if applicable.

(2) Describe the radio frequency (RF) spectrum used for the command and control link.

(3) Describe how the radio signal strength, signal error rate, or similar information is computed and displayed to the pilot. Identify the threshold values that represent a critically degraded signal.

e. Lost Link and Flight Recovery.

(1) Describe the procedures that the UAS follows in the event of a lost-link. Include a description of event timing, such as a lost-link timer and what information is displayed to the pilot during takeoff, cruise, and landing during the lost-link procedure.

(2) Describe the flight recovery capability of the UA, including what single or combination of events initiates the flight recovery system and what the aircraft is programmed to do during the flight recovery procedure.

f. Control Station.

(1) Describe in detail the control station design. Provide a diagram of the control station layout if possible. Include screen captures of the most important control station displays.

(2) Describe any caution, warning, and advisory alarms that the system provides to the pilot (for example, low fuel or battery, failure of critical systems, or departure from an operational boundary).

4. Ground Support Equipment. Describe any critical support equipment that is used on the ground (for example, launch or recovery systems, ground data terminals, and external power generators).

5. Software Development Process. Describe the software development process and identify what software functions were developed by the applicant or the applicant's suppliers, and what functions are implemented by COTS software.

6. Operations.**a. National Airspace System (NAS) Integration and Interaction.**

(1) Surveillance and aircraft visibility.

(a) Is the aircraft equipped with technical standard order (TSO) approved Mode-C or Mode-S transponder? If yes, under what TSO and Class of equipment was the transponder approved?

(b) Is the aircraft equipped with a non-TSO Mode-C or Mode-S transponder? If yes, describe the method used to determine that the transponder meets the performance and environment requirements of any class of TSO-C74d (Mode C) or TSO-C112 (Mode S). Highlight any TSO deviations or non-TSO functions.

- (c) What functions and/or settings of the transponder can be changed by the pilot?
 - (d) Describe the transponder test procedures (refer to [14 CFR 91.413](#)).
 - (e) Does the aircraft have a high-visibility paint scheme that enables other pilots to see and avoid the aircraft and enables the observer to visually acquire and track the aircraft?
 - (f) What characteristics of the aircraft shape or structure increase its ability to be seen and tracked?
 - (g) Does the aircraft have anti-collision lights? Does the aircraft have position lights? What are the procedures if the lights are inoperative?
 - (h) For OPA, does the cockpit have instrument and cockpit lighting?
- (2) Air traffic control (ATC) and crewmember communications.
- (a) How does the pilot communicate with ATC?
 - (b) How does the pilot communicate with other users of the airspace?
 - (c) Describe the communications equipment (radios), including any equipment on the aircraft.
 - (d) Is there an intercommunication system that allows for communication between the pilots, ground support personnel, crewmembers, and observers?
 - (e) What procedures have been established in the event of intercom failure?
- (3) Sense and avoid.
- (a) Describe the methods in place for sense and avoid, and if applicable, identify the members of the flightcrew that hold this responsibility.
 - (b) What are the minimum traffic detection capabilities in azimuth and elevation?
 - (c) Describe the procedures that will be implemented should another user of the NAS enter the operating area.
- (4) Chase aircraft operations.
- (a) Describe the roles and responsibilities of the chase aircraft crew.
Note: Chase aircraft pilots must not concurrently perform either observer or UA pilot duties while operating the chase aircraft.
 - 1 Pilot.
 - 2 Observers.
 - (b) Describe any special training that the chase aircraft crew will receive.
- b. Flight Phases.**
- (1) Preflight/taxi operations.
- (a) Describe the entire flight planning process, including how weather briefings and updates are obtained.

(b) Describe coordination procedures with ATC before takeoff by addressing the following at a minimum:

- 1 Notices to Airmen (NOTAM).
- 2 Filing the flight plan.
- 3 Transponder codes.

(c) Describe preflight activities and the system and support equipment required by addressing the following at a minimum:

- 1 The process by which the system is prepared for flight.
- 2 The systems required to prepare the system for flight.
- 3 What critical process points are established, such as system configuration files needed to establish flight controls calibration?

(d) Describe how mapping updates are performed on the control station.

(e) Describe the flightline/operations safety program, if any.

(f) How do you ensure the area is clear for taxi?

(g) Describe the procedures to ensure the engine isn't started in a manner that could cause injury to ground personnel.

(2) Takeoff/launch. Provide a description of system equipment required for this operation. Identify unique system performance and procedures.

(3) Flight.

(a) Identify the components of the system, including support equipment that is required for the UA to conduct safe flight operations. Information presented in response to this item shall address the following at a minimum:

- 1 The process by which the system is operated during flight.
- 2 The systems required to operate the system during flight.
- 3 Critical process points that are established.

(b) Describe the method for switching between pilot-controlled (manual) and automated (autopilot) flight modes. At what points during the flight will this happen?

(c) Describe the indication the pilot will have that he/she is in control of the aircraft.

(d) For OPA, describe how the remote control equipment will be engaged and disengaged during ground and flight operations.

(e) How are changes made to the flight plan during flight?

(f) Describe the procedures in the event of lost communication with ATC (if applicable).

(4) Landing/recovery. Provide a description of system equipment required for this operation. Identify unique system performance and procedures.

(5) Post-Flight.

(a) Identify the parts of the system, including support equipment required for the UAS to conduct safe operations. Information presented in response to this item will address the following at a minimum:

- 1 The process by which the system is operated post-flight.
- 2 The systems required to operate the system post-flight.
- 3 Critical process points that are established.

- (b) Describe the process for a post-flight inspection.
- (c) Describe the process for incident/accident reporting.

c. Operating Areas.

(1) Describe how you will ensure there is no unusual ground activity under the flight operations area. For example, are there any weekend events scheduled? Are there housing areas or public gathering places?

(2) Identify any military or civilian routes through the proposed operational area.

(3) Identify the proposed operating area on an aeronautical chart. The proposed area must define lateral boundaries and requested altitudes.

d. Flight Envelope and Test Plans.

(1) Describe the conditions under which flight envelopes will be tested. How close will operations be to any populated areas and major highways?

(2) Describe how you plan to meet test objectives under the proposed flight envelope and operating area. Include test plans, if possible.

e. Operating History. Describe the operational history of the system. Include details of the following items:

(1) Total number of flights and flight hours on the aircraft.

(2) Any system failures, incidents, accidents, or emergencies, and the resultant system modifications or corrective actions.

f. Manuals.

(1) Is there an operating manual for the aircraft?

(2) Does the manual have a section with all of the aircraft limitations in one location?

(3) Does the operating manual have bolded or underlined procedures for emergencies for memory item steps?

(4) Is there an operational checklist for all phases of the operation?

(5) Are there separate checklist items for normal, abnormal, or emergency procedures?

7. Organizational Considerations.

a. Pilot/Crew Qualifications/Training. Refer to [14 CFR part 61](#), Certification: Pilots, Flight Instructors, and Ground Instructors; [part 63](#), Certification: Flight Crewmembers Other Than Pilots; and [part 65](#), Certification: Airmen Other Than Flight Crewmembers.

(1) Crew. Is there a crew resource management training program? If so, describe the program.

(2) Pilot.

(a) Do the pilots have current pilot certificates? If so, what type of pilot certificates?

(b) Do the pilots have current medical certificates? If so, which classes of medical certificates?

(c) Describe in detail and reference any procedures that show that the pilots are properly trained.

(d) Is there an established formal training curriculum for all pilots including PIC, supplemental, or chase pilots?

(e) Is the pilot type rated for the aircraft being flown?

(3) Observer.

(a) Do the observers have current pilot certificates? If so, what type of pilot certificates?

(b) Do the observers have current medical certificates? If so, which classes of medical certificates?

(c) Does the observer understand the applicable aviation regulations, such as see and avoid, cloud clearance requirements, and right-of-way rules?

(d) Is the observer a current pilot? Has he/she completed a training curriculum? Is there an established formal training curriculum for all observers? If so, please provide it during the onsite inspection.

(e) Describe, in detail, how the observer is properly trained to be an effective member of the flight team.

(f) Does the observer understand—

1 Proper communications and phraseology?

2 Proper visual scan techniques?

3 Standard flight operations at non-towered airports?

4 Containment areas and how to determine whether the UA is operating within that area?

b. Maintenance. Does a maintenance and inspection program exist?

End of Safety Checklist

Appendix E. UAS Risk Index

Use the applicant's program letter to determine the points to assess for each risk category in table E-1. Use the total score from table E-1 to determine the group category (as listed in table E-3). Use table E-4 below to determine the tasks that should be completed by the applicant to establish that the aircraft will meet the applicable regulatory standards. Some certification items were not included in table E-4 because they will likely be necessary for all group categories. These items include the FAA Form 8130-6, program letter, aircraft registration, aircraft markings, and qualified crewmembers. Additional guidance on the use of this UAS Risk Index is contained in chapter 3 of this order.

Table E-1. Risk Categories

Risk Category	Incremental Element	Value	Points
Maximum Takeoff Weight	Up to 4.5 lbs	0	
	4.5 up to 55 lbs	5	
	55 lbs up to 300 lbs	10	
	300 lbs up to 1,000 lbs	15	
	Greater than 1,000 lbs	25	
Maximum Speed	Less than 87 kts (100 mph)	0	
	87 kts to 250 kts	10	
	Greater than 250 kts	20	
Maximum Operating Altitude	Less than 200 ft AGL	0	
	200 ft AGL up to 500 ft AGL	5	
	500 ft AGL up to 5,000 ft AGL	10	
	5,000 ft AGL up to 17,999 MSL	15	
	Class A and above	25	
Flight History	Known – previous flight time \geq 50 hrs	0	
	Known – previous flight time < 50 hrs	2	
	Unknown – first flight	6	
Total Score			

Table E-2. Special Considerations

	Yes	No
Night Operations		
IMC		
Beyond or Extended Visual Line of Sight (BVLOS/EVLOS)		
Chase Aircraft		
Operations Closer Than 2 Miles From Towered Airport		

Note: If "Yes" is checked for any of these items, Group III requirements will be applied. FAA Order 8900.1 may impose additional requirements (such as a safety case) for these items.

Table E-3. Group Categories

Group Category	Total Score
Group I	0 to 16
Group II	17 to 39
Group III	40 and above

Table E-4. Applicant Tasks

Applicant Task	Group I	Group II	Group III
Chartered Flight Area	Should be completed by applicant	Should be completed by applicant	Should be completed by applicant
Safety Checklist	N/A	Should be completed by applicant	Should be completed by applicant
Safety Evaluation	FAA only reviews program letter; questions resolved via email or phone	FAA determines if safety evaluation is necessary and the appropriate format	Should be completed
Initial Flight Test Plan	N/A*	Should be completed by applicant; Comprehensive review by FAA not required*	Should be completed by applicant*
Flight Test Plans for Major Configuration Changes	N/A*	Should be completed by applicant; Comprehensive review by FAA not required*	Should be completed by applicant*
Operating Manual	Should be completed by applicant	Should be completed by applicant	Should be completed by applicant
Weight and Balance	Should be completed by applicant	Should be completed by applicant	Should be completed by applicant
Maintenance and Inspection Program Review and Acceptance	See FAA Order 8900.1	See FAA Order 8900.1	See FAA Order 8900.1
Self-Certifying Statement of Compliance With Maintenance and Inspection Program	See FAA Order 8900.1	See FAA Order 8900.1	See FAA Order 8900.1
Maintenance Records	See FAA Order 8900.1	See FAA Order 8900.1	See FAA Order 8900.1
Condition Inspection	See FAA Order 8900.1	See FAA Order 8900.1	See FAA Order 8900.1
Comply With Airworthiness Directives	Should be completed by applicant	Should be completed by applicant	Should be completed by applicant
Major Configuration Change Reporting	Should be completed by applicant	Should be completed by applicant	Should be completed by applicant

* Flight testing should show that the aircraft is controllable throughout its normal range of speeds and throughout all the maneuvers to be executed and has no hazardous operating characteristics or design features.

**Identification is in accordance with [§ 21.182](#). Small UA do not require a fireproof ID plate.

Note: Table E-4 does not include all certification requirements listed in chapter 3 of this order.

Appendix F. Definitions

Certificate of Waiver or Authorization (COA). For aircraft, a COA is issued as a waiver from Title 14 of the Code of Federal Regulations (14 CFR) [91.113](#). COAs are issued by the FAA's Air Traffic Organization.

Optionally Piloted Aircraft (OPA). A manned aircraft that can be flown or controlled by the onboard pilot in command or by another individual from a location not onboard the aircraft.

Small Unmanned Aircraft. An unmanned aircraft weighing less than 55 pounds on takeoff, including everything that is on board or otherwise attached to the aircraft.

Unmanned Aircraft (UA). An aircraft that is operated without the possibility of direct human intervention from within or on the aircraft.

Unmanned Aircraft System (UAS). An unmanned aircraft and associated elements (including communication links and the components that control the unmanned aircraft) that are required for the pilot in command to operate safely and efficiently in the national airspace system.

Appendix G. FAA Form 1320-19, Directive Feedback Information

Directive Feedback Information

Please submit any written comments or recommendations for improving this directive, or suggest new items or subjects to be added to it. Also, if you find an error, please tell us about it.

Subject: FAA Order 8130.34D

To: Directives Management Officer (DMO) at 9-AWA-AVS-AIR-DMO@faa.gov or complete the form online at <https://ksn2.faa.gov/avs/dfs/Pages/Home.aspx>

(Please check all appropriate line items)

An error (procedural or typographical) has been noted in paragraph _____ on page _____.

Recommend paragraph _____ on page _____ be changed as follows:

(attach separate sheet if necessary)

In a future change to this directive, please include coverage on the following subject *(briefly describe what you want added)*:

Other comments:

I would like to discuss the above. Please contact me.

Submitted by: _____ Date: _____

FTS Telephone Number: _____ Routing Symbol: _____