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of Transportation
Federal Aviation
Administration

Advisory Circular

Subject: Certification Process for Agricultural
Aircraft Operators

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Change:

This advisory circular (AC) describes an acceptable means, but not the only means, for an agricultural aircraft operator to apply for an Agricultural Aircraft Operator Certificate under Title 14 of the Code of Federal Regulations (14 CFR) part [137](#). The AC also addresses safety practices for agricultural aircraft operators. This AC is not mandatory and does not constitute a regulation. However, if you use the following means described, you must follow it in all important aspects.

This AC does not change regulatory requirements; the provisions of applicable regulations control the AC. Interpretations of regulations are issued only under established agency procedures.

This AC applies to the evaluation of applicants for an Agricultural Aircraft Operator Certificate.

This AC also applies to agricultural aircraft operations using an Unmanned Aircraft System (UAS). A part 137 operator who wishes to use a UAS should have additional knowledge of Public Law (PL) [112-95](#), FAA Modernization and Reform Act of 2012, Section [333](#), Special Rules for Certain Unmanned Aircraft Systems; the 14 CFR part [11](#) exemption process; 14 CFR part [107](#); and Federal Aviation Administration (FAA) Order 8900.1, Volume 16, Unmanned Aircraft Systems. Please be aware, the operator of a UAS either cannot comply with several sections in part 137, or those requirements are not applicable to UAS operations. Therefore, an operator proposing to use a UAS must receive a grant of exemption with relief of the appropriate sections of part 137 before the certification process reaches the Demonstration and Inspection Phase. The exemption requirement applies to either a UAS that weighs 55 pounds or more or to a UAS that weighs less than 55 pounds (total weight) and can operate under part 107. The operator must provide a copy of the exemption to the certification team. The phrase “unless otherwise exempted” is used numerous times in this AC and Order 8900.1, and refers to an operator’s exemption, whether they are operating a small UAS under part 107 or under a PL 112-95, Section 333 exemption for a UAS that weighs 55 pounds or more.

ORIGINAL SIGNED by

/s/ John Barbagallo
Deputy Executive Director, Flight Standards Service

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CHAPTER 1. GENERAL

1.1 Purpose of This Advisory Circular (AC). This AC describes an acceptable means, but not the only means, for an agricultural aircraft operator to apply for an Agricultural Aircraft Operator Certificate under Title 14 of the Code of Federal Regulations (14 CFR) part [137](#). The AC also addresses safety practices for agricultural aircraft operators. This AC is not mandatory and does not constitute a regulation. However, if you use the following means described, you must follow it in all important aspects.

1. This AC does not change regulatory requirements; the provisions of applicable regulations control the AC. Interpretations of regulations are issued only under established agency procedures.
2. This AC applies to the evaluation of applicants for an Agricultural Aircraft Operator Certificate.

1.1.1 Exemptions. This AC also applies to agricultural aircraft operations using an Unmanned Aircraft System (UAS). A part 137 operator who wishes to use a UAS should have additional knowledge of Public Law (PL) [112-95](#), FAA Modernization and Reform Act of 2012, Section [333](#), Special Rules for Certain Unmanned Aircraft Systems; the 14 CFR part [11](#) exemption process; 14 CFR part [107](#); and FAA Order 8900.1, Volume 16, Unmanned Aircraft Systems. Please be aware, the operator of a UAS either cannot comply with several sections in part 137, or those requirements are not applicable to UAS operations. Therefore, an operator proposing to use a UAS must receive a grant of exemption with relief of the appropriate sections of part 137 before the certification process reaches the Demonstration and Inspection Phase. The exemption requirement applies to either a UAS that weighs 55 pounds or more or to a UAS that weighs less than 55 pounds (total weight) and can operate under part 107. The operator must provide a copy of the exemption to the certification team. The phrase “unless otherwise exempted” is used numerous times in this AC and Order 8900.1, Volume 16, and refers to an operator’s exemption, whether they are operating a small UAS under part 107 or under a PL 112-95, Section 333 exemption for a UAS that weighs 55 pounds or more.

1.2 Applicability. This AC applies to persons or entities that are seeking either a Private or Commercial Agricultural Aircraft Operator Certificate. Part 137 prescribes certain operating limitations for private operators, but the certification process for both private and commercial applicants is identical.

1.3 Where You Can Find This AC. You can find this AC on the FAA’s website at http://www.faa.gov/regulations_policies/advisory_circulars.

1.4 What This AC Cancels. AC 137-1A, Certification Process for Agricultural Aircraft Operators, dated October 10, 2007, is cancelled.

1.5 Related Regulations. Title 14 CFR parts [1](#), [21](#), [43](#), [61](#), [91](#), [107](#), and [137](#).

1.6 Related Reading Material. The information contained in Order 8900.1 may be valuable and assist operators with understanding the operating privileges and limitations of part 137.

- [Volume 2, Chapter 8, Section 1](#), The Certification Process of a Part 137 Operator.
- [Volume 2, Chapter 8, Section 2](#), Introduction to Airworthiness Issues for Part 137.
- [Volume 2, Chapter 8, Section 3](#), Evaluate Airworthiness Issues for Part 137.
- [Volume 3, Chapter 52, Section 1](#), Introduction to Part 137 Related Tasks.
- [Volume 3, Chapter 52, Section 2](#), Evaluate a Part 137 Congested Area Operations Plan.
- [Volume 5, Chapter 11, Section 1](#), Qualify a Pilot in Command.
- [Volume 6, Chapter 6, Section 1](#), Conduct a Part 137 Base Inspection.
- [Volume 6, Chapter 6, Section 2](#), Surveillance of a Part 137 Dispensing Operation.
- [Volume 6, Chapter 6, Section 3](#), Surveillance of a Part 137 Satellite Site/Facility.
- [Volume 6, Chapter 6, Section 4](#), Monitor a Part 137 Congested Area Operation.
- [Volume 16, Chapter 4, Section 2](#), Operations in Accordance with PL 112-95, Section 333, and Exemptions.
- [Volume 16, Chapter 4, Section 3](#), Issue a Certificate of Waiver to the Provisions of Part 107.

1.7 Definitions.

1.7.1 Agricultural Aircraft Operation. The operation of an aircraft for the purpose of:

1. Dispensing any economic poison.
2. Dispensing any other substance intended for plant nourishment, soil treatment, propagation of plant life, or pest control.
3. Engaging in dispensing or nondispensing activities that directly affect agriculture, horticulture, or forest preservation, but not including the dispensing of live insects.

1.7.2 Economic Poison.

1. Any substance or mixture of substances intended for preventing, destroying, repelling, or mitigating any insect, rodent, nematode, fungus, weed, and other forms of plant or animal life or virus. This does not include viruses on or living in humans or animals.
2. Any substance or mixture of substances intended for use as a plant regulator, defoliant, or desiccant.

1.8 Background.

- 1.8.1 General.** This AC describes the process for applying and becoming a certificated agricultural aircraft operator under part 137. It provides operators with the basic information and guidance to prepare for the certification process, and describes a methodical path for certification.
- 1.8.2 Filing an Application.** Applicants should file the application for an Agricultural Aircraft Operator Certificate with the responsible Flight Standards (AFS) office.
- 1.8.3 Certification Process.** The certification process for either a private or a commercial agricultural aircraft operator is identical. Applicants must follow the same process for the issuance of an Operating Certificate.
- 1.8.4 Operating Certificate.** The Operating Certificate identifies the operator authorized to conduct private or commercial agricultural aircraft operations. The Operating Certificate will also display privileges to dispense economic poisons, if authorized.

1.9 Exemptions to Part 137.

- 1.9.1 Public Aircraft.** A public aircraft is used exclusively in the service of any Federal, state, or local government or its political subdivision and is not engaged in carrying persons or property for commercial purposes. A public aircraft conducting agricultural aircraft operations needs not comply with the certification rules of part 137, but must comply with certain operating rules, which includes completing and submitting a congested area plan (CAP) for approval. Public operators may find the information in Chapter [3](#) useful for compliance with part 137 subpart C, as well as AC [00-1.1](#), Public Aircraft Operations.
- 1.9.2 Part 133 Rotorcraft External-Load Operations.** If operators hold a 14 CFR part 133 Rotorcraft External-Load Operations Certificate, they may conduct an agricultural aircraft operation that involves only the dispensing of water with spreader additive on forest fires by rotorcraft external-load means without having to meet part 137 certification requirements. If operators are conducting forest firefighting activities with fire bombers or tankers, they must have an Agricultural Aircraft Operator Certificate (refer to part 137, § [137.11](#)).
- 1.9.3 UAS Operations.** If operators are conducting agricultural aircraft operations with a UAS, they must hold an FAA-issued exemption (refer to www.faa.gov/uas). Certain regulations in 14 CFR, Aeronautics and Space (e.g., sections in parts [45](#), 61, 91, 107, and 137) may not be applicable to UAS operations. Therefore, the exemption provides the necessary relief.
- ## **1.10 Certification Process.**
- 1.10.1 FAA Evaluation.** The FAA has established a methodical approach for evaluating and determining an applicant's ability to comply with part 137 and other applicable regulations. The FAA is also responsible for determining the operator is capable of

performing the services with the highest degree of safety. Evaluation items focus on three categories: airmen, aircraft, and operations.

1.10.2 Evaluation Process. Applicants must successfully satisfy each of the five phases in the evaluation process to receive a certificate. The phases are:

1. Preapplication Phase.
2. Formal Application Phase.
3. Document Compliance Phase.
4. Demonstration and Inspection Phase.
5. Certification Phase.

Note: For part 137 operations using a UAS, prior to the Formal Application Phase, the applicant must have petitioned for an exemption, and prior to the Demonstration and Inspection Phase, a grant of exemption must have been issued to the applicant.

1.11 AC Content. Chapters [2](#) and 3 provide an in-depth overview of individual tasks required to complete the certification process. Chapters [4](#) and [5](#) provide industry best practices and information regulated by organizations other than the FAA. The following is a description of each chapter:

- Chapter 2 details each phase of the part 137 certification process.
- Chapter 3 contains tasks applicable to the functions of operators, airmen, and aircraft.
- Chapter 4 contains safety and security industry practices for agricultural operators.
- Chapter 5 contains informational resources from organizations other than the FAA.

1.12 Contact. For additional information or suggestions contact the Commercial Operations Branch (AFS-820) at 202-267-1100.

CHAPTER 2. PART 137 OPERATOR CERTIFICATION PROCESS

- 2.1 Purpose.** This chapter outlines each phase of the FAA process to become a certificated agricultural aircraft operator.
- 2.2 Introduction.**
- 2.2.1 Certification Process.** Certification is one of the most important responsibilities of Flight Standards (AFS). The FAA uses the certification process to determine that an applicant is qualified to hold a certificate and operate in a safe manner. The process also verifies that the FAA has the ability to provide the required oversight. The FAA also uses the certification process to determine if the applicant meets rules governing the operation of agricultural aircraft by a private or a commercial operator. When the applicant successfully completes this process, the FAA will issue a part [137](#) Private or Commercial Agricultural Aircraft Operator Certificate to them.
- 2.2.2 Understanding Responsibilities.** This information will assist applicants in understanding their responsibility for conducting proposed operations in compliance with the applicable regulations and to the highest degree of safety. Applicants must demonstrate their abilities before receiving authorization to conduct agricultural aircraft operations.
- 2.3 The Preapplication Meeting.**
- 2.3.1 Overview.** The preapplication meeting is an informal meeting to provide applicants with an overview of the certification process and identify the necessary resources to assist them in becoming certificated.
- 2.3.2 Meeting Exemption.** If an applicant is familiar with all of the requirements of the certification process and the required documentation, they may not need a preapplication meeting (e.g., if they have previous experience as a part 137 operator). In such cases, the FAA eliminates the Preapplication Phase and the applicant proceeds to the Formal Application Phase.
- 2.3.3 Required Information.** During the meeting, the FAA will ensure that applicants meet the eligibility requirements for obtaining an Operating Certificate under § [137.19](#) by conducting a general inquiry. Be prepared to provide the FAA with the following information:
1. Area of operation.
 2. Location of home base of operations.
 3. Location of probable satellite sites.
 4. Type of operation, private or commercial.
 5. Economic poisons or other dispensing material.
 6. Operating as individual, corporation, or partnership.
 7. Previous experience with part 137 operations.

8. Category and class of aircraft (helicopter, airplane, or Unmanned Aircraft Systems (UAS)).
9. Qualifications and experience of chief supervisor.
10. Applicability of parts [61](#), [91](#), [107](#), and 137.
11. Disclosure of any previous or pending enforcement action pertaining to the applicant, management personnel, or chief supervisor.
12. Acknowledge the intent to make petition for an exemption for operating UAS under part 137.

2.3.4 Letter of Intent (LOI). Be prepared to submit an LOI (see Figure [2-1](#), Sample Letter of Intent) for the Document Compliance Phase. The LOI is an overall description of the applicant's proposed operation, which applicants usually submit with the application. Depending on the size and scope of the proposed operation, the FAA may determine that an LOI is not necessary. If the FAA requires an LOI, include the following:

1. The specific type of Agricultural Aircraft Operator Certificate the applicant is applying for (commercial or private);
2. The legal company name and any doing business as (DBA), home base of operations address;
3. Primary airport address (if applicable), mailing address, and telephone numbers;
4. Type of aircraft proposed for the operation;
5. The estimated date when operations or services will begin;
6. The names and addresses of all management personnel or chief supervisor;
7. Three, three-letter certificate designators, in order of preference; and
8. If the operation is a corporation, the Articles of Incorporation.

2.3.5 AFS Offices. AFS offices accomplish part 137 certifications. An AFS office assembles a certification team, usually of two to three aviation safety inspectors (ASI). Each inspector represents their specialty, which includes Operations, Maintenance, and Avionics. One of the three inspectors will be designated as the certification project manager (CPM). All correspondence, both to and from the applicant, should be coordinated with the CPM.

2.3.6 CPM. During the meeting, the CPM will ensure that applicants understand the applicability of parts [1](#), [43](#), [61](#), [91](#), [107](#), and 137. This is usually accomplished through discussions pertaining to part 137 certification and operational requirements. Before the conclusion of this meeting, applicants should ask any questions pertaining to the certification. Applicants must fully understand the CPM's responsibilities and roles during the certification process to avoid delays to their proposed date for the start of operations. Applicants should have current copies of parts 91 and 137. Before the conclusion of the meeting, the CPM will explain the following requirements:

- General applicability and definition of FAA terms related to part 137;
- Certification process and requirements;
- Operating rules;
- Records and reports required under part 137; and
- The need for an exemption, waiver, or Certificate of Authorization (CoA), if operating a UAS.

2.3.7 Compliance with Regulations. The CPM advises applicants of their responsibility for compliance with other Federal, state, and local regulations regarding aerial applications. Applicants are responsible for determining the applicability and compliance with these regulations. At the conclusion of the preapplication meeting, the CPM will provide them with the following:

1. Three copies of FAA Form 8710-3, Agricultural Aircraft Operator Certificate Application (see Figure [2-2a](#), FAA Form 8710-3, Agricultural Aircraft Operator Certificate Application (Front), and Figure [2-2b](#), FAA Form 8710-3, Agricultural Aircraft Operator Certificate Application (Back)). A copy of the form is available at <https://www.faa.gov/forms/index.cfm/go/document.list?omni=Forms&q=8710-3&parentTopicID=0&display=current&subjectClassPrefix=&documentNumber=FAA+8710-3>; and
2. Other related reference material and FAA guidance pertaining to the certification and exemption process.

2.4 Formal Application Phase. Refer to Order 8900.1, [Volume 11, Chapter 13, Section 1](#), Flight Standards Certification Services Oversight Process.

2.4.1 Submitting the Application. This phase begins when an applicant submits their application and, if applicable, an LOI. Applicants should prepare and submit three copies of a Schedule of Events (SOE) (see Figure [2-3](#), Schedule of Events) to show their plan for the process. The SOE will be continually updated throughout the certification process to reflect the status of each item. For UAS operations, the petition for exemption and related operating documents must be submitted during this phase.

2.4.2 Application Review. The certification team will review the application within 30 business-days of receiving it. If an LOI is required, the team will review the letter.

2.4.3 Application Decision. Applicants are notified, in writing, whether the formal application is accepted or rejected. If the application is inaccurate or not completed properly, the CPM returns the application to them with a letter outlining the items that are unsatisfactory. Applicants must take the appropriate action to correct the items before the certification process can continue. The CPM may determine that a formal application meeting is necessary to resolve issues with the application. Typically, the preapplication meeting covers these items or specific discrepancies found with the application.

2.4.4 Application Acceptance. The FAA's acceptance of a formal application does not constitute approval or acceptance of individual attached documents. The documents are thoroughly evaluated during subsequent phases of the certification process. The Formal Application Phase ends upon CPM acceptance of the application, and the Document Compliance Phase begins.

2.5 The Document Compliance Phase.

2.5.1 Reviewing Documents. The Document Compliance Phase consists of an in-depth review of all documents the applicant submits. The CPM inspects the aircraft for compliance with § [137.31](#) and reviews the application, SOE, LOI, and the following items:

- Chief supervisor qualifications for commercial agricultural operators;
- Qualifications and currency requirements for pilots to conduct agricultural aircraft operations;
- Previous letters of competency;
- Copy of the aircraft registration certificate, unless otherwise exempted (or to be exempted);
- Copy of the airworthiness certificate, unless otherwise exempted (or to be exempted);
- An appropriate minimum equipment list (MEL) for the aircraft being used, if applicable;
- Aircraft maintenance documents;
- Inspection of the aircraft determining compliance with § 137.31, unless otherwise exempted;
- UAS operational documents, if applicable (such as exemptions, waivers, or CoAs); and
- UAS registration number (FA number) and serial number of the unmanned aircraft (UA) if noncertificated).

2.5.2 Private Use. If applicants apply for a Private Agricultural Aircraft Operator Certificate, they may only conduct operations over property they own or lease, or have ownership or other legal interest in the crops located on the property. Applicants must provide the FSDO with proof of a bona fide property interest. This requires applicants to provide a deed or agricultural use lease for the property where operators will perform aerial dispensing.

2.5.3 Civil Aircraft Use. If applicants intend to use a large civil aircraft of U.S. registry, they must comply with the requirements prescribed in part 91, § [91.23](#). (Refer to FAA Order 8900.1, [Volume 3, Chapter 13, Section 6](#), Process an Aircraft Lease Agreement for Regulatory Compliance Under § 91.23.)

2.5.4 Unsatisfactory Documents and Phase Completion. If any item required for the Document Compliance Phase is unsatisfactory, the CPM will advise the applicant that they must correct it before the certification process continues. The CPM will provide the applicant with a letter that outlines the items found unsatisfactory. After addressing the unsatisfactory items, the applicant should resubmit the documents for another review by the team. When the team determines that all documents are satisfactory, the CPM terminates the Document Compliance Phase. The CPM schedules a time to conduct the Demonstration and Inspection Phase.

2.6 The Demonstration and Inspection Phase.

Note: If the operator is seeking certification with a UAS, the applicant must have received a grant of exemption (from the applicable 14 CFR parts) before beginning this phase of certification.

2.6.1 General. The Demonstration and Inspection Phase is an inspection of the applicant's facilities and aircraft. During this phase, applicants show that they can conduct operations under part 137 to the highest degree of safety. The team will inspect their home base of operations for compliance with the applicable operating procedures. The size and complexity of the operation will determine the extent of the inspection required at the base.

2.6.2 Aircraft Requirement. Unless otherwise exempted, applicants must present at least one certificated and Airworthy aircraft that is equipped for agricultural operation. An Airworthiness inspector will verify that the aircraft is properly certificated and Airworthy, the inspection status is current, and is in a condition for safe operation.

2.6.3 Areas of Examination. This phase examines the following five areas:

1. Recordkeeping system (for commercial operators).
2. The method for informing personnel of their duties and responsibilities.
3. Aircraft.
4. Facilities (if applicable).
5. The applicant's knowledge and skills.

2.6.4 Commercial Operators. A private agricultural aircraft operator is not required to comply with § [137.71](#) (recordkeeping requirements), but a commercial agricultural aircraft operator must maintain a current recordkeeping system at their home base of operations. They must keep these records for at least 12 months and make them available for inspection upon request from the FAA. Because § 137.71 is not specific in the type of recordkeeping system, operators must determine how they intend to comply with the recordkeeping requirements. Some operators use records such as copies of bills or invoices sent to the operator's customers. Regardless of the type of recordkeeping system used, the records should include the following information:

- The name and address of each person for whom agricultural aircraft services were provided.
- The date of the service.
- The name and quantity of the material dispensed for each operation conducted.
- The name, address, and certificate number of each pilot used in agricultural aircraft operations and the date that pilot met the knowledge and skills requirements of § 137.19(e).

2.6.5 Inform Personnel of Duties and Responsibilities. Under § [137.41\(a\)](#), private and commercial operators must ensure that each person used in an agricultural aircraft operation is informed of their duties and responsibilities for the operation. A private or commercial agricultural aircraft operator is not required to have an operations manual; therefore, it is important for them to develop safe operating procedures that all personnel can easily understand. The FAA will evaluate and determine whether the operator's method for informing personnel is acceptable. A commercial operator may also wish to keep a written record to indicate that personnel have been informed of their duties and responsibilities (refer to § 137.71(a)(4)).

2.6.6 Inspection. For both private and commercial agricultural aircraft operators, the Airworthiness inspector will inspect the aircraft, aircraft records, and dispensing equipment. The following considerations determine if the aircraft is safe to conduct the proposed operation:

- Aircraft and aircraft maintenance records, as applicable.
- Compliance with all applicable Airworthiness Directives (AD), as applicable.
- Proper certification and airworthiness of aircraft in full compliance, unless otherwise exempted.
- Up-to-date inspection status, as applicable.
- The aircraft has seat belts and approved shoulder harnesses installed for each pilot station, unless otherwise exempted.
- The aircraft is appropriately equipped for agricultural operations.
- The aircraft is equipped to prevent inadvertent release by the pilot or other crewmember, if it is equipped to release the tank or hopper as a unit.
- The aircraft is in a condition for safe operation.

2.6.7 Restricted-Category Aircraft. Part [21](#), or the operating limitations established for the aircraft, may not require a flight manual for restricted-category aircraft. Performance information may be found in an applicable military technical order, operating limitation, placard, flight test performance data established by the aircraft manufacturer, or any combination of these. Performance information provided by a designated engineering representative is satisfactory.

- 2.6.8** Load Jettisoning. Should questions arise concerning the load jettisoning capability of the aircraft used in congested-area operations, applicants must present jettisoning test data which show that the aircraft is equipped with a device capable of jettisoning at least one-half of the aircraft's maximum authorized load of agricultural materials within 45 seconds. If such data is not determined for the aircraft, or if any doubt exists concerning meeting this requirement, the inspector should have the applicant conduct an in-flight load jettisoning demonstration. During the test, the aircraft must be loaded with any suitable material (e.g., lime, sand, and water) and the inspector observes the demonstration from the ground. The discharge of material from the aircraft should be timed to determine compliance with the 45-second jettisoning requirement. Jettisoning does not apply to helicopters (§ [137.53\(c\)\(2\)](#)).
- 2.6.9** Home Base of Operations. Part 137 does not specify the type of physical facilities applicants must have as an agricultural operator. This is usually governed by state and local regulations, and to some extent by regulations from the Environmental Protection Agency (EPA). FAA inspectors have no enforcement capability for state, local, or EPA areas. The inspector's duty is to determine that the applicant's practices and procedures at the base of operations conform to the regulations prescribed in part 137.
- 2.6.10** Minimum Equipment List (MEL). Most manufacturers of restricted-category aircraft used in agricultural operations have not developed or requested approval for a Master Minimum Equipment List (MMEL). Despite the guidance in AC [91-67](#), Minimum Equipment Requirements for General Aviation Operations Under FAR Part 91, an operator of a small, single-engine, turbopropeller agricultural aircraft may use the generic part 91 single-engine MMEL shown in the MMEL subsystem. If an applicant wishes to use this document, they must develop maintenance and operational item procedures for their operation. Part 137 currently does not contain provisions for the use of an MEL by part 137 operators. The MEL approval process for part 137 operators is the same that is used for part 91 operations (refer to Order 8900.1, [Volume 4, Chapter 4, Section 2](#), MEL Requirements for 14 CFR Parts 91, 137, and [142](#) Operators) for approval of an MMEL for use as an MEL by means of a Letter of Authorization (LOA). The MEL LOA template (Operations Specification (OpSpec) D095, Minimum Equipment List (MEL) Authorization) is available in the Web-based Operations Safety System (WebOPSS) for part 137 operators.
- 2.6.11** Knowledge Test. The Operations inspector conducts a knowledge and skill test during the applicant's initial part 137 certification. As required by § 137.19(e), the applicant or their designated chief supervisor will be the testing candidate. This requirement applies to applicants who seek either a Private or Commercial Operating Certificate.
- 2.6.11.1** The objective of the knowledge and skill test is to determine the knowledge and abilities of the pilots applicants use and to determine that they are qualified to act as pilot in command (PIC) of an agricultural aircraft. If the pilot was previously qualified under part 137, the CPM may not require the pilot to take a knowledge and skill test provided that the proper logbook endorsements or a letter of competency from an FAA ASI is available. Operators must also demonstrate a knowledge and understanding of the

applicable exemption and/or waiver they may be operating under (e.g., UAS operations).

2.6.11.2 The pilot must have adequate knowledge of operating limitations for the aircraft (contained in the Aircraft Flight Manual (AFM) or the pilot's operating handbook (POH)) to be used under the applicable requirements contained in § [91.9](#) and part 107. Weight and Balance (W&B) information will receive special emphasis. The applicant and the pilot must also be knowledgeable of the aircraft's performance capability. Knowledge of performance capability includes items such as:

1. Stall speeds at maximum certificated gross weight, straight ahead, power off, and flaps up.
2. Best rate and best angle of climb speed.
3. Maneuvering speeds.
4. Density Altitude (DA) and its effect on performance.
5. Performance capabilities and operating limitations of the aircraft to be used.
6. Takeoff distance required to clear a 50-foot obstacle at maximum certificated gross weight with zero wind (manned aircraft).

2.6.11.3 Applicants and the pilot must also be knowledgeable of UAS-specific performance capability (if operating a UAS). Specific performance capability includes items such as:

1. Performance of the aircraft within the proposed flight envelope.
2. System response and safeguards used to mitigate the risk of engine power loss.
3. Failed signal input from the control station procedures.
4. Considerations for payload equipment configurations that significantly change W&B, electrical loads, or flight dynamics.
5. Aircraft lost link and emergency recovery procedures.
6. Sequence the UA will follow in the event control link is lost.
7. Determination of and thresholds for radio signal strength and/or health.
8. Communication procedures between the PIC and the visual observer (VO) during operations, to include lost communication procedures.
9. Method(s) in place for see and avoid, including the flightcrew that hold this responsibility.

10. Aircraft reaction during takeoff, climb, cruise, descent, and landing in the event of a lost link.
11. Operations from a moving vehicle, if applicable.
12. Loss of sight of UA procedures.
13. Manned aircraft avoidance.

2.6.11.4 Applicants must demonstrate their knowledge of the limitations involved with agricultural aircraft operations, which includes:

1. Limitations on passenger carrying.
2. Limitations on W&B.
3. Limitations on operating without position lights.
4. Limitations on dispensing in congested areas.
5. Limitations on not observing standard airport traffic patterns.
6. Limitations on altitude, per § [91.119](#), concerning ferrying to and from dispensing sites.

2.6.11.5 If applicants seek approval to dispense economic poisons, they must demonstrate a thorough knowledge of 1) the methods to safeguard the pilot against contamination, and 2) the safe handling of economic poisons. The knowledge test will consist of the following subject areas:

1. Steps to be taken before starting operations, including survey of the area to be worked.
2. Safe handling of economic poisons and the proper disposal of used containers for those poisons.
3. The general effects of economic poisons and agricultural chemicals on plants, animals, and persons, with emphasis on those normally used in the areas of intended operations; and the precautions to observe when using poisons and chemicals.
4. Primary symptoms of persons affected by economic poisons, the appropriate emergency measures to take, and the location of poison control centers.
5. Safe flight and application procedures.

2.6.11.6 Economic poisons manufactured for interstate use must, by regulations, be registered with the EPA. Those poisons must be labeled, showing the brand name, active ingredients, inert ingredients, directions for use, warning, net contents, and name and address of manufacturer or registrant. The label normally contains other detailed instructions concerning the effects on plants, animals, and persons. When required by § 137.19(e), applicants must have

satisfactory knowledge of the general effects and precautions described on the label of the economic poison that they normally use in the area of operation.

- 2.6.11.7** Applicants should be knowledgeable about recommended methods for disposing of used pesticide containers. EPA-approved methods for disposal are contained on the pesticide label. Applicants should be aware of state and local laws that may require additional precautions.
- 2.6.11.8** If an applicant does not apply for authorization to dispense economic poisons, the inspector will not test them on § 137.19(e)(1)(ii)–(iv). The statement of competency that is issued will reflect that the pilot is not authorized to dispense economic poisons. The knowledge test will consist of the following subject areas:
1. Steps to take before starting operations, including a survey of the work area.
 2. Performance capabilities and operating limitations of the aircraft to be used.
 3. Safe flight and application procedures.
- 2.6.11.9** Applicants should be aware that the Operations inspector may give the knowledge test in either an oral or written format. Applicants may find it useful to study the following samples to prepare for the knowledge test:
1. When dispensing a highly toxic chemical, what instruction would you give your flagger, if one is being used?
 2. How would you dispose of containers that held a toxic poison?
 3. What are some of the symptoms of chronic toxic effect, the cumulative buildup of chemicals in the body?
 4. Where is the nearest poison control center?
 5. If you have mild symptoms of organophosphate poisoning, can you administer the recommended antidote yourself and continue work until an appointment with a doctor can be arranged?
 6. What emergency action would you take if a known contamination exists?
 7. Indicate your swath runs and procedure turns over the following field, when dispensing a herbicide that could damage plants in the congested area.
 8. Would you apply a chemical, such as a highly toxic insecticide, to this field? (If so, how and when?)
 9. How long should you keep records that are required by § 137.71?

10. While airborne, what steps would you take before starting your first swath run?
11. What precautions should you take in applying insecticides adjacent to a lake, stream, or fish-stocked earth tank?
12. Does your agricultural aircraft operator's certificate allow you to fly under 500 feet over-the-top, or closer than 500 feet horizontal to a farm building site while going to or from your base of operation and the field you are to treat?
13. What steps should you take before you can dispense chemicals over a city, town, settlement, or other congested area?
14. Does your aircraft have to be inspected before you can engage in applying insecticide over a congested area?
15. In your procedure left turn, you misjudge your turn and roll out 300 feet to the right side of your intended course. How would you correct this error?
16. In order to dispense chemicals over a congested area, you are required by part 137 (unless otherwise exempted) to have your aircraft equipped with which of the following:
 - Stall warning horn.
 - Tank quantity gauge.
 - Emergency dump valve or chemical jettison device.
 - Boom pressure gauge.
17. What certificate or certificates have to be carried on an aircraft engaged in agricultural aircraft operations?
18. You are flying a restricted-category agricultural aircraft with a belly unit and two seats. Can you use this aircraft for purposes other than agricultural operations?
19. Are you required to wear a crash helmet during operations?
20. Describe in detail the dangers involved with a hot, heavy, downwind turn.
21. As your bank increases, what happens to your stall speed?

2.6.11.9.1 UAS-specific types of questions:

1. Performance of the aircraft within the proposed flight envelope.
2. System response and safeguards used to mitigate the risk of engine power loss.
3. Failed signal input from the control station procedures.

4. Considerations for payload equipment configurations that significantly change W&B, electrical loads, or flight dynamics.
5. Aircraft lost link and emergency recovery procedures.
6. Sequence the UA will follow in the event control link is lost.
7. Determination of and thresholds for radio signal strength and/or health.
8. Communication procedures between the PIC and the VO during operations, including loss of sight of UA.
9. Method(s) in place for see and avoid, including the flightcrew members that hold this responsibility.
10. Aircraft reaction during takeoff, climb, cruise, descent, and landing in the event of a lost link.
11. Manned aircraft avoidance.

2.6.12 Skill Test. For the skill test, the aircraft's tanks or hoppers must be loaded with any suitable material (e.g., water, lime, or sand). Load to the maximum certificated takeoff weight or the maximum weight established for the special-purpose load, whichever is greater. Current environmental conditions can also be a factor for the maximum weight. Operators must ensure that the dispensing equipment is free from chemicals and chemical residue.

2.6.12.1 While not required by regulation (but may be required by the AFM), a flight helmet can provide the pilot with added protection in the event of an accident. The FAA encourages pilots to wear a U.S. Department of Transportation (DOT)-approved or military specifications flight helmet when operating agricultural aircraft in dispensing operations.

2.6.12.2 Before beginning the skill test, the inspector will inform the pilot/applicant of expectations and performance requirements, and factors that could lead to disqualification. The pilot/applicant are evaluated on piloting skill and operational judgment in the following skill testing task areas:

1. Crewmember (including ground crew and VOs, if applicable) coordination and loading procedures.
2. Engine start, warm-up, and taxi procedures.
3. Short-field and soft-field takeoffs (airplanes and gyroplanes only), directional control, liftoff, and climb.
 - One soft-field takeoff and climb (airplanes and gyroplanes only).
 - Short-field takeoff and maximum performance climb.
4. Approaches to the working area (may be exempted for UAS).

- Satisfactory aerial survey of area for obstructions (manned aircraft and UA).
 - Proper method of beginning operations (normally, starting operation crosswind on downwind side of field).
5. Flareout.
- Should not touch ground or crop during flareout.
 - Should be consistently at same height and proper position over field on several flareouts.
6. Swath runs.
- Consistent altitude (plus or minus 5 feet).
 - Four or more passes demonstrated.

Note: Looking behind the aircraft at the spray pattern during swath run is disqualifying. The flight should be executed so as not to fly through the spray droplets or the dust of previous swath. Spacing successive swath runs to place the wing tip into or overlapping the vortices of the previous swath is not disqualifying.

- Start and stop the spray application within the target area and prevent drift onto adjacent fields.
7. Pullups and turnarounds (may be exempted for UAS).
- Consistent height in turnarounds, obstructions permitting.
 - Smooth and coordinated.
 - Turn in proper direction relative to wind, obstructions, and field layout.
 - Obstruction clearance before starting turn.
 - Proper throttle, flap, and hopper or tank control.
8. Clean-up swath or trim passes.
- Recognize the need for clean-up swath.
 - Adequately cover area to be treated.
9. Jettisoning of remainder of load after swath runs in the event of in-flight emergency.
10. Rapid deceleration or quick stops (helicopter and rotorcraft UAS only).
11. Approach, touchdown, and directional control on landing.
- One landing.
 - Adequate precautions used around turning propellers or rotor blades.

12. Taxi, engine shutdown, and securing of aircraft.
13. For UAS operations:
 - Communication procedures during normal and lost communications between the PIC and essential crewmembers (e.g., VO).
 - Ability to operate the UA in accordance with applicable operating documents.
 - Lost link procedures.
 - Risk mitigation associated with UAS operation (e.g., radio signal interference, and separation from manned aircraft)

2.6.13 Phase Completion.

2.6.13.1 If either the knowledge test or skill test results are unsatisfactory, the CPM notifies the pilot and applicant in writing of the disposition of the test. The pilot and/or applicant must schedule another appointment with the team to retake the test.

2.6.13.2 Applicants may not progress through the certification process before satisfactorily completing the tasks of the Demonstration and Inspection Phase. The CPM terminates the Demonstration and Inspection Phase only upon the applicant's successful completion of the required tasks.

2.7 The Certification Phase. Applicants receive the appropriate Agricultural Aircraft Operator Certificate (private or commercial) after the certification team concludes that all qualifications are met. Applicable authorizations, such as an approval to use an MEL, will be prepared and issued from WebOPSS. The operator will be issued an LOA from WebOPSS. These are considered "part 137 authorizations" and are not OpSpecs. These are used as a national tracking system for all part 137 operators and aircraft.

2.8 Termination of the Certification Process. During any phase, the CPM can terminate the certification process if an applicant does not adequately correct a discrepancy noted by the certification team. Applicants receive written notification of denial of certification through a notice of disapproval. This document, denying the issuance of an Operating Certificate, includes the remarks pertaining to the denial. The application is returned with the notice. The certification team returns any other documentation an applicant submitted. If they address all of the remarks in the notice of disapproval and wish to become a candidate for an Operating Certificate, they must start the certification process again from (at least) the Document Compliance Phase.

Figure 2-1. Sample Letter of Intent

[*Your Letterhead*]

[*Date*]

[*Geographically responsible Flight Standards (AFS) office address*]

Greetings:

This is to notify the Federal Aviation Administration (FAA) of our intent to become a certificated commercial [*or private*] agricultural aircraft operator under Title 14 of the Code of Federal Regulations (14 CFR) part 137.

We plan to begin operations on [*date*], and are ready for your certification inspection at this time. Operations will be confined to [*geographic location*] and will involve the operation of [*number and type of aircraft*].

Enclosed are two copies of FAA Form 8710-3, Agricultural Aircraft Operator Certificate Application. Our three requested letter certificate designators are [*list preferred designators*], in that order of preference.

Sincerely,

[*Operator's name and title*]

Attachments

Figure 2-2a. FAA Form 8710-3, Agricultural Aircraft Operator Certificate Application (Front)

Form Approved
 OMB No. 2120-0049
 09/30/2014

US Department of Transportation Federal Aviation Administration		AGRICULTURAL AIRCRAFT OPERATOR CERTIFICATE APPLICATION		INSTRUCTIONS Submit in triplicate to the local Flight Standards District Office.	
1. APPLICATION FOR		TYPE <input type="checkbox"/> PRIVATE <input type="checkbox"/> COMMERCIAL		FOR DISPENSING (Check one) <input type="checkbox"/> ECONOMIC POISONS <input type="checkbox"/> OTHER THAN ECONOMIC POISONS	
				<input type="checkbox"/> ORIGINAL <input type="checkbox"/> AMENDMENT <input type="checkbox"/> REISSUANCE	
2. NAME AND ADDRESS OF APPLICANT _____ _____ TELEPHONE NUMBER _____			3. PRINCIPAL OPERATIONS BASE (Airport, City, State) _____ _____ TELEPHONE NUMBER _____		
4. OPERATING AS <input type="checkbox"/> INDIVIDUAL <input type="checkbox"/> CORPORATION <input type="checkbox"/> PARTNERSHIP		OTHER (Specify) _____		5. NAME OF CHIEF SUPERVISOR OF OPERATIONS IF OTHER THAN SHOWN IN ITEM 2. (COMMERCIAL OPERATIONS ONLY) _____ (First) _____ (Middle Initial) _____ (Last) _____	
6. AIRMAN CERTIFICATE HELD GRADE <input type="checkbox"/> PRIVATE <input type="checkbox"/> COMMERCIAL <input type="checkbox"/> AIRLINE TRANSPORT			CERTIFICATE NUMBER _____ RATINGS <input type="checkbox"/> ASEL <input type="checkbox"/> AMEL <input type="checkbox"/> ASES <input type="checkbox"/> AMES <input type="checkbox"/> HELICOPTER <input type="checkbox"/> GYROPLANE TYPE RATING(S) (Specify) _____		
7A. DO YOU HOLD A CURRENTLY EFFECTIVE CERTIFICATE OF WAIVER FOR CONDUCTING AGRICULTURAL AIRCRAFT OPERATIONS?					<input type="checkbox"/> NO <input type="checkbox"/> YES (Complete 7B)
7B. WAIVER HELD		DATE ISSUED _____	EXPIRATION DATE _____	FAA DISTRICT OFFICE WHERE ISSUED _____	
8. AGRICULTURAL AIRCRAFT TO BE OPERATED					
MAKE	MODEL	EQUIPPED FOR	TOTAL NUMBER EACH AIRCRAFT OPERATED	REGISTRATION MARK (List a minimum of one)	
		LIQUID SOLID			
9. LIST THE NAME(S) AND AIRMAN CERTIFICATE NUMBER(S) OF AGRICULTURAL PILOT(S) WORKING FOR YOU AT THE PRESENT TIME (Use separate sheet and attach if additional space is needed.)					
NAME	CERT. NO.	NAME	CERT. NO.		
10. REMARKS _____ _____ _____					
11. CERTIFICATION: I CERTIFY THAT STATEMENTS MADE ON THIS FORM ARE TRUE AND CORRECT.					
DATE		TITLE		SIGNATURE	
_____		_____		_____	

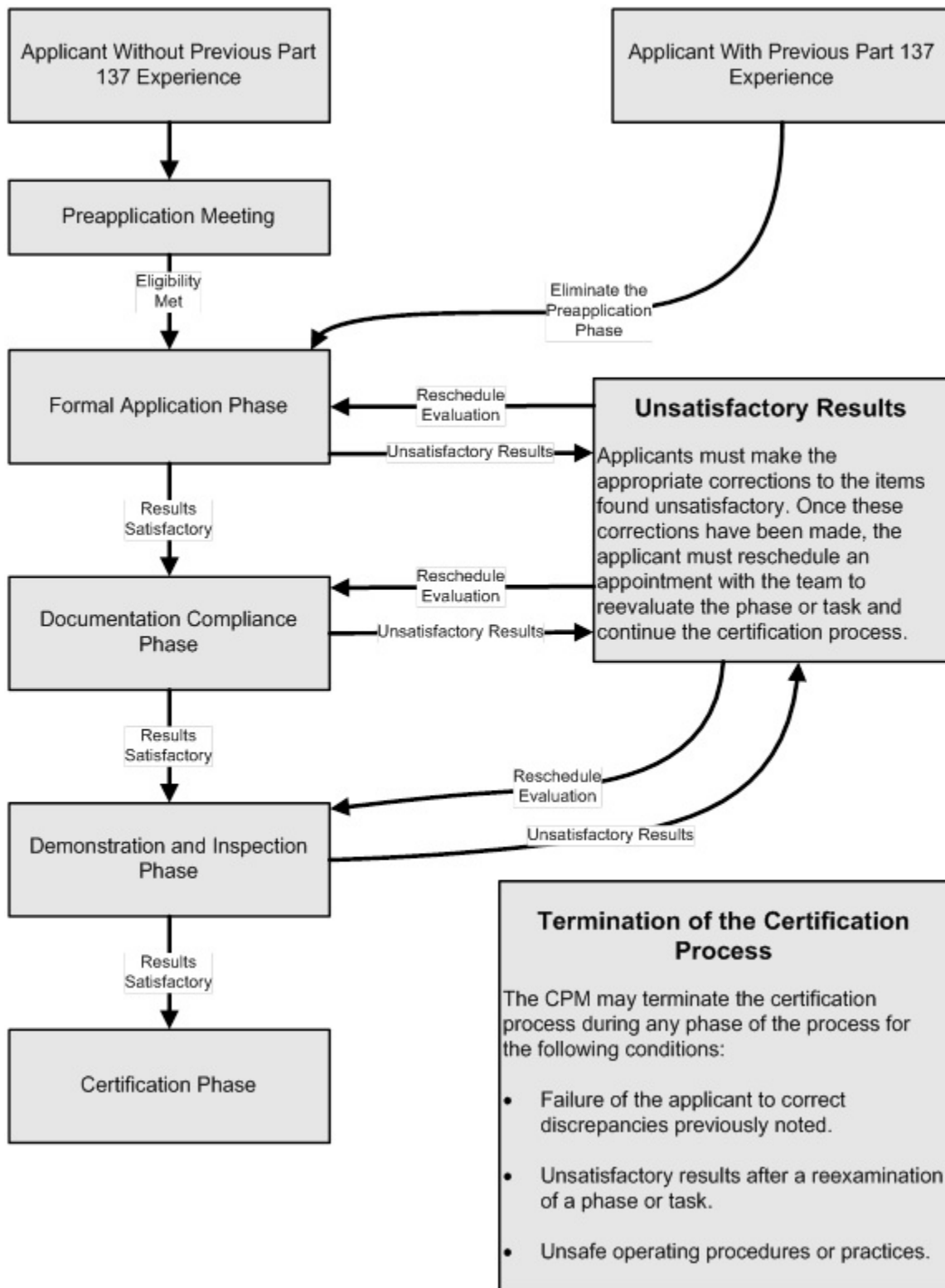
Figure 2-2b. FAA Form 8710-3, Agricultural Aircraft Operator Certificate Application (Back)

INSPECTION REPORT - For FAA Use Only <i>(To be completed by the General Aviation for Flight Standards District Office)</i>			
COMPLIANCE WITH APPLICABLE REGULATIONS			
1. PILOTS	NOT REQUIRED	SATISFACTORY	UNSATISFACTORY
A. CERTIFICATES	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
B. RATING(S)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
C. KNOWLEDGE TEST	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
D. SKILL TEST	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. AIRCRAFT			
A. CERTIFICATED		<input type="checkbox"/>	<input type="checkbox"/>
B. AIRWORTHY		<input type="checkbox"/>	<input type="checkbox"/>
C. EQUIPPED FOR AGRICULTURAL OPERATIONS		<input type="checkbox"/>	<input type="checkbox"/>
10. REMARKS <i>(Include an explanation of denial if application is disapproved).</i>			
4. DISTRICT OFFICE ACTION			
<input type="checkbox"/> CERTIFICATE ISSUED	INSPECTORS SIGNATURES		
<input type="checkbox"/> APPLICATION DISAPPROVED			
DATE INSPECTION COMPLETED			

Figure 2-3. Schedule of Events

14 CFR PART 137 SCHEDULE OF EVENTS					
Name of Operator	Names of Management Personnel				
	Name:				
Address	Title:				
	Applicant Date Ready	FAA Date Received	FAA Date Returned	FAA Date Applied/ Accepted	Inspector Initials
Letter of Intent					
Application (FAA Form 8710-3)					
Chief Supervisor Knowledge and Skill Test					
Other Pilots Knowledge and Skill Test					
Aircraft Lease/Proof of Availability					
Aircraft Conformity Inspection (Airworthiness)					
Aircraft Records (Airworthiness)					
Operator Recordkeeping System (Commercial)					
Proof of Bona Fide Property Interest (Private Operators)					
Proof of Registration for UAS (FA number or N-number)					
Other					

Figure 2-4. Flowchart for Applicants Seeking a 14 CFR Part 137 Operating Certificate



CHAPTER 3. PART 137 OPERATOR-SPECIFIC, AIRMEN-SPECIFIC, AND AIRCRAFT-SPECIFIC ITEMS

- 3.1 Purpose.** This chapter provides operators with highlighted items for airmen, aircraft, and operation.
- 3.2 Operator-Specific Items.**
- 3.2.1 Business Name (Commercial Applicants).** A commercial operator must conduct their agricultural aircraft operation under the business name shown on their Commercial Agricultural Aircraft Operator Certificate. If operators intend to operate under different business names, they must submit a letter that reflects each doing business as (DBA) to the responsible Flight Standards (AFS) office that has jurisdiction over their operation.
- 3.2.2 Change of Address.** If an agricultural aircraft operator changes the address of their home base of operations, they must notify the FAA in writing before the change becomes effective.
- 3.2.3 Amendment of Operating Certificate.** Operators should be knowledgeable of the procedures for amending their certificate with the FAA. As prescribed by § [137.17](#), operators should apply with the responsible AFS office. The application procedure for an original certificate applies when an operator desires to have dispensing economic poisons added to or removed from their Operating Certificate.
- 3.2.4 Display of Operating Certificate.** Under § [137.57](#), an agricultural aircraft operator must keep the certificate at their home base of operations. Per § [137.33](#), operators must have a facsimile of the Agricultural Aircraft Operator Certificate in the aircraft, unless otherwise exempted. Upon request, the Administrator or any Federal, state, or local Law Enforcement Officer (LEO) may view the certificate or facsimile.
- 3.2.5 Registration and Airworthiness Certificates.** Original airworthiness and registration certificates need not be kept in the aircraft, but they must be available at the operator's base of operations (home base or temporary base) from which dispensing operations are conducted. A temporary base where operators station maintenance facilities and personnel is considered the base from which they conduct dispensing operations; therefore, operators must keep any airworthiness or registration certificate that was removed from aircraft available for inspection when requested.
- 3.2.6 Additional Preflight Procedures.** In addition to the preflight action required by § [91.103](#) (if Unmanned Aircraft System (UAS), refer to § [107.49](#)), operators should take the following steps before starting agricultural aircraft operations:
- 3.2.6.1** If obstructions to flight include structures, trees, unfavorable terrain, housing areas, towers, etc., and the pilot has not previously worked the particular area, it may be useful to obtain a description of the work area from a person familiar with that area and/or conduct a ground survey. A ground survey may be crucial when a pilot finds it necessary to fly under wires.

- 3.2.6.2** When in the vicinity of the target area, pilots should conduct an in-flight survey, assessing any risks, such as Meteorological Evaluation Towers (MET), wind turbines, Airborne Wind Energy Systems (AWES), or other uncharted obstacles. Pilots should survey the area adjacent to the work location to determine that the material dispensed will not damage property or injure persons on the surface. UAS operators should conduct a visual survey of the area from the ground prior to flight.
- 3.2.6.3** Pilots should be aware of the possible damage to some enterprises from engine and propeller noise emitted as the pilot executes a pullup and turnaround.
- 3.2.6.4** Investigate the target area for fish ponds, lakes, streams, and drainage ditches, as certain economic poisons may be lethal to fish and wildlife.
- 3.2.7** Safety Procedures. Pilots should determine whether the potential treatment area could be considered a congested area. They may want to confer with the responsible AFS office. The pilot should be familiar with the provisions of § [137.51](#) for operating over a congested area.
- 3.2.7.1** Operators should be knowledgeable about safe flight and safe application procedures during agricultural operations. Pilots should be familiar with the hazards associated with dispensing materials that may be flammable.
- 3.2.7.2** When conducting operations over sloping terrain, pilots should exercise caution relative to the direction of swath runs. Flying up the slope may result in stalling the aircraft before reaching the end of the swath run or contribute to an inadvertent stall during the pullup or turnaround.
- 3.2.7.3** Pullups and turnarounds are normally made on the downwind side of the centerline of the swath run. Unfavorable terrain, wires, guy wires, poles, trees, or other obstructions may require making pullups and turnarounds on the upwind side. If a no-wind condition exists, usually the best procedure is to make the turn into an open area (if available) in the event of power loss or engine failure.
- 3.2.7.4** The aerial applicator pilot should avoid distraction during a swath run. Inattentiveness may result in allowing the aircraft to fly into the ground or other obstruction. The aerial applicator pilot may tend to apply forward pressure on the elevator or cyclic control when flying under wires. Pilots should avoid such a tendency because once any part of the structure of the aircraft (e.g., wheels and skids) becomes entangled in crop foliage, it may be difficult, if not impossible, to prevent the aircraft from being pulled to the ground. The vertical fin may also contact the wires as the aircraft passes underneath them. Pilots of aircraft, and especially helicopter pilots, may choose not to fly under wires and dress-up the field parallel to the wires.

- 3.2.7.5** When using two or more aircraft (manned or unmanned) to apply chemicals to a field, the pilots conducting the operation should be encouraged to arrange between themselves who performs the cleanup swaths or trim passes, when applicable. Mid-air collisions have occurred between aircraft conducting team operations when no coordination is accomplished.
- 3.2.7.6** If using Global Positioning System (GPS) swath-marking equipment, use extreme caution to prevent diverting attention away from the task of flying the aircraft safely. The pilot should make it a practice to not adjust the computer while in the swath run. The pilot should plan the turn using the light bar as reference, but should not fixate on it.
- 3.2.8** Risk Assessment and Mitigation Strategies. There are numerous hazards and risks associated with low altitude aerial application. Pilots need to identify the hazards and risks, and one tool that is helpful to use is the “PAVE” checklist. The elements of PAVE are: Pilot in command, Aircraft, enVironment, and External pressure.
1. Pilot in Command (PIC)—The Risks and Hazards:
 - Pilot’s health, illness, and medications.
 - Fatigue.
 - Stress.
 - Emotions.
 2. Aircraft—The Risks and Hazards:
 - Ready for flight (preflight accomplished), legal to fly.
 - Maintenance issues or concerns.
 - Performance considerations.
 - Experience in make and model (M/M).
 3. Environment—The Risks and Hazards:
 - Weather, ceiling, visibility, wind, fog, and Density Altitude (DA).
 - Obstacles, such as wires, towers, trees, METs, AWES, and wind turbines.
 - Congested areas, such as buildings, structures, and treelines.
 4. External Pressures—The Risks and Hazards:
 - Finances, the pressure to keep earning money regardless.
 - The customer who needs their crops sprayed now.
 - The growing season, small windows for applied substances.
 - The peer pressure from the boss or family to work.
 - The temptation to use cell phones, texting, snapping pictures, and filming while flying.

- 3.2.8.1** A risk assessment can then be formulated. Does the proposed operation fall within a low, medium, or high assessment? Using a risk assessment matrix can be helpful. Refer to FAA-H-8083-2, Risk Management Handbook, for examples at https://www.faa.gov/regulations_policies/handbooks_manuals/aviation/media/FAA-H-8083-2.pdf.
- 3.2.8.2** Once a pilot has identified and quantified the risk (determined the level or risk), mitigation strategies can then be used. Some examples are:
- Well-rested, not fatigued.
 - Adequate weather conditions for safe flight and personal minimums.
 - Target field properly surveyed.
 - No maintenance discrepancies.
 - Partial load versus full load for performance needs.
- 3.2.9** Night Operations. Pilots may conduct night operations under certain conditions. The following guidance is useful in assessing the basic safety considerations of such operations:
- 3.2.9.1** Immediately before a night operation, the pilot should obtain any available information concerning the possibility of a temperature inversion in the area of operation. Inversion causes the suspension of dust particles and liquid droplets in the air, which could result in an uncontrollable drift problem. Conducting operations in an area with temperature inversions is inadvisable.
- 3.2.9.2** Operators should establish safety practices and procedures for night operations. The following are some suggestions for these practices and procedures:
1. The field where night operations are to be conducted should be checked from the ground in daylight with ground personnel (if used) or with the operation's supervisor.
 2. Develop a plan for working the field. The pilot may find it advantageous to diagram the field and indicate the approximate locations of any obstructions that could affect the safety of the operation.
- Note:** If operating a UAS at night, an exemption or waiver is required.
- 3.2.9.3** Night vision goggles (NVG) operations will require operations in accordance with applicable sections of parts [61](#) and [91](#) for both certification of aircraft and pilot. The operator using NVGs will be required to maintain currency in accordance with those applicable regulations, including an endorsement for ground and flight training, unless meeting certain requirements per part 61.

At present time, AFS requires no additional authorizations for NVG use in part [137](#) operations.

3.2.10 Aircraft Position Lights. Manned agricultural aircraft without position lights may takeoff and land at an airport with a functioning control tower only when authorized by air traffic control (ATC). Pilots may takeoff and land at uncontrolled airports only with the permission of the airport management and when other aircraft operations that require position lights are not in progress.

3.2.11 Use of Safety Belts and Shoulder Harnesses. Unless otherwise exempted, each seat installed in an aircraft must have safety belts and approved shoulder harnesses. Section [137.42](#) prohibits operating aircraft without a safety belt and shoulder harness properly secured about an occupant. The shoulder harness may be unfastened if it hinders the occupant in performing his or her required duties.

3.2.12 Prior Coordination. The operator is responsible for coordinating with airport management and ATC before conducting agricultural operations in and around airports.

Note: UAS operations require a waiver and Certificate of Authorization (CoA) to operate in other than Class G airspace and some Class E airspace (refer to § [107.41](#)).

3.2.13 Deviation From Published Airport Traffic Patterns. The pilot in command (PIC) of an aircraft engaged in part 137 operations may deviate from an airport traffic pattern when authorized by the control tower. At an airport without a functioning control tower, the PIC may deviate from the traffic pattern if:

- Prior coordination has occurred with the airport management.
- Deviations are limited to the agricultural aircraft operation.
- Use of ramps, taxiways, or other areas of the airport not intended for landing and takeoff only occurs during emergencies.
- The agricultural aircraft at all times remains clear of, and gives way to, aircraft conforming to the traffic pattern for the airport. (Refer to § [137.45](#).)

3.2.14 Operations Within Controlled Airspace.

3.2.14.1 Except for flights to and from a dispensing area, pilots may not operate an aircraft within the lateral boundaries of the surface area of Class D airspace designated for an airport. To operate in such airspace, pilots must receive prior authorization from the ATC facility that has jurisdiction over that area.

3.2.14.2 Pilots may not operate an aircraft in weather conditions that are below visual flight rules (VFR) minimums within Class E airspace. To operate under such conditions, pilots must receive prior authorization from the ATC facility that has jurisdiction over that area.

Note: UAS operations require a waiver and CoA to operate in other than Class G airspace and some Class E airspace (refer to § 107.41).

3.2.15 Dispensing Operations.

- 3.2.15.1** The resulting cloud from dispensed chemical dust could spread in such a way that it obscures the horizon, flaggers, or other ground reference. If this condition occurs, operators must halt dispensing until ground references are once again visible.
- 3.2.15.2** The pilot should brief the ground crew concerning the chemical being used and the necessary protective clothing. The personal protective equipment (PPE) (rubber gloves, apron, boots, respirator, etc.) should be tailored to the environment and particular chemical in use. When using flaggers, pilots should be able to brief them concerning the potential hazard of the pesticide being dispensed, and should indicate that they equip themselves with the appropriate PPE.
- 3.2.15.3** Pilots should also be aware that persons working closely with or handling pesticides should change clothes and bathe at the end of the operation, or immediately if the pesticide contacts their skin. Persons handling pesticides should wear clean work clothes daily.
- 3.2.15.4** The pilot must be knowledgeable about procedures to prevent contamination of the water sources if water is obtained from streams or ponds for mixing purposes. The pilot must know state and local laws concerning spillage. They should be knowledgeable about how often to clean aircraft and spray equipment (e.g., daily or as often as required) to remove accumulation of pesticide residue. When cleaning aircraft, the pilot should be aware of state and local laws concerning drainage into a sewer, ditch, pond, stream, or other body of water, and the location of approved disposal sites.
- 3.2.15.5** Section [137.19\(e\)\(1\)\(iv\)](#) requires that the agricultural pilot possess sufficient knowledge of the primary symptoms of poisoning to promptly seek immediate professional medical attention when concern exists regarding contamination. If required, perform decontamination in accordance with the manufacturer's labeling and instructions.

3.2.16 Poison Control Resources.

- 3.2.16.1** Use the latest issue of the Directory of Poison Control Centers to locate poison control centers in the United States. This U.S. Department of Health and Human Services (HHS) publication may be available at local HHS offices. Several chemical hotlines are available for the use of persons who handle chemicals.
- 3.2.16.2** The National Pesticide Telecommunications Network (NPTN) operates a toll-free hotline, 1-800-858-PEST (7378), Monday through Friday, 8:00 a.m.

to 12:00 p.m. PST. During those hours, qualified personnel are available to answer questions about pesticides. This hotline can provide information about treatment by a physician after contamination or suspected contamination. The location of the nearest poison control center, cleanup of a pesticide spill, and other related information is also available on the National Pesticide Information Center's website at www.ace.orst.edu/info/nptn.

3.2.16.3 The Chemical Transportation Emergency Center (CHEMTREC) offers emergency phone service 24 hours per day, 7 days per week. In the event of an incident or accident involving pesticides, CHEMTREC can provide emergency response information pertaining to chemical spills. In emergency situations call 1-800-424-9300. For nonemergency, general information, or referrals call 1-800-262-8200, Monday through Friday, 9:00 a.m. to 6:00 p.m. EST. They also maintain a website at www.chemtrec.com.

3.2.17 Operations over Noncongested Areas. The following applies to part 137 operations in noncongested areas during actual dispensing, including approaches, departures, and turnarounds reasonably necessary for the operation. Provided the operation does not create a hazard to persons or property on the surface (refer to § [137.49](#)), aircraft may operate:

- Below 500 feet above the surface.
- Closer than 500 feet to persons, vessels, vehicles, and structures.

3.2.18 Congested Area Plan (CAP).

3.2.18.1 Unless prohibited by conditions and limitations (C&L) in an exemption, waiver, or CoA, applicants (including public aircraft operators) should have procedures for preparing CAPs in the event such aerial dispensing applications are necessary.

3.2.18.2 CAPs are operation-specific functions; the plan applies to the specific location of proposed dispensing operations. The operator (including public aircraft operators) should try and submit a CAP as soon as possible when learning of, or expecting the need for such. The applicant must develop the CAP and have it approved by the responsible AFS office. The plan should provide:

1. Insight as to how the applicant intends to ensure maximum safety of the persons and property on the surface.
2. Assurance that the operator has established appropriate emergency precautions consistent with the proposed operation.

3.2.18.3 Once approved, the operator must follow this plan without exception. The applicant should submit the CAP of operation in writing with the following:

1. A current aerial photograph (preferably within the preceding 24 months to be considered representative of the area), large-scale

map, or diagram of 1) the proposed work area that is appropriately marked to show all obstructions that may present a hazard during the operation, and 2) areas that could be used for an emergency landing and dumping of agricultural materials.

2. The altitudes and airspeeds during the operation.
3. The approximate dispensing rate per acre, and the name and type (solid, liquid) of material to be dispensed.
4. Dates and hours of the day of the performance of proposed dispensing operations.
5. Coordination with ATC.
6. Other limitations, safety, or operating procedure considerations as may be required for the particular situation.
7. Any applicable exemptions, waivers, or CoAs for manned aircraft and UA operations.

3.2.18.4 Agricultural aircraft may operate over congested areas with prior written approval from the appropriate official or governing body of the political subdivision over the area of proposed dispensing operations. An appropriate elected public official or governing body may include any of the following:

- Mayor,
- City Manager,
- City Council,
- County Board of Supervisors,
- County Commissioner, and/or
- Any other similar elected public official.

3.2.18.5 Under § 137.51(b)(2), a public notice should be given at least 48 hours before dispensing operations begin. The form that the public notice takes is up to the operator. Newspaper ads, radio announcements, television announcements, or door-to-door handbills are all acceptable methods.

3.2.19 Records.

3.2.19.1 Under § [137.71](#), commercial operators must keep their records at the operator's designated home base of operations. It is not necessary for private operators to maintain records under this section; however, it may be in the operator's best interest to do so.

3.2.19.2 Pilot records are usually kept separate from the operating records and they must meet the requirements of § 137.71(a)(4). Commercial and private operators must present evidence that each person used in the agricultural

operations is informed of their duties and responsibilities, and when that person passed or demonstrated their knowledge and skill test.

3.2.20 Additional Operating Procedures. Applicants should develop operating procedures to address the following subject areas:

1. Dispensing any material or substance in a manner that will not create a hazard to persons or property on the surface.
2. Ensuring that each person used in the agricultural aircraft operation is informed of their duties and responsibilities.
3. Ground crew coordination and loading procedures.
4. Limitations on a private agricultural aircraft operator.
5. Limitations on passenger carrying.
6. Limitations on Weight and Balance (W&B).
7. Procedures for ATC coordination.
8. Airport traffic pattern operating procedures.
9. Night operations procedures.
10. Limitations and operating restrictions for pilots and aircraft conducting operations over congested areas.
11. General limitations and restrictions for conducting operations over congested areas.
12. Conducting operations over noncongested areas.
13. Limitations on dispensing in congested areas.
14. Limitations and operating restrictions for dispensing economic poison.
15. Procedures for recording and handling aircraft discrepancies.
16. If the aircraft has an approved minimum equipment list (MEL), procedures for deferring and returning items to service.
17. Operating limitations and restrictions for approaches to the working area, flareout, swath runs, pullups and turnarounds, and jettisoning.
18. Preflight procedures.
19. Procedures for when it is necessary to fly under wires.
20. Safe aerial application procedures.
21. Knowledge of aircraft operating limitations.
22. Risk mitigation strategies.
23. Fatigue awareness and fatigue management strategies.
24. Procedures reflecting the C&L in applicable exemptions.

3.3 Airmen-Specific Items—Basic Eligibility Requirements.

3.3.1 Commercial Agricultural Operators. Applicants receive a Commercial Agricultural Aircraft Operator Certificate after demonstrating compliance with the requirements of § 137.19(c), (d), and (e). The applicant must have the appropriate knowledge and skills, or have the services of a chief supervisor of agricultural operations who has the appropriate knowledge and skills. Pilots designated to conduct operations for the commercial operator/applicant must hold a current Commercial or Airline Transport Pilot Certificate with the appropriate ratings. Applicants who meet the airmen certification requirements for a commercial aircraft operator may be designated as a pilot for the operation (refer to § 137.19). Unless otherwise exempted, applicants for a Commercial Agricultural Aircraft Operator Certificate must have the following:

- At least one person who holds a current U.S. Commercial or Airline Transport Pilot Certificate and rating for the aircraft to be used.
- The aircraft used must be certificated, Airworthy, equipped for agricultural operation, and in a condition for safe flight, unless otherwise exempted.
- For UAS operations in accordance with part 107, a Remote Pilot Certificate is required.
- The pilot must successfully complete a knowledge and skill test for the category of aircraft flown (e.g., airplane, rotorcraft, or UAS).

3.3.2 Private Agricultural Operators. An applicant for a Private Agricultural Aircraft Operator Certificate is entitled to that certificate if the applicant demonstrates compliance with the requirements of § 137.19(b), (d), and (e). Applicants seeking a Private Agricultural Aircraft Operator Certificate should be familiar with the limitations set forth for private operators (refer to § [137.35](#)). Private agricultural aircraft operators may not conduct operations for compensation or hire, or conduct operations over a congested area. The operator must provide proof of property ownership or other property interest in the crop located on the property where the operation will be conducted. Unless otherwise exempted, applicants for a Private Agricultural Aircraft Operator Certificate must have the following:

- A person holding a current U.S. Private, Commercial, or Airline Transport Pilot Certificate and is properly rated for the aircraft to be used.
- For UAS operations in accordance with part 107, a Remote Pilot Certificate is required.
- The aircraft used is certificated, Airworthy, and equipped for agricultural operation.
- The pilot must successfully complete a knowledge and skill test for the category of aircraft flown (e.g., airplane, rotorcraft, or UAS).

3.3.3 All Agricultural Operators. Commercial and private agricultural aircraft applicants can designate someone as the chief supervisor of agricultural aircraft operations. That individual should have satisfactory knowledge and skills regarding agricultural aircraft

operations. The chief supervisor must satisfactorily complete a knowledge and skill test (administered by the FAA) regarding the proposed operation (e.g., airplane, rotorcraft, or UAS). Considering the following, the CPM decides whether conducting the knowledge and skill test is necessary:

- The chief supervisor has previous part 137 experience.
- The chief supervisor provides evidence of a logbook endorsement or a letter of competency from an FAA aviation safety inspector (ASI) that verifies their level of experience.

3.3.4 Pilot Experience for Operation Over Congested Areas. Unless otherwise exempted, prior to the FAA approving a CAP, operators must comply with § [137.53\(b\)](#) with regard to flight experience. The PIC must have 100 hours of flight experience in dispensing agricultural materials or chemicals. The PIC also must have 25 hours of flight time in the make and basic model of the aircraft. At least 10 of the flight hours must have been acquired within the preceding 12 months.

3.3.5 Night Operations Experience. The operator should establish flight experience qualifications for pilots conducting night operations. For example, an operator may require pilots to acquire 15–25 hours in operations in proximity to the area of proposed night operations. To enhance safety, operators should require a pilot to work an area during daylight before working the same area at night. For operations using a UAS at night, an exemption or waiver is required.

3.3.6 Fatigue and Fatigue Management Strategies. All airmen need to be aware of fatigue and the effects it can have on human performance, especially those pilots who conduct operations under part 137. It is vitally important for pilots to recognize when they are fatigued and then take action to rest. Operators and pilots need to develop mitigation strategies to help prevent fatigue. The following items and mitigations need to be considered:

- Adequate rest is needed before flying; learn to recognize and manage fatigue.
- Fatigue can also be associated with tiredness, weakness, lack of energy, lethargy, depression, lack of motivation, and sleepiness.
- Studies show loss of sleep has a negative effect on one's cognitive functions (logical reasoning, mental arithmetic, and coding–decoding), maintaining situational awareness, and impaired short-term memory.
- Lack of sleep can affect your mood, leading to detrimental interactions with ground crew or mechanics.

3.3.6.1 Strategies to Mitigate the Effects of Fatigue.

1. Plan on recovery sleep, in general, if a person has experienced several days of sleep restriction below the normal requirement of 8 hours per day. Full recovery of performance may require several days of 9 hours or more sleep per day.
2. Sleep is the only way to reverse sleepiness. Therefore, at time when some amount of sleep is possible but limited, napping is the most effective physiological strategy for restoring alertness levels.
3. Plan activity breaks into your schedule, which can increase alertness.
4. Use of caffeine can be an effective way to help improve alertness and performance.
5. Pilots and operators are encouraged to read AC [120-100](#), Basics of Aviation Fatigue, which can be found at http://www.faa.gov/documentLibrary/media/Advisory_Circular/AC%20120-100.pdf.

3.4 Aircraft-Specific Items.

3.4.1 Aircraft Performance. Each operator and PIC should become familiar with their aircraft's pilot's operating handbook (POH) and/or the Aircraft Flight Manual (AFM) or the Rotorcraft Flight Manual (RFM) for the aircraft flown. This should also include, but is not limited to:

- Working W&B problems for full loads and partial loads for aircraft flown.
- Be aware of handling characteristics of their aircraft at different weights and configurations.
- Be aware of DA and how it affects performance (e.g., flights conducted during morning conditions, flights conducted in the heat of day, and flights conducted in evening hours).
- Plan for performance differences affected by DA and load conditions.
- Be aware of operating close to stall speed during pullups and turnarounds while conducting operations.

3.4.2 Aircraft Requirements. Aircraft typically used in agricultural operations are type certificated (TC) under 14 CFR parts [21](#) and [23](#). Aircraft TC'd under part 21 receive a Special Airworthiness Certificate under part 21, §§ [21.25](#) and [21.185](#) for restricted-category aircraft, and §§ [21.191](#), [21.193](#), and [21.195](#) for experimental aircraft (private operator only). Unless otherwise exempted, the aircraft must meet the following criteria:

- The aircraft is properly certificated, Airworthy, and equipped for agricultural operations.

- The aircraft is equipped with a suitable and properly installed shoulder harness for use by each pilot (refer to § [137.31\(b\)](#)).

3.4.3 Certification of Restricted-Category Aircraft.

3.4.3.1 An aircraft issued a restricted-category TC under § 21.25(a)(1) must conform to the following:

- The type design approved under the category in which the aircraft previously held certification.
- The type design for the restricted-category modifications to the aircraft.

3.4.3.2 If no modifications were made to the aircraft, and the aircraft was previously certificated in the standard category, the applicant must show that it is in safe operating condition and conforms to the type design for the standard category (unless the restricted-category type design data specifies airworthiness requirements that have been found inappropriate for the special purpose).

3.4.3.3 A restricted-category type certification is a special TC. An aircraft used in agricultural operations must be TC'd under § 21.25 or Civil Air Regulations Part 8 ([CAR 8](#)) before receiving a restricted-category airworthiness certificate. In the case of an aircraft previously TC'd in another category (e.g., standard category) and modified for a restricted, special-purpose operation under § 21.25 or CAR 8, the previously approved TC and the Supplemental Type Certificate (STC) or approved data can be considered the equivalent of a restricted TC. The TC and STC or approved design data should define the design parameters that make up the restricted-category Type Certificate Data Sheets (TCDS).

3.4.3.4 The following are examples of aircraft that are eligible for a Special Airworthiness Certificate (restricted category):

1. Aircraft TC'd in the restricted category and manufactured under a production certificate, approved production inspection system, or a TC.
2. Aircraft TC'd in the restricted category that were surplus U.S. military aircraft and manufactured in the United States.
3. Aircraft that are imported to the United States and TC'd in the restricted category under § [21.29](#) and that have been certified by the country of manufacture to conform to the approved type design.
4. TC'd, standard-category aircraft that have been modified and approved for a restricted purpose under § 21.25, including aircraft TC'd under CAR 8.10(b) for agricultural operations.

3.4.3.5 Modified aircraft that were either surplus U.S. military aircraft or TC'd in another category (i.e., § 21.185(b)), must satisfy the following to be eligible for a Special Airworthiness Certificate in the restricted category:

1. The modification conforms to the FAA-approved data that forms the basis for the restricted TC.
2. The aircraft is in a good state of preservation and repair and is in a condition for safe operation.

3.4.3.6 All aircraft TC'd in the restricted category must operate in compliance with the limitations prescribed in § [91.313](#). For turbine-powered aircraft, piston-powered aircraft over 800 horsepower, rotorcraft, large aircraft (over 12,500 pounds), and any other aircraft deemed necessary, a limitation concerning pilot qualifications may have been prescribed in the aircraft certification. This limitation may require the PIC to have an aircraft type rating or possess an LOA.

3.4.3.7 Section 91.313(c) prohibits carrying cargo for compensation or hire in restricted aircraft. It is, however, acceptable to transport cargo necessary to accomplish the operation for which the restricted TC was issued.

3.4.4 Aircraft Operating Restrictions.

3.4.4.1 The FAA limits restricted-category aircraft to the special purpose operations for which they have specific approval. The special purposes approved for an aircraft must be listed in the aircraft's TCDS or in an STC installed on the aircraft.

3.4.4.2 The provisions of § 21.25 authorize restricted-category aircraft to conduct the following special-purpose operations:

- Agricultural (e.g., spraying, dusting, seeding, and livestock and predatory animal control);
- Forest and wildlife conservation;
- Aerial surveying (e.g., photography, mapping, and oil and mineral exploration);
- Patrolling (pipelines, power lines, and canals);
- Weather control (cloud seeding);
- Aerial advertising (e.g., skywriting, banner towing, airborne signs, and public address systems); and
- Any other operation specified by the Administrator.

3.4.4.3 Operators must use restricted-category aircraft under § 91.313. Restricted-category aircraft may have a reduced level of safety compared to

that of standard-category aircraft. The FAA imposes certain operating restrictions to maintain an equivalent level of safety for the public. Section 91.313 imposes the following operating restrictions:

- No carriage of passengers for compensation or hire;
- No carriage of cargo for compensation or hire; and
- Unless otherwise authorized, no operations may be conducted over densely populated areas, in congested airways, or near busy airports where passenger transport operations are conducted.

- 3.4.4.4** Provided that an aircraft certificated as experimental is properly equipped for the agricultural operation, private agricultural operators may use it under certain conditions, as prescribed in § [91.319](#).
- 3.4.5** International Limitations for Restricted-Category Aircraft. A restricted-category aircraft may not meet the International Civil Aviation Organization (ICAO), Annex 8, Airworthiness of Aircraft. Before working within foreign airspace, operators must ensure they comply with that country's pertinent regulations.
- 3.4.6** Civil Aircraft of U.S. Registry Operating Outside the United States. Agricultural aircraft operators conducting operations outside the United States must comply with § [91.703\(a\)\(2\)\(3\)](#) and (b). Operators conducting flight operations between the United States and Canada or Mexico must file an appropriate flight plan, as prescribed in § [91.707](#).
- 3.4.7** North American Free Trade Agreement (NAFTA) Specialty Air Service Operation. NAFTA came into effect on January 1, 1994, after its ratification by Canada, Mexico, and the United States of America. NAFTA opened up cross-border trade in specialty air service, as defined in NAFTA Article [1213](#), for aerial mapping, aerial surveying, aerial photography, forest fire management, firefighting, aerial advertising, glider towing, parachute jumping, aerial construction, heli-logging, aerial sightseeing, flight training, aerial inspection and surveillance, and aerial spraying services. For more information, consult AC [00-60](#), North American Free Trade Agreement and Specialty Air Services Operations.
- 3.4.8** Noise Compliance. Restricted-category aircraft must comply with the applicable noise requirements of 14 CFR part [36](#). Small, propeller-driven aircraft and rotorcraft used for agricultural aircraft operations (as defined in part 137, which includes aerial dispensing of firefighting materials), are exempt from part 36 noise requirements.
- 3.4.9** Aircraft Markings. The operator of an aircraft must display on that aircraft marks consisting of the Roman capital letter "N" followed by the registration number of the aircraft (for UAS requirements, refer to 14 CFR part [48](#), § [48.1](#)). Each suffix letter used in the marks displayed must also be a Roman capital letter. The aircraft must display the word "restricted" or "experimental" near each entrance to the cabin, cockpit, or pilot

station. The letters making up the word “restricted” or “experimental” cannot be less than 2 inches nor more than 6 inches in height. (Refer to part [45](#), § [45.23](#).)

- 3.4.10** Fixed-Wing Aircraft Markings. Unless otherwise exempted, fixed-wing aircraft must display their required markings on either the vertical tail surfaces or the sides of the fuselage. Markings on the vertical tail surfaces must be horizontally affixed on both surfaces of a single vertical tail or on the outer surfaces of a multivertical tail. Markings on the fuselage must be affixed horizontally on both sides between the trailing edge of the wing and the leading edge of the horizontal stabilizer. (Refer to § [45.25](#).)
- 3.4.11** Rotorcraft Markings. Unless otherwise exempted, each rotorcraft display must include the Roman capital letter “N” followed by the registration number of that rotorcraft. The marks must be displayed horizontally on both surfaces of the cabin, fuselage, boom, or tail. (Refer to § [45.27](#).)
- 3.4.12** Size of Markings (Nationality and Registration Marks).
- 3.4.12.1** Unless otherwise exempted, the height of the markings for a fixed-wing aircraft must be at least 12 inches. Aircraft manufactured between November 2, 1981, and January 1, 1983, that are displaying marks of at least 2 inches high may display those marks until the aircraft is repainted or the marks are repainted, restored, or changed.
- 3.4.12.2** Unless otherwise exempted, rotorcraft markings must be at least 12 inches high. Rotorcraft manufactured between April 18, 1983, and December 31, 1983, may display the marks required of that time period until the aircraft is repainted or the marks are repainted, restored, or changed.
- 3.4.12.3** If an aircraft will be penetrating an Air Defense Identification Zone (ADIZ) or distant early warning identification zone (DEWIZ), it must display nationality and registration (temporary or permanent) marks of at least 12 inches in height. (Refer to § [45.29](#).)

Figure 3-1. Exceptions to Displaying the N-Number

Displaying an N-number on a restricted-category aircraft or aircraft certificated as experimental	Unless the aircraft’s category is included between the letter N-number and the registration number (e.g., NR1234 for a restricted aircraft), the aircraft must display near each entrance to the cabin or cockpit the term “limited,” “restricted,” or “experimental,” as appropriate. The term should be visible to anyone entering the aircraft and should be 2 to 6 inches high.
Displaying an N-number on an aircraft with multiple airworthiness certificates	The operator may use a removable category placard for the term “restricted” or “experimental,” as appropriate. The term should be 2 to 6 inches high.

Displaying an N-number on a restricted-category aircraft or aircraft certificated as experimental	Unless the aircraft's category is included between the letter N-number and the registration number (e.g., NR1234 for a restricted aircraft), the aircraft must display near each entrance to the cabin or cockpit the term "limited," "restricted," or "experimental," as appropriate. The term should be visible to anyone entering the aircraft and should be 2 to 6 inches high.
Displaying a minimum-height N-number on a fixed-wing aircraft	On an aircraft displaying 2-inch marks before November 1, 1981, and on aircraft manufactured between November 2, 1981, and January 1, 1983, the display marks may remain until the aircraft is repainted or the marks are repainted, restored, or changed. The N-number, after such alterations, must be 12 inches high.
Displaying a minimum-height N-number on a rotorcraft	On a rotorcraft manufactured and marked before December 21, 1983, the display marks may remain until the rotorcraft is repainted or the marks are repainted, restored, or changed. The N-number, after such alterations, must be 12 inches high.
Displaying required marks on a surface not large enough to meet size requirements	(1) If one of the surfaces authorized for displaying required marks is large enough to display marks meeting the size requirement and the other authorized surface is not large enough, the display must be full-sized marks on the larger surface. (2) If neither authorized surface is large enough for full-sized marks, operators must display marks as large as practicable on the largest authorized surface.

3.4.13 Imported Aircraft. Foreign-manufactured aircraft may be imported and TC'd in the restricted category by following the procedures in § 21.29. Because there are not any published airworthiness standards, the certification basis has to be established before initiation of the certification. Applicants must comply with all other procedures in § 21.29. For example, the country of manufacture: 1) must certify that the aircraft conforms to the approved type design, and 2) the aircraft type must be within the scope of the applicable bilateral agreement. Foreign-manufactured aircraft that are TC'd in the standard category are considered the same as domestic aircraft, and are eligible for a restricted-category TC.

3.4.14 TC of Military Surplus Aircraft.

3.4.14.1 The type certification process for surplus aircraft of the U.S. armed forces under § 21.25(a)(2) would include an FAA evaluation of the military safety record of the aircraft model. An aircraft the military declares as not Airworthy is not eligible for certification in any category. Title 14 CFR parts 23 or [25](#) would prescribe the certification basis for approval of modifications to a military aircraft that was never TC'd in any category. The applicant must demonstrate under § 21.25(a), "that no feature or characteristic of the aircraft makes it unsafe when it is operated under the limitations prescribed for its intended use."

- 3.4.14.2** For a surplus military aircraft, § 21.185(b) requires the FAA to determine that the aircraft is in a good state of preservation and repair, and in a condition for safe operation. In making those determinations, the certificating inspector may require any degree of teardown for inspection. The inspector may need to search aircraft records to establish the condition of the aircraft and its systems that could deteriorate over a long period of storage. This inspection can occur simultaneously with the type certification process.
- 3.4.15** Maintenance of Restricted-Category Aircraft. Restricted-category aircraft must meet the applicable maintenance requirements of parts [43](#) and 91, including the accomplishment of Airworthiness Directives (AD).
- 3.4.16** Authorized Operations Over Congested Areas. Unless otherwise exempted, for authorized operations over congested areas, the following are applicable to the specific aircraft listed:
- 3.4.16.1** Aircraft other than large or turbine-powered must have completed at least one of the following:
- A 100-hour or annual inspection within the past 100 hours of time in service;
 - A 100-hour or annual inspection by a person authorized by an authorized mechanic; or
 - An inspection under a progressive inspection system.
- 3.4.16.2** An aircraft that is a large or turbine-powered, multiengine civil airplane of U.S. registry must be inspected under the applicable inspection program requirements of § [91.409](#).
- 3.4.16.3** Except for a helicopter, an aircraft must be equipped and capable of jettisoning at least one-half of the aircraft's maximum authorized load of agricultural material within 45 seconds. An aircraft equipped with a device for releasing the tank or hopper as a unit must have a means to prevent inadvertent release by the pilot or other crewmember.
- 3.4.16.4** Operators must take additional safety measures to ensure persons and property are not at risk when conducting congested area operations. The operator is required to arrange with appropriate officials to take the necessary measures to conduct the operation safely in the interest of public safety. These measures may include precautionary actions, like blocking off streets and other areas that could be used for an emergency landing.
- 3.4.16.5** The aircraft may not be operated over a congested area below the altitudes prescribed in part 91, except during the actual dispensing operation, including the approaches and departures necessary for that operation. Above all, the operator must ensure they comply with the requirements in § 137.51.

- 3.4.16.6** Operators who propose to use multiengine aircraft for the CAP must prove that they can operate under the performance requirements in § 137.51(b)(5)(ii). The operator can accomplish this by presenting the FSDO with conclusive, documented performance evidence. If it is necessary to takeoff over a congested area during dispensing operations, the operator must provide such evidence to determine compliance with § 137.51(b)(5)(i). Operators who cannot meet these requirements may not takeoff over a congested area.

Table 3-1. Additional Resources for Aircraft Requirements (current editions)

Document Number	Document Title
AC 00-60	North American Free Trade Agreement and Specialty Air Services Operations
AC 21-18	Bilateral Airworthiness Agreements
AC 21-21	Use of Automobile Gasoline in Agricultural Aircraft
AC 21-23	Airworthiness Certification of Civil Aircraft, Engines, Propellers, and Related Products Imported to the United States
AC 21.25-1	Issuance of Type Certificate: Restricted Category Agricultural Airplanes
FAA Order 8110.4	Type Certification
FAA Order 8130.2	Airworthiness Certification of Products and Articles
FAA Order 8900.1, Volume 8, Chapter 5, Section 1	Issue Airworthiness Certificate for an Aircraft
FAA Order 8900.1, Volume 16	Unmanned Aircraft Systems

CHAPTER 4. SAFETY AND SECURITY INDUSTRY PRACTICES FOR AGRICULTURAL OPERATORS

4.1 Purpose. This chapter introduces the applicant/operator to agricultural aircraft operator industry practices regarding operational safety procedures and security pertinent to agricultural operations. The FAA does not mandate the information in this chapter; this information does not constitute a regulation.

4.2 Safety Procedures.

4.2.1 Safe Handling of Economic Poisons. The operator/applicant is required to have satisfactory knowledge about safeguards to protect the pilot against contamination and the safe handling of economic poisons. If the operator/applicant handles economic poisons, they should use the following guidelines:

1. The agricultural pilot who is engaged in the actual application of economic poisons should not assist (although not prohibited) in the mixing or loading of highly toxic poisons.
2. Ground crews should receive a briefing about economic poisons. The crews should wear protective clothing recommended for the particular chemical in use and the environment where it is being handled.
3. When using flagmen during an application of economic poisons, they should be briefed about the potential hazard of the pesticide in use. Flagmen handling economic poisons should wear the appropriate personal protective equipment (PPE).
4. Persons working closely with or handling pesticides should change clothes and bathe at the end of the operation, or immediately if pesticide contacts the skin. Follow the material safety data sheet (MSDS) recommendations. Persons who handle pesticides should wear clean work clothes daily.
5. If operators obtain water from streams or ponds for mixing purposes, the pesticide should not be allowed to contaminate the water source. If the pesticide is spilled on the ground, it may be acceptable to cover the contaminated area with dirt until other protective measures can be taken.
6. Operators should clean the aircraft and spray equipment daily, or as often as necessary to remove accumulation of pesticide residue.
7. While cleaning aircraft, operators should not allow the drainage to run into a sewer, ditch, pond, or stream.

4.2.2 Additional Guidance. For more detailed information regarding personal protection against pesticides, the operator/applicant should consult the publication titled, "Guidelines and Precautions to be Taken by Personnel in Storing, Using, Handling, and Disposing of Agricultural Chemical Pesticides," at <http://www.afm.ars.usda.gov/ppweb/PDF/600-12-ARS.pdf>.

4.3 Safe Operating Procedures for Aircraft.

- 4.3.1 Sloping Terrain.** When conducting operations over sloping terrain, operators should be cautious relative to the direction of swath runs. Flying up the slope may result in stalling the aircraft before reaching the end of the swath run, or contribute to an inadvertent stall during the pullup or turnaround.
- 4.3.2 Turnarounds.** Turnarounds (procedure turns) are normally made on the downwind side of the centerline of the swath. The pilot must maintain situational awareness with regard to unfavorable terrain, wires, guy wires, poles, trees, or other obstructions. If a no-wind condition exists, usually the best procedure is to make the turn into an open area (if available) in the event of power loss or failure.
- 4.3.3 Swath Run.** Agricultural pilots should not look back at the swath during a swath run. Doing so may result in allowing the aircraft to fly into the ground or other obstruction.
- 4.3.4 Push/Pull Devices.** If the aircraft is equipped with a push/pull device for starting and stopping the flow of agricultural material, the pilot should be especially alert to not unintentionally close the throttle or further open the hopper or tank at the end of a swath run.
- 4.3.5 Flying Under Wires.** Inexperienced agricultural pilots may tend to apply forward pressure on the elevator or cyclic control when flying under wires. Pilots should avoid such a tendency because once any part of the aircraft wheels or skids becomes entangled in crop foliage, it may be difficult to prevent the aircraft from being pulled into contact with the ground. The vertical stabilizer may also contact the wires as the aircraft passes underneath them.
- 4.3.6 Close Proximity to Aircraft.** Pilots who will operate two or more aircraft to simultaneously work a field should discuss how they will safely operate in close proximity. Pilots operating in close proximity should be aware of their location in relation to other aircraft.
- 4.4 Survey Prior to Starting Operations.** In addition to the preflight action required by § [91.103](#), the FAA suggests operators/applicants take the following steps before starting agricultural aircraft operations:
- 4.4.1 Working Area.** The pilot should survey the working area, including the area over which turnarounds will be made. If obstructions to flight include structures, trees, wires, METs, wind turbines, AWES, communication towers, or unfavorable terrain, etc., and the pilot has not previously or recently worked the particular area, it may be necessary to conduct a ground survey. The pilot should also conduct a ground survey when he or she finds it necessary to fly under wires.
- 4.4.2 Surrounding Areas.** Survey the area immediately surrounding the working area in an attempt to locate sensitive areas, such as poultry farms, beehives, animal corrals, wetland areas, etc.

4.4.3 Densely-Populated Areas. In many areas throughout the United States, large housing or other densely-populated areas now occupy land previously used for a farm, orchard, or range. When the agricultural pilot applies economic poisons or other agricultural materials to an area immediately adjacent to a densely-populated area, persons living in those areas may complain about the resulting engine noise and possible drift. Operators should advise the occupants of such areas before conducting dispensing operations.

4.4.4 State and Local Laws. The FAA suggests the agricultural pilot learn applicable state and local laws relative to such topics as honey bees, maximum wind velocity, droplet size, and the economic poison to be dispensed.

4.5 Precautions for Sulfur Dust Fires.

4.5.1 Combustion. Sulfur dust as used in sulfur dusting is combustible. Sulfur has a very low ignition point and is highly combustible when atomized with air (which occurs during dusting operations). Sulfur readily picks up electric charges, which under atmospheric conditions of low relative humidity, may result in combustion. There are actual cases of sulfur igniting when thrown from a shovel due to static electricity. Such occurrences are rare, but they serve as examples of how easy it is to ignite sulfur. In the industrial handling of sulfur (pulverizing, grinding, etc.), every effort is made to prevent the formation of a cloud of sulfur dust because of the danger of explosion.

4.5.2 Causes and Precautions. During aircraft dusting operations, the objective is to form a cloud of sulfur to widely distribute the insecticide. The problem of resolving fire prevention in sulfur dusting operations is more complicated than in industry. The importance of using extreme care in sulfur dusting operations cannot be overemphasized. Pilots should be aware of the potential causes of sulfur fires and the precautions listed below:

1. Dusting with a dirty aircraft coated with oil and sulfur dust increases the risk of a sulfur fire occurring. Keep the aircraft used for spreading sulfur as clean as possible at all times.
2. The engine exhaust system should be free of leaks; use the best grades of lubricating oil to decrease carbon formation.
3. Exercise care while loading the hopper to prevent foreign matter (wire, paper, etc.) from getting in the hopper. Such foreign matter can cause a spark or clog in the agitator shaft, causing it to overheat, thus starting a fire.
4. Do not smoke in the vicinity of sulfur dust.

4.5.3 Relative Humidity. Fires that occur while dusting with sulfur usually happen under conditions of low relative humidity. Relative humidity is usually lowest during the late morning and early afternoon. As a further precaution against sulfur dust fires, pilots should dust only in the early morning or late evening, preferably during the early morning. Pilots should not suddenly open the throttle except in case of an emergency. Sparks from a sudden blast of exhaust can enter the dust swath.

- 4.5.4 Pullup.** The pullup at the end of the field directs exhaust downward toward the dust swath. The hopper gate should be closed before beginning the pullup to minimize the possibility of fire. This may slightly reduce the efficiency of the dusting operation, but the pilot can always fly across the ends to spread dust on the parts of the field missed by closing the gate early.
- 4.5.5 Ventilation.** Compartments where dust might collect should have ventilation and be free of ignition sources, such as electrical circuits (unless special provisions are made to prevent sparks from short circuits or other sources, such as unsealed circuit breakers). Previous favorable experience does not minimize the hazard of dusting with sulfur. Remember, it takes only one act of carelessness or inattention to cause a disastrous fire.
- 4.5.6 Engine Exhaust System.** Keeping the engine exhaust discharge and sulfur dust apart can prevent fires from hot carbon sparks. The engine exhaust system should be arranged so that it will not discharge exhaust gases under or along the bottom of the aircraft. Sulfur ignites at a temperature of approximately 500 °F, depending upon its form. The temperature of the exhaust from an aircraft engine is about 1,500 °F when discharged from the cylinder. Although the gas will cool considerably in the exhaust manifold and will cool further upon coming in contact with the outside air, a potential fire hazard still exists. It is desirable to place the exhaust outlet as far from the path of the sulfur discharge as possible. The exhaust discharge should be directed so that it will not blow into the dust swath when a pullup is initiated.
- 4.5.7 Aircraft Bonding.** All aircraft that spread sulfur dust should be completely bonded by connecting all metal parts with electrical cable and also should have sharp-pointed, static-discharge rods on each wing tip to provide the most protection against a spark discharge. Complete bonding of an aircraft will prevent differences in electrical potential between various metal parts, and will thereby prevent sparks from occurring between these parts. Sometimes it is not possible or practical to completely bond all parts of the wings and tail surfaces, but at least the following should be bonded: the fuselage aft and in the vicinity of the hopper, the struts and fittings adjacent to the hopper, and the hopper itself.
- 4.6 Agricultural Aircraft Maintenance Precautions.** Maintenance personnel working on agricultural aircraft (manned or unmanned) may be exposed to pesticides from a single product or a mixture of contaminated products. Degraded by-products of some pesticides are more hazardous than the parent product. Routes of exposure through the skin may be significant; perspiration can enhance exposure. Agricultural aircraft and external parts should be thoroughly cleaned before repair. The FAA recommends that maintenance personnel of aircraft and dispensing equipment wear PPE for skin and respiratory protection to limit exposure to contaminants.
- 4.7 Security Regulations.**
- 4.7.1 Transportation Security Regulations (TSR).** The Transportation Security Administration (TSA) issues and administers TSRs, which are codified in Title 49 of the Code of Federal Regulations (49 CFR) parts [1500 through 1699](#). Many TSRs are FAA rules that were

transferred to TSA when they assumed the FAA's civil aviation security function on February 17, 2002. These regulations can be found at <http://www.tsa.gov/>.

4.7.2 Applicability. These regulations pertain mainly to certificate holders and commercial operators. Most parts of 49 CFR parts [1540 through 1562](#) apply to aircraft operators holding Operating Certificates under 14 CFR part [119](#). Part 119, § [119.1\(e\)\(4\)\(i\)](#) excludes part [137](#) operators from compliance with part 119. The following parts of 49 CFR, parts 1540 through 1562, are provided for reference and informational purposes only as they relate to agricultural aircraft operators:

4.7.2.1 Title 49 CFR part [1540](#), Civil Aviation Security: General Rules, contains rules that cover all segments of civil aviation security and contains definitions that apply to parts 1540 through 1562.

4.7.2.2 Title 49 CFR part [1550](#), Aircraft Security Under General Operating and Flight Rules, applies to the operation of aircraft for which there are no security requirements elsewhere in parts 1500 through 1699, including General Aviation (GA) aircraft.

4.7.2.3 Title 49 CFR part 1550, § [1550.7](#), Operations in Aircraft of 12,500 Pounds or More, the "Twelve-Five Rule," requires that certain operators using aircraft with a maximum certificated takeoff weight of 12,500 pounds or more carry out a security program. This program was effective April 1, 2003.

4.7.3 GA Threat Vulnerability.

4.7.3.1 Historically, GA airports were not subject to Federal rules regarding airport security. Before September 11, 2001, the Federal government's role in airport security focused exclusively on airports serving scheduled operations. Now, TSA must examine all aspects of the transportation system for vulnerabilities to terrorist activities.

4.7.3.2 The TSA has not taken a position that GA airports and aircraft are a threat in and of themselves. As vulnerabilities within other areas of aviation have been reduced, GA may be perceived as a more attractive target and, consequently, be more vulnerable to misuse by terrorists. The security guidelines outlined in this document will help agricultural aircraft operators determine the necessary security measures at their facility to reduce vulnerabilities.

4.7.3.3 GA includes a broad range of aircraft and aviation activity that vary greatly in size, function, and operational characteristics. GA airports and operations differ in their security needs. The TSA understands that "one size fits all" security will not accommodate the entire spectrum of GA airports and facilities. A privately-owned landing strip in a rural area would not need to implement the same security measures as a large, corporate GA airport near a major metropolitan area. While the potential for misuse of an aircraft operating from the rural airport exists, each operator should employ the following basic security rules:

1. Lock facilities.
2. Secure aircraft.
3. Be aware of unusual activities.
4. If suspicious activities are occurring, contact the TSA at 866-GA-SECUR (427-3287)
5. If facing an urgent threat, dial 911 for immediate assistance.

4.7.4 Agricultural Aviation Security Measures.

4.7.4.1 An aerial application plane has never been involved in any terrorist activity. Various industry organizations have aggressively promoted enhanced security procedures. In an effort to mitigate the potential of a threat, the agricultural aviation industry has adopted the following security measures:

1. Store aircraft and crop protection products in locked hangars with electronic security systems.
2. Park and disable loader trucks, forklifts, or use other equipment to block aircraft.
3. In cases where the aircraft must be left outdoors, use propeller locks, propeller chains, or tie-downs on aircraft.
4. Remove batteries and render engines mechanically inoperable on unused aircraft.
5. Install hidden security switches to prevent unauthorized startup of the aircraft.
6. Establish contact with Federal and local Law Enforcement Agencies (LEA) to coordinate responses to security breaches at agricultural aviation facilities. Encourage operators to list the appropriate LEA telephone numbers in a prominent place within their operations.
7. Encourage the use of outdoor security lighting around hangars and operations.

4.7.4.2 The National Agricultural Aviation Research & Education Foundation (NAAREF) conducts an educational program for agricultural aviators during the off-season called Professional Aerial Applicators' Support System (PAASS) program. This educational program travels from state-to-state each year emphasizing aviation security, safety, and drift mitigation. The security module has been presented in over 33 states and attended by nearly 2,000 agricultural pilots.

4.7.4.3 Aerial application is an important component in the production of food and fiber in the United States. Also, it is an important means of fighting forest and brush fires and providing public health spraying services.

- 4.7.4.4** The agricultural aviation industry is recognized by Federal, state, and local law enforcement and security agencies for its cooperation with government officials in safeguarding homeland security. Agricultural aviation continues to work closely with Federal, state, and local officials to ensure that industry equipment is not a threat to homeland security.
- 4.7.5** Securing the Aircraft. The National Agricultural Aviation Association (NAAA) worked with the FAA to develop an expedited policy to allow installation of hidden battery cutoff switches on agricultural aircraft. The FAA determined that this procedure is a minor alteration that, once installed, can be recorded with a maintenance record entry and does not require an FAA Form 337, Major Repair and Alteration (Airframe, Powerplant, Propeller, or Appliance), nor a field approval. Refer to the FAA memorandum titled, “Agricultural Aircraft Security,” dated February 13, 2003. For additional information on this matter, contact the General Aviation Branch (AFS-350), at 202-267-1675.
- 4.7.6** Best Practices for General Aviation Security. Security issues for operators are divided into four primary areas: personnel, procedures, aircraft, and facilities. The following lists focus on each area to enhance security initiatives for agricultural aircraft operators:
- 4.7.6.1 Personnel.**
1. Have one person in charge of security issues for the organization.
 2. Establish and maintain communications links with the company personnel and appropriate government agencies regarding security issues.
 3. All personnel should complete annual security training developed by the operator.
- 4.7.6.2 Procedures.**
1. Require that aviation department members participate in security training.
 2. Develop and maintain a security information program.
 3. Limit access to facilities and aircraft to company personnel and authorized guests.
 4. Have a security plan specific to your location and operation.
 5. Develop, maintain, and exercise an emergency response plan with associated resources.

4.7.6.3 Aircraft.

1. A crewmember should be present at all times when the aircraft is serviced.
2. Check the aircraft for unauthorized people or objects before every departure.
3. Conduct a thorough preflight inspection anytime maintenance is performed.
4. Use the aircraft's security system (locks and alarms) whenever it is unattended to prevent unauthorized entry and use.

4.7.6.4 Facilities.

1. Ensure facility security limits access to all areas.
2. Ensure street side gates and doors are closed and locked at all times.
3. Close and lock hangar doors when that area is unattended.
4. Secure all key storage areas.
5. Have an access control management system for keys and passes.
6. Escort all visitors on the ramp and in the hangar area.
7. Post emergency numbers prominently around the facility.
8. Ensure easy access to phones or panic buttons in various facility locations.
9. Be aware of surroundings and do not be complacent; challenge strangers.

4.7.7 Security Procedures and Communications. GA operators may find it helpful to develop written security procedures. Many of these security initiatives are already conducted on airfields, but are not formalized into a documented program. Documentation provides operators with a traceable and auditable method of ensuring personnel are aware of and understand security issues. Such a protocol should minimally consist of, but not be limited to, airport and local law enforcement contact information, including alternates (when available), and the use of programs like Airport Watch to increase airport user awareness of security precautions.

4.7.8 Threat Communication System.

4.7.8.1 The FAA recommends that operators develop a comprehensive contact list and distribute the list to all personnel affiliated with the organization. Operators should include the following phone numbers in the contact list:

- Airport manager.
- Local police or county sheriff's department.
- County/city emergency manager.
- State aviation director.
- State police.
- Emergency medical service (EMS).
- Fire department.
- Department of Homeland Security (DHS).
- Federal Bureau of Investigation (FBI).
- Local FAA contact.
- Local TSA contact.

4.7.8.2 In the event of a security incident, it is essential that first responders and airport management are able to communicate. Where possible, coordinate radio communication and establish common frequencies and procedures to establish a radio communications network with local law enforcement.

4.7.8.3 The communication process is important and is a means by which tenants and airport users can receive all new security policies, procedures, and alerts. Conducting regular meetings with airport tenants and the flying public to discuss security issues and challenges, establishing a centralized area for posting of security information, or developing an email alert system are methods for successful communication.

4.7.9 Additional Aviation Security Information Resources. The NAAA is actively working with the FAA to address security issues within the agricultural aviation industry. For more information regarding their efforts, use the contact information below:

National Agricultural Aviation Association
1440 Duke Street
Alexandria, VA 22314-3403
Phone: 202-546-5722
Fax: 202-546-5726
<http://www.agaviation.org>

CHAPTER 5. INFORMATIONAL RESOURCES FROM ORGANIZATIONS OTHER THAN THE FAA

5.1 Purpose. This chapter provides informational resources applicable to agricultural aircraft operations and operators/applicants. The FAA does not regulate the information in this chapter.

5.2 EPA Worker Protection Standard.

1. Agricultural Worker Protection Standard, Parts 156 and 170. Interpretive Policy. <http://www.epa.gov/pesticides/safety/workers/wpsinterpolicy.htm>.
2. How to Comply With the Worker Protection Standard for Agricultural Pesticides: What Employers Need To Know. <http://www.epa.gov/agriculture/htc.html>.
3. Recognition and Management of Pesticide Poisoning. <http://www.epa.gov/pesticides/safety/healthcare/handbook/handbook.pdf>.
4. Pesticides: Health and Safety. Human health issues. <http://www.epa.gov/pesticides/health/human.htm>.
5. Toxicity Categories and Pesticide Label Statements. The EPA uses the criteria in Table 5-1, Toxicity Categories and Pesticide Label Statements, to determine the toxicity category of pesticides. These criteria are based on the results of animal tests done in support of registration of the pesticide.

Table 5-1. Toxicity Categories and Pesticide Label Statements

	I	II	III	IV
Oral LD 50 (Lethal Dose)	Up to and including 50 mg/kg	From 50 thru 500 mg/kg	From 500 thru 5,000 mg/kg	Greater than 5,000 mg/kg
Inhalation LC 50 (Lethal Concentration)	Up to and including 0.2 mg/liter	From 0.2 thru 2 mg/liter	From 2.0 thru 20 mg/liter	Greater than 20 mg/liter
Dermal LD 50	Up to and including 200 mg/kg.	From 200 thru 2,000 mg/kg	From 2,000 thru 20,000 mg/kg	Greater than 20,000 mg/kg
Eye effects	Corrosive; corneal opacity not reversible within 7 days	Corneal opacity reversible within 7 days; irritation persisting for 7 days.	No corneal opacity; irritation reversible within 7 days	No irritation
Skin effects	Corrosive	Severe irritation at 72 hours	Moderate irritation at 72 hours	Mild or slight irritation at 72 hours.

6. Human Hazard Signal Word.

- **Toxicity Category I.** All pesticide products meeting the criteria of Toxicity Category I must bear on the front panel the signal word “Danger.” If the product was assigned to Toxicity Category I on the basis of its oral, inhalation, or skin toxicity (as distinct from skin and eye local effects) the word “Poison” must appear in red on a background of distinctly contrasting color, and the skull and crossbones must appear in immediate proximity to the word “Poison.”
- **Toxicity Category II.** All pesticide products meeting the criteria of Toxicity Category II must bear on the front panel the signal word “Warning.”
- **Toxicity Category III.** All pesticide products meeting the criteria of Toxicity Category III must bear on the front panel the signal word “Caution.”
- **Toxicity Category IV.** All pesticide products meeting the criteria of Toxicity Category IV must bear on the front panel the signal word “Caution.”

5.3 Personal Protection Information.

5.3.1 New Worker Protection Standard Glove Requirements for Workers, Handlers, and Pilots.

5.3.1.1 On November 2, 2015, the EPA revised the Worker Protection Standard (WPS) for agricultural workers, handlers, and their families. Personal protective equipment (PPE) exception is allowed for aerial applications (Title 40 of the Code of Federal Regulations (40 CFR) part 170, § [170.607\(e\)](#) and (f)). Wearing chemical-resistant gloves when entering or leaving an aircraft used to apply pesticides is optional, unless such gloves are required on the pesticide product labeling. If gloves are brought into the cockpit of an aircraft that has been used to apply pesticides, the gloves must be kept in an enclosed container to prevent contamination of the inside of the cockpit.

5.3.1.2 Handlers applying pesticides from an open cockpit aircraft must use the PPE specified in the pesticide product labeling for use during an application, except that chemical-resistant footwear need not be worn. A helmet may be substituted for chemical-resistant headgear. A helmet with a face shield lowered to cover the face may be substituted for protective eyewear.

5.3.1.3 Persons occupying an enclosed cockpit may substitute a long-sleeved shirt, long pants, shoes, and socks for labeling-specified PPE.

5.3.1.4 Information can be found in the WPS “How to Comply” manual: <https://www.epa.gov/pesticide-worker-safety/pesticide-worker-protection-standard-how-comply-manual>.

5.3.2 U.S. Occupational Safety and Health Administration (OSHA). The OSHA website has information about on-the-job safety and laws relating to that topic: <http://www.osha.gov/>.

5.3.3 Interpreting PPE Statements on Pesticide Labels. See Figure 5-1, PPE Statements and Pesticide Labels.

Figure 5-1. PPE Statements and Pesticide Labels

Label Statement	Acceptable PPE
Long-sleeved shirt and long pants	Long-sleeved shirt and long pants, or woven or nonwoven coverall plastic, or other barrier-coated coverall, or rubber or plastic suit
Coverall worn over short-sleeved shirt and short pants	Coverall worn over short-sleeved shirt and short pants, or coverall worn over long-sleeved shirt and long pants, or coverall worn over another coverall, or plastic or other barrier-coated coverall, or rubber or plastic suit
Coverall worn over long-sleeved shirt and long pants	Coverall worn over long-sleeved shirt and long pants, or coverall worn over another coverall, or plastic or other barrier-coated coverall, or rubber or plastic suit
Chemical-resistant apron worn over coverall or over long-sleeved shirt and long pants	No substitute
Waterproof suit or liquid-proof suit	No substitute
Waterproof gloves	Any rubber or plastic gloves sturdy enough to remain intact throughout the task being performed
Chemical-resistant gloves	Barrier-laminate gloves, or other gloves that glove selection charts or guidance indicate are chemical-resistant to the pesticide for the period of time required to perform the task
Chemical-resistant gloves such as butyl or nitrile	Butyl gloves, or nitrile gloves, or other gloves that glove selection charts or guidance indicate are chemical-resistant to the pesticide for the period of time required to perform the task
Shoes	Leather, canvas, or fabric shoes chemical-resistant shoes, or chemical-resistant boots, or chemical-resistant shoe coverings (booties)
Chemical-resistant footwear	Chemical-resistant shoes, or chemical-resistant boots, or chemical-resistant shoe coverings (booties)
Chemical-resistant boots	Chemical-resistant boots
Chemical-resistant hood or wide-brimmed hat	Rubber-, or plastic-coated, safari-style hat or fire-fighter hat, or plastic or other barrier-coated hood, or rubber or plastic hood, full hood or helmet that is part of some respirators

5.3.4 Human Exposure. Use the following if someone has swallowed, inhaled, or gotten a pesticide in the eye or on the skin:

1. Call 911 if the person is unconscious, has trouble breathing, or is having convulsions.
2. Check the label for directions on how to give first aid.
3. Call the Poison Control Center at 1-800-222-1222 for help with first aid information.
4. The National Pesticide Information Center (NPIC) (1-800-858-7378) also can provide information about pesticide products and their toxicity.

Note: See Figure 5-2, Government Agency Resources, for government agency resources.

Figure 5-2. Government Agency Resources

Agency	Contact Information
<p>Occupational Safety and Health Administration (OSHA). More than 100 million workers and 6.5 million employers are covered under the Occupational Safety and Health Act, which covers workers in pesticide manufacturing. OSHA and its state partners have approximately 2,100 inspectors, plus investigators, standards writers, educators, physicians, and other staff in over 200 offices across the country. OSHA sets protective workplace standards, enforces the standards, and offers employers and employees technical assistance and consultation programs. Note that some states have their own OSHA.</p>	<p>OSHA/U.S. Department of Labor 200 Constitution Ave, NW Washington, DC 20210</p> <p>Tel: 1-800-321-6742</p> <p>www.osha.gov</p>
<p>United States Department of Agriculture (USDA), Extension Service. USDA's Extension Service works with its university partners, the state land-grant system, to provide farmers and ranchers information to reduce and prevent agricultural-related work incidents. The Pesticide Applicator Training program trains applicators in the safe use of pesticides and coordinates pesticide-related safety training programs.</p>	<p>USDA 1400 Independence Ave, SW Washington, DC 20250</p> <p>Tel: 202-720-2791</p> <p>www.usda.gov</p>

Figure 5-2. Government Agency Resources (Continued)

Agency	Contact Information
National Center for Environmental Health (NCEH), Centers for Disease Control and Prevention (CDC). NCEH provides environmental pesticide case surveillance and disease outbreak investigations.	NCEH, CDC 4770 Buford Highway NE Atlanta, GA 30341-3717 Tel: 1-800-232-4636 www.cdc.gov/nceh/
National Institute for Occupational Safety and Health (NIOSH), Centers for Disease Control and Prevention (CDC). NIOSH is the Federal agency responsible for conducting research on occupational disease and injury. NIOSH may investigate potentially hazardous working conditions upon request, makes recommendations on preventing workplace disease and injury, and provides training to occupational safety and health professionals.	NIOSH, CDC 1600 Clifton Road Atlanta, GA 30329-4027 Hotline: 1-800-323-4636 www.cdc.gov/niosh/homepage.html

5.4 National Institute for Occupational Safety and Health (NIOSH) Agricultural Health and Safety Centers. NIOSH has funded eight agricultural health and safety centers throughout the country that employ clinicians and other health specialists in the area of pesticide-related illness and injury. A list of NIOSH-supported centers can be found in Figure 5-3, NIOSH-Supported Centers.

Figure 5-3. NIOSH-Supported Centers

University of California Center for Health and the Environment University of California Old Davis Road Davis, CA 95616 Tel: 530-752-1340
High Plains Intermountain Center for Agricultural Health and Safety Colorado State University Fort Collins, CO 80523 Tel: 970-491-6152
Great Plains Center for Agricultural Health University of Iowa Iowa City, IA 52242 Tel: 319-335-4405

Figure 5-3. NIOSH-Supported Centers (Continued)

<p>Southeast Center for Agricultural Health and Injury Prevention University of Kentucky Department of Preventive Medicine Lexington, KY 40536</p> <p>Tel: 859-257-5678</p>
<p>Northeast Center for Agricultural and Occupational Health One Atwell Road Cooperstown, NY 13326</p> <p>Tel: 1-800-343-7527</p>
<p>Southwest Center for Agricultural Health, Injury and Education University of Texas Health Science Center at Tyler 11937 U.S. Highway 271 Tyler, TX 75708-3154</p> <p>Tel: 903-877-5896</p>
<p>Pacific Northwest Agricultural Safety and Health Center University of Washington Department of Environmental Health Seattle, WA 98195</p> <p>Tel: 1-800-330-0827</p>
<p>Midwest Center for Agricultural Research, Education and Disease and Injury Prevention National Farm Medicine Center Marshfield, WI 54449-5790</p> <p>Tel: 1-800-662-6900</p>

5.5 Non-Governmental Organizations.

5.5.1 NPIC. NPIC is based out of Oregon State University and is cooperatively sponsored by the university and the EPA.

5.5.1.1 NPIC serves as a source of objective, science-based pesticide information on a wide range of pesticide-related topics, such as recognition and management of pesticide poisonings, safety information, health and environmental effects, referrals for investigation of pesticide incidents, emergency treatment for humans and animals, and cleanup and disposal procedures.

5.5.1.2 A toll-free hotline service provides pesticide information to callers in the continental United States (CONUS), Puerto Rico, and the Virgin Islands. The NPIC hotline number is 1-800-858-7378. Pesticide questions and comments can be sent to npic@ace.orst.edu.

- 5.5.1.3** The website has links to other sites and databases for further information. For a list of state and regional poison control centers, or the nearest location, visit <http://npic.orst.edu/>.
- 5.5.2** American Association of Pesticide Safety Educators (AAPSE). The AAPSE maintains a list of Web resources by state, with links to program information, newsletters, journals, and other resources for pesticide educators. It includes guidebooks for evaluating pesticide applicator training programs and guides to EPA regulations. For more information, visit <http://www.aapse.ext.vt.edu>.
- 5.6 Pesticide Databases.**
- 5.6.1** Extension Toxicology Network. The Extension Service's Toxicology Network (EXTOXNET) provides science-based information about pesticides to healthcare providers treating pesticide-related health concerns. Pesticide toxicological information is developed cooperatively by the University of California, Davis; Oregon State University; Michigan State University; Cornell University; and the University of Idaho. For more information, visit <http://extoxnet.orst.edu/>.
- 5.6.2** The Integrated Risk Information System (IRIS). IRIS is an electronic database on human health effects that may have been caused by exposure to various chemicals in the environment. IRIS is intended for those without extensive training in toxicology, but with some knowledge of health sciences. It provides hazard identification and dose-response assessment information. Combined with specific exposure information, the data in IRIS can be used in risk management to characterize the health risks of a chemical to protect public health. Extensive supporting documentation is available at <http://www.epa.gov/iris/>.
- 5.6.3** Agency for Toxic Substances and Disease Registry (ATSDR). This organization (part of the HHS) publishes fact sheets and other information on pesticides and other toxic substances. For more information, visit <http://www.atsdr.cdc.gov/>.
- 5.6.4** California Department of Pesticide Regulation. This website includes pesticidal chemical ingredients queries, links to EPA/Office of Pesticide Program's chemical dictionary, Product/Label Database Queries (updated nightly), a current listing of California's Section 18 Emergency Exemptions, and more: <http://www.cdpr.ca.gov/dprdatabase.htm>.
- 5.6.5** Federal Pesticide Recordkeeping Program. This website details USDA requirements for recordkeeping for restricted-use pesticides: <http://www.ams.usda.gov/science/sdpr.htm>.
- 5.6.6** Restricted Use Product Report (EPA). This is a list of restricted-use pesticides from the U.S. EPA: <https://www.epa.gov/pesticide-worker-safety/restricted-use-products-rup-report>.

5.7 Industry Resources.

- 5.7.1** NAAA. This organization represents more than 1,300 members in 46 states. Its member operator/pilots are licensed as commercial applicator–operators that use aircraft to enhance food and fiber production, protect forestry, and control health-threatening pests. Through its affiliation with the NAAREF, the NAAA contributes to research and educational programs focused on enhancing the efficacy and safety of aerial application. For more information, visit <http://www.agaviation.org/>.
- 5.7.2** AgAir Update Online. *AgAir Update* is a monthly publication that delivers up-to-date news about new products and modifications for the agricultural aircraft to the agricultural aviation industry and its affiliates worldwide. The publication is filled with human interest stories about the people who fly agricultural aircraft, and how they run their individual flying operations. For more information, visit <http://www.agairupdate.com/>.
- 5.7.3** Agricultural Chemical Use Database. This website provides interactive access to data from the National Agricultural Statistics Service (NASS) as part of a cooperative effort among USDA, the USDA Regional Pest Management Centers and the National Science Foundation Center for Integrated Pest Management. All data available have been previously published by NASS and have been consolidated at the state level. Commodity acreages and active ingredient agricultural chemical use data are available. All data can be searched by commodity, year, state, and active ingredient. Search results can be obtained in Web format and as downloadable Excel files. Dynamic U.S. maps of each use statistic can be generated for each individual active ingredient, commodity, year and statistic. Agricultural chemical usage statistic data can also be seen in a graphical format. For more details on methodology, please see the NASS website: <http://www.pestmanagement.info/nass/>.
- 5.7.4** Agricultural Health Study. More than 89,000 individuals are participating in the Agricultural Health Study. This includes private and commercial pesticide applicators and their spouses. The study is sponsored by the National Institutes of Health (NIH) (specifically, the National Cancer Institute (NCI) and the National Institute of Environmental Health Sciences (NIEHS)) and the EPA and is being administered through the efforts of collaborators at the University of Iowa and Battelle Centers for Public Health Research and Evaluation. The goal is to investigate the effects of environmental, occupational, dietary, and genetic factors on the health of the agricultural population. This study will provide information that agricultural workers can use in making decisions about their health and that of their families. For more information, visit <http://www.aghealth.org>.
- 5.7.5** National Pesticide Stewardship Alliance. The Pesticide Stewardship Alliance (TPSA), founded in 2000, is an organization of Federal, state, and local governmental agencies; educational and research institutions; public organizations; private corporations; and individuals that are involved in different aspects of pesticide stewardship. Stewardship in this context includes any activity that has a positive impact on the safety and efficacy of pesticides from manufacture, marketing and commerce, through storage and use, and ultimately disposal of unwanted or unusable products and the management of emptied

containers. TPSA will serve as a forum to facilitate cooperation among all interested individuals, organizations, agencies, and companies. The goal of TPSA is to increase the effectiveness, efficiency, and longevity of various pesticide stewardship efforts. TPSA will use education, training, outreach, and other activities to accomplish its stewardship objectives and will be involved in the local, national, and international arenas. For more information, visit <http://www.tpsalliance.org/>.

5.8 State and Local Licensing Requirements.

5.8.1 Rules and Regulations. Most state and local governments have rules and regulations pertaining to agricultural aircraft operations (including UAS operations). The scope of these rules and regulations vary. Operators should become familiar with the rules and regulations set forth in their respective state and local governments.

5.8.2 Subjects. Operators can expect to address the following subjects for local and state licensing requirements:

- Initial licensing requirements.
- Financial responsibility.
- Proof of residency.
- Licensing of nonresident applicators.
- Inspection of agricultural aircraft operation.
- Additional aircraft and pilots, deletions, and transfers.
- Records.
- License and pesticide violations.

5.9 Spray Application Information Resources. Spray drift is a significant issue aerial applicators face. The following website contains a list of studies and presentations that are dedicated to mitigating drift by using varied equipment and application techniques: http://www.ars.usda.gov/main/site_main.htm?modecode=30-91-05-15.

Advisory Circular Feedback Form

If you find an error in this AC, have recommendations for improving it, or have suggestions for new items/subjects to be added, you may let us know by contacting the General Aviation and Commercial Division (AFS-800) or the Flight Standards Directives Management Officer at 9-AWA-AFS-140-Directives@faa.gov.

Subject: AC 137-1B, Certification Process for Agricultural Aircraft Operators

Date: _____

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:

In a future change to this AC, please cover the following subject:
(Briefly describe what you want added.)

Other comments:

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

Submitted by: _____

Date: _____