

STRAIGHT TALK ABOUT CERTIFICATIONS

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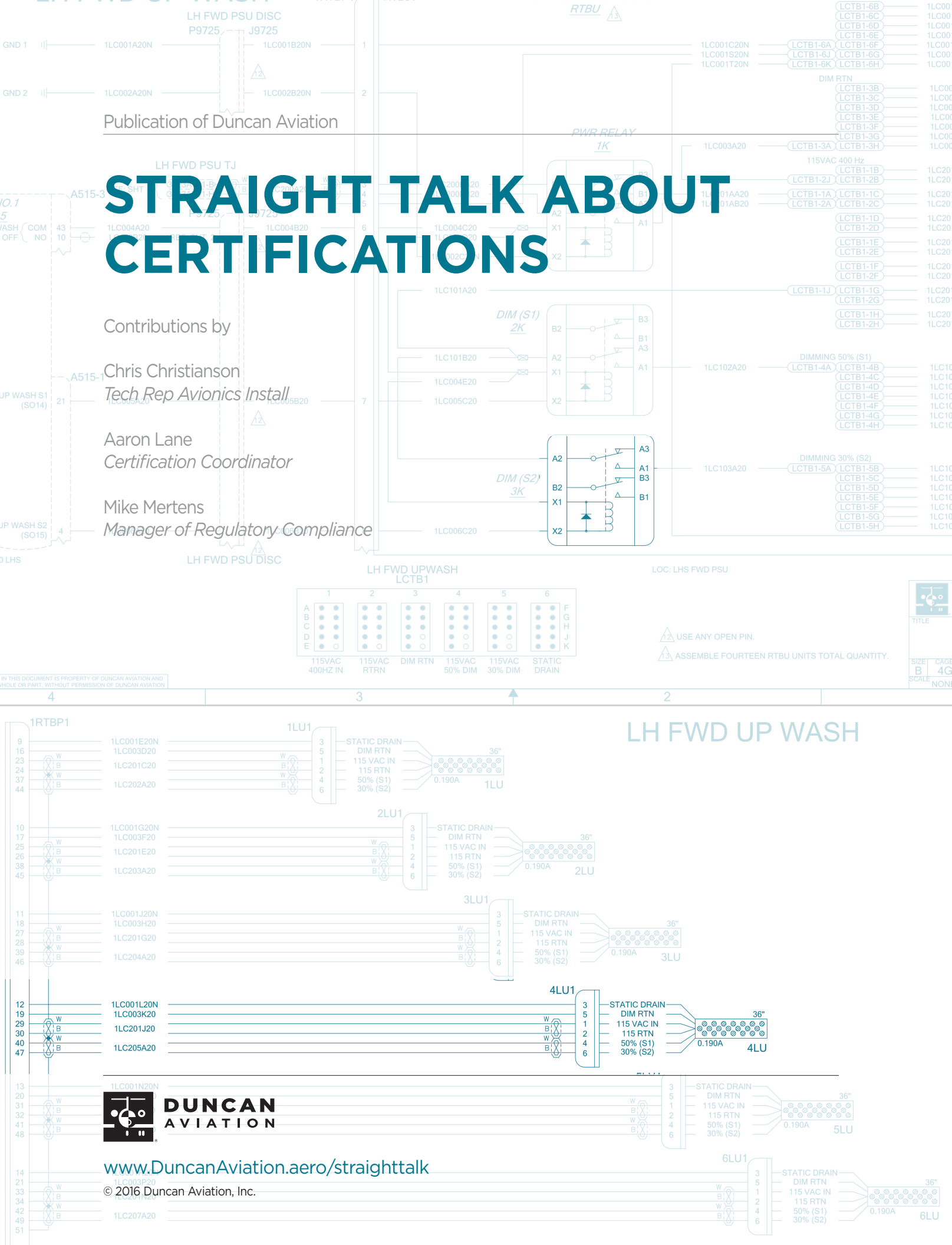


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WHAT IS CERTIFICATION?

Feelings about aircraft certification vary depending on whether you own and operate the aircraft or you're a passenger on it. Passengers want to know that the metal object in which they're encased as they fly through the air is demonstrably and certifiably safe. Owners and operators, on the other hand, sometimes feel stymied by the reams of paperwork and data necessary to make sure the aircraft they operate is safe.

In spite of that frustration, however, owners and operators share the goals of the regulators to promote safety throughout the lifecycle of their aircraft, from the design and production of the aircraft to its entry into service and continued safe operation. Additionally, owners and operators must keep their aircraft **airworthy** (meaning it meets its type design and is in a condition for safe operation) by maintaining and operating it according to its airworthiness type certification and operating limitations.

We'll explain type design, airworthiness, and operating limitations in the next few sections. First, though, let's talk about certification.

WHAT IS AIRWORTHINESS CERTIFICATION?

Airworthiness Certification is basically the **FAA**—the United States' civil aviation authority—certifying that an aircraft is safe to fly. There's a great deal more to it, of course, but without an FAA-issued Airworthiness Certificate, an aircraft cannot taxi onto a runway much less take flight.

The most common **Airworthiness Certificate** granted by the FAA, the Standard Airworthiness Certificate (FAA Form 8100-2), references three things: In order to have a valid airworthiness certificate, the aircraft must be certified under part 21, must operate under part 91, and must be maintained under part 43.

That means that a Type-Certificated aircraft is able to operate as long as the aircraft conforms to its **approved type design**, is in safe-operating condition, and has had all of its preventative maintenance and any alterations performed according to the applicable US Code of Federal Regulations. The Standard

Airworthiness Certificate must be displayed in the aircraft.

To secure this authorization, an owner (or an owner's legal agent) must apply to the FAA. Before doing so, however, the aircraft must have a TCDS (**Type Certificate Data Sheet**). Think of a TCDS as a kind of birth certificate for the airplane. This document defines the aircraft's configuration, powerplant, equipment, intended use, and other characteristics.

When an airplane first enters into service, it must be in compliance with the Type Certificate of the stated design (make/model). Issued by the FAA, the Type Certificate determines an airplane's operating limitations and shows that the aircraft's design meets the FAA's airworthiness requirements. This means that the aircraft has met the standards for safe handling, structural integrity, system reliability, and other characteristics.

Airworthiness means that this aircraft has been shown to conform to its type design and has been documented as safe. Airworthiness means, for instance, that owners, operators, and passengers can get in and fly 600 mph at 35,000 feet and feel that they are in a safe machine.

CIVIL AVIATION AUTHORITY

As the Civil Aviation Authority for the United States, the FAA's mission is to provide the safest, most efficient aerospace system in the world. Its vision is to strive to reach the next level of safety, efficiency, environmental responsibility, and global leadership. The FAA considers itself accountable to the American public and its stakeholders (www.faa.gov/about).

Nearly every country in the world has a government agency like the FAA that regulates and oversees its nation's civil aviation environment. Examples include Canada's TCCA (Transport Canada Civil Aviation), Brazil's ANAC (Agencia Nacional de Aviacao Civil), and South Africa's CAA (Civil Aviation Authority). See Appendix 3 for a list of civil aviation authorities around the world.

EASA (European Aviation Safety Agency) is a little different from the FAA because it's a governing body for a collection

of 32 European nations, which include the 28 member states of the EU (European Union) and four additional countries (Switzerland, Norway, Iceland, and Liechtenstein).

EASA's mission (www.easa.europa.eu/the-agency/the-agency) is similar to the FAA's and other civil aviation agencies in that it intends to:

- Ensure the highest common level of safety protection for EU citizens
- Ensure the highest common level of environmental protection
- Serve as a single regulatory and certification process among member states
- Facilitate the internal aviation single market & create a level playing field
- Work with other international aviation organisations & regulators

WHAT DOES THIS MEAN FOR AN AIRCRAFT OWNER?

Each country's civil aviation authority determines the rules and regulations for their own domestic aircraft and aviation operations. The FAA's certification process works to promote aviation safety throughout the lifecycle of an airplane. Its design, production, entry into service, and continued safe operation are all a part of its certification.

According to the FAA, the owner/operator is the primary party who is responsible for the total airworthiness of the airplane.

You can keep your aircraft airworthy by performing regular inspections and necessary maintenance and by operating it according to its published limitations.

- Inspections—prescribed by the OEM (Original Equipment Manufacturer)
- Necessary maintenance—the results of the inspections
- Airworthiness and functional limitations—originally prescribed by the aircraft's TCDS

Once a United States-registered aircraft is modified in any way after its entry into service, there are two paths to ensure its continued airworthiness and compliance. Title 14: Aeronautics and Space in the CFR (Code of Federal Regulations) details the rules and regulations for

making any changes to an existing airplane via the following paths:

1. STCs (Supplemental Type Certificates), developed under part 21
2. Major and minor alterations, under part 43

Every modification to an aircraft must be certified as safe, compliant with the regulations, and airworthy. For instance, if you put new seat frames in your aircraft that are different from what was originally certified, the seat frames would need to be certified safe, compliant, and airworthy for that aircraft.

HOW TO OBTAIN AN STC

An **STC (Supplemental Type Certificate)** is one way to approve a change to an aircraft's type design. STCs are issued by the FAA when an applicant, such as Duncan Aviation, has sought approval to modify an aircraft/aircraft product from its original type design.

Anyone can apply for an STC. The FAA doesn't charge a fee to an applicant, but there's a relatively complicated process that you have to go through with the FAA to gain approval of the STC.

You must have a detailed certification plan that lays out exactly what the modification will be and how it will be shown to be compliant with the applicable regulations (such as the parts pertaining to your aircraft and its modification as prescribed in Chapter 14 of the Code of Federal Regulations).

Next, you'll need design data that will become the instructions on how to perform the modification. Substantiating documentation, such as structural analyses, EMI/RFI (Electromagnetic Interference/Radio Frequency Interference) reports, burn certification reporting, or software substantiation reports, are necessary to explain why it's safe and compliant to the appropriate federal regulations.

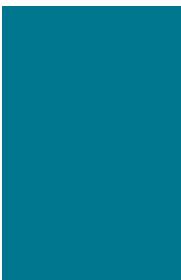
You will likely also have to perform and document ground testing and/or flight testing, depending on what you're modifying. And finally, you'll have to generate operating and maintenance instructions, such as an AFMS (Airplane Flight Manual Supplement) and an ICA (Instructions for Continued Airworthiness).

The AFMS are the instructions for the flight crew. For example, if you've installed a new Wi-Fi system in the aircraft, the flight crew will need to know how to use it, access it, and disable it in the event of an emergency. The ICA documents are necessary for the maintenance technicians who'll be servicing the aircraft in the future.

Most owner/operators simply don't have the resources to effectively generate all of the necessary data and documentation for the STC process. An applicant can go to an organization, such as Duncan Aviation, that has the resources and experience to fulfill all of the requirements necessary to generate and substantiate all of this data.

It also comes down to approval authority. Anyone can write an ICA, but every single step in the process has to be approved by someone who has an approved quality system, an approved engineering system, and either has delegated authority from the FAA or has access to resources that have delegated authority. The ultimate sign off has to come from an FAA-delegated authority.

You must get an STC for new and novel and/or flight-safety critical modifications to the aircraft. As mentioned, you must have an STC for a flight-safety critical modification that upgrades the avionics suite in a cockpit. Another example of a new and novel modification would be installing winglets on wings that have never had them before. An STC can be both a single-use or a multiple-use certificate, meaning some STCs can be designed for use on multiple aircraft of the same make and model.



caption

MAJOR REPAIR OR ALTERATION

In the United States, some modifications may be made under an MRA (Major Repair or Alteration) process rather than an STC process.

An MRA is an acceptable certification path for modifications that are not new and novel, such as replacing the soft goods of an interior, adding shelves to a cabinet, or swapping incandescent reading light bulbs for the brighter and more energy-efficient LEDs. An MRA stands by itself and cannot be applied to multiple aircraft.

Many countries accept an aircraft with an MRA-approved modification based on the fact that the FAA has approved it, but there are some that

don't recognize an MRA as having the same level of authority as an STC. Be sure you consult with your design authority before modifying an aircraft that you intend to sell to a buyer outside of the United States.

Every modification to an aircraft or fleet of aircraft must be evaluated on an individual basis. The appropriate certification path will need to be decided based on a number of variables, including what is being modified, where that aircraft flies, the country of registration for that aircraft, and how the aircraft is going to be used (business transportation, cargo, charter, etc.).

Someone who has the experience, resources, and authority to make decisions—such as organizations with delegated FAA authority—will need to determine the proper path, whether that's an MRA or an STC.

ADDITIONAL REQUIREMENTS FOR MODIFICATIONS

Anytime an airplane is altered, the same range of airworthiness requirements must be addressed as they were in the original type certificate, and there may be additional certification requirements depending on the details of the changes. That includes advances in technology, such as ADS-B, or changes to the airworthiness standards that stem from any knowledge gained through accident investigations.

Once an aircraft is altered, it is governed by the new set of regulations to prove that it's airworthy. Before any further maintenance can be performed or changes made, a shop must see the record of compliance. The lifespan of most airplanes is 25-30 years, and it's fairly rare for an aircraft to maintain its original configuration for that entire time. As changes are made, it's often the case that no single, reliable source of data exists with regard to the airplane and its subsequent certification.

As an aircraft owner, you can help to alleviate this situation by demanding thorough documentation for every modification and/or alteration, as well as maintenance activities, for as long as you own the aircraft. Duncan Aviation, for example, will always provide a complete set of documents every time we touch your aircraft.

Don't be shy when it comes to asking for documentation. Someone may not provide this paperwork; however, for everything that has ever been done during the life of your aircraft, there has to be a story

documenting it. If you come to Duncan Aviation for modifications or alterations, and we cannot validate what was previously done on the aircraft, the cost to you as the owner can increase significantly.

For instance, if you wanted us to modify your PSU with new ultraleather and LED lights, but you don't have the burn report from the previous interior modification, Duncan Aviation would have to substantiate not just the modification you're currently requesting, but also the previous modification that was done at another facility.

The reason we'd have to do that is because the FAA requires that everything you put into the interior of the aircraft has to have burn data so we can prove that what we've done is safe and compliant. Anyone doing these modifications should provide the data because the FAA regulations requires that you substantiate every modification you do—and part of the substantiation has to do with the flammability of installed materials.

Regardless of the path by which a design change is defined and approved, the airplane must continue to comply with the applicable rules under which it was certified, including the new and additional rules that apply to a specific alteration.

If the original configuration did not contain a microwave oven, and the new alteration does, then the rules for COTS (commercial off the shelf) equipment will now apply—even though they may not have been applied when the aircraft came out of the factory.

When an owner/operator wants to make significant design changes to his or her aircraft, the current documentation will be evaluated along with the new design data. At minimum, the evaluation will include a review of the following:

- Form 337 (FAA form for Major Repairs & Alterations)
- AFM (Aircraft Flight Manuals)
- ICA (Instructions for Continued Airworthiness)
- IPC (Illustrated Parts Catalog)
- Maintenance & Wiring manuals
- AD (Airworthiness Directives) research—to see if there are any unresolved ADs that may apply to your aircraft
- STC research—to see if there are any previous

STCs that will impact the current workscope

- MMEL (Master Minimum Equipment List) Impact Assessment—
if the modification affects anything on the MMEL, come
up with a plan for how to handle the equipment

Here's a checklist so that, you, the owner/operator, can
determine what information you must supply in order
to support the design changes you've requested:

1. Floorplan—drawings, photographs, loading chart
2. Emergency equipment drawing
3. Placards—drawings, photographs, IPC chapter 15
4. Passenger seats—equipment list, photographs of parts
and TSO tags if part 135 Fireblock Report and photos of
tags if dynamic certified upholstery finish drawings
5. Crew seats—component Maintenance Manual*
6. COTS equipment—coffee makers, microwaves, cooling or
warming units, non-aviation-grade entertainment equipment
7. Logbooks all (history of modifications) and
documentation, design data, and all paperwork
8. Wiring diagrams
9. Previous modifications/installations records
10. Engine & APU manuals
11. Burn data
12. AFM—airplane flight manual
13. Existing ICA (Instructions for Continued Airworthiness)

*Some seat vendors require recertification when other foams or materials are installed.
There may be significant lead time necessary to secure vendor foam and covers

HARMONIZATION

Harmonization is a concept we hear about regularly, but it's not
a new idea. Attempts to establish bi-lateral agreements among
the civil aviation authorities in European nations and the FAA in
the United States have been going on since the predecessor of
EASA, the Joint Aviation Authorities (JAA), first formed in 1970.

Efforts to unite the European Union (EU) nations under one civil
aviation authority have run the gamut of options from loose agreements
that simply allow reciprocity—you accept our work, and we'll accept

yours—to more stringent demands of individual countries.

Eventually, EASA was formed as a legal entity with regulatory authority that applies to all EU nations. Although EASA regulates air travel throughout Europe, there are some nuanced interpretations of rules and regulations in the various EASA countries.

The same is true of various regional FAA offices in the United States. Although the FAA has one set of regulations, policies and orders for the entire country, the industry is aware that there are inconsistencies among various regional offices. This means owner/operators may encounter slightly different interpretations of rules and regulations. As with EASA, the FAA is working through the differences in order to standardize procedures and remove inconsistent policy interpretations.

In spite of minor variations, reciprocity among most nations with each country's civil aviation authority works to their advantage. Without known sets of regulations, policies and orders, it would be difficult, not to mention unsafe, to fly in another country's airspace or attempt to land or take off.

Harmonization, in its various forms, is also a benefit for most countries. Between the FAA and EASA, there are differences on what constitutes major or minor repairs, but the two countries have agreed to accept the rules and regulations of the other. The standard is that we respect that our rules and regulations are different, but they have the same goal, and that's aviation safety.

That means that although the two authority's regulations don't say exactly the same things, each aviation authority is willing to accept the other's rules so US-registered aircraft may operate in EU airspace, and aircraft registered in any of the EU nations may operate in US airspace. The two authorities also agree to respect the other's authority when it comes to selling aircraft and performing maintenance and modifications. This information is found in the bilateral agreements.

WHAT ARE BILATERAL AGREEMENTS?

Bilateral agreements provide the basis for reciprocity among nations that sign them. Without any kind of an agreement recognizing the authority of another nation's civil aviation organization to

certify an aircraft as airworthy, flying between and in countries, other than the one in which an aircraft is registered, would be time-consuming, costly, difficult, and potentially unsafe.

For instance, if the United States and Germany did not have a bilateral agreement that allowed each country to recognize the airworthiness authority of the other's civil aviation organization, a US-registered aircraft would have to undergo an inspection by a German aviation entity to certify it as airworthy prior to flying in German airspace or even landing at or taking off from an airport in Germany. And the same would be true of German-registered aircraft attempting to fly in US airspace.

Agreements such as the BAA (Bilateral Airworthiness Agreement) or BASA (Bilateral Aviation Safety Agreement) provide the basis for cooperation when it comes to recognizing the authority of the FAA and its counterpart civil aviation authorities in other countries. In addition to recognizing another country's ability to certify that aircraft are airworthy, the agreements also allow for cooperation among countries with regard to other aspects of aviation, including maintenance, flight operations, and environmental certification.

IMPORT/EXPORT

The FAA guidelines for importing aircraft to and exporting from the United States fill more than 280 pages, so the information here is not exhaustive. It's intended to provide an overview of what owner/operators will need to do in order to import an aircraft into the United States or export one out. Keep in mind, though, that the process and required paperwork will vary depending on the countries involved and the specifics of the aircraft. It's not a linear process, and it's not one you can replicate exactly from one aircraft to another.

In the next two sections, we'll give a brief overview of the process to import a non-U.S.-registered aircraft into the United States and how to export a U.S.-registered aircraft to another country. Dan Moody, Assistant Administrator of the Duncan Aviation ODA says, "Basically Duncan Aviation offers turnkey solutions for over 98% of the business jet makes and models, and we are not restricted to a specific product line. Due to the immense capacity and resources of the Class 4 Repair Stations combined with the far reaching STC, PMA (Parts Manufacturer Approval), and MRA (Major Repair, Alteration and Airworthiness)

authority of the ODA, we are able to offer unparalleled modification solutions at multiple locations throughout the country. The customer doesn't have to piecemeal his overall upgrade and relocate the aircraft multiple times with our nose-to-tail turnkey approach."

These are the steps that a potential owner/operator would go through when dealing with a company like Duncan Aviation—that is both an MRO (Maintenance, Repair, and Overhaul) facility and an ODA—for everything from the pre-buy inspection to the Certificate of Airworthiness.

IMPORT NON-U.S.-REGISTERED AIRCRAFT

To start the process, the current owner/operator needs to fly the aircraft to the United States to Duncan Aviation in Battle, Creek, Michigan; Lincoln, Nebraska; or Provo, Utah; and the potential registered owner will eventually make application to the FAA (through Duncan Aviation) for an airworthiness certificate (8130-6).

1. Show that the aircraft is airworthy. Once at Duncan Aviation, the aircraft will be physically inspected and evaluated and the records will be researched and reviewed for the potential buyer. If the inspection finds anything that renders the aircraft unairworthy, squawks (aviation term for a discrepancy item) will be generated. For instance if an inspection reveals that the tires are worn beyond limits, Duncan Aviation would generate an unairworthy squawk
2. Document that any major alterations were accomplished in accordance with an approved STC or other FAA-approved data. Document whether the aircraft continues to meet, or has been returned to, its approved type design configuration and is in condition for safe operation
3. Decide the extent of the workscope. At this point, the current owner and prospective buyer will negotiate who will pay to resolve the squawks
4. Show that the aircraft complies with all applicable ADs (Airworthiness Directives). Duncan Aviation will complete the

research of the records and redefine the workscope, if necessary.
If the records are incomplete, there may be more negotiations
as to who'll pay to make sure the records are complete

5. Demonstrate that any major repairs conform to FAA-approved data or were performed in accordance with bilateral agreement procedures
6. Arrange to make available for inspection and review the aircraft, aircraft records, and any other data necessary to establish conformity to its type design
7. As applicable, ensure compliance with the noise standards of §21.93(b); §21.183(3); part 36, Noise Standards: Aircraft Type and Airworthiness Certification; or part 91. Also ensure compliance with the fuel venting and exhaust emission requirements of part 34, Fuel Venting and Exhaust Emission Requirements for Turbine Engine Powered Airplanes, and the applicable passenger emergency exit requirements of §21.183(f)
8. Review records and documentation to the extent necessary to establish the following:
 - a) All of the required records and documentation are provided for the aircraft, that is, an up-to-date approved flight manual, a current weight and balance report, an equipment list, the maintenance records, the FAA-accepted ICA (Instructions for Continued Airworthiness), the FAA-accepted maintenance manual(s), and any other manuals required by §§21.31, 21.50, 33.4, and 35.4, and by §§23.1529, 25.1529, 27.1529, and 29.1529. These documents must be in English
 - b) The aircraft is eligible by make, model and serial number, using the TCDS (Type Certificate Data Sheets), aircraft specifications, and/or applicable aircraft listing. For example, an aircraft listing may consist of aircraft model and serial numbers associated with newly manufactured aircraft that are not yet listed on the TCDS
 - c) The inspection records and technical data reflect that the aircraft conforms to the type design, all required inspections and tests have been satisfactorily completed, and the records are complete and reflect no unapproved alterations
 - d) Large airplanes, turbojet, or turbopropeller multiengine airplanes

comply with the inspection program requirements of part 91, subpart E, Maintenance, Preventive Maintenance, and Alterations, or other regulations referenced therein.

A supplemental structural inspection program also is required for certain large transport category airplanes. Refer to AC 91-56, Continuing Structural Integrity Program for Airplanes

- e) The Type Certificate or STC holder has furnished one set of FAA-accepted ICA or one complete set of FAA-accepted manuals to the owner of the aircraft when the first standard airworthiness certificate is issued, or has procedures in place to ensure FAA-accepted ICA or maintenance manuals are provided upon delivery of the aircraft, as required by §§21.17(a) and (b), 21.31, and 21.50. The ICA or maintenance manuals also are required for all products with a Type Certificate or an STC. If no FAA-accepted ICA or maintenance manuals are available, they will need to be ordered and received before the Certificate can be issued
- 9. Once the terms have been agreed upon, the records are completed, and the workscope has been defined, the buyer and seller close their deal and ownership of the aircraft transfers to the buyer. Now, the new owner must fill out a customs declaration and pay the necessary taxes after the US Customs and Border Protection office assesses them
- 10. The new owner must also apply to the FAA for a registry import, which will require the previous owner to deregister the aircraft from the country in which it had been previously registered. Once placed on FAA registry by the new owner, Duncan Aviation can apply for an airworthiness certificate (8130-6) on the customer's behalf, provided the registered owner issues a notarized limited power of attorney letter for Duncan Aviation to act as agent on his or her behalf
- 11. The customer must provide proof of registration prior to applying for an Airworthiness Certificate. Since it is a foreign transaction, and no previous FAA registration exists, we recommend that the new owner request an FAA form AFS-750-FAX-4 from FAA Registry, which provides the necessary proof of registration

12. Once secured, the repair station starts working on the aircraft:
 - a) US registration number is painted on the tail
 - b) The avionics are restrapped to the new registration number. Restrapping is an industry term that means the broadcast signal will now be linked to the new registration number
 - c) The customer must also have the ELT (Emergency Locator Transponder) reregistered. This is not something Duncan Aviation can do for its customers. Go to www.sarsat.noaa.gov/beacon.html and click the Register Now button to register your beacon
13. The 8130-6 application can be completed once the repair station, in this case, Duncan Aviation, says it's ready. Duncan Aviation will then do a conformity inspection and review the flight documents, records, and aircraft for FAA compliance under its ODA
14. The new owner will subscribe to the OEM subscription service to get an FAA flight manual and required flight documentation (as opposed to EASA-approved manuals, for instance). He or she will also need to subscribe to all of the avionics subscriptions (EGPWS, SatCom, and Wi-Fi), based on what is installed in the aircraft
15. Once the conformity inspection is complete, Duncan Aviation generates an approved and completed work order, which in effect says we're done with the aircraft, and it's good to go. All of the log entries have been completed. Duncan Aviation's Tracker is now updated to reflect the new inspection status
16. The aircraft must be completely put together and ready to fly. (For instance, it cannot be torn apart, on jacks, or missing any of its parts)
17. The Certificate of Airworthiness is issued

After all that, you might expect a parade, complete with a band and confetti, but all you get is a tiny, little card that needs to be displayed in the cockpit or in plain view of the passengers when boarding.

EXPORT AN N-REGISTERED AIRCRAFT

As with importing an aircraft to the United States, exporting an aircraft from the United States is a complicated, non-linear procedure, and individual owners' experiences will be different.

1. To start the process to export an aircraft from the United States, the owner or his or her authorized agent must apply to the FAA, using form 8130-1. The 8130-1 application is for an Export C of A (Export Certificate of Airworthiness), basically a request for FAA Form 8130-4. It is the FAA's certifying document that the aircraft meets the Special Requirements of the country that is importing the aircraft. It only pertains to Airworthiness and Certification standards
2. The CAA of the importing country will require that the aircraft meet its certification requirements. The ODA will attest to these requirements on the Export C of A. Any requirements that can't be met must be agreed to in writing by the country's CAA prior to the Export C of A being issued. The ODA may request a CAA/DGAC waiver (if the necessary requirements cannot be met, however the waiver is subject to approval of the importing country authority). For instance, let's say we have a US-registered aircraft that's currently located in the US, and we want to export it to a buyer in Mexico. Mexico's DGAC (Directorate General of Civil Aeronautics) requires that the emergency placards be written in Spanish; however, it'll take 6-8 weeks to get those placards from the manufacturer, which will hold up the sale. To keep the sale and export of the aircraft moving, the DGAC may grant a temporary waiver until the appropriate placards arrive and can be installed
3. Registration numbers/characters (known as marks by the FAA) are applied. The aircraft must display the registration marks issued by the country of registry. So when the aircraft is purchased and registered, the new marks must be applied. That can occur either before or after the Export C of A is issued. The registration marks are applied at Duncan Aviation in its capacity as a repair station; in its capacity as an ODA, an ODA unit member makes sure the registration marks are accomplished in accordance with the regulations of the importing country.

4. Transponders and associated avionics are restrapped. Once the new registration number has been assigned, the transponders and associated avionics are linked to the new number. Whenever the registration number changes, the associated avionics must be changed to transmit the proper number
5. ELT restrapped. Although Duncan Aviation doesn't register the beacons with the SARSAT/NOAA beacon registry, it does restrap the ELT with the new number so it'll transmit the new registration number
6. Aircraft physically reviewed by an ODA unit member. FAA Order 8130.2 requires the registered owner to have the aircraft inspected prior to requesting an airworthiness certificate—either an Import or Export C of A. In its capacity as a repair station, Duncan Aviation conducts the applicable evaluation, which is a physical inspection of the aircraft and records research. After the repair station completes this activity, the unit member will review all the records presented by the repair station to ensure they meet FAR 91.417 and inspect the aircraft. This is conformity of the records to the aircraft, making sure they match. The unit member is acting as a representative of the FAA, re-inspecting the items that the repair station has certified it to be in compliance. Additionally the unit member inspection ensures the aircraft meets the applicable type design. The unit member must ensure the aircraft and records meet the certification requirements
7. Aircraft flight documentation reviewed. The aircraft's owner is required to have current flight documentation. Subscriptions are expensive, and not everyone remembers to renew subscriptions. The OEM for the aircraft will publish revisions to the flight documentation from time to time, and the owner is required to make sure this flight documentation is current and complete as part of the conformity inspection
8. Flight documentation ordered and received as required. Flight documentation that is found to be out-of-date or missing will generate a discrepancy. Ultimately, it's the owner's responsibility to update the flight documentation if he or she wishes to proceed with either the import or export. He or she may contract with the Duncan Aviation repair station to perform this, just like any other maintenance requirement

9. Conformity squawks generated, approved, and completed. Any discrepancies (such as missing placards) must be resolved now before the aircraft can be issued an Export C of A. The current and future owners will have to agree on who will pay to resolve the squawks
 10. If there were any open work orders, they must be closed now
 11. Log entries completed. The repair station, Duncan Aviation in this instance, will close the work order and complete the log entry for the work order
 12. Tracker updated to reflect new inspection status after work order complete. Tracker is always updated during an Import or Export, and a full records research is sold as part of the deal; therefore, Tracker is Duncan Aviation's proof of records compliance
 13. The aircraft must be completely put together and ready to fly. (For instance, it cannot be torn apart, on jacks, or missing any of its parts)
 14. Export C of A issued. The ODA unit member issues the Export C of A
- Duncan Aviation knows what to do to meet all of the importing country's requirements. There aren't too many other places you can take your aircraft that can do everything from the outset: make application, perform inspections, research records, make repairs, recertify the aircraft, and provide day-to-day updates on schedule impacts

"Our ODA in combination with the repair station authorization gives us a vast array of capabilities on 76 aircraft models," says Dan Moody.

RESPONSIBILITY OF THE AVIATION INDUSTRY

When you work in the aviation industry, regardless of whether you're a pilot or a parts runner, you know that safety is paramount. Not only that, but of the many aviation jobs in the industry, one common thread that unites nearly all of them is that they somehow touch upon safety.

Whether you work as an engineer creating design data, in production installing seats in an aircraft, or as a certification coordinator making the plan to show compliance to the regulations, you know that everything you do affects the safety of the aircraft.

Safety not only matters, but it also depends completely on a dedicated and highly trained workforce. Repair stations like Duncan Aviation are required to employ qualified personnel and provide approved procedures to ensure that all jobs are performed in a manner that will result in a safe aircraft. Whatever we do, we must keep your airplane airworthy, safe, and in conformance with its approved design.

Investment in training. For instance, Duncan Aviation invests heavily in training each year. The company paid \$2.6 million in tuition for 2,150 team members to attend airframe-specific training, as well as courses in safety, certification, and licensing in 2015.

INSPECTION & MAINTENANCE

Although the type design and certification of an airplane are important to safety, the only way to ensure continued airworthiness is by performing scheduled inspections and the necessary maintenance.

GLOSSARY OF TERMS WITH ACRONYMS

AC (Advisory Circular)—A type of publication produced by the FAA to provide guidance for aircraft owner/operators on compliance with regulations for continued airworthiness. ACs define a means of showing compliance with the airworthiness regulations.

AD (Airworthiness Directive)—The legally enforceable regulations that the FAA issues in accordance to 14 CFR part 39 to correct an unsafe condition in a product. Part 39 defines a product as an aircraft, engine, propeller, or appliance.

AFM (Aircraft Flight Manual)—A manual or set of manuals that contain detailed information and documentation, such as ownership, airworthiness, maintenance and operation, for a particular aircraft. The manuals provide information, instructions and flying techniques for the pilots who will be operating the aircraft. A pilot operating an aircraft

must have a thorough knowledge of the aircraft's flight manuals.

Airworthiness Approval or Airworthiness Certificate—Issued in the United States by the Federal Aviation Administration (FAA), this document certifies that an aircraft conforms to its approved type design. This is basically your passport to fly in whatever country in which you live and fly. And because of bilateral agreements, it's also recognized in most other countries in which you might fly, too.

Airworthy—According to the FAA, airworthy means the aircraft meets its type design and is in condition for safe operation.

appliance—An instrument, mechanism, equipment, part, apparatus, appurtenance, or accessory, including communications equipment, that is used or intended for use in operating or controlling an aircraft, and is not part of an airframe, engine, or propeller. (14 CFR Part 1).

APU (Auxiliary Power Unit)—This unit provides the power for an aircraft when its engines are shut off. It can also provide power to start engines and power the aircraft if an engine fails.

CAA (Civil Aviation Authority)—Typically a governmental agency that regulates and oversees the safety and security of the non-military aviation in a country. This agency determines policy for the use of a country's airspace. Think of these agencies as the FAA equivalent in other countries.

CAR 4B (Civil Aviation Regulations)—Regulations that governed aircraft certification prior to the current CFRs (Certified Federal Regulations).

Certified Repair Station—In the United States, a repair station is a maintenance facility that has been certified by the FAA under Title 14 of the Code of Federal Regulations (14 CFR) Part 145. These facilities may perform maintenance, preventative maintenance, inspections, and alterations on aircraft and aircraft products.

CFRs (Code of Federal Regulations)—This body of rules and regulations, general and permanent, is published each year by the executive departments and agencies of the United States federal government. Title 14, Aeronautics and Space, provides all of the

guidance, rules, regulations, and laws that affect civil aviation.

DOA (Design Organization Approval)—This is the European entity that's responsible for the design of aircraft, aircraft engines, propellers, APUs, and related parts and appliances. It is through these organizations that owner/operators must apply for type certificates, STCs, changes and/or repairs to design approvals.

EASA (European Aviation Safety Agency)—EASA is the European Union's (EU's) agency that regulates civilian aviation for the EU countries.

FAA (Federal Aviation Administration)—The FAA is the agency that oversees and regulates all aspects of civil aviation in the United States.

ICA (Instructions for Continued Airworthiness)—These instructions provide a way to keep products airworthy. ICAs provide documentation of recommended methods, inspections, processes, and procedures, and they must contain information on each item or part that is installed on the product.

MEL (Minimum Equipment List)—This list is used to deviate from the MMEL (Master Minimum Equipment List). It sets a minimum period of time by which repairs must be accomplished. Suitable conditions and limitations in the form of placards, maintenance procedures, crew operating procedures, and other restrictions, as necessary, are required to be accomplished by the operator to ensure that an acceptable level of safety is maintained. For instance, if the MMEL says there are three flash lights in the aircraft, but only two can be located. It doesn't prevent the aircraft from operating safely, but it doesn't comply with the MMEL. Duncan Aviation can facilitate the process of getting an MEL from the FAA, showing the aircraft is airworthy but temporarily not in compliance with the MMEL. The MEL must say that it's OK to fly without whatever that piece of non-operating equipment is and state at deadline for bringing the aircraft back into compliance with the MMEL.

MMEL (Master Minimum Equipment List)—An OEM-generated MMEL is an FAA-approved list of airplane systems, instruments, and equipment, some of which may be inoperative and still maintain an acceptable level of safety by appropriate conditions and limitations. An aircraft operator uses this list to determine if the aircraft can be flown with the inoperative equipment.

MRA (Major Repair, Alteration and Airworthiness)—

This type of alteration to an aircraft does not require an STC and can be certified under a field approval.

ODA (Organization Designation Authorization)—This designation is earned by an organization that has been delegated certain approval authority by the FAA. Examples are ODA for STC (Supplemental Type Certificate), ODA for MRA (Major Repair, Alteration and Airworthiness), and ODA for PMA (Parts Manufacturing Approval). The FAA has granted Duncan Aviation delegated authority for all three, meaning Duncan Aviation acts on behalf of the FAA when undertaking these types of projects.

Part (CFR Part definition)

Certification Rules:

- Part 21—This part covers certification procedures for products and parts. A product or part cannot fly until it is certified. A product is an airplane, engine, or propeller, and a part makes up a product. This type certification provides the basis for all of our ODA activity here at Duncan Aviation.
- Part 23—This part provides the airworthiness standards for airplanes in the normal, utility, acrobatic, and commuter categories. It dictates the standards for issuing and changing the type certificates for airplanes in these categories. For instance, it dictates the mtow (maximum takeoff weight) of an airplane in the normal, utility, or acrobatic category cannot exceed 12,500 pounds, while the commuter category cannot exceed 19,000 pounds.
- Part 25—This part contains the airworthiness standards for airplanes in the transport category—transport category aircraft are either: 1) Jets with 10 or more seats or an mtow greater than 12,500 pounds (5,670kg); or 2) propeller-driven airplanes with greater than 19 seats or an mtow greater than 19,000 pounds (8,618 kg).

Repair Station Rules:

- Part 145—Gives the regulations dictating how we as a company (a certified repair station) must operate. (Part 43 and Part 65 are under the umbrella of Part 145)

- **Part 43**—Our technicians at the Duncan Aviation Certified Repair Station follow the rules of maintenance activities.
- **Part 65**—Airman certification under which our individual technicians (who are certified) are certificated.

Operating Rules:

- **Part 91**—This part provides general operating and flight rules. These regulations define how small, non-commercial aircraft operate in the United States; however, many other countries defer to these rules. They set the conditions under which an aircraft may operate.
- **Part 135**—This applies to turbojet engine-powered aircraft with 1-30 seats, non-transport category turbo-propeller-powered aircraft with 10-19 seats, and transport category turboprops with 20-30 seats. Applicants for Part 135 certificates must have exclusive use of at least one aircraft.

PMA (Parts Manufacturing Approval)—Delegated authority from the FAA to an ODA (Organization Designation Authorization) prescribing the responsibilities and procedures for approving replacement and modification parts for installation on type-certificated products.

Product—This term refers to a type certificated aircraft, aircraft engine, propeller, or an appliance, component, or part, thereof.

RSGOM (Repair Station General Operating Manual)—Duncan Aviation, with company headquarters in Lincoln, Nebraska, is made up of several FAA-Certified Repair Stations. To standardize our operations, all repair stations operate under one Repair Station and Quality Control manual. That manual is the Repair Station General Operating Manual, or RSGOM.

STC (Supplemental Type Certificate)—This certificate is issued when the FAA gives its approval to modify an aircraft or aircraft product from its original design. An STC also mentions how the modification affects the original design.

Squawk—An industry term for a discrepancy. For instance, if we inspect an aircraft and find the veneer peeling off of the galley cabinets, we'll generate a squawk (aka customer advisory squawk). That squawk will not ground the aircraft; it's purely cosmetic, and the owner may decide he can live with the peeling veneer.

An unairworthiness squawk, on the other hand, will ground the aircraft. For example, if an inspection revealed that the tires were worn beyond their tolerance, we'd have to issue an unairworthiness squawk that grounds the aircraft until the tires are replaced.

TCDS (Type Certificate Data Sheet)—On the TCDS, you'll find a description of the aircraft and information on the limitations for safe operation, including airspeed, occupants, fuel and weight. The datasheet specifies which part of the GST (Federal Aviation Regulations) and amendments provide the basis for certification for the aircraft and what exemptions, if any, apply.

CIVIL AIR AUTHORITIES AROUND THE WORLD

Afghanistan	Ministry of Transport and Civil Aviation
Albania	Albanian Civil Aviation Authority
Algeria	Directorate of Civil Aviation and Meteorology
Angola	Instituto Nacional da Aviacao Civil
Argentina	National Civil Aviation Administration
Armenia	General Department of Civil Aviation of Armenia
Aruba	Department of Civil Aviation of Aruba
Australia	Civil Aviation Safety Authority
Austria	Austro Control
Azerbaijan	Civil Aviation Administration
Bahamas	Department of Civil Aviation of Bahamas
Bahrain	Department of Civil Aviation Affairs
Bangladesh	Civil Aviation Authority, Bangladesh
Barbados	Civil Aviation Department of Barbados
Belarus	Aviation Department of Belarus
Belgium	Federal Public Service Mobility and Transport
Benin	National Civil Aviation Agency
Bermuda	Bermuda Department of Civil Aviation
Bhutan	Department of Civil Aviation of Bhutan
Bolivia	General Directorate of Civil Aviation of Bolivia
Bosnia & Herzegovina	Bosnia and Herzegovina Directorate of Civil Aviation
Botswana	Department of Civil Aviation of Botswana
Brazil	National Civil Aviation Agency of Brazil
Brunei	Department of Civil Aviation of Brunei

Bulgaria	Directorate General Civil Aviation Administration
Cabo Verde	Agencia de Aviacao Civil
Cambodia	Secretariat of State for Civil Aviation
Cameroon	Cameroon Civil Aviation Authority
Canada	Transport Canada Civil Aviation
Cayman Islands	Civil Aviation Authority of the Cayman Islands
Chile	Directorate General of Civil Aviation
China	Civil Aviation Administration of China
Colombia	Special Administrative Unit of Civil Aeronautics
Comoros	L-Agence Nationale l'Aviation Civile
Congo	Agence Nationale de l-Aviation Civile
Cook Islands	Pacific Aviation Safety Office
Costa Rica	Directorate General of Civil Aviation of Costa Rica
Croatia	Croatian Civil Aviation Agency
Cuba	Institute of Civil Aeronautics of Cuba
Cyprus	Department of Civil Aviation of Cyprus
Czech Republic	Civil Aviation Authority of the Czech Republic
Denmark	Danish Transport Authority
Dominican Republic	Dominican Institute of Civil Aviation
Ecuador	Directorate General of Civil Aviation of Ecuador
Egypt	Ministry of Civil Aviation of Egypt
El Salvador	Civil Aviation Authority of El Salvador
Estonia	Estonian Civil Aviation Administration
European Union	European Aviation Safety Agency
Fiji	Civil Aviation Authority of Fiji
Finland	Finnish Transport Safety Agency
France	Directorate General for Civil Aviation
Gabon	National Civil Aviation Agency
Gambia	Gambia Civil Aviation Authority
Georgia	Georgian Civil Aviation Administration
Germany	Federal Office for Civil Aviation of Germany
Ghana	Ghana Civil Aviation Authority
Greece	Hellenic Civil Aviation Authority
Guatemala	Directorate General of Civil Aviation of Guatemala
Guyana	Guyana Civil Aviation Authority
Honduras	Direccion General de Aeronautica Civil
Hong Kong	Civil Aviation Department
Hungary	Transportation Safety Bureau
Iceland	Icelandic Transport Authority
India	Directorate General of Civil Aviation
Indonesia	Directorate General of Civil Aviation
Iran	Civil Aviation Organisation of Iran

Iraq	Directorate General of Civil Aviation of Iraq
Ireland	Irish Aviation Authority
Israel	Civil Aviation Authority
Isle of Man	Isle of Man Aircraft Registry
Italy	Italian Civil Aviation Authority
Ivory Coast	(Cote de l'Ivoire) Autorite Nationale de l'Aviation Civile
Jamaica	Jamaica Civil Aviation Authority
Japan	Japan Civil Aviation Bureau
Jordan	Civil Aviation Regulatory Commission of Jordan
Kenya	Kenya Civil Aviation Authority
Korea (South)	Korea Office of Civil Aviation
Kiribati	Pacific Aviation Safety Office
Kosovo	Civil Aviation Authority of Kosovo
Kuwait	Directorate General of Civil Aviation
Kyrgyzstan	Civil Aviation Agency of Kyrgyz Republic
Laos	Department of Civil Aviation of Laos
Latvia	Civil Aviation Agency of Latvia
Lebanon	Lebanese Civil Aviation Authority
Lesotho	Department of Civil Aviation of Lesotho
Libya	Libyan Civil Aviation Authority
Liechtenstein	Office of Civil Aviation of Liechtenstein
Lithuania	Civil Aviation Administration of Lithuania
Luxembourg	Directorate of Civil Aviation of Luxembourg
Macau	Civil Aviation Authority
Macedonia	Civil Aviation Agency of Macedonia
Madagascar	Civil Aviation Department
Malaysia	Department of Civil Aviation of Malaysia
Malawi	Department of Civil Aviation of Malawi
Maldives	Civil Aviation Department of the Maldives
Mali	Agence Nationale de l'Aviation Civile
Malta	Civil Aviation Directorate of Malta
Marshall Islands	Directorate of Civil Aviation of the Marshall Islands
Mauritius	Department of Civil Aviation of Mauritius
Mexico	Directorate General of Civil Aviation of Mexico
Moldova	Civil Aviation Administration of Moldova
Monaco	Monaco Civil Aviation Authority
Mongolia	Civil Aviation Authority of Mongolia
Montenegro	Civil Aviation Agency of Montenegro

Morocco	Direction Generale de l'Aviation Civile
Mozambique	Civil Aviation Institute of Mozambique
Myanmar	Department of Civil Aviation of Myanmar
Namibia	Directorate of Civil Aviation
Nauru	Pacific Aviation Safety Office
Nepal	Civil Aviation Authority of Nepal
Netherlands	Human Environment and Transport Inspectorate
New Zealand	Civil Aviation Authority of New Zealand
Nicaragua	Nicaraguan Institute of Civil Aviation
Nigeria	Nigerian Civil Aviation Authority
Niue	Pacific Aviation Safety Office
Norway	Civil Aviation Authority of Norway
Oman	Directorate General of Civil Aviation and Meteorology
Pakistan	Pakistan Civil Aviation Authority
Panama	Civil Aviation Authority of Panama
Papua New Guinea	Civil Aviation Authority of Papua New Guinea
Paraguay	Direccion Nacional de Aeronautica Civil
Peru	Directorate General of Civil Aviation of Peru
Philippines	Civil Aviation Authority of the Philippines
Poland	Civil Aviation Office
Portugal	National Institute of Civil Aviation of Portugal
Qatar	Civil Aviation Authority of Qatar
Romania	Romanian Civil Aeronautical Authority
Russia	Federal Air Transport Agency
Rwanda	Rwanda Civil Aviation Authority
Samoa	Pacific Aviation Safety Office
San Marino	San Marino Civil Aviation and Maritime Authority
Saudi Arabia	General Authority of Civil Aviation
Senegal	National Civil Aviation Agency of Senegal
Serbia	Civil Aviation Directorate of Serbia
Seychelles	Seychelles Civil Aviation Authority
Singapore	Civil Aviation Authority of Singapore
Slovakia	Civil Aviation Authority of the Slovak Republic
Slovenia	Civil Aviation Directorate of Slovenia
Solomon Islands	Pacific Aviation Safety Office
Somalia	Somali Civil Aviation and Meteorology Authority
South Africa	South African Civil Aviation Authority
Spain	General Directorate of Civil Aviation of Spain
Sri Lanka	Civil Aviation Authority of Sri Lanka
Sudan	Civil Aviation Authority of Sudan
Suriname	Civil Aviation Department of Suriname

Swaziland	Swaziland Civil Aviation Authority
Sweden	Swedish Transport Agency
Switzerland	Federal Office for Civil Aviation
Syria	Syrian Civil Aviation Authority
Taiwan	Civil Aeronautics Administration
Tanzania	Tanzania Civil Aviation Authority
Thailand	The Civil Aviation Authority of Thailand
Timor-Leste	Civil Aviation Division of Timor-Leste
Togo	Civil Aviation Agency of Togo
Tonga	Pacific Aviation Safety Office
Trinidad and Tobago	Airports Authority of Trinidad and Tobago
Tunisia	Office of Civil Aviation and Airports
Turkey	Directorate General of Civil Aviation of Turkey
Turks & Caicos Islands	Turks and Caicos Islands Civil Aviation Authority
Tuvalu	Pacific Aviation Safety Office
Uganda	Civil Aviation Authority of Uganda
Ukraine	State Aviation Administration of Ukraine
United Arab Emirates	General Civil Aviation Authority
United Kingdom	Civil Aviation Authority
United States	Federal Aviation Administration
Uruguay	Direccion Nacional de Aviacion Civil e Infraestructura Aeronautica
Vanuatu	Pacific Aviation Safety Office
Venezuela	National Institute of Civil Aviation of Venezuela
Vietnam	Civil Aviation Administration of Vietnam
Yemen	Civil Aviation and Meteorological Authority of Yemen
Zambia	Department of Civil Aviation
Zimbabwe	Civil Aviation Authority of Zimbabwe