



U.S. Department  
of Transportation  
**Federal Aviation  
Administration**

Federal Aviation Administration  
Northwest Mountain Region  
17900 Pacific Highway S., C-68966  
Seattle, Washington 98168

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# DESIGNEE NEWSLETTER

Aircraft Certification Division  
Transport Airplane Certification Directorate

## Dear Designee

In response to the numerous letters and requests we have received from Northwest Mountain Region designees, and in an effort to accomplish our goals in supporting the designee program, the Northwest Mountain Region Aircraft Certification Division is resuming publication of its Designee Newsletter with this edition.

Although the FAA is still operating under most of the budget restrictions which effected the dissolution of the Newsletter in June 1985, we have been able this year to allocate some of our funding for publication purposes. Our upcoming issues, however, will be "scaled down," as compared to previous editions, which will allow us to cut publishing costs and preparation time; this, in turn, will enable us to print more editions on a more timely basis.

Even with its "abbreviated" format, the Newsletter is intended to serve as one medium for creating and maintaining a good communication system, and is designed to respond to your needs as our Regional designees. Through it, we

will provide designees with the latest information concerning regulations, guidance material, policy and procedures changes, and personnel activities involving the certification work accomplished within the Aircraft Certification Division's jurisdictional area. As always, we welcome your ideas, comments, and suggestions for further improvement.

I'd like to share with you the following letter issued by FAA Administrator Donald Engen, which contains policy information concerning FAA's relationship with designees, and how it is intended that we carry out that relationship. Even though the Administrator has announced his resignation, this policy has been and will remain in effect. It reaffirms our commitment to and confidence in the importance of the designee program.

Leroy A. Keith, Manager  
Aircraft Certification Division

**NORTHWEST MOUNTAIN REGION  
DESIGNEE NEWSLETTER**

(Published semiannually; 5th edition)

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LETTER DATED DECEMBER 15, 1986, FROM  
ADMINISTRATOR ENGEN TO CONGRESSMAN  
NORMAN Y. MINETA, CHAIRMAN,  
SUBCOMMITTEE ON AVIATION, COMMITTEE ON  
PUBLIC WORKS AND TRANSPORTATION

Dear Mr. Chairman:

Thank you for your letter of October 22 regarding correspondence you received expressing concern about the Federal Aviation Administration (FAA) designee program.

The concerned person, referring to the Southwest Region Aircraft Certification Designee Newsletter No. 86-3 dated July 3, stated that "the Southwest Region of FAA has a designee policy that places conformity and subservience to a bureaucrat ahead of safety, competence,

and economical service for the aviation industry." This is simply not true. I would agree that the newsletter could have been more carefully worded to preclude misinterpretation, as was the case by the person that wrote to you.

Designees (there are many kinds of designees covering many technical disciplines) are private persons authorized by the FAA to make findings of compliance with the Federal Aviation Regulations as representatives of the Administrator. They are expected to make their findings in accordance with established FAA policies and under the supervision of the appointing official. In the aircraft certification regulatory program, they have much the same authority as FAA aerospace engineers, flight test pilots, and aviation safety inspectors in granting FAA approvals within the scope of their delegation. For example, designated engineering representatives have the authority to grant FAA approval of aircraft design data, including engineering test results, leading to the issuance of aircraft type certificates and supplemental type certificates. Designated manufacturing inspection representatives and designated airworthiness representatives are authorized to issue aircraft airworthiness certificates and other airworthiness approvals on behalf of the FAA. For this reason, it is important to aviation safety and to national standardization in the application of FAA regulatory policies that designees not only be technically competent, but also have a good working knowledge of the Federal Aviation Regulations and demonstrate a positive attitude toward determining compliance with these regulations in accordance with established FAA technical policies and practices. That was the central message intended by the newsletter.

Over the years, the designee program has made a significant contribution toward reducing Government costs by avoiding FAA staffing levels that would otherwise be required to provide the

same level of service to the public. However, it can only continue to serve the FAA, the applicants for FAA certificates, and the public interest in aviation safety if designees are responsive to FAA supervision concerning acceptable means of compliance with the regulations. Designees simply cannot function as independent entities. It is not merely a question of competence, but is very heavily dependent upon standardization in our interpretation and application of the rules.

The many kinds of designees and the FAA regulations concerning the appointments and duration of appointments are set forth in Federal Aviation Regulations, Part 183, entitled "Representatives of the Administrator." The designee program, as codified in Part 183, was established under the "Delegation of Powers and Duties to Private Persons" provision of Section 314 of the Federal Aviation Act of 1958. Designees are not certificate holders under Title VI of the Act; therefore, the "Amendment, Suspension, and Revocation of Certificate" provision in Section 609 of the Act is not applicable to designees.

I fully appreciate and am sensitive to the adverse economic impact on an affected individual that results where I find it necessary to withdraw a delegation of authority from a designee. I would not do so in an arbitrary or capricious way or without cause. However, to preserve the integrity of the program, I am committed to assuring that only technically competent and qualified persons are appointed, and that those who retain their appointments indeed continue to function as trusted representatives of the Administrator, in whom FAA maintains full faith and confidence.

Sincerely,

Donald D. Engen  
Administrator

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### 60TH ANNIVERSARY OF AIRCRAFT CERTIFICATION

This year marks the 60th anniversary of the certification of aircraft in the United States. On March 29, 1927, Type Certificate No. 1 was issued by the newly formed Department of Commerce to the manufacturer of the Buhl-Verville J4 Airster CA-3, a 3-place open land biplane. It had an empty weight of 1,415 pounds (gross weight 2,300 pounds), and was propelled by a Wright "J4 Whirlwind" engine with a rating of 200 horsepower.

Prior to that time, the Federal government did not regulate or monitor the design or manufacture of aircraft. However, as aviation became a more popular and viable form of public transportation, the government and the public began to recognize that regulatory measures should be imposed to ensure the safety of all involved in civil aviation. In 1926, the Air Commerce Act was introduced, and from then on, every newly-developed commercial airplane has been required to meet the applicable Federal type certification requirements.

As a result, the U.S. certification system has evolved as a standard recognized the world over, and patterned after by many foreign governments.

This article cannot be complete without some recognition given to Robert F. (Bob) Hall, an aerospace engineer in the Northwest Mountain Region's Aircraft Certification Division, for being the first person in the agency to identify this important FAA milestone.

On August 27, 1986, Bob wrote a note to the Aircraft Certification Division Manager suggesting that the agency recognize the 60th anniversary of aircraft certification, noting that a great deal of attention had been given to the 50th anniversary of air traffic

control. This note was passed on to the Regional Director and to the Director of Airworthiness in FAA Headquarters.

Bob's initial suggestion grew into a nationwide observance of the 60th anniversary of aircraft certification, with commemoration activities taking place in many cities across the country. It has been a source of pride for the agency, particularly for employees involved in aircraft certification.

We congratulate Bob for his thoughtfulness and initiative in beginning this celebration.

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## TECHNICAL STANDARD ORDERS (TSO)

The Office of Airworthiness in FAA Headquarters recently issued the following TSO's to reflect technological advances in aeronautics:

### TSO-C13e: Life Preservers.

Revision "e" includes: acceptability of a single chamber vest, no more than one attachment, no more than one adjustment, a specific test for ease of donning, and the preserver must be equipped with a survivor locator light.

### TSO-C41d: Airborne Automatic Direction Finding (ADF) Equipment.

Revision "d" includes: requirements contained in DO-178 for software, and updated environmental standards to use procedures in DO-160B. The minimum performance standards are referenced in DO-179, which updates the requirements in several areas, including selectivity, cross modulation, intermodulation, etc.

### TSO-C91a: Emergency Locator Transmitter (ELT) Equipment.

Revision "a" includes more stringent requirements to improve activation switches, improve quality of the transmitted signal, preclude battery failures, and eliminate false alarms.

### TSO-C100a: Child Restraint Systems.

This TSO was revised to adopt the standards set forth in the Federal Motor Vehicle Safety Standard No. 213, effective February 26, 1985.

### TSO-C109: Airborne Navigation Data Storage System. (New TSO)

### TSO-C110: Airborne Passive Thunderstorm Detection Systems. (New TSO)

### TSO-C112: Air Traffic Control Radar Beacon System/Mode Select (ATCRBS/Mode S) Airborne Equipment. (New TSO)

To obtain a copy of any of the TSO's listed, write to:

Federal Aviation Administration  
Office of Airworthiness  
Aircraft Engineering Division,  
(AWS-100)  
800 Independence Avenue S.W.  
Washington, D.C. 20591

Indicate in your request whether you would like to have your name placed on the mailing list to receive future issuances of the TSO's, notices for public comment on proposed TSO's, or copies of proposed TSO's.

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# Advisory Circulars (AC)

AC 20-88A, Guidelines on the Marking of Aircraft Powerplant Instruments (Displays), was issued September 30, 1985. This AC provides revised guidelines on the marking of aircraft powerplant instruments and electronic displays (cathode ray tubes, etc.).

AC 20-124, Water Ingestion Testing for Turbine Powered Airplanes, was issued September 30, 1985. This AC describes a method of demonstrating compliance with the regulations concerning ingestion of water from the runway/taxiway surface into the airspeed system, the engine, and essential auxiliary power unit (APU) air inlet ducts of turbine engine powered airplanes.

AC 25-7, Flight Test Guide for Certification of Transport Airplanes, was issued April 9, 1986. This AC provides guidelines for the flight test evaluation of transport airplanes. The methods and procedures described in the AC have evolved through many years of flight testing of transport category airplanes and, as such, represent current certification practice.

AC 25-8, Auxiliary Fuel System Installations, was issued May 2, 1986. This AC sets forth a means by which compliance may be shown with the requirements of Part 25 of the FAR pertaining to the installation of auxiliary fuel systems in transport category airplanes.

AC 25-9, Smoke Detection, Penetration, and Evacuation Tests and Related Flight Manual Emergency Procedures, was issued July 29, 1986. This AC provides guidelines for conducting certification tests relating to smoke detection, penetration, and evacuation.

AC 25.571-1A, Damage-Tolerance and Fatigue Evaluation of Structure, was issued March 5, 1986. Included in this AC is an acceptable means of compliance with the provisions of Part 25 of the FAR dealing with the damage-tolerance and fatigue evaluation requirements of aircraft structure.

AC 25.812-1, Floor Proximity Emergency Escape Path Marking, was issued September 30, 1985, and provides guidance for use in demonstrating compliance with the requirements for floor proximity emergency escape path markings.

AC 25.853-1, Flammability Requirements for Aircraft Seat Cushions, was issued September 17, 1986. This AC provides guidance for demonstrating compliance with the regulations pertaining to flammability or aircraft seat cushions and also defines certain terms used in the FAR in the context of these regulations.

AC 25.939-1, Evaluating Turbine Engine Operating Characteristics, was issued March 19, 1986. This AC provides guidelines for the evaluation of turbine engine (turbojet, turboprop, and turboshaft) operating characteristics for subsonic transport category airplanes. These guidelines are derived from FAA experience in establishing compliance with the airworthiness requirements, and represent the means and methods found to be acceptable by that experience. The guidelines described in this AC may not be entirely applicable to all

airplane designs; thus, each design should be examined to determine whether the suggested methods of evaluation are adequate or if other additional methods may be appropriate.

AC 25.994-1, Design Considerations to Protect Fuel Systems During a Wheels-Up Landing, was issued July 24, 1986. The guidelines in this AC pertain to protecting fuel system components located in the engine nacelles and the fuselage from damage which could result in spillage of enough fuel to constitute a fire hazard as a consequence of a wheels-up landing on a paved runway.

AC 25.783-1, Fuselage Doors, Hatches, and Exits, was issued December 10, 1986. Guidance information is provided for showing compliance with structural and functional safety standards for doors and their operating systems.

#### PROPOSED ADVISORY CIRCULARS

AC 25-XX, Airworthiness Criteria for the Approval of Airborne Windshear Warning Systems in Transport Category Airplanes, is a proposed AC concerning certification of airborne windshear warning systems. The guidance in this AC addresses system design aspects, functions, characteristics, and the criticality of system failure cases. Although not limited to a specific technology, the guidance criteria is directed toward systems which inherently depend upon the airplane to enter a windfield and suffer some degree of performance degradation in order to detect and annunciate a windshear condition. A Notice inviting public comment on the proposed AC was published in the Federal Register on December 31, 1986 (51 FR 250). The comment period closes April 30, 1987.

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## NOTICES AND DIRECTIVES

Notice 86-11, Improved Seat Safety Standards, was issued on July 10, 1986. It announces the FAA's intent to upgrade the standards for occupant protection during emergency landing conditions in transport category airplanes by revising the passenger restraint requirements and impact injury criteria. Notice 86-11 was published in the Federal Register on July 17, 1986 (51 FR 25982), and the comment period closed January 14, 1987. Comments are currently being reviewed.

Also published with Notice 86-11 was a request for comments on two related advisory circulars: AC 21-YY, which addresses analytic methods in impact dynamics; and AC 25.562-1 (Dynamic Evaluation of Transport Airplane Seats), which describes the FAA's crashworthiness program for transport airplanes and provides information and guidance for showing compliance with the standards applicable to dynamic testing of airplane seats. The comment period for the proposed AC closed January 14, 1987. However, at the request of certain industry groups, the comment period was reopened February 2, 1987 (52 FR 3191), and this comment period closes July 14, 1987.

Notice 86-5, Independent Power Source for Public Address System in Transport Category Airplanes, was issued May 19, 1986. It proposes to amend the Airworthiness standards for transport category airplanes and the operating rules for air carrier and air taxi operators of such airplanes, by requiring an independent power source for the PA system. Notice 86-5 was published in the Federal Register on May 27, 1986 (51 FR 19140). The comment period closed November 24, 1986. Comments have been reviewed, and a final rule is now being drafted.

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# FINAL RULES

Amendment No. 25-60, Fire Protection Requirements for Cargo or Baggage Compartments, was issued by the Administrator on May 19, 1986. It was published in the Federal Register on May 16, 1986 (51 FR 18236), and became effective on June 16, 1986. This amendment upgrades the fire safety standards for cargo or baggage compartments in transport category airplanes by establishing new fire test criteria and by limiting the volume of Class D compartments. This amendment is the result of research and fire testing, and is intended to increase airplane fire safety.

Amendments 25-61 and 121-189, Improved Flammability Standards for Materials Used in the Interiors of Transport Category Airplane Cabins, were issued by the Administrator on July 10, 1986. They were published in the Federal Register on July 21, 1986 (51 FR 26206) and became effective on August 20, 1986. The FAA requested any additional comments on the final rule to be submitted by January 21, 1987. These amendments upgrade the fire safety standards for cabin interior materials in transport category airplanes by: (1) establishing new fire test criteria for type certification; (2) requiring that the cabin interiors of airplanes manufactured after a specified date and used in air carrier service, comply with these new criteria; and (3) requiring that the cabin interiors of all other airplanes type certificated after January 1, 1985, and used in air carrier service, comply with these new criteria upon the first replacement of the cabin interior after a specified date. These amendments are the result of research and fire testing and are intended to increase airplane fire safety.

On February 4, 1987, the Director of the FAA Northwest Mountain Region issued a Notice to reopen the comment period on this final rule. This Notice was published in the Federal Register on February 20, 1987 (52 FR 5422). The comment period closes April 21, 1987. The reopening of the comment period resulted from industry request for additional time in which to review the results of a recently conducted third series of round robin tests. These tests were conducted to determine whether certain refinements in the apparatus and procedures would improve the repeatability of test results.

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## General News

### AEROSPACE RECOMMENDED PRACTICE (ARP) 1834

In August 1986, the Society of Automotive Engineers released Aerospace Recommended Practice (ARP) 1834, which addresses fault and failure analysis for digital systems and equipment. This ARP augments RTCA/DO-178A for digital equipment, and it represents an ongoing effort by the FAA to encourage industry groups to prepare guidance material which could be used in the aircraft certification process.

While DO-178A provides guidance to develop quality software, ARP 1834 is oriented toward providing general guidance for the selection, approach to, and performance of various kinds of fault and failure analysis (F/FA) of digital equipment. This document is directed toward the analysis of line replaceable units, rather than toward a comprehensive analysis of systems.

ARP 926A, "Fault/Failure Analysis Procedures," addresses the application of F/FA methods to parts, components, and systems which are essentially analog in nature. ARP 1834 was developed as a separate document to address digital F/FA and to recognize:

- the expanding use of digital hardware in commercial, military, and consumer products;

- the need to apply F/FA procedures to digital devices, components, and systems; and

- the distinctive characteristics of digital equipment which have unique potential failure modes which, if not recognized and designed for, can result in either excessive downtime or erroneous output, sometimes with severe ramifications.

ARP 1834's primary objective is to provide credible results in identifying, analyzing, and documenting digital equipment failure modes and their effects using industry acceptable methods which are cost effective. However, it is not intended as an exhaustive treatment of the enormously complex process involved in the analytical failure evaluation of complete digital systems, nor as a universally applicable and comprehensive description of such an evaluation.

As with RTCA/DO-178A, when ARP 1834 is used as an aspect of an FAA certification program, early coordination with the FAA should be initiated to establish the scope and level of effort that would be required. Specific applications of the F/FA processes discussed in the document (and others possibly omitted) should be negotiated on a case-by-case basis. For systems that are performing critical or essential functions, it may not be possible to demonstrate compliance with safety and certification requirements without the use of design techniques aimed at producing a fault tolerant system.

A goal for these design techniques is the reduction or possible elimination of the need for part level failure mode and effects analysis. The depth of the F/FA required to show compliance would be strongly influenced by such design techniques.

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#### TRANSPORT AIRPLANE REPAIRS

Following the August 12, 1985, Japan Airlines B-747 accident in Japan, the National Transportation Safety Board issued several recommendations concerning the repair of primary structure on transport category airplanes. Specifically, it recommended that the FAA emphasize to persons responsible for the engineering approval of repairs that the approval should adequately consider the repair's influence on ultimate failure modes or other fail-safe design criteria.

The primary structure of modern transport airplanes incorporates fail-safe and damage-tolerant design features which ensure that damage will be detected before reaching unsafe dimensions. The design is such that damage will be detected by scheduled inspections, or it will be obvious on the flight on which it occurs. It is crucial that these design features be retained when repairs are incorporated. Repairs to primary structure should be design consistent with the fail-safe or damage-tolerant characteristics of the basic structure.

It is, therefore, recommended that all designees who are authorized to approve structural design data for transport category airplanes confer with structures personnel in your cognizant ACO prior to submittal of such repair design data.

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### FAA-APPROVED DATA

The following is extracted from FAA Action Notice A8110.7, dated November 18, 1986, and is provided for your information:

Recent indepth inspections of selected air carriers, which included engineering participation, have revealed a widespread practice of completion of major repairs and alterations without technical data approved by the FAA. There appears to be a lack of clarity with regard to what constitutes "technical data approved by the Administrator."

Major repairs and major alterations are required to be accomplished in accordance with technical data approved by the Administrator. The approval of the repair or alteration data should be accomplished by FAA personnel, a designated engineering representative (DER) with authorization in the necessary engineering discipline, or a designated alteration station (DAS) for major alterations. All approvals should be based on substantiating data.

A holder of an authorization issued under Special Federal Aviation Regulation (SFAR) No. 36 may approve an aircraft, airframe, aircraft engine, propeller, or appliance for return to service after accomplishing a major repair, even though the data is not specifically approved by the Administrator, if the data used for the repair was developed by that certificate holder in accordance with an authorization issued under SFAR 36.

Major repairs were found that had been approved on the basis of information from the manufacturer indicating that it regarded the design to be acceptable, but without specifying that the design and appropriate substantiating data were FAA approved. In addition, manufacturers' service documents were found which contained major repair or alteration data that were not designated as FAA-approved but had been

treated as approved data. Engineering change orders and other documents used by air carriers containing major repair data issued by persons not authorized to approve major repair data have also been treated as approved data. Informal agreements from the manufacturer or other organizations without indicating FAA approval does not satisfy the requirement for technical data approved by the Administrator.

Data such as stress analysis, damage tolerance assessment, or process specification used to substantiate a major repair or alteration to primary structure can only be approved by:

- an Aircraft Certification Office (ACO);
- a DER with authorization in the necessary engineering discipline;
- a DAS, when accomplished by an STC; or
- a repair station or air carrier, air taxi, or commercial operator authorized under SFAR 36 (major repair only).

All approvals must be based upon substantiating data, which should be retained by the approving person or organization and, in the case of DER approvals, submitted to the ACO which appointed the DER.

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### DER INSTRUCTIONS CONCERNING APPROVAL OF TECHNICAL DATA

A designee must, with respect to the technical data, assure that the cognizant Aircraft Certification Office (ACO) has established the certification basis (specific regulations and special conditions), the design criteria, and pertinent standards, procedures, and policies which will apply to the certification program.

Within the established scope of appointment, a designee may be authorized to approve technical data or to perform other functions when they are concerned with eventual issuance or amendment of a Type Certificate or a Supplemental Type Certificate, or the accomplishment of alterations and repairs.

Designees must obtain authorization for the cognizant ACO prior to conducting or witnessing official tests and approving test data. When obtaining this prior authorization, it must be thoroughly understood whether such tests are to show compliance with specific certification requirements or to collect test data as part of the overall substantiation effort. A conformity inspection of the test article must be accomplished prior to conducting type certification tests.

When a designee is requested by an applicant to assist in obtaining a Supplemental Type Certificate, the designee, through discussion with the applicant and by examination of the actual modification or data describing the proposal, determines the complexity of the the modification. The applicant, in all cases, should be informed regarding the probable approval process, including the conduct of engineering tests and flight tests, the submittal of engineering data, the possible need for formal Type Certification Board Meetings, and, on complex programs, that early meetings with the FAA are advisable.

A designee may act in his capacity as a DER in any FAA region. When a designee has a client who is located outside his supervising region, the designee must contact the cognizant ACO in the geographical area in which the client is located, and outline plans for submittal of FAA Form 8110-3 to his supervising region for information purposes so that an accurate record of his activities may be maintained.

Designees may be called upon to process "one time only" approvals. The substantiation of "one time only" approvals is no different from other approvals. Data is necessary to completely describe the modification. However, it need not be in the form of production drawings; accurate sketches, marked photographs, etc., which positively identify and location the modification, will suffice.

If you have any questions concerning the foregoing instructions, please contact your cognizant ACO.

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#### AIRWORTHINESS AUTHORITY

During recent weeks, several situations involving the improper export of parts by Manufacturing Designees have been discovered. The situations have involved the execution of Airworthiness Approval Tags, FAA Form 8130-3, for parts not manufactured under an FAA production approval. The designees in these situations had the parts presented to them because of a request for FAA tags by the purchaser. The designees apparently misunderstood the limits of their authority and issued the approval tags, based upon the rationalization that the parts were built to the same quality standards used for FAA-approved parts.

If you are working as a Manufacturing Designee, please periodically review the current parts listed on your organization's production approval. Your authority to issue FAA airworthiness approvals begins and ends with your organization's current FAA production approval. If you have any questions on this subject, please contact your managing office for detailed guidance.

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## DER AUTHORITY IN FOREIGN COUNTRIES

The FAA Office of Airworthiness issued a memo on June 2, 1986, revising DER guidelines as follows:

- DER's must assure themselves that their activities are not in conflict with the laws of the foreign countries.

- DAR's may be used to conduct conformity inspections leading to the issuance of an STC on U.S. type certificated aircraft located in foreign countries when authorized by their managing office and their activity can be monitored or supervised without posing an undue burden on the FAA.

- The DER must coordinate involvement in a project with the project engineer in the ACO where the STC application has been made, any DAR(s) used, and advised the DER's appointing office of each activity.

- DER's may be authorized to engage only in activities leading to the issuance of an STC on a U.S.-certificated aircraft.

- A letter from the Airworthiness Authority of the country of registry (addressed to the FAA Manager of the ACO) must be submitted as part of the STC application, stating that the Airworthiness Authority has no objections to representatives of the FAA making findings of conformity or compliance on the aircraft of their registry in their country.

- The project DER must meet with the ACO as an initial step in the project to determine that the DER's/DAR's proposed for the project have knowledge of the aircraft type design, as necessary, to make findings of data compliance as a DER, and establish conformity as a DAR in the foreign country.

- A DER may be authorized to prepare data that demonstrate compliance with the FAR's, and to determine that the data and the product comply with the FAR's. The DER can indicate this determination and approval on FAA Form 8110-3, which is then submitted to the ACO where the STC application has been made, with a copy to the appointing ACO for review as deemed necessary.

- The ACO where the STC application has been made must make itself aware of the designee's limitation. More than one designee may be necessary to cover the entire project. Therefore, the applicant for the STC is responsible for identifying how each aspect of the project is to be approved, so that the ACO can fully determine the extent of its involvement.

- A DER does not have the authority to grant "field approval" for return to service, to sign an FAA Form 337, or to issue an STC.

- A DER is not authorized to grant data approvals by signing logbooks, aircraft flight manuals, or other similar documents.

In addition, all policy, guidance, and procedures in FAA Orders 8110.4 and 8110.37, Advisory Circular 183.33, and other documents applicable to a domestic TC or STC project involving designees, are still applicable in this case.

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## CONFORMITY INSPECTIONS

Conformity inspections are concerned with determining that the materials, parts, processes, heat treatment, fabrication, procedures, installations, etc., conform with the approved technical data. The results of conformity inspections must be submitted prior to the start of FAA tests; traceability of

the product is essential. Where DER's are involved, it is accepted practice to conduct conformity inspections utilizing DER approved technical data.

However, there have been recent cases of DER's witnessing tests in the field, wherein the product/specimen did not have 8130-3 conformity inspection tags attached. This has been found on many types of tests, including flammability and fire blocking tests. The DER then notifies the manufacturer that the product/specimen passed the FAR requirements. This misleads the manufacturer into believing that he has an FAA approved product. In the case of the fabric manufacturers, they advertise their product/specimen for sales as "FAA approved." The FAA is then placed in an awkward position of having to notify the manufacturer that, since the product/specimen has not been FAA conformity inspected and cannot be traced back to production lots, FAA approval cannot be granted.

For further information regarding conformity inspection procedures, refer to FAR 21.33, the Type Certification Handbook (FAA Order 8110.4), and your cognizant ACO's Manufacturing Inspection Branch Manager:

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#### DESIGNATED ALTERATION STATION

Designated Alteration Station (DAS) authorization procedures were promulgated to alleviate delays that modifiers of aircraft and aircraft components were experiencing in obtaining supplemental type certificates (STC) under the normal FAA approval procedures. Under the DAS system, an eligible domestic repair station, air carrier (except an air taxi operator), commercial operator of large aircraft, or manufacturer may

hold a DAS authorization. A DAS authorization holder has, within certain limits, the delegated authority of the Administrator to issue STC's which are official FAA design approvals for aircraft, aircraft engines, and aircraft propellers which have undergone major changes in type design. The DAS also has authority to issue experimental certificates of airworthiness for aircraft undergoing supplemental type certification. In addition, the DAS is authorized to issue amended standard airworthiness certificates for aircraft which incorporate alterations covered by an STC issued by the DAS.

Advisory Circular (AC) 21.431-1A, "Designated Alteration Station Authorization Procedures," dated December 19, 1985, is available. It updates the FAA's DAS authorization program; provides acceptable means of compliance with the DAS eligibility, personnel qualifications, and procedural requirements; provides information of FAA's participation in design change approval projects conducted under DAS procedures; and describes the FAA's DAS audit procedures.

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#### DAR/DMIR/DOA/DAS STANDARDIZATION COURSE SCHEDULE IDENTIFIED

FAA Order 8000.60A contains a listing of the tentative locations and dates for the Phase II DAR/DMIR/DOA/DAS Standardization Course for 1987 and 1988. The order is available for review at your managing office. A review of the schedule will allow you to determine which location and time will meet your scheduling requirements. When you have selected your preferred session and have arranged to attend it, please remember to bring your current copy of FAR Part 21 and Order 8130.2B to the course.

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SPACE AGE TECHNOLOGY TO AID  
VICTIMS OF AIRCRAFT ACCIDENTS

In 1970, Congress amended the Federal Aviation Act of 1958 to require installation of emergency locator transmitters (ELT) on most U.S.-registered aircraft to aid search and rescue efforts for downed aircraft.

Since then, ELT's of various types have been developed as a means of locating downed aircraft. These electronic, battery operated transmitters emit a distinctive downward swept audio tone on radio frequencies of 121.5 Mhz and 243.0 Mhz. If installed correctly and subjected to external forces generated by a crash, they are designed to automatically activate and continuously emit these signals. The transmitters will operate continuously for at least 48 hours over a wide temperature range. This automatic activation and continual operation can expedite search and rescue operations and save lives by allowing homing devices both in aircraft and on the ground to identify the crash location.

Previously developed ELT's continue to have problems which result in false alarms, failure to activate under certain conditions caused by poorly functioning activation switches, and battery failures. Accidental or unauthorized activation will generate an emergency signal that cannot be distinguished from an actual aircraft accident or an aircraft parked at the airport, which leads to expensive and frustrating searches. A false ELT signal could also interfere with genuine emergency transmissions and hinder or prevent the timely location of crash sites. Frequent false alarms could also result, unfortunately, in complacency and decrease the vigorous reaction that must be attached to all ELT signals.

In April 1985, the FAA adopted RTCA Document 183 into the TSO-C91a performance standards that were developed to alleviate these problems associated

with the previous design requirements. The major improvements involve the conditions needed to activate a distress signal, and the improved transmitted signal quality to aid in search and rescue satellite (SARSAT) detection.

The improvement for an ELT to activate in an actual aircraft accident will reduce nuisance and undesired emergency signals, while improving the probability to activate when required. The possibility of launching unnecessary search and rescue missions will be reduced. The improved output signal spectrum will provide a faster and more accurate detection and location by means of satellites in earth orbit. ELT's are not only detected by U.S. satellites, but the Soviet Union has an agreement with the U.S. to report the location of transmitted signals received by their satellites.

The FAA's Seattle Aircraft Certification Office has recently approved the first Emergency Locator Transmitter (ELT) to meet the performance standards that were adopted in April 1985. Arnav Systems, a manufacturer of avionic equipment, located in Portland, Oregon was granted approval was granted on October 30, 1986, for their Model ELS-10 ELT. The Arnav ELT has the standard satellite detection with additional features. These additional features, which are not required by the FAA, include a synthesized voice generated message which provides the aircraft identification number and the time (in hours and minutes) when the ELT was activated. If the ELT is interconnected with a Loran-C receiver, it will transmit by synthesized voice the latitude and longitude of the ELT distress signal recorded just prior to the crash.

The FAA is now in the planning stages for rulemaking to implement TSO-C19a, with the consideration to require that all new ELT installations meet TSO-C91a standards, and to upgrade existing ELT's.

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# Special Topic

## CONFUSED ABOUT TYPE CERTIFICATE NUMBERS?

With type certificates (TC) issued by about a dozen different offices in at least a dozen and a half numerical series over the past sixty years, it's no wonder there has been some confusion about exactly what their numbers stand for. Actually, there has been a degree of logic used and, by knowing the TC number, one can identify which office originally issued the certificate and the approximate time it was issued.

During the early years of type certification, the system was simple. Although type certification programs were administered by the local offices, all TC's were issued by Washington Headquarters. Furthermore, "airplanes" were the only form of "aircraft" around that time. A simple numerical series, beginning with "1," was sufficient. These early certificates were originally known as "approved type certificates;" the "approved" was later dropped — the word was obviously redundant!

Later, TC's were issued for engines, propellers, and even equipment items (such as radios, floats, skis, etc.). Engines and propellers received numbers from separate series, beginning with "E-1" and "P-1", respectively.

Less than two years after type certification began, it became apparent that a way to handle non-standard, but nevertheless fully airworthy, airplanes was needed. These included prototype airplanes, modified airplanes, etc. These types of craft were given numbers from a new series prefaced with "2-," and were referred to as "Group Two Approvals."

By the end of World War II, the government was burdened with large stocks of airworthy military surplus aircraft; at the same time, there was an acute shortage of civil aircraft. The holders of TC's for corresponding civil models were encouraged to seek amendments to their type certificates to include the military models. For example, Douglas' type certificate No. 669 was amended so that military C-47's could be flown as civil DC-3C's.

For other airplanes, some unusual steps were taken. First, the FAA (then known as the CAA) set up its own test facility at Bush Field, Georgia. Airplanes found to comply fully with the prevailing type certification requirements were granted Group Two Approvals. For example, Approval No. 2-582 was given to Beech AT-11 airplanes.

For other airplanes, a new "limited" category was established. Limited category type certification was based on a satisfactory military service record rather than compliance with regulations, per se. Airplanes certificated in the limited category enjoyed most of the privileges of standard category airplanes, except that they could not be used for compensation or hire. A new numerical series of type certificates beginning with "L-1" was established for these aircraft. After two or three years, however, the need for limited category type certification passed, and it was withdrawn.

Rotorcraft also came on the aviation scene, and their type certificates were given a numerical series beginning with "H-1." Similarly, separate numerical series were used for gliders, balloons, and restricted category aircraft.

Prior to about 1949, all TC's were issued by FAA Washington Headquarters. Later, the responsibility for the issuance of TC's for domestic models was decentralized to the Regions. The simple numerical sequence for

identifying TC's was no longer practical, and new systems were established for each certificating Region.

The six Regions existing at that time were identified by numbers, One through Six, rather than names. Each Region had its own type certificate number series beginning with "1". Examples:

- "4A21" was the 21st type certificate issued by Region Four for an airplane model.

- "2H3" was the 3rd type certificate issued by Region Two for a helicopter model.

Type certificates for foreign aircraft were issued by Washington Headquarters for another nine years, so the original numerical series remained in use for those aircraft through 1957. (The last number issued in the original series was No. 817, issued in 1957 for the Fokker F27.) Eventually, the responsibility for the issuance of TC's for foreign aircraft was turned over to the Paris Office (predecessor of the European Region, now headquartered in Brussels):

In the 1960's, when the Regions received names, a third system of type certificate numbering was adopted, with a two-letter code reflecting the Regional names. Examples:

- "A16WE" was the 16th type certificate issued for an airplane model by the Western Region, after its name was changed from Region Four.

- "A35EU" was the 35th type certificate issued for an airplane model by the European Region after its name was changed.

Some of the two-letter codes once used have become obsolete. The Paris Office (IN) became the European Region (EU); and the Southern (SO), Eastern (EA), Great Lakes (GL), Western (WE), and

Pacific (PC) Regions lost authority to issue type certificates as a result of the Directorate system. Also, the Northwest (NW) and Rocky Mountain (RM) Regions were combined to form the Northwest Mountain (NM) Region. Other codes currently in use are CE (Central Region), SW (Southwest Region), and NE (New England Region).

Once issued, TC's always retain the same number, even though the TC may be sold to someone in another Region, or the TC holder may move to another Region.

One might think that the rate of type certificate issuance would have increased dramatically as aviation expanded. Actually, this has not happened because TC's are generally amended today to include follow-on models. During the early days, however, new TC's were issued for such minor changes as alternate engine installations:

The exact number of TC's issued over the past sixty years is not actually known and would be difficult to calculate. All of the equipment TC's, for example, have faded into obscurity. There have been at least 1,200 TC's issued for powered airplanes alone, and that number would probably more than tripled if we include the number issued for rotorcraft, gliders, balloons, engines, propellers, and equipment, as well as the Group Two Approvals.

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#### NOTE FROM THE EDITOR

If you would like a copy of any of the previous editions of the Northwest Mountain Region's Designee Newsletter, please submit your request to:

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The Transport Airplane Certification Directorate currently has a number of vacancies at the GS-5 through GS-13 levels (\$19,268 to \$50,346 per annum) for qualified aerospace engineers in the following specialties: airframe, systems and equipment, propulsion, flight test, and modifications.

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