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DESIGNEE NEWSLETTER

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Aircraft Certification Service; Northwest Mountain Region
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Douglas Model DC-3

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The purpose of The Designee Newsletter is to provide designees with the latest information concerning regulations, guidance material, policy and procedures changes, and personnel activities involving the certification work accomplished within the Transport Airplane Directorate's jurisdictional area. Although the information is the latest available at press time, it should not be considered "authority approved" unless specifically stated; neither does it replace any previously approved manuals, special conditions, alternative means, or other materials/documents. If you are in doubt about the status any of the information addressed, please contact your cognizant Aircraft Certification Office (ACO), Manufacturing Inspection District Office (MIDO), or other appropriate FAA office.

Summary of Ongoing U.S./Soviet Civil Aviation Activities

The following remarks were delivered by Michael C. Moffet, FAA's Assistant Administrator for Policy, Planning and International Aviation, at a 1991 U.S./U.S.S.R Aerospace Conference held on April 9, 1991:

It is a pleasure to speak before this distinguished and important gathering of executives and technical officials from U.S. and Soviet aviation industries. First I would like to convey **Administrator Busey**'s personal best wishes to all for a successful conference, and to our Soviet colleagues for a most worthwhile visit to the United States. Administrator Busey has met with **Minister of Aviation Industry Systsov** and with **Minister of Radio Industry Shimko**, and looks forward to meeting with **Chairman Mashkivsky** of the State Supervisory Commission for Flight Safety. The Administrator has been pleased to learn of the aircraft certification system that exists in the Soviet Union and of the many U.S/Soviet joint aviation and aviation electronics ventures now in progress or under consideration. He also knows of, and supports proceeding with, the Government-to-Government exploratory steps needed to facilitate airworthiness approvals for the import and export of aircraft and other aeronautical products between our two countries.

I'd like first to mention some important U.S./Soviet civil aviation cooperative efforts, in which our respective aviation or aviation electronics industries are -- or soon will be -- involved. I'd also like to highlight the need to establish a better means of communication between the FAA and the broader Soviet Union civil aviation community.

Some of you may know that technical cooperation between the FAA and Soviet counterparts has been underway for a long time. In the early 1970's, the FAA began establishing those ties on important air navigation issues with the Ministry of Civil Aviation and with leading elements of the Soviet Union's air navigation industry. Those links between our civil aviation organizations have been enriched by more than 15 years of genuine technical interchange, through bilateral technical cooperation, and through careful advance coordination during our joint participation on technical panels of the International Civil Aviation Organization (ICAO).

One outcome of this cooperation is strong U.S. and Soviet support of the standards adopted by ICAO for major air navigation systems, such as Microwave Landing and Airborne Collision Avoidance Systems. Another outcome is an obvious and genuine desire to work together to help shape the future global airspace and air traffic system, as witnessed by the well-attended annual international symposia on Aviation in the 21st Century which the FAA and the Ministry of Civil Aviation have co-sponsored the past three years in Cambridge, Moscow, and Paris.

An interesting by-product of this longtime cooperation is the recent announcement that the AUSRIRE Institute in Leningrad is teaming with the U.S. Norden Corporation, in competition with other manufacturers, as contenders for a planned FAA purchase of new microwave landing systems. Not long ago, such an arrangement would have been no less likely than the idea of AEROFLOT operating Western European Airbus aircraft powered by General Electric engines from the United States.

Meanwhile, the FAA is also working with the State Supervisory Commission for Flight Safety, headed by **Chairman Ivan Mashkivsky**, and with the Ministry of Civil Aviation to strengthen U.S./Soviet coordination in the fields of aviation security, accident investigation, aviation medicine and human factors. We are making progress in normalizing procedures for assessing aviation security arrangements at the U.S. and Soviet Union airports to be served by our respective airlines. We are delighted with recent exchanges on the subjects of accident investigation and of aviation medicine and human factors, which have occurred since conclusion of the 1988 U.S./U.S.S.R. Transportation Cooperation Agreement.

Of perhaps even greater longtime significance to our airline industries is the FAA's work with the new U.S.S.R. State Commission for Air Traffic Control and Airspace Usage, headed by **Marshall Yefimov**. One goal of cooperation between the FAA and the Commission is to technically facilitate the expanded air service between our two countries, which was agreed to in the new Air Transport Agreement signed at the 1990 Summit in Washington. I understand that this agreement is expected eventually to triple the number of air travellers between our two countries.

Another important goal of cooperation -- between the FAA, the new State ATC Commission, and the Ministry of Civil Aviation -- is to open shorter, more efficient, great circle air routes between North America and Far East points through Soviet, Far East, Chinese, and Japanese airspace. The international airline industry wants to use these routes just as quickly as possible, preferably later this year. Familiarization exchanges of U.S. and Soviet air traffic controllers have already begun, and we are working with the airlines to soon begin expanded English language training programs for Soviet Far East air traffic controllers. On April 4, Northwest Airlines began demonstration training flights over a Soviet Far East air route, using a Boeing 747 cargo aircraft equipped with U.S. and Soviet satellite navigation receivers, along with the standard Inertial Navigation System. We at the FAA hope that the controller familiarization exchanges, English language training programs, and Northwest's demonstration program will facilitate the early opening of more efficient international air routes through Soviet Far East airspace -- for use by all interested international airlines. [*NOTE: As of press time, Northwest Airlines has started regular service to two cities in the U.S.S.R. via a great circle route.*]

Administrator Busey and **Marshall Yefimov** have already exchanged letters of support for a strong working relationship between the FAA and the new State ATC Commission, and FAA and Commission staff are already hard at work. We are especially pleased that, in establishing the State ATC Commission, the Soviet Union is moving toward an integrated civil/military air traffic control and airspace system. This is a vital step, in our view, to provide the system capacity to accommodate future growth in air travel through the Soviet Union. We look forward to the commission soon receiving the necessary authority from -- from the Soviet Government -- to permit us to continue joint technical efforts with our Chinese and Japanese colleagues to open new Asia-Pacific air routes and to encourage still greater growth in air travel.

Looking ahead, this expansion in air transportation and air travel -- throughout the vast reaches of the Soviet Union's airspace -- should facilitate industrial growth,

increase tourism, and generate expanded revenues to support modernization of the overall Soviet air traffic control system. Needless to say, that same growth will create a demand for more transport aircraft...

Let me now turn to what I believe to be one of the most exciting developments underway in international aviation. This is the cooperative U.S./U.S.S.R. effort to expedite the worldwide availability of satellite navigation. With strong U.S. and Soviet support, the International Civil Aviation Organization's Future Air Navigation Systems (FANS) Committee has already developed a recommended concept for a Global Navigation Satellite System (GNSS). Later this month [April 1991], the FANS Committee is expected to propose minimum operational availability criteria for any satellite navigation systems which may be proposed by ICAO Member States to fulfill the FANS concept.

"As civil aviation relations expand, so does the necessity of facilitating good communication and a fuller understanding of each other's evolving civil aviation systems."

In September [1991], ICAO will convene a worldwide Air Navigation Conference of all ICAO Member states to consider endorsement and implementation of the overall Future Air Navigation System concept, including implementation of a worldwide Global Navigation Satellite System. At that conference, the governments of the United States and Soviet Union will have an opportunity to advise all ICAO countries whether our respective satellite navigation systems -- the U.S. Global Positioning System (GPS) and the Soviet Union's Global Orbiting Navigation Satellite System (GLONASS) -- will satisfy ICAO criteria to become elements of a Global Navigation Satellite System. [*See article on these systems on p. 32 of this edition.*]

As many of you know, experts believe that the global signal coverage which can be provided by the U.S. GPS and the Soviet GLONASS systems will allow for a very precise, worldwide navigation capability. Satellites have the potential to revolutionize the navigation capabilities and navigation precision which will be available -- worldwide -- for civil aviation and for other modes of transportation. Worldwide access to civil signals from both GPS and GLONASS could bring the significant safety, system capacity, and cost benefits of satellite navigation to areas of the world which cannot afford a land-based navigation system, and could do so well before the end of this decade.

I hope this far-from-complete summary of ongoing U.S./Soviet civil aviation activities conveys to you a sense of the need for closer, real time relations among our organizations. As civil aviation relations expand, so does the necessity of facilitating good communication and a fuller understanding of each other's evolving civil aviation systems. Therefore, I ask representatives of U.S. and Soviet civil aviation entities to give serious thought to how we collectively can establish better communication between U.S. and Soviet Union civil aviation organizations. You should also make diplomatic officials aware of the vital importance of civil aviation to future economic and political relations between the U.S. and the Soviet Union -- and of the need for our diplomatic colleagues to attend to this important aspect of U.S./U.S.S.R. relations.

Finally, let me turn to the matter which is undoubtedly of greatest interest to this audience -- that of reciprocal airworthiness certification for aircraft and other aeronautical products produced by our respective manufacturers and under Soviet/U.S. joint ventures. Until recently, U.S./Soviet political differences severely limited government and industry cooperation in the field of high technology civil aircraft and engine design, certification, production, operation, and maintenance. The political progress already made by **Presidents Gorbachev and Bush** now makes it possible for our industries to consider a wide range of joint development and production ventures. It also makes it possible for the U.S. and Soviet governments to explore the feasibility of a bilateral airworthiness agreement for the reciprocal airworthiness certification of aircraft and other aeronautical products for import and to work cooperatively with the aviation safety regulatory authorities of other technologically advanced countries to promote safety in the international air transportation system.

We've made a good beginning. We appreciate that our Soviet colleagues accepted the invitation last summer to participate in the annual standards harmonization meetings between the FAA and the European Joint Aviation Authorities. Following those meetings, a discussion took place at FAA Headquarters on the next steps to take in U.S./U.S.S.R. airworthiness relations. And this past weekend, a top-level aircraft certification team headed by **Anthony Broderick**, Associate Administrator for Regulation and Certification, returned from a very successful visit to the Soviet Union. [*See article on this visit beginning on p. 11 of this edition.*]

As we move ahead on this process, we should not underestimate the challenges that may lay before us. Unfortunately, the U.S. and Soviet governments have had virtually no past relations in the area of airworthiness certification. The Soviet and U.S. regulatory systems for aircraft certification have developed independently of each other over the past several decades. We in the FAA are only just now becoming completely familiar with the fundamental certification procedures and standards of the Soviet Union. This contrasts with the situation with our Canadian, Western European, and Australian counterparts, with whom we have been working closely for four decades on reciprocal airworthiness certification efforts. Therefore, at the outset of these exploratory talks, we need to continue the significant progress made in the past two weeks in Moscow. We can do that in several ways:

- **By developing a mutual understanding of each other's governmental structure and responsibility assignments for initial airworthiness certification and for assuring the continuing airworthiness of in-service aircraft and other aeronautical products;**
- **By developing a better understanding, within the FAA, of the fundamental relationships between the Soviet government aviation authorities and the Soviet design bureaus and production facilities;**
- **By developing interim alternatives under which the FAA and our Soviet government counterparts can perform their important tasks; and**
- **By working in cooperation with national aviation authorities in other countries to promote the safety of the international air transportation system**

....We are working to better understand the Soviet Union's airworthiness standards and certification organizational structure, the distribution of certification authority and responsibility among Soviet organizations, and the relationship of Soviet regulatory agencies to the Soviet Union's aviation manufacturing industry. Those structures and relationships, like Soviet airworthiness standards, are different from our own and from those of other Western countries. Nonetheless, we believe that there is sufficient similarity for our two governments to continue the exploratory process towards a bilateral airworthiness agreement.

FAA's Aircraft Certification Service Director **Craig Beard** recently accepted applications for FAA Design Certification of the Tupolev Model TU-204-200 and the Ilyushin Model IL-96M. Because of limits on FAA manpower resources, and in accordance with **Minister Systsov's** advice, the TU-204-200 will be given first priority, and a TU-204-200 design review will be scheduled for next month. Let me add that FAA Design Certifications could only be issued after a bilateral airworthiness agreement is concluded between the United States and the Soviet Union.

These joint certification projects are being undertaken as the most practicable means of understanding of each other's national certification standards and regulations -- including how standards are applied in the U.S. and in the Soviet Union. In our judgment, this is the best way to evaluate the equivalency of our respective regulatory systems. I think that **Airworthiness Director Beard** expresses it best, and in manufacturing terms, when he describes this process as "*developing the tooling for future relations.*"

This process will be neither short nor easy. However, we need to fully understand the significance of the differences in our two airworthiness certification systems before determining whether the two governments are in a position, from a technical perspective, to conclude a diplomatic agreement for the reciprocal airworthiness certification for the import and export of aircraft and other aeronautical products.

From this summary, I believe you will agree that we are making significant steps in advancing a broad range of mutual civil aviation interests, including the most important task of all -- which is to maintain the confidence of the traveling public in the safety of the international air transportation system. I think that you will also agree that by advancing civil aviation technical interests, we will provide important leadership to the rest of the world. That makes it all the more important that we use the finite resources of our two countries wisely, and that we concentrate on those issues which are of lasting importance. While we, as governments, must be willing to be flexible in order to facilitate aviation growth, we must ensure, first of all, that our safety and security measures are up to the task. The fact is that there can be no longer term progress if we do not maintain public confidence in our aviation systems.

Based upon the results of our efforts so far, I am confident that we share these objectives. ...Let me express our sincere desire to build -- in the field of airworthiness certification -- the relationship that we've long enjoyed in the field of air navigation. In short, let us work to become partners, in the fullest sense of that word, in all areas of civil aviation safety.

Safety Regulation of Civil Aviation: The Beginning and The Future

Following are introductory remarks presented by M. Craig Beard, Director of the FAA's Aircraft Certification Service, on the Aerospace Panel of the "European Business Outlook 1991 Conference" held on May 1, 1991, at the University of Tennessee in Knoxville:

Aircraft certification is an aviation safety regulatory function of the U.S. Department of Transportation, Federal Aviation Administration. Regulation of civil aviation by the Federal Government to promote safety began in the United States with enactment of the Air Commerce Act of 1926, signed into law by President Calvin Coolidge on May 20, 1926. That was sixty-five (65) years ago this month. The main thrust of the Air Commerce Act was "*...to promote air commerce...*"

Unlike the genesis of much of the public health and safety legislation on the books today, the Air Commerce Act was not the result of a public outcry to correct a perceived danger. Rather, it was aviation visionaries of the day who persuaded Congress that a viable national air transportation system ad great potential for providing significant economic and social benefits for the country, and should thus be promoted by the Federal Government. Proponents of aviation and the framers of the Act also wisely recognized that a very high level of public confidence in the safety of the system would first be needed and then maintained. Thus, from the outset, Congress and aviation advocates alike saw that the establishment of a safety regulatory program was an essential prerequisite for promoting air commerce.

The Air Commerce Act provided for the establishment of an Aeronautics Branch under the Department of Commerce, headed by a Director of Aeronautics. The Branch was provided a budget in fiscal year 1927 of $250,000 to administer all its safety regulatory activities. The first "*Air Commerce Regulations,*" were developed by the Aeronautics Branch and became effective on December 31, 1926. These regulations addressed the certification and licensing of aircraft, registration marking of aircraft, aircraft operations, the licensing of pilots and mechanics, and introduced the first air traffic rules. The first civil aircraft to be certificated in the United States was the Buhl-Verville J-4 "*Airster.*" The Airster was certificated by the Aeronautics Branch on March 27, 1927.

These events marked the origin of our present aircraft certification system. The basic precepts of the Air Commerce Act of 1926, as they related to the safety regulation of civil aircraft design, civil aircraft production quality control systems, and to the continued operational safety (or "*airworthiness*") of individual civil aircraft, have been carried forward to the current day, enabling legislation of the Federal Aviation Administration (FAA) -- the Federal Aviation Act of 1958.Today it is unlawful to operate a civil aircraft unless it is registered and that aircraft has a valid airworthiness certificate. The FAA develops and publishes standards that govern civil aircraft design, production quality control, and maintenance practices. Before an airworthiness certificate is issued, an aircraft must be determined to conform in detail to a design that has been previously approved by FAA. The aircraft must be inspected at specified intervals and be maintained in a condition for safe operation for the airworthiness certificate to remain valid. The safety performance of civil

aircraft types is monitored by the FAA, and regulatory measures are taken to assure unsafe situations that may be found to exist are corrected. Most countries have similar systems, and many are patterned after that of the FAA.

"By promoting its safety, we promote the development of air commerce. Unsafe aircraft lack passenger appeal."

The duty to "*promote air commerce*" is still a key provision of our current legislation, and some have found that to be troubling. The Federal Aviation Act states that "*In the exercise and performance of his powers and duties,... the Administrator shall consider...the regulation of air commerce in such a manner as to best promote its development and safety...*" to be in the public interest. We in the Aircraft Certification Service see the charter to both "*promote development and safety*" of air commerce as being complementary, not conflicting, interests. Like two sides of the same coin, you cannot have one without the other. By promoting its safety, we promote the development of air commerce. Unsafe aircraft lack passenger appeal. However, if we were to be divested of the duty to be concerned about the economic impact of our regulatory actions, it would be easy to ensure safety by simply grounding all aircraft. Of course, that is a ridiculous proposition. But the point is made to emphasize that it has only been through an ability to see both economic and safety concerns in balance as complementary concerns that we are able to enjoy the benefits of today's remarkably safe international air transportation system.

Even though the basic legislative language and legal precepts of the aircraft certification system have remained the same for the past 65 years, many things have changed. The most obvious changes have been in the advanced technologies, performance capabilities, and safety enhancements of modern civil aircraft designs. The FAA's aircraft certification standards and practices have likewise evolved to keep pace with these changes and to respond to the public interest of ever higher levels of safety.

There is, however, a less obvious area of significant and accelerating change taking place today; that is, the current trend toward transnational ventures in civil aircraft design, production, and operations.

In 1928 and for at least a decade thereafter, the design, production, and operation of civil aircraft were pretty much confined within national borders. Even after an international air transportation system began to emerge after World War II, the design and production of civil aircraft remained pretty much national in character. Aircraft types operating in the system could be accurately thought of as having a nationality. Boeing 707's were American, Comets were British, Caravels were French, and so forth. Also, national airlines favored aircraft designed and manufactured within their own country or commonwealth, and passengers tended to travel aboard airlines carrying the flag of their own country. That was the environment that existed in 1944 when the Chicago Convention was concluded to facilitate further development of an international air transportation system. It is surprising how many people have retained that paradigm as representative of today's system.

Multi-national joint ventures in civil aircraft design and manufacturing are giving way to transnational arrangements, at least for major transport aircraft and their engines.

The time is clearly in sight -- if it has not already arrived -- when the only airborne elements of the international air transportation system that will have an identifiable nationality will be the individual passengers aboard the aircraft and the registration marks painted on the side of the aircraft, but certainly not the aircraft nor its engines. Even though many sentimentalists might wish to continue to do so, it is becoming more difficult, for safety regulatory purposes, to think in terms of "*country of manufacture,*" or to assign a nationality to an aircraft type based on the ancestral homeland of the manufacturer whose name appears on the aircraft nameplate.

"Every national authority must see itself as a member of an international team, with prime responsibility for a section of the field, but sharing responsibility for total team performance."

What all this means is that, if safety regulation of civil aviation is still important and if the aviation safety regulatory authorities of the world are to continue to meet their responsibilities to the citizens of their country -- and I am talking about those passengers again -- we in the aviation safety regulatory business must work together toward higher levels of international consultation, cooperation, and assistance, staying clear of "*vestigial trade issues*" (leaving those issues to others). Every national authority must see itself as a member of an international team, with prime responsibility for a section of the field, but sharing responsibility for total team performance.

Over the past two decades, the aircraft certification regulatory authorities of a number of Western European and Scandinavian countries have shown remarkable progress toward harmonizing the aircraft certification standards and practices of their community and in developing common Western European airworthiness standards.

I am referring to the authorities that have joined together as the European "*Joint Aviation Authorities (JAA)*" and the European Joint Airworthiness Requirements (JAR) that they have developed and are continuing to develop. The FAA considers this to be a positive development. Progress within the JAA community and the growth of that community has led, in turn, to considerable progress being made between FAA and the JAA members over the past eight years in what has become known as the "*FAR/JAR harmonization effort.*" This is an effort to harmonize U.S. and European safety standards governing the design, production quality control, and continued airworthiness of civil aircraft. Canada and Australia have also participated in this effort from the start, and, within the past year, the Soviet Union and China have begun to participate as observers. Also, the FAR/JAR harmonization effort within the last year has started to expand, as it must, into the harmonization of aviation safety standards and practices pertaining to aircraft maintenance and operations.

New opportunities are developing to reach even further, and we at FAA plan to do so. One might observe that there are essentially three "*core*" aircraft certification standards used in the world today. These are the Airworthiness Standards of the U.S. Federal Aviation Regulations (the FAR's), the Joint Airworthiness Requirements of the European Joint Aviation Authorities (the JAR's), and the Civil Airworthiness

Regulations (CAR's) of the Soviet Gosaviaregistr. Virtually every other country, including those of South America and Asia, having a functional aircraft certification system has either adopted one of these core standards as their national standards or have developed their own standards based extensively on one or a combination of these core standards.

Even though there are significant similarities between the three core standards, significant differences remain. The greatest commonality exists between the U.S. FAR's and the European JAR's because of our past decades of close working relationships culminating in the ongoing FAR/JAR harmonization effort. However, during my recent visit to the Soviet Union, we learned that the Soviets have made the decision to move their standards into closer alignment with the U.S. FAR's. They too are anxious for closer dialogue toward harmonization of their standards with those of the U.S. and Western Europe. A clear opportunity seems now to be developing to promote harmonization of the three core standards of the world.

In designing the framework for the harmonization efforts of the future, we must recognize that, even though other countries may have selected to borrow from one or more of the core standards for their own standards, the aircraft certification professionals of these countries have a valuable contribution to make in the development of new standards and in keeping the old standards up to date with new technologies and the ever-changing operational environment. They too must be included on the team.

It would appear that great opportunities now exist for the aviation safety regulatory authorities of all countries, having an aircraft design and manufacturing industry, to work closer together than has ever been possible in the past toward standards harmonization. The transnational nature of the civil aircraft design, manufacturing, and operations industry makes it imperative that we do.

In closing, let me just state that we in the Aircraft Certification Service consider the traveling public to be our most important customer, and we consider public confidence in the safety of the international air transportation system to be our most important product. Because of the transnational nature of the civil aircraft design, manufacturing, and operations industry, and because citizens of all nationalities travel in aircraft of all registries, we believe to succeed in meeting our national responsibilities we must succeed internationally and do all we can to help our counterpart authorities of other countries to succeed. The aviation safety regulatory authority of every other country faces exactly the same situation.

FAA Meets with U.S.S.R. Counterpart on Airworthiness Certification

April 4, 1991, is a date that will be remembered by the FAA and by the Union of Soviet Socialist Republics (U.S.S.R.) State Supervisory Commission for Flight Safety under the Cabinet of Ministers of the U.S.S.R. (Gosavianadzor). On this date a top level aircraft certification team headed by **Anthony J. Broderick**, FAA's Associate Administrator for Regulation and

Certification, concluded a very successful 10-day visit to the Soviet Union.

The purpose of the FAA visit was to become acquainted with the Soviet regulatory system. The visit was made after:

- **a series of talks in FAA Headquarters last year;**
- **submittal of a U.S.S.R. diplomatic note in December 1990 requesting a bilateral airworthiness agreement (BAA) for the reciprocal airworthiness certification of aircraft and other aeronautical products for import; and**
- **a U.S. government policy decision to pursue a BAA with the U.S.S.R., incrementally with certain basic criteria.**

The visit included discussion of the U.S.S.R. regulatory system with the U.S.S.R. State Aviation Register (Gosaviaregistr), the U.S.S.R. civil airworthiness authority under Gosavianadzor, U.S.S.R. Research Institutes, U.S.S.R. Design Bureaus, and U.S.S.R. Aircraft Production Facilities. The FAA team concluded that, although the airworthiness standards and certification organizational structure, the distribution of certification authority and responsibility, and the relationship between Gosaviaregistr and the Soviet aviation industry are different from the FAA and from those of other leading countries, they are impressive.

Also, the FAA team determined that there are sufficient similarities in the two regulatory systems to begin work toward a BAA. To explore these possibilities further the FAA accepted through Gosaviaregistr an application for FAA design certification of:

- **The Tupolev Design Bureau Model TU-204-200, a high technology, two engine, medium range, 214 passenger aircraft, and**
- **The Ilyushin Design Bureau Model IL-96M, a four engine, long range, 386 passenger aircraft.**

Both aircraft designs will be powered by Pratt and Whitney PW2000 series engines and will be equipped with either Collins or Honeywell avionics, making them the first Soviet aircraft to be equipped with U.S. engines and avionics. Because of limits in FAA manpower resources, and in accordance with **Apollon S. Systsov**, U.S.S.R. Minister of Aviation Industry, the Tupolev Model TU-204-200 will be given first priority. The Tupolev and Ilyushin projects are being undertaken as the most practical means of understanding each others national certification standards and regulations, including how standards are applied in the U.S. and the Soviet Union. This is the best way to evaluate the equivalency of the two regulatory systems. In essence, the FAA and Gosaviaregistr are "*developing the tooling*" for future relations.

There are many challenges that lay before the FAA and Gosaviaregistr in this technical process. The U.S. and Soviet Government have had virtually no past relation in the area of airworthiness certification. The Soviet and U.S. regulatory systems for aircraft certification have developed independent of each other over the past several decades. The FAA is only just now becoming familiar with the fundamental certification procedures and standards of the Soviet Union. This contrasts with the situation with our Canadian, Western European, and Australian counterparts with whom the FAA has been

working closely for four decades in reciprocal airworthiness certification efforts.

Actual FAA design certification of the Tupolev Model TU-204-200 and Ilyushin Model IL-96M aircraft would be issued only after a U.S.S.R./U.S. BAA is realized through an exchange of diplomatic notes.

The FAA and Gosaviaregistr agreed to form a team of technical specialists to begin the formal process at the earliest possible date and to hold top-level program review meetings semi-annually.

Gosavianadzor and the FAA stated that they welcomed the opportunity to work together to better understand each others regulatory system, to develop a relationship on airworthiness certification, to harmonize the U.S.S.R. airworthiness standards with the U.S. standards, and to promote safety of the international air transportation system.

Aviation Rulemaking Advisory Committee

The following was taken from a presentation by Anthony J. Broderick, FAA's Associate Administrator for Regulation and Certification, to the Aviation Rulemaking Advisory Committee, on May 23, 1991, in Baltimore, Maryland:

The FAA was the first Federal agency to initiate and complete a "*negotiated*" rulemaking. That involved flight crew flight and duty time limitations. While that activity was not without difficulties, the FAA and other interested parties from industry together resolved a regulatory issue of several decades standing. That was no small accomplishment and represented the first successful completion of a negotiated or consensual rulemaking completed in modern times.

In establishing the "*Aviation Rulemaking Advisory Committee,*" the process has been taken a step beyond what has been done before: this committee will engage in development of consensual or negotiated rulemaking products spanning the entire scope of the agency's rulemaking activity. Another first!

BACKGROUND

In the Fall of 1989, **Secretary Samuel Skinner** and **FAA Administrator James B. Busey** formed a Departmental Task Force to recommend ways to improve the Administrator's ability to manage the FAA during the period of rapid change in the aviation industry. Before the year was out, the Administrator forwarded to the Secretary recommended management initiatives in the areas of personnel reform, procurement improvement, streamlining the rulemaking process, and other administrative improvements. One of the key initiatives approved by the Secretary was :

"**Establish a standing advisory committee for rulemaking.** Current rulemaking procedures can hamper exchange of information with the public. Creation of a no-cost advisory committee would allow useful information to the gathered expeditiously, particularly for rules that have tight deadlines and those with short public comment periods."

The Secretary approved the charter for the Committee in December 1990, and it was eventually filed with the Congress on

February 5, 1991. With that act, the Aviation Rulemaking Advisory Committee came to life. The Committee and its charter has a "*life limit*" of two years, as required by Congress, at which time it must be rechartered. The reason that Congress requires this biennial rechartering is so that the work product and effectiveness of each committee can be critically reviewed. Said another way, the committee must demonstrate that it deserves to be continued.

PURPOSE

The Committee's charter reads, in part, as follows:

> "The committee is to provide advice and recommendations to [the FAA] concerning the full range of the FAA's rulemaking activity with respect to safety-related issues, such as air carrier operations, aircraft certification, airports, and noise. The committee will afford the FAA additional opportunities to obtain easily direct, firsthand information and insight from the substantially affected interests meeting together and exchanging ideas with respect to proposed rules and existing rules that should be revised or eliminated. This advice will result in the development of better rules in less overall time and is intended to require fewer FAA resources than under the current practice..."

In other words, it may be said that the purpose of this advisory committee is to further the FAA's regulatory agenda; to assist the agency in the conduct of the people's business. There are currently a substantial number of regulatory issues that need to be resolved, such as:

- **42 rules to adopt based on closed Notices of Proposed Rulemaking;**
- **7 Notices of Proposed Rulemaking in the intergovernmental coordination process;**
- **73 regulatory projects which have started and are scheduled;**
- **114 other regulatory projects awaiting resource allocations.**
- **114 pending petitions for rulemaking**
- **220 pending petitions for exemption.**

The primary task of the Committee is to assist the FAA in resolving these issues.

TASKING

Various subcommittees will be formed and assigned the task of tackling individual issues. AS the subcommittees begin their work, virtually all of the tasks they address will come from the agency's existing regulatory agenda. That agenda will be the source of the tasks the agency will initially assign. It is doubtful that the first two years of work will do more than put a significant dent in the backlog of 292 projects. However, slowly but surely, the program will become more manageable as the subcommittees and their working groups learn how to negotiate rules, to reach consensus, and to product high quality documents that reflect, articulate, and justify that consensus.

THE COMMITTEE

The agency has appointed **Jonathan Howe**, President of the National Business Aircraft Association (NBAA), as committee Chair; and **John O'Brien**, Director of Engineering and Air Safety for the Air Line Pilots Association (ALPA), as Vice-Chair. **Joe**

Hawkins, FAA's Deputy Director of Rulemaking, has been appointed as Executive Director. An Executive Committee is being formed, having as members the Chair, Vice-Chair, Subcommittee Chairs, and the Executive Director of the full committee. There are 56 member organizations in the full committee.

The agency has made every effort to include every interested worldwide aviation organization as a member. For the time being, sister government agents will participate in the committee and subcommittee activities as observers only. This is because the primary purpose was to gain the insight of the private sector in the agency's rulemaking activities.

The committee itself is without specific function. Rather, it should be viewed as an amalgamation of subcommittees who will receive tasks to complete and transmit products to the agency. Apart from the subcommittees, the committee is an umbrella organization created primarily as an administrative convenience. Using this device, the agency avoids the need to charter 8 to 12 separate committees, and the workload connected with reporting and recordkeeping for each one. This approach also gives the FAA immediate access to all interest aviation organizations so that it is able to quickly reach all interests on a given issue.

SUBCOMMITTEES

The main work of the Advisory Committee will the accomplished through its subcommittees. Several are already planned:

The **Air Carrier Operations Subcommittee** will provide advice and recommendations to the FAA regarding air carrier operations, pertinent regulations, and associated advisory material. The tasks assigned to this subcommittee are:

- **Determine the limits for safe standard noise abatement takeoff profiles and prepare the material for incorporation in Advisory Circular (AC) 91-53.**
- **Determine fuel supply requirements for international and overseas operations, including criteria for minimum fuel, diversion fuel, contingency fuel, and alternate fuel; determine fuel requirements related to redispatching; and develop regulatory language for revision of Federal Aviation Regulations (FAR) Parts 121 and 135 and material for publication as one or more AC's.**
- **Determine the criteria that parties to lease agreements must meet, including operational control criteria, the kinds of operations authorized, and the specific procedures and limitations to be incorporation into FAR Parts 121 and 135 operations specifications.**
- **Determine the criteria for autopilot engagement because the current regulation (FAR Section 121.579) does not address existing autopilot technology.**

The **Transport Airplane and Engine Subcommittee** will provide advice and recommendations to the Director of FAA's Aircraft Certification Service regarding the airworthiness standards for transport category airplanes and engines in FAR Parts 25, 33, and 35, and parallel provisions in Part 121. The tasks assigned to this subcommittee are:

- **Assume jurisdiction over most of the efforts of the Airworthiness Assurance Task Force, which is investigating the adequacy of the agency's existing airworthiness assurance efforts in fatigue and corrosion control.**
- **Assume jurisdiction over the Systems Review Task Force, which is investigating what are feasible improvements to the backup flight control systems of existing and future aircraft that have fully-powered control systems; and whether engine containment structure designs in use today are the best that can be implemented or whether improvements are practicable for current and future designs.**

The **Emergency Evacuation Subcommittee** will provide advice and recommendations to the FAA on regulatory standards for the purpose of enhancing the ability of passengers to quickly and safety evacuate and aircraft in an emergency situation. The initial task assigned to this subcommittee is to establish a working group to consider whether proposed new or revised standards for emergency evacuation can and should be stated in terms of the safety performance, rather than as specific design requirements.

The **General Aviation Operations Subcommittee** will provide advice and recommendations to the FAA regarding the operation of general aviation aircraft, and training and certification of airmen under FAR Parts 61, 91, 125, 133, 141, and 143.

The **General Aviation and Business Airplane Subcommittee** will provide advice and recommendations to the FAA regarding the airworthiness standards for standard and commuter category airplanes and engines in FAR Part 23, and parallel provisions in FAR Parts 91 and 135.

The **Rotorcraft Subcommittee** will provide advice and recommendations to the FAA regarding the airworthiness standards for normal and transport category rotorcraft n FAR Parts 27 and 29.

The **Maintenance Subcommittee** will provide advice and recommendations to the FAA's Director of Flight Standards Service regarding mechanic certification and approved training schools outlined in FAR Parts 65 and 147, and the maintenance standards for aircraft, engines, propellers and their components in FAR Parts 21, 43, 91, 121, 125, 127, 129, 133, 135, and 137.

Realignment of the States of Utah and Colorado Within the Transport Airplane Directorate

The Transport Airplane Directorate is continually reviewing the way it does business to produce a continuously improving organization.In response to an organizational study conducted of the Denver Aircraft Certification Field Office (ACFO), this Directorate has decided to realign the aerospace engineering certification responsibility for customers located in the states of Utah and Colorado under the Denver ACFO, which ultimately falls under the responsibility of the Seattle Aircraft Certification Office (SACO).

The reasons for this realignment are:

- **to re-establish the geographic boundaries for the SACO to make them consistent with the boundaries of the Northwest Mountain Region;**
- **to eliminate the confusion that continues to exist at the Salt Lake City Flight Standards District Office (FSDO); and**
- **in response to applicants' concerns last summer during an organizational study conducted in Denver.**

In addition to this realignment of boundaries, the organizational title of the Seattle ACO's Aircraft Modification Branch (ANM-190S) will be changed to the "*Special Certification Branch,*" and the title of the Special Certification Section (ANM-191S) will be changed to the "*Aircraft Modifications Section.*" This change is intended to reduce the misconception that the Modification Branch only deals with modifications to small aircraft when, in fact, the Branch and the ACFO's manage type certificates and handle transport category airplane projects as well.

The Seattle Manufacturing Inspection District Office (MIDO) will continue to provide certificate management support for Production Approval Holders in the state of Colorado. Support for Production Approval Holders in the state of Utah will remain with the Phoenix Manufacturing Inspection Satellite Office (MISO).

Any questions regarding these changes may be directed to the Special Certification Branch, ANM-190S, at (206) 227-2594; the Denver Aircraft Certification Field Office, ANM-191D, at (303) 393-0839; or the Anchorage Aircraft Certification Field Office, ANM-191A, at (907) 271-2668.

Certification of Modified Douglas Model DC-3 Airplanes

There has recently been confusion concerning the type certification basis for modified Douglas Model DC-3 series airplanes. Except for the Super DC-3s, which were type certificated in 1950 under Type Certificate 6A2, none of the DC-3 series airplanes are transport category airplanes. *[See cover photo.]*

The DC-3 series and the corresponding DST series were first type certificated in 1936 under the prevailing airworthiness standards of Aeronautics Bulletin 7-A. (The DST series differed from their DC-3 counterparts by having sleeper interiors.) There were a number of type certificates for the various DC-3/DST series originally; however, they were later consolidated in two type certificates. The Wright-powered DC-3 series, DC-3B series and DST series are covered by Type Certificate 618, and the Pratt & Whitney-powered DC-3A series, DC-3C series, DC-3D series and DSTA series are covered by Type Certificate 669. Since this was before the time the concept of separate standards for air carrier and general aviation airplanes was adopted, the DC-3's were simply type certificated in the "*standard category.*"

At the end of World War II, it was recognized that the standards under which the DC-3's were originally type certificated did not provide an adequate level of safety. A number of improvements were, therefore, required by airworthiness directives.

During the late 1940's, Douglas elected to make a number of modifications to the DC-3s to improve their usefulness. These included new outer wing panels, a fuselage stretch

ahead of the wing and an increase in power. Under a predecessor of Section 21.19 of the Federal Aviation Regulations (FAR), Douglas was required to apply for a new type certificate and comply with the then current provisions of Part 4b of the Civil Air Regulations (CAR). The Super DC-3's, as these modified airplanes are designated, are transport category airplanes. Surplus military R4D-8's or R4D-8Z's are also eligible for certification as transport category airplanes under this type certificate.

During this period, others were making or proposing significant modifications to DC-3 series and Lockheed 18 Lodestar airplanes. Although those modifications were not so extensive as to require applications for new type certificates, it was recognized that they were so extensive that the original certification basis would no longer provide an adequate level of safety. Accordingly, Special Civil Air Regulation SR-398 was adopted to require DC-3's and Lodestars with certain increases in power or weight to comply with portions of either Part 4a or Part 4b of the CAR. SR-398 was superseded with SR-407 which, in turn, was recodified as Special Federal Aviation Regulation (SFAR) 13.

Part 121 of the FAR, as well as predecessor regulations, makes a distinction in performance requirements for transport category reciprocating-powered airplanes (Sections 121.175 - 121.187) from those for non-transport category airplanes (Sections 121.199 - 121.205). As noted in Aircraft Specifications A-618 and A-669, DC-3's that have not been modified under SR-407 must be operated as non-transport category airplanes. Those that have been so modified are considered to be transport category airplanes insofar as the performance requirements of Part 121 are concerned. They have never been considered to be transport category airplanes in general and, indeed, fail to meet the transport category standards of Part 4a or Part 4b in many areas. Two such areas are stability and controllability. Douglas, in fact, went through several empennage redesign efforts before the Super DC-3 was capable of meeting those transport category standards.

The FAA has acknowledged the non-transport category status of DC-3's (except of course for Super DC-3's) on numerous occasions over the past 40 years. One example in particular is the preamble to the rulemaking that requires the installation of weather radar. In that document, the FAA notes that the DC-3's do not have to comply because they are not "*transport category.*"

Because of the areas of non-compliance with the transport category standards of Part 4a or Part 4b, DC-3's other than Super DC-3's should never be considered to be transport category airplanes.

In determining the type certification basis for modified DC-3's, the following should be considered. Under current FAA policy, as outlined in FAA Action Notice A8110.23 entitled, "*Procedures for Establishing the Type Certification Basis for Derivative Aviation Products,*" *[see article on p. 33 of this edition...]* there should be a starting assumption that the airplane will be required to comply with current Part 25 of the FAR in all areas affected by the modification.

If that is determined to be inappropriate for a reason or reasons outlined in the Action Notice, the following will be considered in accordance with Section 21.101 of the FAR:

For DC-3's, other than Super DC-3's:

- **The requirements of Aeronautics Bulletin 7-A.**
- **The superseding requirements of any Airworthiness Directives applicable to DC-3's.**
- **Any requirements of Part 4a or Part 4b of the CAR made applicable by SFAR 13 and the change involved.**
- **In the case of modifications for which the above do not provide adequate standards, e.g. the installation of turbopropeller engines, the modified airplane must also meet the standards of current Part 25 that are needed to provide an adequate level of safety in accordance with Section 21.101(b). Note that Section 21.101(c) is not applicable to DC-3's, other than Super DC-3's, because they are not transport category.**

NOTE: It is not anticipated that applications will be received for approval of modified Lockheed Lodestars; however, the above criteria would apply to those airplanes as well.

For Super DC-3's, R4D-8's and R4D-8Z's:

The certification basis for modified Super DC-3's or their military surplus equivalents is more straightforward. In accordance with Section 21.101(a), it will include Part 4b. If there are modifications for which Part 4b does not provide adequate standards, the modified airplanes must also comply with the standards of current Part 25 that are needed to provided an adequate level of safety. If the change is to turbopropeller engines, the modified airplanes must also comply with the Part 25 standards specified in Section 21.101(c).

Modified Super DC-3's, R4D-8's and R4D-8Z's must also meet the noise certification requirements of Part 36 of the FAR for large transport category airplanes. Questions concerning the noise certification requirements, if any, for large, non-transport category airplanes such as the other DC-3's should be referred to your cognizant FAA office.

Software Certification's Long Journey

When software was first introduced to the aviation community, it followed the same rocky road that non-aviation systems encountered: cost overruns, schedule overruns, and bizarre failure manifestations -- all systems didn't fail this way but some did. Analysis of successful systems and failed systems gave birth to a more organized approach to software development. This approach was labeled "*Structured Software Development,*" and included extensive documentation conventions (a semi-formal definition of the software development process) and various improvements in design and coding techniques (e.g., go-to-less programming, structured system analysis, information hiding, higher order languages). When properly applied, these new techniques appeared to produce noticeably higher integrity software.

The aviation manufacturing and regulatory industry formed a Radio Technical Commission for Aeronautics (RTCA) committee to provide standards for developing and certifying software. This standard was delivered in November 1981 as RTCA Document DO-178, "*Software*

Considerations in Airborne Systems and Equipment Certification." Although it was a good first effort, it allowed a large amount of latitude and required extensive interpretation. It basically required developers to apply state-of-the-art development practices using structured software development approaches, without requiring a specific methodology and without providing to the regulatory authorities documents demonstrating their efforts. Also, within RTCA DO-178 there was very little distinction between software development activities for software used in different levels of criticality.

Within 2 years after the release of DO-178, RTCA SC-152 was formed to improve the guidelines. In March of 1985, DO-178A was released. The new document provided for distinction of the level of rigor between the different criticality areas, as well as the associated delivery of documentation substantiating the completion of these activities.

Although DO-178A corrected many of the deficiencies of the original document, it still required significant interpretation. Because of the complexity of the systems and a significant increase in the use of software and digital computer technology since the release of DO-178A, issues such as multi-tasking operating systems, fly-by-wire flight and engine controls, and partitioning were part of almost every new certification. In addition, due to the increase in the use of software in society, more public attention was being focused on software approvals.

Within the FAA, a number of programs were being initiated to deal with these problems. A program to improve FAA awareness was initiated, research was started to determine the effectiveness of current approaches, a coordinated approach to develop software policy was developed, and a review and modification of DO-178A was initiated.

To determine FAA awareness of software, a survey was made of all certification offices to asses the need for additional training in software. Each Directorate received an overview of the software certification process for certification engineers and policy and procedure specialists. A two-day intensive training course for Designated Engineering Representatives (DER) approving software systems was developed and used by a number of certification offices. Criteria for selecting DER's with a software specialization was published and implemented.

Through the efforts of the FAA Technical Center (in Atlantic City, NJ), NASA was contracted to develop an aircraft control system to meet the requirements of DO-178A for critical systems. Additional research would help validate the effectiveness of dissimilar software versions; and documentation for this research would provide non-proprietary models of documents to new applicants and to FAA training courses. To date, a single version of this documentation is being submitted to the FAA for approval.

To develop uniform interim and final software policy recommendations to the Directorates and FAA Washington Headquarters, an inter-Directorate Software Advisory Team ("*SWAT*") was created. They have considered such topics as major/minor changes, TSO authorizations and software approval, grandfathering software, on-board data loading of software, partitioning, etc. Currently, the team has recommended publishing two Action Notices regarding grandfathering software and TSO authorizations/software approval.

"THE SWAT TEAM." *Front row (left to right): Bob Tessier (Aircraft Certification Service, FAA Headquarters), Dick Kirsch (Aircraft Certification Service), Heinz Mueller (Aircraft Certification Service), Cosimo Bosco (Engine & Propeller Directorate), Jim Williams (Atlanta ACO), Kim Wolfley (Aircraft Certification Service).*
Back row: Pete Saraceni (FAA Technical Center), Jim Griswold (Small Airplane Directorate), Mike DeWalt (FAA National Resource Specialist), Tom Kraft (Transport Airplane Directorate).

An additional function of the team is to provide a unified FAA position for the revision of DO-178A.

As a result of field problems in applying DO-178A and advances n technology, RTCA created a subcommittee, SC-167, to review and revise DO-178A as needed. The subcommittee is chaired by Roger Seaman from the Boeing Commercial Airplane Group. A committee in Europe, EUROCAE WG-12, is being chaired by **Dan Hawkes** of the British Civil Airworthiness Authority (UK-CAA). In addition to the aviation community, a number of researchers are also contributing to these efforts. The FAA has assigned a member from each Directorate to serve on this subcommittee.

One of the major developments of this committee was the identification of five software levels corresponding to the four levels in Advisory Circular (AD) 25-1309-1-A and the European community, plus one level for *"truly don't care software."* This replaces the original three levels in DO-178A. Another major development is the incorporation of a software safety

assessment to support the overall system safety assessment. The ultimate goal is to provide a document requiring the minimum of interpretation, the needed flexibility for the developer, and the necessary visibility for the regulator.

Throughout all levels of the FAA, the need to provide additional emphasis on software has been recognized. The programs previously discussed are designed to produce tools, awareness, and visibility for the certification engineer.

Access to Emergency Exits

The FAA has recently become aware that there may be some confusion in the field regarding Type III exit access requirements for transport airplanes with 19 or fewer seats. The regulations allow different access provisions for Type III exits in smaller and larger airplanes, with some latitude given to the smaller airplanes if the effectiveness of the exit is not reduced.

Specifically, for airplanes of 20 passengers or greater, FAR Section 25.813 requires that there be no interference in opening the exit, and that the projected opening of the exit provided be unobstructed. For the smaller airplanes, there could be some minor obstructions, provided that they do not reduce the effectiveness of the exit. Throw-type pillows have frequently been used in this application, and are considered acceptable if they do not impede opening the exit. In either case however, the exit must be openable, by untrained persons, from the inside and the outside.

Interior features (galleys, closets, seats etc.) must not prevent an exit from being opened. For example, an adjustable seat that can translate into the exit opening such that the exit is not openable, is not acceptable. Procedural considerations, such as placarding the seat to be in a specific position for takeoff and landing, are not considered sufficient. Seats should have a positive design feature that *prevents* them from being moved into positions which render an exit unopenable.

Location of Passenger Emergency Exit Signs

The Transport Airplane Directorate recently received an inquiry concerning the acceptability of using exit signs placed over exits in lieu of an overhead sign. From a regulatory standpoint, there is a separate and distinct requirement for an exit locator sign, located overhead, for each passenger emergency exit and an exit marking sign next to each passenger emergency exit. Therefore, substituting the marking sign for the locator sign is not, in itself, in compliance with the regulations.

We have posed this question to other offices and it appears that the practice of not requiring a locator sign where marking signs are visible to each seat has been employed elsewhere. We consider that it may be acceptable for sidewall mounted signs to serve both the marking and locating function, on an equivalent safety basis, provided the signs meet the objectives of both requirements. That is, an exit sign clearly

marks the exit, and an exit sign is clearly visible to passengers approaching along the main aisle. Exit locating signs should be visible from each adjacent exit locating sign or when viewed from the point furthest from the exit along the aisle (when there are not exits in both directions.)

If this approach is employed, a finding of equivalent level of safety under FAR Section 21.21(b)(1) is required.

Interior Materials Testing

A question has arisen regarding the definition of "*exposed surface*" with respect to heat release and smoke emissions testing of interior materials. Specifically, could a prefabricated, pre-approved panel be attached to the outer surface of interior structure to form the "*exposed surface*" without having to qualify the resulting composite?

Historically, any constituent panel component that was permanently attached to the panel, either by bonding or mechanical means, was considered part of the panel. Consequently, all such constituent components were required to be included in test samples for certification. If, on the other hand, there was no permanent attachment (i.e., clamps, velcro or friction guides), the components could be tested separately.

Prior to the adoption of heat release and smoke standards, each component would undergo the same tests, namely the vertical bunsen burner test. Heat release and smoke emissions testing is only required for the exposed surface areas of interior materials. For example, the interior panels of stowage bins and closets are not required to be tested, where these units are required to be closed for takeoff and landing. In the case described above, where a prefabricated panel is not permanently attached to existing interior structure, heat release and smoke testing of the combined panel is acceptable but not necessary. Instead, as has been traditionally accepted, both components may be subjected to both tests independently.

Certification Testing of Cargo Compartment Liner Repairs

On April 2, 1991, an industry meeting was held in Seattle concerning repairs to cargo compartment liners. At the meeting, several questions were raised regarding acceptable certification procedures. The impetus behind the questions was the tendency for some repair schemes to fail the oil burner testing required under Amendment 25-60 to the Federal Aviation Regulations (FAR), apparently due to the inherent qualities of the base panel material.

In promulgating Amendment 121-202, which is the companion change to operating rules, is was recognized that some types of fiberglass reinforced resin material might not pass all of the requirements in Amendment 25-60. Specifically, the requirement that the temperature on the back face of the "*ceiling panel*" remain below 400° F, was known to be a problem with certain types of fiberglass. For several reasons, including the overall superiority of fiberglass compared to other materials and the cost of attempting to determine what types of fiberglass were

installed in the current fleet, it was decided that the interests of safety would best be served by accepting, without test, all fiberglass reinforced resin panels. This blanket acceptance of fiberglass for retrofit application is the prime difference between Section 121.314/Amendment 121-202 and Section 25.855/Amendment 25-60.

With the above as background, the following may be used as guidance when qualifying repairs. If the material used as a repair (i.e., patch) passes all of the Amendment 25-60 criteria when tested by itself, then, when tested as part of the repair on a panel, the 400$ requirement need not be considered, provided the repair remains intact and there is no flame penetration through the test panel.

Other questions arose related to modifying the test apparatus to include a baffle, or increasing the size of the horizontal test panel. The original design of the test recognized that some back side burning could occur that was indirectly attributable to the size of the test panel. In developing the certification criteria, however, it was determined that this phenomenon was useful as a screening tool for inferior materials. Therefore, it would not be acceptable to modify the test set up as described above for panel certification. For the purposes of qualifying a repair only, such modifications could be acceptable, but would need to be specifically agreed to with the FAA prior to conducting any tests. Given the relief granted above for the 400° requirement, we do not see a need to modify the test set up.

Finally, questions were raised regarding the use of tape as an air seal in seams and joints. Since the tape is not a flame barrier, and since the liner panels can pass the oil burner test without the use of tape, it is permissible for the tape to disbond during the test. This is analogous to the resin burning out of the base panel during the test in that both conditions could compromise the integrity of the compartment seal. The degree to which a compartment is sealed is evaluated as part of the certification requirements, but this is done with an intact compartment. Therefore, the tape may be required for certification as a means of preventing ventilating air flow and maintaining sufficient concentrations of extinguishing agent etc., regardless of the ability of the tape to withstand the oil burner test.

Seat Dynamic Test Regulation, a Clarification

The Transport Airplane Directorate has been asked for clarification of two specific issues related to the seat dynamic test regulation, Aerospace Standard (AS) 8049, and Advisory Circular (AC) 25.562-1:

(1) Does the FAA hold any particular code as a preference? No, the FAA does not hold any code as a preference.

(2) Will the FAA approve selection of "*worst cases?*" Yes. "*Worst case*" selection may be approved with the following considerations:

- **The FAA always reserves the right to select and require testing of any "*worst case*" condition it considers necessary.**
- **The analysis of all the selected "*worst case*" conditions must be submitted for FAA review and approval.**

- **The analysis and test results of all the selected "*worst case*" conditions must show a positive correlation.**
- **Compliance with the Head Injury Criteria (HIC) must be demonstrated by test for each specific obstacle.**

The seat dynamic performance standards require compliance demonstration by tests. Analysis alone may not be used as a substitute for a compliance test.

Applicability of Seat Cushion Flammability Standards, Amdts. 25-59, 29-23, and 121-184

The seat cushion flammability standards of FAR Section 25.853(c) apply to all transport category airplanes for which the application for type certificate is made after November 25, 1984, regardless of their size and regardless of what Part 121 or 135 may or may not require.

For transport category airplanes for which the application for type certificate was made prior to that date, such as Cessna 500's, Section 121.312(b) requires the seat cushions to comply with the flammability standards of Section 25.853(c) after November 27, 1987, regardless of their size.

Section 135.169(a) incorporates the provisions of Section 121.312(b) by reference only for large airplanes. A small transport category airplane is, therefore, not required to comply as a condition of operation under Part 135. Section 135.169(a) does not, however, provide relief for a small transport category airplane for which the application for type certificate was made after November 25, 1984.

Incomplete Testing after Aircraft Alteration to Install Mode S Transponder

We are aware that some aircraft may have been returned to service in an unairworthy condition after alterations were accomplished to install a Mode S transponder. Specifically, several Technical Standard Order-C113 transponders are reportedly in use in the National Airspace System which have not been functionally tested as installed to ensure the Mode S feature functions as designed, including the assignment and transmission of the proper discreet address code. Reports implicate the lack of test equipment and/or incomplete test/inspection instructions as the contributing factor. This practice may place the person performing the alteration and approving the aircraft for return to service in noncompliance with certain sections of Federal Aviation Regulations Part 43 and place the Mode S transponder and, therefore, the aircraft in an unairworthy condition.

Further, a malfunctioning Mode S transponder, even installed on an aircraft not equipped with a Traffic Alert and Collision Avoidance (TCAS) System, could affect the data exchange needed by approaching TCAS-equipped aircraft to compute resolution advisories. Aircraft must not be approved for return to service after alterations to install a Mode S transponder until COMPLETE in situ tests have been accomplished.

At this time, airworthiness directive actions are being considered to address this issue. Flight Standards divisions should ensure that PAI's distribute this notice to all assigned facilities performing alterations to install Mode S transponders. Any Mode S

transponder not fully tested should be immediately deactivated in accordance with piecemeal installation procedures until such time that all functional tests can be accomplished.

The information contained in this notice will be incorporated into Order 8300.10, Airworthiness Inspector's Handbook.

National Resource Specialists

The National Resource Specialist (NRS) Program was established based on the recognition of the need for technical specialists in the FAA with highly specialized, state-of-the-art knowledge and skills in specific technical areas. The program was established to assure continued FAA technical competence in the aircraft certification programs.

The rapid technological advances being made in the aircraft industry make it essential for FAA to have a number of professional aerospace engineers, electronic engineers, computer software specialists, engineering flight test pilots, and manufacturing and airworthiness inspectors who have developed highly specialized, state-of-the-art knowledge and skills in particular technical disciplines, e.g., aeroelasticity, advanced materials, engine design, metallurgy, advanced navigation systems, transport airplane flight management, etc.

While the need for personnel possessing these skills exists throughout the FAA, constraints on the numbers of positions available for this purpose and the limited numbers of individuals available to the FAA having the required specialized training, experience, and recognized expertise preclude the assignment of such experts to staff all locations. Therefore, an FAA cadre of technical experts was established for national utilization in the development and application of regulatory policies and practices. Persons so selected and identified are known as "*National Resource Specialists.*" These specialists are under the operation control of the Office of Airworthiness in FAA Washington, D.C., Headquarters, but are physically located in the FAA Directorates.

NRS' are responsible for maintaining close and continuous contact with representatives of the aviation industry, professional societies, academic and research institutions, specialists in other Federal agencies including the military establishment, and foreign airworthiness authorities to maintain and develop their specialized professional knowledge and skills. They serve as special technical advisors to:

- **The FAA's aircraft certification Directorates in the performance of their certification functions;**
- **Regional Type Certification Boards, Airworthiness Directive Boards, Maintenance Review Boards, and Flight Operations Evaluation Board chairpersons, and on Special Certification Review Teams, when requested; and**
- **FAA Washington, D.C., Headquarters officials.**

They also represent the FAA in national and international activities requiring utilization of their technical knowledge and skills, and participate as technical advisors in the development of FAA type certification regulations and standards, national policy (for issuance by the FAA Administrator), and

national directives or advisory circulars to provide procedures and practices in their highly specialized technical areas. The NRS's have often been closely involved in the initial research and development of new systems, such as the Global Positioning System (GPS), Microwave Landing System (MLS), Traffic Alert and Collision Avoidance System (TCAS), fly-by-wire flight control systems, new composites, flutter suppression, etc. Many times they are called upon to participate in or lead such activities as seminars or symposiums, and develop training courses designed to enhance the state-of-the-art knowledge of FAA certification engineers, pilots, and inspectors.

The NRS Program provides the NRS with a unique opportunity and working relationship to achieve uniformity between the aircraft certification Directorates in procedures, application of the Federal Aviation Regulations, and a better understanding of the FAA's technical positions.

Following is a list of the FAA's current National Resource Specialists, including the name, office location, telephone and FAX numbers, and technical specialty of each.

TERENCE J. BARNES
Specialty: Flight Loads/Aeroelasticity (Fixed Wing)
Mailing address:
Federal Aviation Administration
Seattle Aircraft Certification Office, ANM-105N
1601 Lind Avenue S.W.
Renton, WA 98055-4056
Office telephone: (206) 227-2761
FAX: (206) 227-1181

ALFRED L. BROZ
Specialty: Non-Destructive Evaluation
Mailing address:
Federal Aviation Administration
Engine & Propeller Directorate
Aircraft Certification Office, ANE-105N
12 New England Executive Park
Burlington, MA 01803
Office telephone: (617) 270-7252
FAX: (617) 836-2412

MICHAEL DEWALT
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FAX: (206) 227-1811

GEORGE LYDDANE
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Long Beach, CA 90806-2425
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FAX: (213) 988-5210

JAMES TREACY
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FAX: (206) 227-1181

JOSEPH SODERQUIST
Specialty: Advanced Composite Materials
Mailing address:
Federal Aviation Administration
Aircraft Engineering Division, AIR-103
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Washington, D.C. 20591
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FAX: (202) 267-5206

STEPHEN SOLTIS
Specialty: Crash Dynamics
Mailing address:
Federal Aviation Administration
Los Angeles Aircraft Certification Office, ANM-102N
3229 E. Spring Street
Long Beach, CA 90806-2425
Office telephone: (213) 988-5207
FAX: (213) 988-5210

THOMAS SWIFT
Specialty: Fracture Mechanics/Metallurgy
Mailing address:
Federal Aviation Administration
Los Angeles Aircraft Certification Office, ANM-1O1N
3229 E. Spring Street
Long Beach, CA 90806-2425
Office telephone: (213) 988-5205
FAX: (213) 988-5210 (COM)

Low-Altitude Windshear Systems Certification

Currently there is a high degree of activity in the certification and development of low-altitude windshear systems.

The recent release of Technical Standard Order (TSO) C117 has presented some inconsistency with the current certification standards set for Reactive Windshear Systems Advisory Circular (AC) 25-12. Where the TSO is applicable for setting the performance standard for reactive windshear systems, certification under AC 25-12 may not meet this required standard.

There is also growing activity in the development of predictive (forward-looking) windshear systems. Three airlines have been granted exemptions from compliance with FAR Section 121.358 to evaluate this method of windshear detection, possibly leading to certification of the first predictive system in 1992.

The Transport Standards Staff of the Transport Airplane Directorate is making an effort to provide greater assistance and standardization concerning certification requirements to all of the Aircraft Certification Offices (ACO's). As a result, Los Angeles ACO's Systems and Equipment Branch is the point of contact for certification guidance relative to windshear systems installations for the Transport Directorate. Should any questions arise regarding low-altitude windshear systems, you may contact the Branch at telephone (213) 988-5345.

Use of Halon in Aircraft Cabin Fire Protection

Prior to the advent of Halon 1211 (bromochlorodifluoromethane)-filled extinguishers, the extinguishers provided most frequently in aircraft cabins contained dry powder (monoammonium phosphate), water, or carbon dioxide. On July 29, 1980, the FAA issued an advisory circular stating that Halon 1211 was one of the agents considered acceptable for use in cabins.

Subsequent to the issuance of that advisory circular, questions arose concerning the amount of toxic decomposition products that might be produced in an aircraft cabin if a Halon 1211 fire extinguisher were used in fighting a fire. A test program was, therefore, conducted at Atlantic City, New Jersey, by the FAA Technical Center to ensure that the use of Halon 1211 did not, in itself, pose a hazard to the cabin occupants. The results of that test program are contained in DOT Report No. DOT/FAA/CT-82-11 entitled, "*In-flight Aircraft Seat Fire Extinguishing Tests (Cabin Hazard Measurements),*" issued in December 1982.

The primary objectives of that series of tests were to assess any hazards that might be associated with the use of Halon 1211 in an aircraft cabin; however, it was also concluded from the tests that extinguishers containing Halon 1211 are much more effective in range and "*knockdown*" capability than the other three types frequently used.

It should be noted that dry chemical extinguishers must be used with caution because they leave a corrosive residue. Water-filled extinguishers are effective for fires involving dry flammable materials, such as paper; however, they cannot be used on either electrical fires or fires involving flammable fluids. Halon 1211 filled extinguishers are particularly effective when used on flammable fluid fires, such as those resulting from terrorist activities.

Halon 1211 is also very effective in extinguishing fires in hidden areas. In that regard, Halon-filled cabin fire extinguishers are credited with saving the lives of 216 passengers on a recent trans-Atlantic flight. A fire developed under the cabin floor and passed through a cold air return grill into the cabin. The Halon-filled cabin fire extinguishers were successfully used to extinguish not only the fire in the cabin, but the fire under the floor as well. Without the Halon-filled extinguishers, there would have been no means to have extinguished the fire under the floor. Had it not been extinguished promptly, it is likely that all 216 passengers would have perished before reaching the nearest place to land.

Questions have arisen concerning the effect of Halon on the earth's ozone layer. On July 26, 1990, the FAA issued Amendment 25-73, "*Fuel Venting and Exhaust Emission Requirements for Turbine Engine Powered Airplanes.*" The preamble to that rule describes the "*... possible minor impact Halon would have on the ozone layer.*" This statement is not intended to minimize the effects of Halon on the ozone layer in general; it simply recognizes the fact that aircraft cabin fires seldom occur and, when they do occur, the amount of Halon released in fighting them is minimal. It is estimated that no more than 300 pounds of Halon 1211 are discharged in commercial aircraft annually to combat cabin fires. This is in marked contrast to the 6 million pounds of Halon 1211 put into use annually in the United States for all portable extinguishers.

As to whether Halon-filled extinguishers have to be tested and replaced, the Halon has an unlimited life. The only testing required is that needed to ensure the integrity of the extinguisher containing the Halon. As long as the integrity of the extinguisher is maintained, the Halon remains available for use forever.

With that fact in mind, the FAA has contracted with Walter Kidde Aerospace, Inc., to study the feasibility of recycling existing supplies of Halon extinguishing agents. In terms of quantity, the primary concern is the Halon 1301 agent used for powerplant installations, cargo compartments, etc., rather than the Halon 1211 used in aircraft cabins. It is believed that the existing supplies of Halon, including those previously intended for non-aviation purposes, would be sufficient for essential aircraft use through the year 2020. The primary concern is the development of effective quality control means to ensure that the purity of the Halon can be maintained. This program, which will cost $130,977 and is scheduled for completion by October, 1991, was initiated with the concurrence of the Environmental Protection Agency (EPA). The EPA also participated in the recent mid-term contract review.

As for other alternative agents, the FAA Technical Center is conducting an in-house test program. The agent developed by the Great Lakes Chemical Corporation, FM-100, is being considered, as well as those of other manufacturers. In order to protect their proprietary rights, the FAA has signed security agreements with both Great Lakes Chemical Corporation and Dupont, stipulating that details of the test program will not be released until it is completed. It must be recognized that many of the characteristics of these alternative agents are presently unknown--particularly those involving toxicity. There will have to be several years of thorough evaluation to ensure that they perform their intended function and do not, in fact, prove to be more hazardous to occupants and the environment than the agents they are to replace.

The FAA continues to exert every possible effort to find a suitable substitute for Halon in aircraft cabin fire extinguishers. However, it should be noted that the Clean Air Act does provide for the continued use of Halon for essential purposes. Until a suitable replacement is found, we must continue to require the use of Halon for this purpose in order to properly discharge our responsibility to the travelling public under the Federal Aviation Act. In addition to direct coordination with the EPA, the FAA is working closely with the United States delegate to the United Nations (UN) subcommittee responsible for UN policy in this matter.

High Intensity Radiated Fields (HIRF): Guidance for Showing Compliance with the FAA's Interim HIRF Requirements

This guidance is provided for aid in showing compliance with the requirements contained in the FAA's Interim HIRF Policy Memorandum, dated December 5, 1989 (see Transport Airplane Designee Newsletter, Edition 10, June 1, 1990). This guidance, developed after a number of discussions with several aviation industry associations, reflects an acceptable means of demonstrating compliance with the interim HIRF policy.

1. The interim HIRF requirements apply to airborne electrical and electronic systems that perform critical functions.

2. The applicant (installer) should prepare and submit a plan for FAA approval outlining the proposed method for compliance with the interim HIRF requirements.

3. An applicant for a new, amended, or supplemental type certificate has four options to demonstrate compliance with the interim HIRF requirements:

OPTION 1: A system qualified to Category "W" (100 volts/meter) RTCA DO-160C, Section 20, and approved by the FAA.

OPTION 2: A low level swept coupling test to determine the internal aircraft environment in terms of the electromagnetic fields and induced cable current. The electrical and electronic systems proposed for installation must be qualified to at least the deduced levels.

OPTION 3: A full-scale aircraft test, with the critical system(s) installed, to the HIRF environment.

OPTION 4: A claim of similarity (see paragraph 11, below) by documenting that the proposed system(s) and installation(s) have previously met the interim HIRF requirements.

4. The applicant(s) may be able to have the system manufacturer bench test a system to procedures stated in RTCA/DO-160C Category W (100 Volts/meter). The system during and after test exposure must continue to perform its critical functions.

5. If a system manufacturer has conducted the RTCA bench test, approved by the FAA, he must:

a. Define installation criteria for the approved system.

b. Define the aircraft system harness so that it can be fabricated to the manufacturer's installation criteria.

6. The applicant (manufacturer) must provide maintenance requirements to assure the continued airworthiness of the installed system(s).

7. A system installed in compliance with paragraph (5) meeting the interim HIRF requirements and no additional HIRF testing is required for the installation.

8. If the critical function(s) of the system is not continually available during the bench test conducted in compliance with paragraph (5), the following conditions must be met:

a. An alternative means of providing the critical function(s) remains available.

b. The system interruption must not provide misleading information and be readily recognizable.

c. After test exposure, the system must be capable of regaining normal operation of the critical function(s) automatically or by a manual means.

9. A system installed in compliance with paragraph (5) and meeting the requirements stated in paragraph (8) needs no additional HIRF testing for installation.

10. Any deviations from specified system performance may need to be assessed for each application by the cognizant Aircraft Certification Office (ACO).

11. An approval may be sought on the basis of similarity to equipment and installations that have met the interim HIRF requirements. The claim of similarity may be based on equipment type, function, design, and installation similarities. If the claim of similarity is not found to be fully satisfactory, a bulk current injection test may be required by the cognizant ACO, over a frequency range of 10 kHz to 400 MHz to confirm similarity.

12. For aircraft the routinely operate below 500 feet, such as rotorcraft in visual meteorological conditions, additional requirements may be necessary to protect critical functions.

13. The statements addressing post certification reassessment, contained in the December 5, 1989, interim HIRF policy, are no longer considered appropriate. Accordingly if the need arises to correct an unsafe condition on previously approved equipment, routine airworthiness directive (AD) process will be utilized.

Disseminating Notices to Airmen (NOTAM) on Global Positioning Satellite Systems (GPSS)

The Radio Technical Commission for Aeronautics has begun developing Minimum Operational Performance Standards (MOPS) for sole means navigation operational use by aviation users of the National Airspace System, and worldwide using the Global Positioning System (GPS) augmented by one of the following:

- **the Union of Soviet Socialist Republic's (U.S.S.R.) "Global Orbiting Navigation Satellite System" (GLONASS);**
- **other navigational equipment, such as inertial and long range navigation (LORAN-C);**
- **the wide range band GPS Integrity Channel (GIC) that contains integrity information, navigation information, and error correction information.**

Supplemental MOPS should be finalized sometime this summer.

Concurrently, the industries of the U.S. (Northwest Airlines and Honeywell) and U.S.S.R. (All-Union Scientific Research Institute of Radio Equipment) are jointly involved in the development and testing of an integrated GPS/GLONASS receiver. The testing of a prototype receiver began in May 1991 with Northwest Airlines flying great circle routes from the U.S. to Japan and Korea via the Soviet Far East.

A ceremonial exchange of receivers by the U.S. and U.S.S.R. took place at the International Civil Aviation Organization (ICAO) Future Air Navigation Systems Phase II (FANS II) Committee meeting in Montreal, Canada, on April 27, 1991.

The interest in accelerating the replacement of station-referenced navigation systems with earth-referenced systems has been overwhelming from the U.S. and other ICAO member states' aviation groups. The FAA's Aircraft Certification Offices have already certified the installation of some GPS sensors in various aircraft.

An integral part of ensuring the safe use of multi-sensor navigation and other systems which receive input from GPS, GLONASS, or a combination of the two, is user notification of each satellite's status through the FAA NOTAM system. The joint requirements contained in a Department of Defense/FAA Memorandum of Agreement regarding GPS calls for the development and refinement of information requirements for NOTAM's.

Work is still underway, however, to establish a system that will provide access to NOTAM's issued on the U.S. GPS and, if possible, to NOTAM's on the U.S.S.R.-generated international GLONASS.

The Transport Airplane Designee Newsletter will provide updates on this subject as issues develop.

Action Notice A8110.23, Procedures for Establishing the Type Certification Basis for Derivative Aviation Products

Action Notice A8110.23, issued on September 26, 1990, prescribes a procedure for establishing the type certification basis for derivative aircraft, aircraft engines, and propellers. These are products that contain type design changes of a previously certificated product whose change is significant but not so extensive as to require a new type certificate (TC) under Section 21.19 of the Federal Aviation Regulations (FAR). This Action Notice is applicable to all derivative products, regardless of approval method, such as an amended TC or supplemental type certificate (STC). The objective of this Action Notice is to enhance safety through the use of the airworthiness standards, as amended by the later amendments, for the type certification of derivative products.

The following is a verbatim transcript of the Action Notice:

Section 21.19 of the FAR requires an application for a new TC if the change is so extensive that a substantially complete investigation of compliance with the applicable regulations is required. Through a series of intermediate models, applicants have, nevertheless, been granted amended TC's for models which bear almost no resemblance to the original model. Similarly, greatly modified aircraft have been approved without issuance of a new TC through a series of STC's. This problem is aggravated by the fact that no specific guidance as to the meaning of the phrase, "*substantially complete investigation,*" has ever been published.

Significant type design changes, which could have been interpreted as requiring a "*substantially complete investigation*" for certification and, therefore, could have required a new TC under Section 21.19, were approved as a change under Section 21.101. In addition, the current trend for new products is toward more derivatives rather than new designs, and toward longer aircraft service life.

In view of this, the certification of these type design changes should reflect the need to comply with the airworthiness standards as amended by the later amendments. Accordingly, the FAA has been obtaining agreements with the applicants to include later regulations for those changes that may otherwise have required a new TC under a stricter interpretation of the rules. The concept of obtaining agreements with applicants to include later regulations for these changes is hereby made the standard practice.

The following procedure is to be used to establish the type certification basis for all derivative aircraft, aircraft engines, and propellers. However, this procedure does not preclude the need to obtain a new TC if required by FAR Section 21.19. The intent is to use the later amendments in effect on the date of the application for the change that are directly related to the change and the components or areas directly affected by the change. These components and areas are those where there is a need for recertification that includes the physical change, the physical components, or systems affected by the change, and all other matters relevant to certification that are affected by the change. It should be emphasized that the applicant is responsible for the whole product as altered, and not for just the physical change itself.

To establish the certification basis, the FAA will begin by determining which amendments to the airworthiness standards should be included, through a review of the design change with the applicant, using the following criteria:

a. Except as provided by paragraphs b. and c., below, the certification basis for the changed product should consist of the certification basis of the model being changed (defined as the basic certification basis), plus those requirements effective on the date of the application that are directly related to the components or areas affected by the change. These components and areas are those where there is a need for recertification which include the physical change, the physical components, or systems affected by the change, and all other matters relevant to certification which are affected by the change. For those aircraft with certification basis other than a part of the FAR (for example, Part 3 or 4b of the Civil Air Regulations, etc.), the requirements of the corresponding part of the FAR will be used. For products manufactured in another country, the date of application will be determined by the provisions of the applicable bilateral agreement. Typically, the bilateral agreements define the date of the application for a change as the date on which the application was submitted to the other country's airworthiness authorities. There are, however, some exceptions.

b. Requirements of the later standards, that are required by paragraph a., above, but would not increase the level of safety of the basic certification basis, need not be considered. This presumes that the basic certification basis is appropriate for the proposed change. However, the applicant may elect to use

these later requirements, in which case, any other amendments that the Administrator finds to be directly related must also be used.

c. The basic certification basis, as incorporated by reference in the type certificate, may be used in lieu of later standards, identified in paragraph a., above, if these regulations, together with applicable service experience, provide a level of safety equivalent to that of the later standards. Applicable service experience is that reflecting the history of the existing components that are being changed or that are directly affected by the change. Additionally, the changed components must be sufficiently similar to the existing components, both in design and usage, so that it can be determined that the service history is applicable.

The determination of which other amendments are applicable should be conducted and documented by the applicant, approved by the FAA, and placed in the project file. This documentation should include the rationale for not complying with the later standards. The responsibility to show that other amendments should not be required rests with the applicant. This procedure need not be applied to restricted category aircraft or limited category aircraft. It applies equally to both U.S. and non-U.S. manufactured products.

Because design changes vary in complexity and magnitude, each proposed derivative product must be evaluated on an individual case-by-case basis. However, guidance is provided to enhance standardization and assist in the definition of a derivative product.

The following design changes are examples, but not a complete list, of significant type design changes that may be considered a derivative and would qualify for the application of more recent regulations. However, this list is not intended to preclude the application for a new TC, if the applicant desires.

- **A design change that constitutes a new design or a substantially complete redesign of a component, equipment installation, or system installation. (These changes extensively invalidate the compliance demonstration of the original designs.)**
- **A design change that significantly affects the basic loads.**
- **A design change that introduces novel or unusual methods of construction or new materials, e.g., composites.**
- **A design change that includes new state-of-the-art systems or components which have not been previously certificated.**
- **A design change that alters the kinematics, dynamics, or substantially alters the configuration of either the flight control or rotorcraft rotor drive system.**
- **A design change to replace reciprocating engines with the same number of turbopropeller engines.**
- **A design change that affects the integrity of the basic load-bearing structure necessary for continued safe flight and landing or operation of the aircraft within approved limits.**
- **A design change that would substantially alter the aircraft flight characteristics or performance from the type design being changed.**

- **A design change that affects compressor/turbine rotor integrity, kinematics, or dynamics of an engine.**

- **A design change that constitutes a substantial flight deck change.**

- **A design change that substantially increases power.**

- **A change from normal or utility to commuter category.**

- **A design change that alters the crashworthiness features.**

The following design changes will normally NOT be considered a derivative and need not be evaluated under the provisions of this Action Notice:

- **Installation of an alternative engine, using the same principles of operation (e.g., reciprocating replacing reciprocating, turbopropeller replacing turbopropeller, etc.), that does not appreciably increase power, and has a minimum of installation changes.**

- **The installation of Electronic Flight Display Systems if installed on relatively modern aircraft where changes are not substantial.**

- **The installation of an alternate autopilot.**

- **A design change that incurs a small weight increase.**

- **Small design changes that constitute production improvements.**

In reviewing an application, no consideration will be given to the way in which the changed product is identified. Use of the old model number, hyphenated numbers, numbers/letters, entirely new numbers, etc. has no bearing on deriving the TC basis for a change in type design.

This procedure applies to all projects involving derivative aircraft, aircraft engines, and propellers when the application is made subsequent to the issue date of this action notice. The certification basis should be established a shortly as possible after the application is submitted.

The applicant should be cautioned that, in addition to the requirements for type certification in this Action Notice, it may be necessary to show that the product meets additional standards in order to receive type certification in a foreign country or to be eligible for operation under the provisions of Part 91, 121, or 135, or a foreign equivalent. The Joint Airworthiness Authority (JAA) will issue a comparable document to this Action Notice.

(The guidance material contained in this Action Notice will be incorporated into an Advisory Circular, which is currently being developed.)

DAR/DMIR/DOA/DAS Standardization Program 1991 and 1992 Tentative Seminar Schedules

The table below provides the tentative schedules for the 1991 and 1992 Standardization Training Course/Seminar for Designated Airworthiness Representatives (DAR), Designated Manufacturing Inspection Representatives (DMIR), representatives of manufacturers with a Delegation Option Authorization (DOA), and representatives of repair stations and manufacturers with Delegated Alteration Station (DAS) authorization:

TENTATIVE SCHEDULE

MANAGING OFFICES SERVED BY SEMINAR	LOCATION OF SEMINAR	DATE
Seattle,WA MIDO Denver, CO FSDO Salt Lake City, UT FSDO Rapid City, SD FSDO Fargo, ND FSDO	Denver, CO	August 27-29, 1991
Wichita, KS MIDO Kansas City, MO MIDO Wichita, KS FSDO Kansas City, MO FSDO St. Louis, MO FSDO Lincoln, NE FSDO	Wichita, KS	October 1-3, 1991
Cleveland, OH MIDO Cleveland, OH FSDO Belleville, MI FSDO Grand Rapids, MI FSDO South Bend, IN FSDO Milwaukee, WI FSDO	Lansing, MI	October 22-24, 1991
Minneapolis, MN MIDO Fargo, ND FSDO Minneapolis, MN FSDO Des Moines, IA FSDO Rapid City, SD FSDO Chicago, IL FSDO's (03 and 31)	Minneapolis, MN	November 19-21, 1991
Farmingdale, NY MIDO Teterboro, NJ MIDO Farmingdale, NY FSDO Teterboro, NJ FSDO Valley Stream, NY FSDO Albany, NY FSDO	Long Island, NY	December 3-5, 1991
Farmingdale, NY MIDO Teterboro, NJ MIDO Farmingdale, NY FSDO Teterboro, NJ FSDO Valley Stream, NY FSDO Allentown, PA FSDO Baltimore, MD FSD	Atlantic City, NJ	January 1-9, 1992
San Antonio, TX MIDO Houston, TX FSDO San Antonio, TX FSDO Baton Rouge, LA FSDO	San Antonio, TX	February 11-13, 1992
Atlanta, GA MIDO Nashville, TN FSDO Louisville, KY FSDO Jackson, MS FSDO Birmingham, AL FSDO Winston-Salem, NC FSDO Richmond, VA FSDO	Nashville, TN	March 3 - 5, 1992

MANAGING OFFICES SERVED BY SEMINAR	LOCATION OF SEMINAR	DATE
Long Beach, CA MIDO San Diego, CA FSDO Long Beach, CA FSDO Riverside, CA FSDO	Long Beach, CA	March 24-26, 1992
Harrisburg, PA MIDO Allentown, PA FSDO Harrisburg, PA FSDO Philadelphia, PA FSDO Baltimore, MD FSDO Chantilly, VA FSDO Rochester, NY FSDO Pittsburgh, PA FSDO's (03 and 19)	Harrisburg, PA	April 1-9, 1992
Cleveland, OH MIDO Belleville, MI FSDO Cleveland, OH FSDO Columbus, OH FSDO Pittsburgh, PA FSDO's (03 and 19 Grand Rapids, MI FSDO	Cleveland, OH	May 5-7, 1992
Harrisburg, PA MIDO Albany, NY FSDO Charleston, WV FSDO Philadelphia, PA FSDO Chantilly, VA FSDO Richmond, VA FSDO (03)	Philadelphia, PA	June 2-4, 1992
Minneapolis, MN MIDO Des Moines, IA FSDO Chicago, IL FSDO's (03 and 31) Springfield, IL FSDO South Bend, IN FSDO Milwaukee, WI FSDO Minneapolis, MN FSDO	Chicago, IL	June 16-18, 1992
Bethany, OK MIDO Albuquerque, NM FSDO Oklahoma City, OK FSDO Little Rock, AR FSDO Lubbock, TX FSDO	Oklahoma City, OK	July 7-9, 1992
Windsor Locks, CT MIDO Boston, MA FSDO Windsor Locks, CT FSDO Bedford, MA FSDO Rochester, NY FSDO	Boston, MA	July 21-23, 1992
Seattle, WA MIDO Portland, OR FSDO Seattle, WA FSDO Helena, MT FSDO Anchorage, AK FSDO Fairbanks, AK FSDO Juneau, AK FSDO	Everett, WA	August 4-6, 1992
Dallas/Ft. Worth, TX MIDO Dallas, TX FSDO Dallas/Ft. Worth, TX FSDO Ft. Worth TX FSDO Lubbock, TX FSDO Baton Rouge, LA FSDO	Dallas/Ft. Worth, TX	August 18-20, 1992
Los Angeles, CA MIDO Long Beach, CA FSDO San Diego, CA FSDO Riverside, CA FSDO Honolulu, HI FSDO	Ontario, CA	September 1-3, 1992
Seattle, WA MIDO Portland, OR FSDO Seattle, WA FSDO Helena, MT FSDO Anchorage, AK FSDO Fairbanks, AK FSDO Juneau, AK FSDO	Renton, WA	September 22-24, 1992

SEMINAR DESCRIPTION: FAA Order 8000.59, "*DAR, DMIR, DOA, DAS Standardization Training Course,*" dated May 17, 1984, provides for this 3-day seminar which familiarizes DAR's, DMIR's, DOA representatives, and DAS representatives with FAA administrative procedures, methods, and practices in the interest of standardization. Phase IV seminar subjects are: Publications; Production Approvals; Export; and Airworthiness Certification and Approval.

SEMINAR PREREQUISITES: Each participant scheduled to attend a seminar should be a DAR or DMIR, be in the process of being designated as a DAR or DMIR, or be authorized to perform certification services on behalf of the FAA under the provisions of a DOA or DAS. Key personnel (managers, etc.) in the local aviation community may be invited by the FAA.

SEMINAR ATTENDANCE: All DAR's, DMIR's, DOA representatives, and DAS representatives are expected to attend a standardization seminar every 2 years.

PROCEDURES FOR ENROLLMENT IN THE SEMINAR: In order to allow scheduling alternatives, the FAA's Aviation Standards National Field Office will send invitations to each district office twice in every 2-year cycle. Attendance is required at only one seminar in each cycle.

FAA inspectors, designees, and industry personnel should, if possible, attend one of the two seminars to which they will be invited. Persons who desire to attend a seminar location other than the one of invitation, must request approval from their cognizant FAA office. The district office will in turn notify and invite personnel within their geographical areas, including any satellite or field offices. Designees or DOA/DAS representatives should respond to their cognizant FAA office to allow for coordination of attendance.

Summary of Crashworthiness Rulemaking for Transport Category Airplanes

This and the following articles are provided in response to numerous requests for information on the FAA's on-going rulemaking activity.

This first article summarizes current projects in the area of cabin safety. (This summary does not include any cabin safety requirements that may have been made mandatory as a result of Airworthiness Directives adopted for specific makes and models of airplanes.)

ACCOMPLISHMENTS IN CABIN SAFETY

Floor Proximity Emergency Escape Path Marking (Amdts. 25-58 and 121-183): Amendment 25-58 requires the airplane emergency lighting systems on all transport category airplanes for which an application for type certificate is made after November 25, 1984, to have a means to visually identify the emergency escape path, and to identify each exit from the escape path. Related Amendment 121-183 requires that airplanes in air carrier (Part 121) service have such emergency lighting systems by November 26, 1986.

Flammability Requirements for Aircraft Seat Cushions (seat cushion fireblocking) (Amdts. 25-59 and 121-184): This rule requires that airplane seat bottom and back cushions meet a more stringent flammability test than previously required. The impact of the rule change is to reduce the involvement of the typical polyurethane foam cushion in a cabin fire. Air carrier, air taxi, and commercial

operators airplanes (Part 121 operators) were required to be in compliance by November 26, 1987.

Cargo Compartment Protection (Class C & D) (Amdts. 25-60, 121-202, and 135-31): This rule upgrades the fire safety standards for cargo or baggage compartments in certain transport category airplanes to require the replacement of ceiling and sidewall liner panels that are not constructed of aluminum or glass fiber reinforced resin by March 20, 1991. In addition, new design airplanes are required to have liners which meet stringent flame penetration standards.

Improved Flammability Standards for Materials Used in the Interiors of Transport Category Airplane Cabins (Ohio State University Test) (Amdts. 25-61, 25-66, 121-189, and 121-198): This rule requires that interior components with large outer surface areas meet a rate-of-heat-release flammability standard based on a test developed at Ohio State University. Air carrier airplanes manufactured on or after August 20, 1988, but prior to August 20, 1990, are required to meet an interim standard using the new test method. In-service air carrier airplanes, type certificated after January 1, 1958, which undergo a substantially complete replacement of the cabin interior on or after August 20, 1988, but prior to August 20, 1990, must also meet the interim standard. Air carrier airplanes manufactured on or after August 20, 1990, were required to meet the total new standard plus a smoke standard (American Society of Testing Materials Standard Test Method ASTM F814-83). In-service air carrier airplanes, type certificated after January 1, 1958, which undergo a substantially complete replacement of the cabin interior on or after August 20, 1990, must also meet the new standards.

Seat Safety Standards (Amdt. 25-64): This rule upgrades the standards for occupant protection during emergency landing conditions in transport category airplanes by revising the seat restraint requirements and by defining impact injury criteria. These design standards were adopted on May 12, 1988, and apply to all transport category airplanes for which an application for type certificate is made on or after June 16, 1988.

Location of Passenger Emergency Exits (Amdt. 25-67): This rule establishes a new standard that limits the distance between emergency exits on transport category airplanes. Manufacturers and air carriers are prohibited from increasing the distance between emergency exits to more than 60 feet. This rule is intended to ensure an opportunity for safe passenger evacuation during an emergency. This rule became effective for all airplanes July 24, 1989.

Power Source for Public Address System in Transport Category Airplanes (Amdts. 25-70 and 121-209): The new rule requires that the PA system be independently powered for at least 10 minutes, including at least 5 minutes of announcements. This requirement provides for improved safety by ensuring that the PA system will be powered in an emergency without having to rely on engine or auxiliary power unit operation. Air carrier and air taxi airplanes manufactured after November 27, 1990, must comply.

Airplane Cabin Fire Protection (Amdts. 25-74 and 121-185): This rule requires improved lavatory fire protection and the installation of halon 1211 (or equivalent) hand fire extinguishers for use in the passenger cabin.

Air carrier airplanes were required to be retrofitted as follows:

- **Lavatory smoke detectors were to be installed by October 29, 1986.**
- **Lavatory waste receptacles were to be outfitted with a built-in fire extinguisher by April 29, 1987.**
- **The number of hand fire extinguishers in the cabins of airplanes with seating capacities greater than 200 were to be increased.**
- **At least two halon fire extinguishers were to be installed in each airplane by April 29, 1986.**

Protective Breathing Equipment (Amdt. 121-193): This rule requires that air carrier airplanes be equipped with protective breathing equipment (PBE) for use by flight attendants to protect them from smoke while using fire extinguishers in fighting on-board fires. The airplanes were to comply by July 6, 1989.

Exit Row Seating (Amdt. 121-214): This rule establishes criteria for persons seated in rows adjacent to emergency exits. Persons seated next to emergency exits must have the physical and mental capability to operate the exit and possibly assist other passengers in emergency evacuation. This rule became effective on October 5, 1990.

Radiant Heat Testing of Material in Inflatable Emergency Evacuation Slides: Technical Standard Order (TSO) C69 was revised to require that emergency evacuation slides manufactured after December 3, 1984, comply with a new standard for resistance to radiant heat in order to be marked as meeting the TSO.

CABIN SAFETY PROJECTS UNDER DEVELOPMENT

Improved Access to Type III Exits (Notice 91-11): This notice proposes a rule which would provide improved access to Type III exits in transport category airplanes. The new standards would affect air carriers, air taxi operators, and commercial operators of transport category airplanes, as well as manufacturers of such airplanes, who would have six months from the effective date of the rule to comply. Notice 91-11 was published in the Federal Register on April 9, 1991; the public comment period closes October 7, 1991.

Type and Number of Passenger Emergency Exits (Notice 90-4): This notice proposes design standards for transport airplanes to clarify the type and number of passenger emergency exits required for various passenger seating capacities. In addition, design standards are proposed which would define two new exit types. Notice 90-4 was published in the Federal Register on February 22, 1990; the public comment period closed August 21, 1990. The final rule is in the early drafting stages.

Miscellaneous Changes to Emergency Evacuation Demonstration Procedures, Exit Handle Illumination, and PA Handsets. (Notice 89-23): This amendment will modify the procedures for conducting an emergency evacuation demonstration by requiring that the flight crew take no active role in the demonstration and by changing the age/sex distribution requirement for demonstration participants. It will also standardize the illumination requirements for the handles of the various types of passenger emergency exits and add a requirement for a *"push to*

talk" switch to the public address system. Notice 89-23 was published in the Federal Register on September 8, 1989; the public comment period closed January 8, 1990. Publication of the final rule is expected sometime in during the summer of 1991.

Improved Flammability Standards for Materials Used in the Interiors of Transport Category Airplane Cabins. (Notice 90-12): This notice proposes clarification that certain transparent panels and areas isolated from the passenger cabin, such as the cockpit and lavatories, do not have to meet the new flammability standards of Amendments 25-61, 25-66, 121-189 and 121-198. In addition, the exposed ends of stowed galley carts would not have to meet the new standards unless they are manufactured after a specified date. A final rule is expected by the end of the year.

Miscellaneous Operational Amendments (Notice 90-6): The FAA has also proposed a series of changes to the operating rules to enhance safety during the period of time the airplane is on the ground, before takeoff and after landing. These would include, lighting passenger information signs (NO SMOKING, FASTEN SEAT BELT), and arming emergency evacuation devices.

Water Survival Equipment: A draft final rule is in coordination in FAA headquarters that would require additional equipment for water survival, regardless of the type of operation. Additional accessibility and performance would also be specified.

OTHER SUBJECTS UNDER STUDY

Cabin Water Spray System: This is a research program to study the possible benefits of an on-board water spray system to help a combat a post crash fire. Preliminary results look favorable, but considerable research is still required and is ongoing to understand the potential drawbacks of such a system and the mechanisms that make the concept effective.

Seat Component Fireworthiness: This is also a research program to determine if seat components (other than the seat cushion, which has already been upgraded) have a quantifiable effect on cabin fires. The tests conducted as result of this research may lead to new regulations if a need is demonstrated.

Ditching Criteria: The Transport Airplane Directorate is currently engaged in a comprehensive study of the requirements for ditching (water landing.) This study is intended to determine if the existing requirements for ditching certification are adequate, and if not, to propose new standards accordingly.

Airframe Crashworthiness: The FAA has a comprehensive research program to study dynamic impact characteristics of several aircraft components. These include composite structure, fuel systems, wing and tail structure as well as seats and occupants. This program is an ongoing effort, from which the current standards for dynamic testing of seats was developed.

Advisory Circular (AC) Projects in Progress

Airplane Flight Manual (AFM):

PURPOSE: To specify the information required to be in the AFM by the applicable regulations and provides further guidance as to both the form and content of the approved and unapproved portions of the AFM.

STATUS: A request for public comment on this draft advisory circular was published in the Federal Register on February 14, 1989; the public comment period closed May 15, 1989. The FAA is now looking at revising the AC for harmonization of the FAR/JAR. An initial redraft of the AC has been completed and is expected to be republished by the end of 1991.

Crashworthiness Handbook:

PURPOSE: Consolidates relevant old policy and guidance material on crashworthiness into one document. It covers the crashworthiness regulations through Amdt. 25-59.

STATUS: The FAA expects to issue this advisory circular by August 1991.

Hydraulic Systems Certification and Analysis:

PURPOSE: To provide guidance for acceptable methods and means of complying with the requirements of Section 25.1435 and related regulations pertaining to hydraulic systems.

STATUS: The AC is in the initial drafting stage. A schedule for publication has not been established at this time.

Operations Without Normal Electrical Power:

PURPOSE: To set forth three specific methods of compliance with the requirements pertaining to electrical power sources and distribution systems required to power instrument displays, systems, equipment, or parts of the airplane which are required for safety of flight during IMC operations.

STATUS: The FAA expects to publish a request for public comments on this draft advisory circular by the end of 1991.

Uniform Distribution of Exits:

PURPOSE: To provide guidance for demonstrating compliance with the requirements for distributing required passenger emergency exits uniformly.

STATUS: AC 25.807-1 was issued August 13, 1990. Project closed.

Pilot Compartment View Design Considerations:

PURPOSE: To provides guidance concerning the geometric characteristics of the pilot compartment and the properties of transparent materials necessary to assure adequate visibility from the flight deck.

STATUS: Notice of availability of draft for public comment was published in

the Federal Register on April 30, 1990. The comment period closed August 29, 1990. Comments have been reviewed and the final document is being revised accordingly. The FAA expects to issue this AC in late 1991.

Noise Abatement Departure Profile:

PURPOSE: This project revises AC 91-53 to provide certification and operational guidance for allowing additional noise abatement procedures.

STATUS: The FAA expects to issue this revised AC in 1991.

Continued Airworthiness:

PURPOSE: To provide instructions to ensure continued airworthiness of transport category airplanes. It addresses the approval procedures to follow when making structural repairs with special consideration given to structure certified to the damage tolerance requirements of the FAR.

STATUS: The AC is being finalized for issuance. The FAA expects to issue this AC in 1991.

Flight Test Guide for Certification of Transport Category Airplanes:

PURPOSE: To update the guidance in FAA Order 8110.8, Engineering Flight Test Guide, and to incorporate that guidance into an AC. The first portion of this project was completed when Subpart B (Flight) was updated and issued as Advisory Circular 25-7 on April 9, 1986. The current portion of this project includes a review of AC 25-7 to address harmonization of the FAR/JAR. Ultimately, all remaining Part 25 guidance from Order 8110.8 will be updated and incorporated into AC 25-7, at which time Order 8110.8 will be canceled.

STATUS: This project has been deferred for several months while an FAA/industry task force conducts a review of rejected takeoff (RTO) safety issues in general. The FAA has identified those areas of the AC that should be revised for international harmonization. Schedule for completion of rewrite of this revised AC has not been established.

High Altitude Takeoff Approval for Turbojet Powered Transport Airplanes:

PURPOSE: To provide guidance for the evaluation of power management techniques, thrust lapse rates, engine limits compliance, and altitude extrapolation limits for turbojet-powered transport airplanes during takeoff.

STATUS: This advisory circular is in the early drafting stages. A schedule has not been established at this time.

Flight Attendant Seat Changes:

PURPOSE: To revise AC 25.785-1 to provide guidance with respect to flight attendant seat head strike zones and restraint system installation.

STATUS: The FAA expects to issue this advisory circular in 1991.

Electrical Fault Fire Prevention and Protection:

PURPOSE: This advisory circular describes certain electrical design and maintenance practices which are considered to provide an acceptable means for minimizing the likelihood of electrical smoke and fires, and for containing fires or minimizing their effects when they do occur.

STATUS: AC 25-16 was issued April 5, 1991.

Certification Methods for Full Authority Digital Electronic Engine Control System (FADEC):

PURPOSE: To provide guidance and acceptable methods for demonstrating compliance with the regulations for approving full authority digital electronic engine control systems.

STATUS: This advisory circular is in the early drafting stages. A schedule for publication has not been established at this time.

Operational Landing Distances for Wet, Grooved, or Porous Friction Course Overlayed Runways:

PURPOSE: To revise AC 121.195(d)-1, which sets forth an acceptable means of showing compliance with the FAR pertaining to operational landing distances on wet runways, to bring the guidance provided in the AC in line with current operational policy.

STATUS: AC 121-195(d)-1A was issued June 19, 1990.

Damage Tolerance and Fatigue Evaluation of Structure:

PURPOSE: To revise AC 25.571-1 to clarify the damage tolerance assessment for the operational life of an airplane type which exceeds the original design life.

STATUS: An AC is scheduled to be published for public comment concurrently with a proposed FAR Part 25 rule later this year.

Takeoff Configuration Warning Systems:

PURPOSE: To provide guidance for a means of compliance with the existing FAR pertaining to takeoff configuration warning systems for transport airplanes.

STATUS: A redraft of this AC was published in the Federal Register on April 3, 1991. The public comment period closes August 1, 1991.

Widespread Multiple Site Damage:

PURPOSE: To provide guidance for the timely repair of multiple site damage (MSD) in primary airplane structure.

STATUS: This document is in the early coordination stages within the FAA at this time. A schedule for publication has not been established.

Software Verification Validation:

PURPOSE: To supplement the software verification guidance provided by RTCA Document DO-178A and AC 20-115.

STATUS: This project is dependent upon activities of RTCA Special Committee 167, whose charter is to review and revise RTCA DO-178A, Software Considerations in Airborne Systems Equipment Certification. A schedule will be established when the issues that need to be addressed in this AC are identified.

Auxiliary Power Unit (APU) Installation:

PURPOSE: To provide guidance concerning APU installation approvals for transport category airplanes.

STATUS: This AC is in the very early drafting stages within the FAA at this time. A schedule for completion has not been established.

Airborne Data Link Systems:

PURPOSE: To provide guidance on airworthiness approval of airborne data link systems.

STATUS: Notice of availability of a draft AC was published in the Federal Register on December 20, 1990. The public comment period closed April 21, 1991. The FAA is currently reviewing public comments received. A final schedule has not been established.

Certification Maintenance Requirements:

PURPOSE: To provide guidance on the documentation and control of certification check requirements.

STATUS: The subject of CMR's is being thoroughly reinvestigated at this time. The current draft AC will be completely rewritten and coordinated within the FAA before proceeding with publication for public comment. A revised draft is due August 1, 1991.

Airworthiness and Operational Approval of Traffic Alert and Collision Avoidance System (TCAS II):

PURPOSE: To update existing AC 20-131 to provide guidance for the airworthiness and operational approval of TCAS II systems.

STATUS: The public comment period for the proposed AC closed October 29, 1990. A schedule for issuance has not been established at this time.

Revise AC 25.629-1, Flutter Substantiation of Transport Category Airplanes:

PURPOSE: The fail-safe design criteria for control surface actuators which must retain stiffness in failure conditions have been developed on a case-by-case basis and have varied with each design presented. These criteria are not established in a general form which can be used as guidance for present and future designs. AC 25.629-1 will be revised to include this guidance.

STATUS: This proposed document is in the early drafting stages. A schedule for issuance has not been established at this time.

Rulemaking Projects in Progress

Fuel System Vent Fire Protection:

PURPOSE: To amend the airworthiness standards for transport category airplanes to require fuel system protection during post-crash ground fires.

STATUS: Advance Notice of Proposed Rulemaking No. 84-17 was issued September 26, 1984. The public comment period closed January 25, 1985. A Notice of Proposed Rulemaking (NPRM) is currently scheduled for Federal Register publication in August 1991. The portion of this proposal pertaining to the fuel shutoff valve has been removed and combined with the fuselage fuel tanks/fuel lines rulemaking project.

Protective Breathing Equipment:

PURPOSE: To amend Section 25.1439 to require protective breathing equipment (PBE) for each crewmember on the flight deck. Currently, PBE is required only if certain classes of cargo compartments are installed in the airplane. This proposal is necessary because it is likely that any Part 25 type design airplane will experience smoke in the cockpit from sources not effectively dealt with by emergency smoke clearance procedures (e.g., electrical smoke). The intent of this proposal is to optimize flight crew performance and survivability when exposed to smoke.

STATUS: An NPRM is currently in preliminary drafting stage. A schedule for issuance has not been established at this time.

Standards for Approval for High Altitude Operation of Subsonic Airplanes:

PURPOSE: To amend Part 25 to specify aircraft and equipment airworthiness standards for subsonic airplanes to be operated up to an altitude of 51,000 ft. As existing rules do not provide adequate certification standards for high altitude operation, standards have been provided in the past for certain airplanes through the issuance of special conditions. This rulemaking would eliminate the need for special conditions.

STATUS: The FAA expects to publish a final rule in the Federal Register by the end of 1991.

Airplane Cabin Fire Protection:

PURPOSE: To provides improved cabin fire protection for transport category airplanes by requiring: (1) each lavatory to be equipped with a smoke detector system that provides warning to the cockpit or to the passenger cabin crew; (2) each lavatory trash receptacle to be equipped with a fire extinguisher that discharges automatically upon the occurrence of a fire within the receptacle; (3) the number of hand fire extinguishers in the cabins of airplanes with seating capacities greater than 200 to be increased; (4) a specified number of hand fire extinguishers in the cabin to contain Halon 1211 or equivalent as the extinguishing agent, and (5) one hand fire

extinguisher in each galley that is located above or below the passenger compartment. In addition, one hand fire extinguisher is required for certain all-cargo airplanes. These requirements follow an existing Part 121 rule.

STATUS: Amendment 25-74 was published in the Federal Register on April 16, 1991.

Standards for Approval of a Wet Runway Reduced V_1 Methodology:

PURPOSE: To add new standards for transport category airplanes which would provide for approval of a reduced takeoff decision speed (V_1) methodology for takeoff on wet and contaminated runways. This rule will provide an increase in stopping distance by allowing a reduced clearance over the end of the runway (screen height) and will provide an increase in safety for rejected takeoffs on wet and contaminated runways.

STATUS: Notice 87-13 was issued November 20, 1987. The public comment period closed March 30, 1988. Since that time, however, this subject has been addressed by an industry/airworthiness authorities group to consider additional rejected takeoff safety enhancement factors. A supplemental Notice is being considered to include reduced obstacle clearance for wet runway operation, line-up distance, and worn brake accountability. Also, a revision to the time delay methodology of Amendment 25-42 will be included. The supplemental Notice is currently scheduled for Federal Register publication later this year.

Low Fuel Quantity Indicators:

PURPOSE: To amend the airworthiness standards for transport category airplanes by requiring a means to alert the flight crew of potentially unsafe low fuel quantities. This rule will require new transport category airplane designs to incorporate a low fuel quantity alert to the flight crew that will allow either correction of certain fuel management errors or the opportunity to make a safe landing prior to engine fuel starvation.

STATUS: The final rule is in early coordination stage within the FAA. Federal Register publication is expected in late 1991.

Airplane Jacking Loads:

PURPOSE: To amends the airworthiness standards for transport category airplanes to include a requirement for airplane tiedown and jacking loads which would provide for protection of primary structure during jacking operations and ground gust conditions.

STATUS: Notice 90-3 was published in the Federal Register on February 9, 1990. The public comment period closed August 8, 1990. Issuance of the final rule is scheduled for late 1991.

Improved Access to Type III Exits:

PURPOSE: To provide improved access to Type III exits in transport category airplanes. The new standards would affect air carriers, air taxi operators, and commercial operators of transport

category airplanes, as well as manufacturers of such airplanes.

STATUS: Notice 91-11 was published in the Federal Register on April 9, 1991. The public comment period closes October 7, 1991.

Landing Gear Aural Warning:

PURPOSE: To amend the existing airworthiness standards and operating rules pertaining to landing gear aural warning systems for transport category airplanes. It will apply to all new or modified airplanes certified after the effective date of the amendment.

STATUS: Federal Register publication of the final rule is scheduled for late 1991.

Airplane Lightning Protection:

PURPOSE: To provide lightning protection requirements for installed electrical and electronic systems which perform essential or critical functions in transport category airplanes. These requirements have been imposed on many recent designs by special conditions.

STATUS: Notice 89-15 was published in the Federal Register May 30, 1989. The public comment period closed September 27, 1989. Issuance of the final rule is scheduled for late 1991.

Update Flutter, Vibration, and Buffet Requirements:

PURPOSE: To revise the airworthiness standards for type certification of transport category airplanes concerning vibration, buffet, flutter, and divergence. It clarifies the requirement to consider flutter and divergence when treating certain damage and failure conditions required by other sections of the Federal Aviation Regulations (FAR), and adjusts the safety margins related to aeroelastic stability to make them more appropriate for the conditions to which they apply.

STATUS: The final rule is scheduled for Federal Register publication in 1991.

1-G Stall Speed as a Basis for Compliance with Part 25 of the FAR:

PURPOSE: To amend Parts 1, 25, and 36 of the FAR to redefine the airplane stalling speed as the corrected 1-g speed in lieu of a minimum speed in the stall maneuver. The proposed changes would provide for a consistent, repeatable reference stalling speed that would eliminate less than desired maneuvering margins, and provide for the adjustments of multiplying factors to maintain equivalent requirements in areas where the use of minimum stalling speed has provided adequate design standards with satisfactory service experience.

STATUS: The FAA expects to publish this Notice of Proposed Rulemaking in the Federal Register in late 1991.

Loss of Engine Cowling:

PURPOSE: To provide improved engine cowling retention for transport airplanes by adding specific design requirements for cowling retention systems.

STATUS: Notice 89-25 published September 19, 1989. Comment period closed 3/19/90. Final rule in early drafting stages. Federal Register publication of the final rule is currently scheduled for 1992.

Type and Number of Passenger Emergency Exits:

PURPOSE: To provide new design standards for transport airplanes to clarify the type and number of passenger emergency exits required for various passenger seating capacities. In addition, design standards are added that define two new exit types.

STATUS: Notice 90-4 was published in the Federal Register on February 22, 1990. The public comment period closed August 21, 1990. The final rule is in the early drafting stage. A schedule for issuance has not been established at this time.

Miscellaneous Changes to Emergency Evacuation Demonstration Procedures, Exit Handle Illumination, and PA Handsets:

PURPOSE: To modify the procedures for conducting an emergency evacuation demonstration by requiring that the flight crew take no active role in the demonstration and by changing the age/sex distribution requirement for demonstration participants. It also standardizes the illumination requirements for the handles of the various types of passenger emergency exits and add a requirement for a "*push to talk*" switch to the public address system.

STATUS: Notice 89-23 was published in the Federal Register on September 8, 1989. The public comment period closed on January 8, 1990. The FAA expects to publish the final rule in the Federal Register sometime this year.

Review of FAA Standard for Maximum Allowable Carbon Dioxide Concentration in the Crew and Passenger Compartments:

PURPOSE: To reduce the maximum allowable concentration of carbon dioxide in occupied areas of transport category airplanes from the current 3 percent to 0.5 percent.

STATUS: The Notice of Proposed Rulemaking is in the final coordination stages within the FAA. This document was scheduled for Federal Register publication during 1991.

All Engine Restart Envelope:

PURPOSE: To add a requirement that Airplane Flight Manuals contain an emergency procedure to enable in-flight restart of an engine after encountering flameout of all engines.

STATUS: This project is not currently scheduled on the agency's Rulemaking Program Plan for 1991.

Use of Inert Gas in Lieu of Air for Airplane Tire Inflation:

PURPOSE: To add a requirement to use dry nitrogen or other inert gas for tire inflation, in lieu of air.

STATUS: Notice 90-7 was issued in the Federal Register on February 23, 1990. The public comment period closed September 3, 1990. The FAA expects to issue the final rule in 1992.

Bird Strike Damage Assessment:

PURPOSE: To require that transport category airplanes be designed such that: (1) only minor damage would result from impact with a four-pound bird and, (2) the airplane would be capable of continued safe flight and landing after impact with an eight-pound bird.

STATUS: This document is in the early coordination stage within the FAA. This project is currently being held in abeyance pending review of economic data.

Depressurization Evaluation of Structure:

PURPOSE: This project concerns a retroactive requirement for transport airplanes to require that normally unpressurized areas and compartments be able to withstand the effects of depressurization into those compartments.

STATUS: A Notice for Proposed Rulemaking is in the final coordination stage within the FAA and is scheduled for Federal Register publication in 1991.

Dynamic Braked Roll Condition:

PURPOSE: To require that transport airplanes have sufficient strength to withstand the maximum likely combination of vertical dynamic reaction and sudden increase in drag load that could occur on the nose gear as a result of sudden main gear braking.

STATUS: The Notice of Proposed Rulemaking is in the early drafting stages within the FAA. This project is not currently scheduled on the agency's Rulemaking Program Plan for 1991.

Fatigue Evaluation of Structure:

PURPOSE: To revise the fatigue requirements for damage tolerant structure on transport airplanes to require full-scale fatigue testing, and to require that the thresholds for inspections be based on crack growth from initial flaws in the structure.

STATUS: A Notice of Proposed Rulemaking is in the final coordination stages within the FAA. Federal Register publication is expected later this year.

Fatigue Test Requirements for Aging Aircraft:

PURPOSE: To add requirements for fatigue evaluation of primary flight structure on certain turbojet powered transport category airplanes. This rule is intended to ensure continued airworthiness of the current fleet of aging airplanes which are approaching their design service lifetimes, and would require that certain operators of turbine powered

transport category airplanes take steps to ensure that multiple site damage (MSD) does not occur.

STATUS: This project is currently in the early stages of development within the FAA. A publication date for the Notice of Proposed Rulemaking has not yet been established.

Miscellaneous Amendments to Part 25:

PURPOSE: This project responds to two petitions for rulemaking relating to Sections 25.903, 25.1301, and 25.1309 of the FAR, and proposed new sections to Part 25. Changes to other sections of Subparts E and F are also proposed for clarity and consistency among related rules.

STATUS: A Notice of Proposed Rulemaking is in the early drafting stage. A publication date has not been established at this time.

Review of Allowable Wear Limits for Aircraft Brakes:

PURPOSE: To require that the brake kinetic energy capacity ratings for wheel brake assemblies that are at the allowable "*maximum brake wear*" limit not be less than the maximum kinetic energy absorption requirements for which the airplane is certified.

STATUS: This issue is to be combined with the reduced V_1 proposal.

Improved Flammability Standards for Materials Used in the Interiors of Transport Category Airplane Cabins:

PURPOSE: To clarify the standards (Amdts. 25-61, 25-66, 121-189, and 121-198) adopted in 1986 concerning the flammability of components used in the cabins of certain transport category airplanes.

STATUS: The FAA expects to publish a final rule in the Federal Register by December 1991.

Crashworthy Fuselage Fuel Tanks and Fuel Lines:

PURPOSE: This project concerns the feasibility of installing in all air carrier aircraft crashworthy fuselage fuel tanks and fuselage fuel lines which are rupture-resistant, and which disconnect and seal in the event of an accident.

STATUS: Advance Notice of Proposed Rulemaking 89-11 was published in the Federal Register on May 2, 1989. The public comment period closed October 30, 1989. Federal Register publication of an NPRM is scheduled for April 1992.

Fire Protection of Flight Controls and Structures:

PURPOSE: To revise Section 25.865 of the FAR to specify the loading conditions that essential flight controls and principal structural elements must withstand.

STATUS: The Notice of Proposed Rulemaking is in the early drafting stages within the FAA, and is not currently scheduled on the agency's Rulemaking Program Plan for 1991.

Revised Seat Safety Standards:

PURPOSE: To revise the seat dynamic test requirements for transport airplanes to relieve the requirement to test crew seats in the cockpit with floor warpage, and to require that seat leg reaction loads be recorded during the dynamic tests.

STATUS: The Notice of Proposed Rulemaking is in the early drafting stages within the FAA, and is not currently scheduled on the agency's Rulemaking Program Plan for 1991.

Flight Controls and Power-Operated Systems:

PURPOSE: To revise the airworthiness standards for transport category airplanes to require separation and isolation of vital control systems. This revision would reflect the latest criteria developed for certification of airplanes equipped with active flight controls.

STATUS: The Notice of Proposed Rulemaking is in the early drafting stages within the FAA, and is not currently scheduled on the agency's Rulemaking Program Plan for 1991.

Fire Protection of Flight Controls and Structures:

PURPOSE: To revise Section 25.865 of the FAR to specify the loading conditions that essential flight controls and principal structural elements must withstand.

STATUS: The Notice of Proposed Rulemaking is in the early drafting stages within the FAA, and is not currently scheduled on the agency's Rulemaking Program Plan for 1991.

Miscellaneous Cabin Safety Changes:

PURPOSE: To amend Part 25 of the FAR to require an assist handle at all designated flight attendant assist spaces to enable attendants to steady themselves while helping passengers out the exit; to require a means to hold door-type emergency exits open when opening in an emergency; to require a viewing window or equivalent, to enable outside conditions to be viewed prior to opening an emergency exit at each emergency exit; to specify that 12" x 20" area on the floor for flight attendant assist space; and to prohibit the installation of an interior door between a passenger and an emergency exit.

STATUS: The Notice of Proposed Rulemaking is in the early drafting stages within the FAA, and is not currently scheduled on the agency's Rulemaking Program Plan for 1991.

Gust Criteria:

PURPOSE: To develop gust criteria for use in the certification of transport category airplanes which will improve airplane safety by utilizing a more representative analytical model of atmospheric turbulence, which considers dynamic responses to continuous turbulence and to discrete gusts.

STATUS: The Notice of Proposed Rulemaking is in the early drafting stages within the FAA, and is not currently scheduled on the agency's Rulemaking Program Plan for 1991.

Technical Standard Orders (TSO)

The Aircraft Certification Service in FAA Headquarters recently issued the following TSO's to reflect technological advances in aeronautics. (Note that the requirements identified are not inclusive to the TSO.)

TSO-C62d: *Tires*, Revision d, dated September 7, 1990, prescribes the minimum performance standards that tires, excluding tailwheel tires, must meet to be identified with TSO-C62d. After September 7, 1990, tires must meet the criteria of the document entitled, "*Federal Aviation Administration Standard for Aircraft Tires,*" dated December 31, 1979, September 12, 1984, or September 7, 1990 (Appendix 1). Notwithstanding the requirements of Section 21.603(a) and (b) of the Federal Aviation Regulations (FAR) and the provisions of any specific previous TSO approval, after December 31, 1982, no person may identify or mark a tire having a speed rating above 160 mph with TSO numbers TSO-C62, TSO-C62a, or TSO-C62b. Further, a tire having a special rating above 160 mph approved prior to December 31, 1979, may not be manufactured under the provisions of its original approval.

TSO-C62d requires maintenance data to be submitted to the FAA regional office. The manufacturer must include inspection criteria for the tire to determine eligibility for used tires of the same part number to be continued in service. Special nondestructive inspection techniques and retreading procedures, if applicable, must be included in the maintenance information, along with any special repair methods applicable to the tire.

TSO-C115A: *Airborne Area Navigation Equipment using Multi-Sensor Inputs*, Revision A, dated February 22, 1991, prescribes the minimum performance standards identified in Radio Technical Commission for Aeronautics (RTCA) DO-187, "*Minimum Operational Performance Standards for Airborne Area Navigation Equipment Using Multi-Sensor Inputs,*" dated November 1984, as amended and supplemented by this TSO.

TSO-C123: *Cockpit Voice Recorder System*, dated May 3, 1991, was developed to adopt the minimum performance standards from the European Organizational for Civil Aviation Electronics (EUROCAE), ED-56, "*Minimum Operational Performance Standard for Cockpit Voice Recorder Systems,*" Chapters 4, 5, and 6, dated February 1988. The performance criteria contained in EUROCAE ED-56 recommend much more stringent test procedures for performing the crash survivability test. EUROCAE ED-56 incorporates, as a reference, RTCA

Document No. DO-160B, "*Environmental Conditions and Test Procedures for Airborne Equipment,*" dated July 1984. If the equipment design implementation includes a digital computer, the computer software must be verified and validated in an acceptable manner. One acceptable means of compliance for the verification and validation of the computer software is outlined in RTCA Document No. DO-178A, "*Software Considerations in Airborne Systems and Equipment Certification,*" dated March 1985. This TSO supersedes TSO-C84, *Cockpit Voice Recorders.*

Proposed TSO's

TSO-C124: *Flight Data Recorders.* This proposed TSO was developed to adopt the minimum performance standards from the European Organizational for Civil Aviation Electronics (EUROCAE), ED-55, "*Minimum Operational Performance Standard for Flight Data Recorder Systems,*" Chapters 4, 5, and 6, dated May 1990. The performance criteria contained in EUROCAE ED-56 recommend much more stringent test procedures for performing the crash survivability test.

EUROCAE ED-55 incorporates, as a reference, RTCA Document No. DO-160B, "*Environmental Conditions and Test Procedures for Airborne Equipment,*" dated July 1984. If the equipment design implementation includes a digital computer, the computer software must be verified and validation of the computer software is outlined in RTCA Document No. DO-178A, "*Software Considerations in Airborne Systems and Equipment Certification,*" dated March 1985.

TSO-C127: *Rotorcraft and Transport Airplane Seating.* This proposed TSO prescribes the minimum performance standards that rotorcraft and transport airplane seating systems of the following types must meet to be identified with the applicable TSO marking:

- **Type A - Transport Aircraft**
- **Type B - Rotorcraft**

Seating systems that are to be identified and manufactured after the date of this proposed TSO would be required to meet the qualification requirements in Aerospace Standard AS8049, dated July 1990. The minimum performance standards, qualification requirements, and minimum documentation requirements are set forth in various sections of AS8049. Options are provided for dynamic test procedures and documentation.

Copies of RTCA documents may be purchased from the

Radio Technical Commission for Aeronautics Secretariat
One McPherson Square, Suite 500
1425 K Street
Washington, D.C. 20005.

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

Federal Aviation Administration
Aircraft Certification Service
Aircraft Engineering Division (AIR-100)
800 Independence Avenue, S.W.
Washington, D.C. 20591

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