Federal Aviation Administration
Aviation Rulemaking Advisory Committee

Air Carrier Operations Issue Area
Single Engine-IMC-with Passengers Working Group

Task 1 – IMC with Passengers

Task Assignment

Aviation Rulemaking Advisory Committee (ARAC)

AGENCY: Federal Aviation Administration (FAA), DOT.

ACTION: Notice of establishment of the Single Engine-IMC-with passengers ARAC Working Group.

SUMMARY: Notice is given of the establishment by the Aviation Rulemaking Advisory Committee of an ARAC working group to examine the feasibility of conducting single-engine passenger carrying operations in instrument meteorological conditions (IMC) under Part 135 of the Federal Aviation Regulations. This notice informs the public of the activities of the ARAC and seeks the public's participation.

FOR FURTHER INFORMATION CONTACT: Mr. Quentin J. Smith, Jr., Executive Director for Air Carrier Operations Issues, Flight Standards Service (AFS–200), 800 Independence Ave. SW., Washington, DC 20591; telephone (202) 267–8166, FAX: (202) 267–5230.

SUPPLEMENTARY INFORMATION: The Federal Aviation Administration (FAA) has established an Aviation Rulemaking Advisory Committee (ARAC) (56 FR 2190, January 22, 1991; and 58 FR 9230, February 19, 1993). One area that the ARAC deals with is air carrier operations. Other working groups in this area have dealt with issues such as autopilot takeoff minimum altitudes, fuel requirements, controlled rest on the flight deck, noise abatement, and flight crewmember flight/rest/duty requirements. The Single Engine-IMC-with passengers Working Group is being established to evaluate the safety aspects and overall feasibility of allowing passenger carrying operations in IMC with single engine aircraft. The Single Engine-IMC-with passengers Working Group will forward its recommendations to the ARAC, which will then determine whether to forward them to the FAA.

Specifically, the Working Group's task is as follows:

(1) Review the Canadian policy authorizing single engine IMC operations in turbine-powered airplanes and make recommendations for adoption.

(2) Re-examine existing policies for commercial IMC and/or night operations by single-engine aircraft.

(3) Determine the conditions and/or limitations which should be met before commercial air transport IMC and/or night operations by single-engine aircraft could be permitted.

(4) When considering the applicability of such operations, include both airplanes and helicopters (both turbine and reciprocating engines), passenger carriage (FAA), passenger/cargo carriage (JAA).

(5) Consider and dispose of any petitions for rulemaking or exemption on this subject.

(6) If, after completing the review, changes are recommended, develop and submit any needed advisory material or notice of proposed rulemaking in final form.

The Working Group should recommend time line(s) for completion of the task, including the rationale, for consideration at the meeting of the ARAC to consider air carrier operations issues held following publication of this notice.

The Working Group will give a status report on the task at each meeting of the ARAC held to consider air carrier operations issues.

The Single Engine-IMC-with passengers Working Group will be comprised of experts from those organizations having an interest in the tasks assigned. A Working Group member need not necessarily be a representative of one of the member organizations of the ARAC. Individuals who have expertise in the subject and wish to become a member of the Working Group should write the person listed under the caption **FOR FURTHER INFORMATION CONTACT** expressing that desire, describing their interest in the task, and the expertise they would bring to the Working Group. The request will be reviewed with the ARAC Assistant Chair for Air Carrier Operations and the Chair of the Single Engine-IMC-with passengers Working Group, and the individual will be advised whether or not the request can be accommodated.

The Secretary of Transportation has determined that the formation and use of the ARAC are necessary in the public interest in connection with the performance of duties of the FAA by law. Meetings of the ARAC to consider air carrier operations issues will be open to the public except as authorized by section 10(d) of the Federal Advisory Committee Act. Meetings of the Single Engine-IMC-with passengers Working Group will not be open to the public except to the extent that individuals with an interest and expertise are selected to participate. No public announcement of Working Group meetings will be made.

Issued in Washington, DC, on October 13, 1994.

Quentin J. Smith, Jr.,

Assistant Executive Director for Air Carrier Operations Issues, Aviation Rulemaking Advisory Committee.

[FR Doc. 94–26068 Filed 10–19–94; 8:45 am]

BILLING CODE 4910–13–M

Recommendation Letter

AIR LINE PILOTS ASSOCIATION
535 HERNDON PARKWAY □ P.O. BOX 1169 □ HERNDON, VIRGINIA 22070 □ (703) 689-2270

April 5, 1995

Mr. Anthony J. Broderick
Associate Administrator for
Regulation and Certification (AVR-1)
Federal Aviation Administration
800 Independence Avenue, S.W.
Washington, D.C. 20591

Subject: Single Engine IFR Working Group

Dear Mr. Broderick:

The Aviation Rulemaking Advisory Committee (ARAC) Air Carrier Operations Issues Group established a Single Engine IFR Working Group last year to perform several tasks assigned by the FAA. One of the tasks was to consider and dispose of any petitions for rulemaking or exemption on the subject of allowing single engine airplanes to conduct commercial operations in IFR.

There were five petitions for exemption considered by the working group. Four of the petitions were similar in that they were from individual Part 135 operators and requested exemption authorization to conduct single engine IFR operations in a specific aircraft. The remaining petition was from the Alaska Air Carriers Association (AACA) and requested exemption only from FAR Part 135.181(c)(2). Their petition, if granted, would give their members authority to conduct single engine IFR operations only under certain narrowly defined circumstances.

At our March 7, 1995 meeting, the working group presented their report which contained two recommendations and a draft notice of proposed rulemaking. One of the recommendations was to grant the group of four petitions and the other was to grant the AACA petition. The issues group felt that the working group needed to have further discussions on several aspects of their report. However, the issues group did feel that there was enough merit in the AACA petition to warrant granting it for use in Alaska. It is sufficiently narrow in scope that it should not present a rulemaking precedent.

Accordingly, I am pleased to forward to you the attached recommendation of the Single Engine IFR Working Group to grant the AACA petition for exemption.

We look forward to sending the additional recommendations as they are completed.

Sincerely,

William W. Edmunds

William W. Edmunds, Assistant Chairman
Aviation Rulemaking Advisory Committee

WWE:jch

cc: Mr. Joe Sprague
Air Carrier Operations Issues Group

Acknowledgement Letter

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

800 Independence Ave., S.W.
Washington, D.C. 20591

MAY 16 1995

Mr. William W. Edmunds, Jr.
Assistant Chairman, Aviation Rulemaking
Advisory Committee
Airline Pilots Association
Herndon, Virginia 22070

Dear Mr. Edmunds:

Thank you for your April 5 letter forwarding the Aviation Rulemaking Advisory Committee (ARAC) proposal concerning the Alaska Air Carriers' Association petition for exemption from section 135.181 of the Federal Aviation Regulations.

The FAA recognizes that there is an ongoing action within ARAC to review and make recommendations on amending the rules affecting single engine IFR (SEIFR) operations with passengers. With this in mind, it would be premature for us to take singular action on this petition, when a rulemaking proposal is near at hand.

Additionally, to grant this petition would set a precedent to allow SEIFR operations with passengers when the related staff work of ARAC is not completed on the subject.

Therefore, the FAA will not take action either to grant or deny this petition until the work on the subject is completed, however, we do look forward to receiving your complete formal proposal at your earliest opportunity.

I would like to thank the ARAC and, in particular, the SEIFR Working Group for its efforts on the task and its continuing work.

Sincerely,

Anthony J. Broderick
Associate Administrator for
Regulation and Certification

Recommendation

- **LETTER OF RECOMMENDATION ON THE PENDING PETITION FOR EXEMPTION TO FAR PART 135.181(c)(2) FROM THE ALASKA AIR CARRIERS ASSOCIATION**

March 7, 1995

Mr. Bill Edmunds
Assistant Chairman
Air Carrier Operations Issues Group
Aviation Rulemaking Advisory Committee
P.O. Box 1169
Herndon, VA 22070

Dear Mr. Edmunds,

The following letter presents the recommendation of the Single-Engine IFR Working Group on the pending petition for exemption from FAR Part 135.181(c)(2) by the Alaska Air Carriers Association (Docket No. 27061).

BACKGROUND

The official list of tasks assigned to the Aviation Rulemaking Advisory Committee (ARAC) regarding the single-engine IFR (SEIFR) issue included the instruction to "consider and dispose of any petitions for rulemaking or exemption on this subject." There are five pending petitions for exemption to all, or part, of FAR Part 135.181. Four of these petitions are similar in that they are from individual Part 135 operators and request authorization to conduct SEIFR operations in a specific aircraft. The Working Group's recommendation to grant these four petitions is contained in a separate letter.

The remaining petition (attached) is from the Alaska Air Carriers Association (AACA) and requests exemption only from FAR Part 135.181*(c)(2)*. This would give the Association's members authority to conduct SEIFR operations in single-engine aircraft only under certain narrowly defined circumstances.

RECOMMENDATION

After considerable review and discussion of all available information on the single-engine IFR issue in general, and the Alaska issue specifically, the SEIFR Working Group strongly recommends that the Alaska Air Carriers Association petition be granted. Studies, including Transport Canada's Safety Study of VFR Flight Into Adverse Weather and the FAA's Part 135 SEIFR Operations in Instrument Meteorological Conditions (IMC) report, have clearly shown that inadvertent flight into IMC is a problem that could be addressed by allowing greater authority for SEIFR operations.

As the FAA report points out, "given the extremely low single-engine airplane accident rate estimated to be achievable for accidents that result from mechanical propulsion failure in IMC, and the highly disproportionate share of VFR into IMC accidents that occur in Alaska, very few VFR into IMC accidents would need to be prevented to offset the incremental risk exposure from propulsion failure that might result from approving single-engine IFR operations in IMC."

The AACA petition retains the existing limitations of Part 135.181, but would allow an instrument approach to be conducted at a destination in forecast, as well as unforecast, IFR conditions. This petition mandates several conservative conditions that must be met before operations are authorized. The Working Group believes that a grant of this petition will provide both the means and the incentive for Alaskan operators to improve safety by shifting operations from the VFR environment to one with aircraft separation, terrain clearance, and guaranteed coverage of navigational aids. Due to the unique nature of Alaska operations and the likelihood of improving safety, this petition should be granted without delay.

This recommendation is made after very careful, deliberate consideration by the Working Group and represents a unanimous consensus on behalf of the Working Group members.

Thank you for your consideration.

Sincerely,

Joseph A. Sprague
Chairman,
SEIFR Working Group

cc: Quentin Smith, ARAC Assistant Executive Director
Distribution: ARAC Air Carrier Issues Group members

- **PETITION FOR EXEMPTION FROM THE ALASKA AIR CARRIERS ASSOCIATION**

ALASKA AIR CARRIERS ASSOCIATION

1117 East 35th. #102 • Anchorage. Alaska 99508 • 907-277-0071 • Fax 907-277-0072

Federal Aviation Administration
Rules Docket, AGC-10
800 Independence Avenue, S.W.
Washington, D.C. 20591

SUBJECT: Petition for exemption from Section 135.181(c) (2).

CONDITIONS: The Alaska Air Carriers Association hereby petitions on behalf of its members for an exemption from Section 135.181(c) (2) of the Federal Aviation Regulations to allow operation of single-engine airplanes carrying passengers in IFR, forecast as well as unforecast, conditions in accordance with the following limitations:

1. Flights may be conducted only on routes or portions thereof which are located entirely in non-mountainous areas as described in Section 95.17 of the Federal Aviation Regulations.

2. At least one of the airports to be used on the planned flight will not accommodate, for some reason, the use of a multi-engine airplane with a passenger seating capacity of nine or less.

3. The most current weather reports or forecasts or any combination thereof indicate that the weather along the planned route allows flight under VFR under the ceiling (if a ceiling exists) beginning at a point no more than 15 minutes flying time at normal cruise speed from the departure airport.

4. Every destination and alternate airport must either: 1) be equipped with an approved instrument approach procedure; or 2) have forecast VFR conditions from a point no less than 15 minutes flying time at normal cruise speed from that airport.

5. Specific routes and airports must be approved by the Flight Standards District Office which holds the certificate for the operator, and must be listed on the operations specifications.

6. In addition to that training required by Part 135 for IFR operations, each operator using the exemption must conduct FAA approved training for its pilots on a representative route the operator is authorized to use, emergency procedures for engine failure under IFR conditions, and the conditions and limitations of the exemption.

7. Each operator must keep a record of each and every flight conducted under the exemption to include the following: pilot's name, aircraft registration number and type, date and time of flight, departure and destination airports, names of passengers, weight and balance calculation, and any accidents, incidents, engine failures or forced landings that occur. These records will be retained for two years and will be made available to the local Flight Standards District Offices upon request.

8. Every accident, incident, engine failure or forced landing which occurs in operations under this exemption must be reported within 24 hours to the nearest Flight Standards District Office.

BACKGROUND: The Alaska Air Carrier Association has been committed to improving the safety of air carrier operations in Alaska since 1966. Two years ago, the AACA safety committee began working with the FAA in a partnership approach to improving aviation safety. The goal is to effect a major cultural change throughout rural Alaska from one of "bush pilot mentality" to that of a professional pilot.

Together with the FAA, the safety committee developed public service announcements for aviation safety during hunting season and provided strong support and technical assistance to the innovative air carrier "Pilot Decision Making Program". As part of our ongoing safety commitment, The Association is working with the FAA to increase the number of AWOS units in outlying villages, increase the number of IFR routes available to the public, and permit the use of widely available equipment such as Loran and GPS for instrument approaches.

The Alaska Air Carriers Association is determined to continue improving aviation safety in Alaska. Studies have shown that, in sharp contrast with the picture in the contiguous United States, the majority of weather related accidents in Alaska occur in single engine airplanes on VFR flights. We believe that a grant of this petition will provide both the means and the incentive for Alaskan operators to improve safety by shifting operations from the VFR environment to one with aircraft separation, terrain clearance, and guaranteed coverage of navigational aids. This petition will require additional training and give the pilots the incentive to sharpen their IFR skills.

HISTORY OF REGULATIONS PERTAINING TO SINGLE ENGINE IFR: Prior to July 8, 1963, Part 42 of the Civil Air Regulations permitted single engine IFR when a VFR buffer zone existed. Every proposed regulatory change up to and including Notice of Propose Rulemaking (NPRM) Number 77-17 (42 FR 34390; August 29, 1977) retained the provision for single engine IFR with a buffer zone. In 1978, Part 135 was substantially revised (43 FR 46742, October 10, 1978). At that time, the buffer zone was dropped for operations involving single engine aircraft IFR conditions, but was retained for operations over-the-top, even though the NPRM had retained the buffer zone for both IFR and over-the-top operations. The preamble discussion to the final rule did not explain why this provision was dropped.

PUBLIC INTEREST AND IMPACT ON SAFETY: There are hundreds of villages in the non-mountainous areas of Alaska each with a population of 100-400 people. The airplane is virtually the only means of transportation available year round and is far safer than the use of dog sled or snowmobile, which are available only in the winter.

These villages have unimproved, short landing strips which can only be used by single-engine airplanes or STOL twin-engine airplanes with high wings and big tires. Typical flights carry only 3-5 passengers. There are no twin-engine airplanes with a seating capacity of nine or less which can operate into these strips. Therefore, operators use single-engine airplanes such as the Piper PA-32, Cessna 185, 206, 207, and 208. The type of service provided by single-engine airplanes in these areas cannot, by its nature, be performed using comparable multiengine aircraft.

Notwithstanding economic considerations, it is believed that shifting these essential operations from the VFR environment to the IFR environment will have a great impact on safety. First, the IFR environment provides the public with a better trained pilot, one who must pass standard FAA check rides every six months. Pilots holding IFR ratings will be required to train and keep IFR proficient.
This, coupled with the innovative air carrier "Pilot Decision Making Program" developed jointly by FAA and industry, can only improve the safety record. Second, the airplanes used under this exemption will have IFR instrumentation and equipment, including an alternate static source. Third, the IFR environment will provide passengers with separation from other aircraft, terrain clearance, and guaranteed coverage of navigational aids. Fourth, the additional IFR training for pilots will be an on-going process.

The primary consideration is that no compromise to the fare paying passenger's safety will result from IFR charter operations of single engine airplanes under this exemption when compared to other alternatives. Indeed, it is believed that a grant of this petition will greatly improve passenger safety for the hundreds of villagers who have had no alternatives other than dog sleds or VFR flights in single engine airplanes since the regulatory change in 1978.

Finally, the record keeping requirements listed above will allow tracking and analysis of safety trends. This capability will permit the determination of any additional conditions, training, or equipment which may be necessary to further improve safety of single engine operations within Alaska.

Mr. Anthony J. Broderick
Associate Administrator for
Regulation and Certification (AVR-1)
Federal Aviation Administration
800 Independence Avenue, S.W.
Washington, D.C. 20591

Subject: Report of Single Engine IFR Working Group

Dear Mr. Broderick:

The Single Engine IFR Working Group recently presented its report to the Air Carrier Issues Group of the Aviation Rulemaking Advisory Committee. The working group presented a draft notice of proposed rulemaking (NPRM) that would allow carriage of passengers on single engine aircraft operating in instrument meteorological conditions under FAR Part 135. The issues group accepted the working group's recommendation that the draft NPRM be published for public comment and a copy is attached for your action.

The working group considered a number of issues in deliberations on this draft NPRM. While there was not unanimous agreement on all aspects of the document, differences of opinion are discussed in the preamble. The Issues Group noted that organizational names should be eliminated from the document when it is published for public comment. The document should reflect "working group" discussions rather than provide identification of specific participants.

The working group stands ready to assist in the development of any advisory material which may be necessary to assist in implementation of the final rule.

In April, we sent you a recommendation to allow a petition for exemption from FAR 135.181 by the Alaska Air Carriers Association (AACA). There are four additional petitions for exemption that were considered by the working group. In view of your response to take no action on the AACA petition, we will not make any specific recommendations regarding the additional petitions. We do, however, urge prompt consideration of the rulemaking proposal.

Thank you for the opportunity to develop this rulemaking proposal.

Sincerely,

William W. Edmunds/jch

William W. Edmunds, Jr., Assistant Chairman
Air Carrier Operations Issues Group
Aviation Rulemaking Advisory Committee

WWE:jch
attachment

cc: L. Beuhler

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

800 Independence Ave., S.W.
Washington, D.C. 20591

JUL 21 1995

Mr. William W. Edmunds, Jr.
Assistant Chairman, Air Carrier Operations Issues
Air Line Pilots Association
535 Herndon Parkway
Herndon, VA 22070-1169

Dear Mr. Edmunds:

Thank you for your June 16 letter forwarding the Aviation Rulemaking Advisory Committee's (ARAC) recommendation in the form of a notice of proposed rulemaking (NPRM) as developed by the Single Engine IFR Working Group.

I would like to thank the aviation community for its commitment to ARAC and its expenditure of resources to develop the recommendation. In this instance, ARAC has assisted the Federal Aviation Administration (FAA) in providing a forum for open discussion of an important issue - single engine IFR operations with passengers.

However, before we can formally accept the NPRM into the FAA for final action, the economic evaluation and legal review must be completed and accepted by the working group members and ARAC. The development of the evaluation is underway and is estimated to be completed by late August, 1995; it will then be forwarded back to you for your completion.

Again, I thank ARAC, and the Single Engine IFR Working Group in particular, for its dedicated efforts in completing to this point the task assigned by the FAA.

Sincerely,

Anthony J. Broderick
Associate Administrator for
Regulation and Certification

DEPARTMENT OF TRANSPORTATION

Federal Aviation Administration

14 CFR Part 135

[DOCKET #]

Single Engine IFR Operations for Commercial Operations

AGENCY: Federal Aviation Administration

ACTION: Notice of Proposed Rulemaking

SUMMARY: Since 1978, single-engine, commercial passenger-carrying operations have been severely restricted from flying under Instrument Flight Rules. The FAA is proposing to allow such operations because operational data indicate that the reliability of the engines and aircraft systems used is comparable to or, in some cases, better than that of multi-engine piston operations. Also, the data indicate that most accidents have occurred when pilots, flying under visual flight rules, encountered instrument meteorological conditions. The proposed revision would impose a number of conditions related to equipment and training that operators would have to meet before conducting passenger-carrying, single-engine instrument flight rule operations. The additional conditions will address the system redundancy available in multi-engine aircraft and add new equipment not practical or available in single-engine aircraft 20 years ago when the current rule was developed. The proposed rule would provide increased safety and flexibility to small air taxi and commuter operators and improve service to small communities, many of which cannot accommodate multi-engine aircraft.

DATES: Comments must be received on or before [insert a date 60 days from date of publication].

ADDRESSES: Comments should be mailed in triplicate, to Federal Aviation Administration, Attention: Rules Docket (AGC-200), 800 Independence Avenue, SW, Washington, DC 20591. Comments must be marked Docket No. . Comments may be examined in room 915G weekdays between 8:30 a.m. and 5 p.m. except on Federal holidays.

FOR FURTHER INFORMATION CONTACT:

SUPPLEMENTARY INFORMATION:

I. Background

Prior to July 8, 1963, part 42 of the Civil Air Regulations permitted single-engine instrument flight rules (IFR) with passengers. Every proposed regulatory change through NPRM Number 77-17 retained the provisions for passenger-carrying, single-engine IFR (SEIFR). In 1978, part 135 was substantially revised (43 FR 46742; October 10, 1978). At that time, the provision allowing SEIFR operations with passengers was dropped without explanation, even though the NPRM had retained the SEIFR provisions. Multi-engine aircraft were also prohibited from operating in IFR conditions or over the top unless, with the critical engine inoperative, the aircraft could maintain a climb rate of 50 feet per minute when operating at the Minimum Enroute Altitude or 5,000 feet Mean Sea Level, whichever is greater. Some provisions were made for aircraft to fly over the top if certain weather conditions were reported or forecast or if unforecast weather was encountered en route. Cargo-only aircraft were still allowed to operate SEIFR and have done so with a high level of safety.

Since 1978, the FAA has received 12 petitions for exemptions from or amendments to § 135.181 to allow the use of all or specific models of single-engine aircraft in passenger-carrying IFR operations. The most recent petitions are still pending. Internationally, commercial operators in several countries have sought permission to conduct passenger operations in instrument meteorological conditions (IMC) with single-engine aircraft. Initially, all authorities have been reluctant to permit these operations, but Canada, following a cooperative effort with the engine manufacturers, aircraft manufacturers, and users that produced a well-documented case, has allowed SEIFR passenger-carrying operations, with a number of specific requirements for equipment and training since February 1993. Australia proposed a similar rule in January 1995.

In response to the petitions, the Canadian action, and changes in technology that have resulted in increasingly reliable engines and aircraft systems, the FAA asked its Office of Integrated Safety Analysis to conduct a study to determine if demonstrable differences exist between single- and multi-engine aircraft in

visual meteorological conditions (VMC) and IMC. The study, *Part 135 Single-Engine Instrument Flight Rules Operations in Instrument Meteorological Conditions*, February 24, 1994, (available in the docket) reviewed the basis for the Canadian action and available data from a number of sources on powerplant/systems reliability and activity exposure data. The study reviewed the petitions submitted to the FAA prior to 1994, but found that neither the petitioners nor the FAA analyzed the issues in detail.

In September 1994, the FAA asked the Aviation Rulemaking Advisory Committee (ARAC) to review the Canadian policy on SEIFR, re-examine FAA policies for commercial IMC and night operations by single-engine aircraft, determine conditions or limitations that such operations should meet, and recommend any changes. The ARAC formed a working group that included representatives of the FAA, Transport Canada-Aviation, the European Joint Aviation Authority, Australian Civil Aviation, several European national aviation authorities, aircraft and engine manufacturers, trade associations, pilot unions, and commercial operators. This proposed rule is based on the working group's recommendations.

II. Discussion of the Proposed Rule

The FAA is proposing to revise § 135.181 to allow single-engine aircraft (certificated for nine or fewer passenger seats) carrying passengers to fly over the top or in IFR conditions subject to the following conditions:

- The engine must have a demonstrated and documented mean time between failures (MTBF) of equal to or better than .01/1,000 hours over a period of 100,000 hours in service based on original equipment manufacturer (OEM) component reliability and instructions for continued airworthiness. The effects of non-OEM components may require separate consideration. Time in service of engines with identical components and in similar operating environments may be considered as equivalent operating experience;
- The aircraft must be equipped with the following:
  - Two independent electrical power generating sources, either of which is capable of sustaining essential instruments and electrical equipment;

- A means of engine wear detection and health monitoring to provide early warning of impending failure;
- An auto-ignition system or use of continuous ignition during takeoff, landing, and flight during heavy precipitation;
- A manual throttle which bypasses the governing section of the fuel control unit and permits continued unrestricted operation of the engine in the event of a fuel control unit failure;
- A radar altimeter;
- Two separately and independently powered attitude indicators; and
- IFR-approved Area navigation equipment that provides immediate identification of and heading to the nearest airport.

- Crew training is required to include —
  - Initial simulator-based pilot in command training to include an additional six hours training annually in emergency procedures that cannot safely be practiced in an aircraft. Aircraft specific training and proficiency must be demonstrated in the make and model aircraft to be operated or in an FAA type-specific simulator;
  - A pilot proficiency check to be completed annually in the make and model of aircraft; and
  - Autopilot training and testing specific to the aircraft (notwithstanding § 135.105).
- Pilots in command on scheduled IFR operations would be required to hold an airline transport pilot certificate with appropriate category and class rating (notwithstanding § 135.243).
- Any scheduled commuter routes must be approved by the certificate holder's operations inspector.

Other requirements currently in § 135.181 would remain unchanged. These proposed conditions are based on those that Canada adopted for single-engine IFR passenger-carrying operations. The FAA decision to propose changes to SEIFR restrictions is based on the results of additional information submitted by petitioners, reviews done by Canada and Australia, and, most importantly, its own study of accident histories and data on single-engine aircraft operations. These changes reflect certain significant modifications to the Canadian rule.

The FAA study found that data that specifically address the issue of the reliability of single-engine aircraft in IMC under Part 135 are necessarily limited because relatively few such operations occur under these conditions. In addition, the FAA does not require manufacturers and operators of small aircraft and powerplants to have established databases capable of providing information needed to support reliability evaluations. Data available collected from various sources were found to be frequently incomplete and inconsistent in reporting format, limiting their usefulness.

The analysis of National Transportation Safety Board (NTSB) data for Part 135 air taxi airplane accidents for 1988 to 1990 indicated that although propulsion system accidents account for a higher percent of total accidents for single-engine than for multi-engine airplanes, only two of these occurred in IMC. Accidents involving propulsion system failure in IMC appear to be very infrequent occurrences. Weather was a causal factor in 24 percent of all accidents; improper flightcrew actions contributed to 95 percent of weather-related accidents. Mechanical problems, however, were a factor in only one single-engine and one multi-engine weather-related accident, suggesting that accidents involving equipment failure during flight in instrument conditions are relatively rare events in air taxi operations. The data also show that most accidents in IMC result in fatal or serious injuries, regardless of the type of flight plan or class of airplane, indicating that the number of engines or type of propulsion is not a major threat. FAA data on part 135 accidents involving single-engine aircraft from 1985 to 1992 indicated that the most common causes of accidents were weather, poor in-flight planning and decision-making, and other weather related errors resulting from attempts to maintain visual flight rules (VFR) flight.

Analysis of Part 135 scheduled airplane accident data revealed patterns in accident causal factors that are very similar to those for on demand operations. Analysis of business airplane accidents that occurred during Part 91 operations provided additional perspective on the relative contribution of systems and equipment reliability problems to accidents. Accidents involving propulsion and other system failures in IMC were infrequent occurrences even though Part 91 operators are not subject to the same restrictions or level of regulation and oversight as Part 135 operators.

Beyond accident data, the study considered reliability data on single-engine aircraft. The Cessna 208 Caravan has achieved a substantial and extensively documented operating history that provides the information necessary to make detailed safety and reliability assessments. The study stated that the experience of this airplane serves as a model for others seeking to expand the operating privileges of their aircraft; its accident record can provide a clear indication of the level of safety that is attainable with current technology single-engine aircraft operating in IMC.

Analysis of the accident data for C208s operated in the U.S. from 1985 to 1991 indicate that there were five mechanical propulsion system-related accidents. No accidents occurred during IMC as the result of propulsion or other system failure even though most of the operations during the period were performed by overnight package delivery services operating in all weather conditions. The overall propulsion-related accident rate of 0.86 per 100,000 hours for the C208 is midway between the air taxi industry overall propulsion failure accident rates of 0.17 and 1.42 per 100,000 hours for multi-engine and single-engine airplanes respectively. It should be noted that the C208 data were based on early data; more recent data indicate a substantially lower propulsion failure accident rate. To date, the C208 has in excess of 1.8 million flight hours. The study estimated that the probability of a propulsion system-related, single-engine airplane accident in IMC that resulted in serious consequences is one in over 600,000 total hours of operation when using properly maintained, current technology airplanes that are flown by proficient pilots. These data are similar to data on U.S. Navy T-34C engine shutdowns from 1984 to 1994; meantime

between engine shutdowns ranged from approximately 400,000 hours for incidents to almost 2 million hours for serious accidents.

A question that the FAA then asked was whether this risk was acceptable and how the risk compared to the risk associated with current restrictions. A position paper developed by the Australian Bureau of Air Safety Information stated that most modern single-engine airplanes operate at cruise altitudes that provide significant glide capability in the event of engine failure. In addition, the failure of one engine in a multi-engine airplane creates control problems that narrow the safe flight regime and raise pilot workload. Australian data indicate that twin-engine airplanes flew 770,000 hours per serious accident while single-engine airplanes flew 1.8 million hours per serious accident. The study concluded that "given a reasonable degree of engine reliability and the greater complexity of handling a twin-engine airplane, it is questionable whether twin-engine airplanes are indeed safer in all cases."

The Alaska Air Carriers Association (AACA) noted that the majority of weather-related accidents in Alaska occur in single-engine airplanes on VFR flights. AACA stated that for hundreds of Alaskan villages, the airplane is almost the only means of transportation available year round. Many of these villages can be served only by single-engine airplanes; there are no multi-engine airplanes that can operate into these airstrips. AACA argued that shifting operations from VFR to IFR will improve safety because the pilots will be better trained and proficient in IFR operations, the aircraft will have IFR instrumentation, and the IFR environment will provide separation from other aircraft, terrain clearance, and coverage by navigational aids. The FAA's study stated that development of satellite-based communications, navigation, and surveillance systems and automated weather information technology make IFR operations more feasible in remote regions. The study also noted the rule change would benefit Alaska where a disproportionate share of accidents occur when aircraft continue flight under VFR into IMC. This argument can be applied nationwide.

The FAA recognizes that engine failure in a single-engine aircraft results in an inability to sustain flight. The FAA believes, however, that allowing SEIFR passenger-carrying operations will enhance safety

over permissible VFR flights into marginal weather conditions. Aircraft operating under IFR are part of the national IFR system, which includes air traffic monitoring and control system; this system ensures that both pilots and air traffic controllers know where the aircraft is and can work together to avoid hazards and land safely. The FAA Administrator, in a November 18, 1994, letter to pilots ("Winter Operations Emphasis Program 1994," available in the docket), expressed his concern about the number of accidents that occur when pilots are flying just below a low ceiling and collide with the terrain. He stated that one of the safest steps available was to take advantage of the IFR system. Aircraft flying at normal cruising altitude have considerably more time to glide to a landing and maneuver to a safe landing area than those flying below the ceiling. Data from the Rescue Coordination Center have shown that should an accident occur, aircraft that were operating under the IFR system are located within a few hours; aircraft that were operating under the VFR system often take days to locate. Finally, if SEIFR passenger operations are allowed, operators will have an incentive to upgrade from older multi-engine aircraft to newer, improved technology aircraft. According to the FAA, there are currently, 5811 aircraft certificated for fewer than 10 passenger seats used in passenger-carrying operations under part 135; of these, 2,815 are single-engine piston, 1,611 are multi-engine piston, 36 are single-engine turbo-prop, 795 are multi-engine turbo-prop, and 554 are turbojets. Under the current rule, these part 135 operators may not find it economically feasible to upgrade equipment because the aircraft is not authorized to operate in all conditions.

New Requirements. The proposed rule would allow passenger-carrying operations with single-engine aircraft under IFR with additional requirements to those that are required to operate under VFR rules. The FAA believes that these additional requirements will enhance safety above levels required currently in part 135 by taking advantage of available technology in aircraft systems and pilot training.

The engine must have a demonstrated and documented mean time between failures (MTBF) of equal to or better than .01/1,000 hours over a period of 100,000 hours in service based on original equipment manufacturer (OEM) component reliability and instructions for continued airworthiness. The effects of non-OEM components may require separate consideration. Time in service of engines with

identical components and in similar operating environments may be considered as equivalent operating experience. The MTBF data would be provided by the engine manufacturer and would be based on lifetime fleet hours, not short-term data. "Life-time fleet hours" means engine reliability results will be added continuously to the data; if, at any time, new data result in MTBF falling below the minimum, approval of SEIFR operations with the engine would be reconsidered.

The FAA selected the .01/1,000 hours because it is a statistically meaningful basis for ensuring the reliability of engines. It is consistent with the MTBF used by Canada and proposed by Australia and with reliability rates used in other programs. When Canada selected this MTBF, it was half the ETOPS (extended, twin-engine, over water operations) target of .02/1,000 hours. Because the small engine rate was better than the ETOPs target, Canada selected .01/1,000 hours, which was historically representative of a mature small gas turbine engine. The MTBF is also achievable; manufacturers will be able to develop data to demonstrate reliability to this level. Finally, the FAA would allow manufacturers to use the reliability records of the engine modules to demonstrate overall reliability. Manufacturers generally combine well-proven modules to meet the airframe requirements of aircraft, which results in a new engine model designation. Although the new engine has no reliability record, the modules frequently have millions of hours in service to demonstrate their reliability.

The aircraft must have two independent electrical power generating sources, either of which is capable of sustaining essential instruments and electrical equipment. This requirement would ensure that no single failure could cause the primary flight and navigation systems to be inoperative. In this way, if either power source failed, the pilot would still have the instruments needed to continue flight and make a safe landing.

The aircraft must have a means of engine wear detection and health monitoring to provide early warning of impending failure, such as an engine chip detector visible to the pilot during normal operations. This requirement would ensure that engine wear is monitored using such methods as trend monitoring and engine chip detectors. Checking engine wear is one of the best ways to identify potential

problems before they create engine trouble during an operation. Therefore, this requirement would decrease the likelihood that an engine would fail in either VFR or IFR operations.

The aircraft must have an auto-ignition system or use of continuous ignition during takeoff, landing, and flight during heavy precipitation. Continuous ignition provides protection from environmental contamination (e.g., water or ice ingestion) that can cause a power reduction in an engine. The system is an added safety feature.

The aircraft must have a manual throttle which bypasses the governing section of the fuel control unit and permits continued unrestricted operation of the engine in the event of a fuel control unit failure. In the case of turboprop engines, one of the possible causes of engine failure is the fuel control unit. Fuel control includes two functions, fuel metering and the computing portion, which is driven by an automatic speed governing section. The latter contains a mechanical throttle input as well as speed governing and pneumatic signals. The fuel metering system has very high reliability; the manual throttle provision, therefore, serves as a backup for the speed governing mechanism and provides an added level of safety.

The aircraft must be equipped with a radar altimeter. This requirement would assist the pilot in descending and making an off-airport landing, should one be needed in IMC.

The aircraft must be equipped with two separately and independently powered attitude indicators. This equipment would ensure that the pilot has access to essential attitude information if one system fails.

The aircraft must be equipped with IFR-approved area navigation equipment that allows the pilot to identify and quickly steer to the nearest airport. This equipment may include approved global positioning systems (GPS). The requirement would reduce the work load during an emergency by allowing the pilot to identify immediately the nearest airport, without needing to use charts or other methods while maneuvering the aircraft in emergency conditions.

Initial simulator-based, pilot in command training must include an additional six hours training annually to cover emergency procedures that cannot safely be practiced in an aircraft. Emergency procedures would include icing, engine-out, and engine restart. The FAA would require that these

procedures be practiced in a simulator; the simulator however, would not have to be aircraft-specific. Aircraft specific training and proficiency must be demonstrated in the make and model aircraft to be operated or in an FAA, type-specific simulator of at least level B.

A pilot proficiency check must be completed annually in the make and model of the aircraft. This requirement would ensure that pilots maintain their skills.

Pilots must be trained and tested on the use of an autopilot specific to the aircraft (notwithstanding § 135.105). This provision would require that pilots receive training in the use of an autopilot, rather than simply being checked on its use. Overall, the training program should cover the use of all equipment required under this section.

Pilots in command on scheduled IFR operations would be required to hold an airline transport pilot's certificate with appropriate category and class rating (notwithstanding § 135.243). This restriction corresponds to the requirements for pilots in command for commuter multi-engine aircraft with nine or fewer seats under § 135.243(a).

The principal operations inspector (POI) must approve the routes to be used for scheduled passenger-carrying SEIFR. Although the FAA believes that SEIFR operations are safe in most parts of the U.S., there may be some areas where there are consistently low ceilings, which in combination with the terrain, may increase the risk of such operations. Rather than set minimum ceilings in the rule, which might encourage pilots to fly below the ceiling, the FAA would require POIs to review the proposed scheduled routes and approve them. The FAA will develop guidance to provide POIs with the basis for route approvals.

Other Issues Discussed. In working group discussions, group members and other ARAC members raised a number of concerns that were debated. In addition, restrictions that Australia has proposed in its January 1995 proposed rule were reviewed. The following discussion outlines the concerns and issues and the working group's consensus on them.

- The Air Line Pilots Association (ALPA) objects to the extension of SEIFR to scheduled operations, but does not oppose SEIFR for on-demand operation. ALPA states that such an extension is not consistent with the NTSB recommendations to operate commuter flights at a single level of safety that is functionally equivalent to 14 CFR part 121.

The NTSB and the FAA agree that there should be a single level of safety for all scheduled operations, but neither has suggested that part 121 standards be applied to aircraft with fewer than 10 seats (single-engine or multi-engine). Single-engine aircraft are limited to nine or fewer passenger seats under part 23 rules. The NTSB and the FAA are in concurrence that part 135 is more suitable for operations, including scheduled operations, with nine or fewer passenger seats. The purpose of this proposal, to improve the safety of current operations by moving single-engine operators into the safer IFR system, is consistent with the FAA's effort to improve safety of commuter operations. The proposed additional requirements for crew training, qualification, and currency, for equipment, and for a high level of engine reliability plus the shift of small aircraft operations to the controlled, structured IFR environment will result in improved safety for single-engine, passenger-carrying operations, whether scheduled or unscheduled.

The working group further noted that scheduled, as well as on-demand passenger and cargo, service is currently provided by single-engine aircraft under the current §135.181 at night, under VFR, or in IFR conditions if weather forecasts indicate the aircraft will reach VMC within 15 minutes at normal cruise speed. In addition, although there are relatively few scheduled operations using single-engine aircraft, they provide critical, regular service to communities that otherwise would have no air service because they do not have the passenger volume to justify larger aircraft and, in some cases, do not have landing strips appropriate for larger, multi-engine aircraft.

- ALPA is concerned that passengers buying tickets for scheduled operations have an expectation about safety and the type of aircraft; single-engine aircraft do not meet this expectation.

Currently in single-engine passenger-carrying operations, passengers are ticketed by operators, who do not have code-sharing arrangements with part 121 carriers. Therefore, passengers using these small aircraft, which serve primarily small communities, are well aware of the type of aircraft being used.

- ALPA is concerned that aircraft operated in scheduled service spend more time operating than cargo aircraft do, accumulating a greater number of flight hours over a shorter time period. The result is less maintenance and more flighttime for the airframe and components. These differences invalidate the use of cargo-operations data.

Maintenance and inspection requirements for these operations are the same as for other part 135 operations. Differences in use under cargo versus passenger-carrying operations do not alter the requirements the operators must meet. In some instances, cargo operators may be under more pressure to defer maintenance than passenger-carrying operations because failure to meet a schedule can mean loss of their contracts to carry cargo.

- ALPA is concerned about the lack of a study or a requirement for a minimum reliability standard for engine components and propellers.

The propulsion-related engine components ALPA mentioned are considered to be part of an engine; failures of these units are included in statistics on engine failure and in-flight shutdowns. Statistics show that propeller reliability is even greater than engine reliability. In 1.8 million hours of C-208 operations, there has never been a propeller failure. Propeller manufacturers have indicated that the incident of propeller failure is approximately 1 in 20 million hours.

- ALPA is concerned that the data on accidents related to weather conditions and multi-engine aircraft are irrelevant because such aircraft can normally sustain flight with one engine inoperative.

The FAA's SEIFR study indicated that an accident in IMC resulting from engine failure would be rare for small aircraft, whether single- or multi-engine. The weather and flight crew proficiency present a much greater risk. The proposal addresses these issues.

The working group recognizes that loss of an engine in a single-engine aircraft means that the aircraft must attempt a forced landing. The proposed rule would impose a number of requirements, in addition to engine reliability, to increase the probability that such a landing could occur safely. Some multi-engine aircraft can sustain flight on a single engine and land safely, but the loss of an engine during any flight segment, especially take-off, is an emergency event and requires an immediate proper response, as is required for a single-engine aircraft, to prevent an accident, as the Australian study indicated.

- The Regional Airline Association (RAA) stated that the FAA should set a forecasted minimum ceiling that would enable an aircraft to descend to VFR conditions in an emergency.

The working group members were concerned that setting a minimum ceiling would encourage pilots to attempt VFR flight below the ceiling when en route segments did not meet the minimum. This type of flight has resulted in a number of accidents and is one of the reasons the FAA is proposing this rule change to move the aircraft to the safer IFR system. The working group agreed with Canada's conclusion that, while making decisions based on airport forecasts is relatively straightforward, decisions on en route weather would often have to rely on area forecasts, which are far less accurate. In addition, weather data indicate that, on a national basis, weather conditions as poor as a 1,000 foot ceiling/3 miles visibility exist only 10 percent of the time. The lower limit for part 135 VFR flight conditions, 500 foot/2 miles, exist only 5 percent of the time; regional averages may vary significantly. Combined with the likelihood of engine failure, these data indicate that the probability of engine failure occurring in these poor weather conditions is 1×10^{-6} or less.

The FAA's proposal is based, as is the Canadian rule, on the fact that these engines rarely ever fail. In addition, if a single-engine aircraft loses an engine flying at normal cruise altitude, Canadian tests indicate that the pilot has time to glide down and select a place to land. In the rare event of an engine failure, it will be safer for crew and passengers if the aircraft is at normal cruise altitude and in the IFR system, where air traffic control will be available to assist. The additional equipment requirements are

being proposed precisely to ensure that, in this situation, the pilot has the maximum information available to find the best landing site.

As an alternative to setting a minimum ceiling, the working group has included in its proposal the requirement that routes for scheduled IFR service be approved by the POIs. RAA opposed this because it was concerned about the basis on which individual route approvals would be made. The FAA will, however, provide guidance to POIs on the weather conditions that may raise concerns about the safety of a route for this kind of service. The rules already set departure and landing minimums; weather data indicate that very few areas routinely experience low ceilings.

- RAA stated that scheduled SEIFR should be limited to turbine engines of high reliability.

The proposed rule sets a minimum reliability standard for engines. At present, only turbine engines meet the requirement. The working group, however, did not want to limit the rule to turbines because future technological advances may make other types of propulsion eligible.

- The RAA questioned the proposal to require two independent electrical generating sources, suggesting that one of these must be independent of the engine (such as battery).

The working group noted that batteries are already required under airworthiness certification requirements. The second electrical generating source will provide the same level of redundancy as is required for multi-engine aircraft.

- The RAA disagreed with the proposal to require autopilot, flight director, approach coupler, radio altimeter, dual attitude indicators, and area navigation systems.

The working group agrees that an autopilot is already required for single-pilot operations. The working group further dropped its recommendation for a flight director and approach coupler. The other equipment requirements, however, are needed to help pilots make a safe landing if the engine fails. They improve the safety of single-engine operations by providing pilots with information on altitude, attitude, and location of the nearest airports.

- The RAA said that airborne thunderstorm detection equipment should be considered for any passenger-carrying operations (single-engine or multi-engine) in forecast IMC.

The working group agreed that this idea may have merit, but it is beyond the scope of this rulemaking, which is limited to passenger-carrying SEIFR requirements. Multi-engine aircraft with nine or fewer passenger seats are currently not required to have this equipment either.

- RAA disagreed that SEIFR training requirements need to be more stringent than requirements for other IFR operations under part 135, in particular by requiring simulator training.

The emergency procedures that pilots must practice for engine loss in SEIFR operations cannot be practiced and demonstrated in the aircraft. The only safe way to learn these skills and maintain proficiency is in a simulator. The working group considered these requirements critical to improving the safety of single-engine passenger-carrying operations and to be consistent with the FAA's intent to increase pilot proficiency through the greater use of simulation in training.

- Based on a requirement imposed in the proposed Australian rule, ALPA questioned whether the FAA should consider supplemental oxygen requirements for those aircraft that operate with pressurized cabins above 15,000 feet cruising altitude.

The working group discussed the issue and decided that given the current oxygen requirements for these aircraft, the likely descent speed, and the rate of depressurization following engine loss, the current oxygen requirements are sufficient to ensure the safety of passengers and crew.

In summary, the working group incorporated some of the ALPA and RAA suggestions into its recommendations. ALPA agreed that with the incorporation of these recommendations it could consider the proposed rule. The FAA is committed to providing guidance to POIs, through bulletins and other directives,to ensure that the POIs are aware of the need to monitor maintenance and operating practices closely to be sure that all FAA rules are being followed.

III. Required Analyses

[To be developed by the FAA in accordance with the operating procedures for the ARAC] (E.O. 12866, Reg Flex, Paperwork Reduction Act)

Dated:

Administrator

List of Subjects in 14 CFR part 135

For the reasons set out in the preamble, 14 CFR part 135 is proposed to be amended as set forth below:

Part 135 - Air Taxi Operators and Commercial Operators

1. The authority citation for part 135 continues to read as follows:

Authority: 49 U.S.C. 1354(a), 1355(a), 1421 through 1431, and 1502; 49 U.S.C. 106(g) (Revised Pub. L. 97-449, January 12, 1983).

2. Section 135.181 is proposed to be amended to read as follows:

§ 135.181 Performance requirements: Aircraft operated over the top or in IFR Conditions

(a) Except as provided in paragraphs (b), (c), (d), and (e) of this section, no person may —

(1) Operate a single-engine aircraft carrying passengers over the top or in IFR conditions; or

(2) Operate a multi-engine aircraft carrying passengers over the top or in IFR conditions at a weight that will not allow it to climb, with the critical engine inoperative, at least 50 feet a minute when operating at the MEAs of the route to be flown or 5,000 feet MSL, whichever is higher.

(b) Notwithstanding the restrictions of paragraph (a)(2) of this section, multi-engine helicopters carrying passengers offshore may conduct such operations over the top or in IFR conditions at a weight that will allow the helicopter to climb, with the critical engine inoperative, at least 50 feet a minute when operating at the MEAs of the route to be flown or 1,500 feet MSL, whichever is higher.

(c) Notwithstanding the restrictions of paragraph (a)(1) of this section, single-engine aircraft (certificated for nine or fewer passenger seats) carrying passengers may conduct such operations in over the top or IFR conditions provided they meet the following conditions:

(1) The engine must have a demonstrated and documented mean time between failures of equal to or better than .01/1,000 hours over a period of 100,000 hours in service based on original equipment manufacturer (OEM) component reliability and instructions for continued airworthiness. The effects of non-OEM components may require separate consideration. Time in service of engines with identical components and in similar operating environments may be considered as equivalent operating experience;

(2) The aircraft must have —

(i) Two independent electrical power generating sources, either of which is capable of sustaining essential instruments and electrical equipment;

(ii) A means of engine wear detection and health monitoring to provide early warning of impending failure;

(iii) An auto-ignition system or use of continuous ignition during takeoff, landing, and flight during heavy precipitation;

(iv) A manual throttle which bypasses the governing section of the fuel control unit and permits continued unrestricted operation of the engine in the event of a fuel control unit failure;

(v) A radar altimeter;

(vi) Two separately and independently powered attitude indicators; and

(vii) IFR-approved Area navigation equipment that provides immediate identification of and heading to the nearest airport.

(3) Crew training is required to include —

(i) Initial simulator-based, pilot in command training to include an additional six hours training annually in emergency procedures that cannot safely be practiced in an aircraft. Aircraft specific

training and proficiency must be demonstrated in the make and model aircraft to be operated or in an FAA type-specific simulator of at least level B;

(ii) A pilot proficiency check to be completed annually in the make and model of aircraft; and

(iii) Autopilot training and testing specific to the aircraft (notwithstanding § 135.105 of this part).

(4) No certificate holder may use nor may any person serve as pilot in command in scheduled, single-engine IFR operations unless that person holds an airline transport pilot certificate with appropriate category and class rating (notwithstanding § 135.243 of this part).

(5) Each scheduled route, as defined by SFAR 38-2, shall be approved by the operator's principal operations inspector.

(d) Without regard to paragraph (a) of this section —

(1) If the latest weather reports or forecasts, or any combination of them, indicate that the weather along the route (include takeoff and landing) allows flight under VFR under the ceiling (if a ceiling exists) and that the weather is forecast to remain so for at least one hour after the estimated time of arrival at the destination, a person may operate an aircraft over the top; or

(2) If the latest weather reports or forecasts, or any combination of them, indicate that the weather along the route allows flight under VFR under the ceiling (if a ceiling exists) beginning at a point no more than 15 minutes flying time at normal cruise speed from the departure airport, a person may —

(i) Take off from the departure airport in IFR conditions and fly in IFR conditions to a point no more than 15 minutes flying time at normal cruise speed from that airport;

(ii) Operate an aircraft in IFR conditions if unforecast weather conditions are encountered while en route on a flight planned to be conducted under VFR; and

(iii) Make an IFR approach at the destination airport if unforecast weather conditions are encountered at the airport that do not allow an approach to be completed under VFR.

(e) Without regard to paragraph (a) of this section, a person may operate an aircraft over the top under conditions allowing —

(1) For multi-engine aircraft, descent or continuance of flight under VFR if its critical engine fails; or

(2) For single-engine aircraft, descent under VFR if its engine fails.

U.S. Department
of Transportation

**Federal Aviation
Administration**

800 Independence Ave., S.W.
Washington, D.C. 20591

SEP 5 1996

Mr. William J. Edmunds, Jr.
Assistant Chair, Aviation Rulemaking Advisory Committee
Air Line Pilots Association
P.O. Box 1169
Herndon, Virginia 22070

Dear Mr. Edmunds:

The purpose of this letter is to advise you of recent activities that have impacted the work of the single engine IFR working group. The original task, presented to ARAC on September 13, 1994, was to consider the viability of using single-engine aircraft in commercial, passenger-carrying operations. Since that time a number of significant events have occurred, such as the release of a report by the NTSB regarding flight operations in Alaska, and the finalization of the commuter rule. In light of these changes, the Federal Aviation Administration (FAA) is reconsidering the direction and scope of the project and is therefore withdrawing the task from ARAC. It is the intent of the FAA to use the efforts of the working group as a foundation to develop a broader proposal than was originally tasked.

The FAA appreciates the work done by ARAC and, in particular, the single engine IFR working group on the task; the information will assist us greatly in offering a viable proposal in the area of single engine, passenger-carrying operations.

Sincerely,

Barry L. Valentine
Acting Associate Administrator for
Regulatory and Certification

Corrections

Federal Register
Vol. 62, No. 211
Friday, October 31, 1997

in the sixth line, "month" should read "months".

DEPARTMENT OF TRANSPORTATION

Federal Aviation Administration

14 CFR Part 135

[Docket No.. 28743; Amendment No. 135-70]

RIN 2120-AG22

Commercial Passenger-Carrying Operations in Single-Engine Aircraft Under Instrument Flight Rules

Correction

In rule document 97–20641, beginning on page 42364, in the issue of Wednesday, August 6, 1997, make the following correction:

PART 135—[CORRECTED]

On page 42373, in the third column, in SFAR No. 81, in the first paragraph,

federal register

Wednesday
August 6, 1997

Part IV

Department of Transportation

Federal Aviation Administration

14 CFR Part 135

Commercial Passenger-Carrying Operations in Single-Engine Aircraft Under Instrument Flight Rules; Final Rule

DEPARTMENT OF TRANSPORTATION

Federal Aviation Administration

14 CFR Part 135

[Docket No. 28743; Amendment No. 135–70]

RIN 2120–AG22

Commercial Passenger-Carrying Operations in Single-Engine Aircraft Under Instrument Flight Rules

AGENCY: Federal Aviation Administration, DOT.

ACTION: Final rule.

SUMMARY: The Federal Aviation Administration (FAA) is amending the conditions and limitations in part 135 for instrument flight rule (IFR), passenger-carrying operations in single-engine aircraft. The rule will expand the passenger-carrying provisions of the current rule, add equipment requirements, as well as maintenance requirements to monitor engine reliability, and remove the limited IFR provisions of the existing rule for both single and multi-engine aircraft. Visual flight rules (VFR) flight into instrument meteorological conditions (IMC) is the most significant cause of fatal accidents in Alaska and is a serious problem for single-engine aircraft nationally. This action will increase the safety of single-engine, passenger-carrying operations by allowing planned instrument flight in the IFR system and by imposing certain other conditions and limitations.

DATES: The rule is effective May 3, 1998, except for SFAR No. 81. Pending OMB clearance on the paperwork requirements, SFAR No. 81 is not effective until the FAA publishes in the **Federal Register** a document specifying the effective date. Comments on the clarification of §§ 135.163(f)(2), 135.411(c), and/or 135.421 (c) and (d), including the paperwork requirements, must be received on or before September 5, 1997.

ADDRESSES: Comments on the clarification of sections 135.163(f)(2), 135.411(c), and/or 135.421 (c) and (d), including the paperwork requirements, should be submitted to: Federal Aviation Administration, Office of the Chief Counsel, Attn: Rules Docket (AGC–200), Room 915–G, Docket No. 28743, 800 Independence Ave., SW, Washington, DC 20591.

FOR FURTHER INFORMATION CONTACT: Ms. Katherine Hakala, Flight Standards Service, Federal Aviation Administration, 800 Independence Ave., SW, Washington, DC 20591, (202) 267–8166/3760.

SUPPLEMENTARY INFORMATION:

Availability of Final Rule

An electronic copy of this document may be downloaded, using a modem and suitable communications software, from the FAA regulations section of the Fedworld electronic bulletin board service (703) 321–3339), the Federal Register's electronic bulletin board service (202) 512–1661), or the FAA's Aviation Rulemaking Advisory Committee Bulletin Board service ((800) 322–2722 or (202) 267–5948). Internet users may reach the FAA's web page at http://www.faa.gov or the Federal Register's web page a http://www.access.gpo.gov/su_docs for access to recently published rulemaking documents.

Any person may obtain a copy of this final rule by submitting a request to the Federal Aviation Administration, Office of Rulemaking, ARM–1, 800 Independence Ave, SW, Washington, DC 20591, or by calling (202) 267–9677. Communications must identify the amendment number or docket number of this final rule.

Persons interested in being placed on the mailing list for future rules should request from the above office a copy of Advisory Circular No. 11–2A, Notice of Proposed Rulemaking Distribution System, which describes the application procedure.

I. Background

Prior to October 10, 1978, passenger-carrying, single-engine instrument flight rule (SEIFR) operations were permitted if an aircraft could descend to visual flight rules (VFR) conditions in the event of an engine failure. This provision allowed operations in instrument meteorological conditions (IMC) or over-the-top of a ceiling, as long as VFR conditions existed below that ceiling (i.e., a buffer zone). In 1978, part 135 was substantially revised for passenger-carrying operations over the top or in IFR conditions to require an aircraft to be able to descend under VFR if its engine fails (43 FR 46742; October 10, 1978). This revision also provided for "limited IFR" operations which, if VFR conditions were forecast within 15 minutes flying time, allowed flight in IMC for the first 15 minutes of flight, and thereafter only if those IFR conditions were unforecast. Under the current regulation, a pilot can operate in IFR conditions if unforecast weather conditions are encountered while en route on a flight planned to be conducted under VFR. The pilot can make an IFR approach at the destination airport if unforecast weather conditions are encountered that do not allow an approach under VFR. This rule had the effect of eliminating the buffer zone provisions, restricting planned flights under IFR in IMC, and restricting VFR over-the-top flights to scattered or broken sky conditions. An exception to the two pilot requirement, or autopilot requirement, is provided for limited IFR operations in § 135.103. Currently, limited IFR can be conducted as a single-pilot operation in aircraft with nine or fewer passenger seats. Cargo-only, single-engine aircraft can operate under IFR over the top without these restrictions.

Since 1978, the FAA has received 12 petitions for exemptions from, or amendments to § 135.181 to allow the use of all or specific models of single-engine aircraft in passenger-carrying IFR operations. Internationally, commercial operators in several countries have sought permission to conduct passenger operations in IMC with single-engine aircraft. Canada, following a cooperative effort with the engine manufacturers, aircraft manufacturers, and users that produced a well-documented case, has allowed SEIFR passenger-carrying operations in turbine-powered airplanes since February 1993, with a number of specific requirements for equipment and training. Other countries are also considering permitting SEIFR passenger-carrying operations.

In response to the petitions, the Canadian action, and changes in technology that have resulted in increasingly reliable engines and aircraft systems, the FAA asked its Office of Integrated Safety Analysis to conduct a study to determine if demonstrable differences exist between single- and multi-engine aircraft in visual meteorological conditions (VMC) and IMC. The study, Part 135 Single-Engine Instrument Flight Rules Operations in Instrument Meteorological Conditions, February 24, 1994, (available in the docket) reviewed the basis for the Canadian action and available data from a number of sources on powerplant/systems reliability and activity exposure data.

In September 1994, the FAA asked the Aviation Rulemaking Advisory Committee (ARAC) to review the Canadian policy on SEIFR, re-examine FAA policies for commercial IMC and night operations by single-engine aircraft, determine conditions or limitations that such operations should meet, and recommend any changes. The ARAC formed a working group that included representatives of the FAA, Transport Canada-Aviation, the European Joint Aviation Authority (JAA), Australian Civil Aviation, several European national aviation authorities,

aircraft and engine manufacturers, trade associations, pilot unions, and commercial operators. The committee recommended that § 135.181 be revised to permit SEIFR passenger-carrying operations provided certain requirements for equipment and training were met. The ARAC proposal, although not technically limited to a particular type of aircraft, proposed certain conditions that are met at present only by turbine-powered aircraft. The ARAC also recommended approval of the Alaska Air Carrier Association's (AACA) petition for exemption, which covers both turbine-powered and reciprocating engine aircraft. Both the ARAC and the FAA study focused on the issue of engine reliability.

In 1995, the National Transportation Safety Board (NTSB) completed a study of operations in Alaska, Aviation Safety in Alaska, (Safety Study NTSB/SS–95/03, PB95–917006, November, 1995). The NTSB noted that, unlike the rest of the U.S., commuter airline service in Alaska is "dominated by single-engine airplanes powered by a reciprocating engine operating under VFR and crewed by one pilot." After reviewing Alaska aviation accidents from 1988 to 1993 (which include single and multi-engine aircraft), the NTSB concluded that "VFR flight into IMC that result in fatal accidents continues to be the most significant safety problem in Alaskan aviation." VFR flight in IMC in Alaska accounted for 67 percent (6 of 9) fatal commuter airline accidents and 47 percent (7 of 15) of the fatal air taxi accidents. Overall, in Alaska, VFR flight into IMC accounted for only 15 percent of the total accidents, but 54 percent of the fatal accidents. The NTSB recommended that the FAA proceed with rulemaking to allow SEIFR passenger-carrying operations in turbine-powered aircraft and evaluate whether extending the rule to all single-engine aircraft would provide a positive effect on safety.

Prior to the Alaska aviation study, the NTSB conducted a study of emergency medical service (EMS) helicopters because their accident rate was twice the rate experienced by part 135 on demand helicopter operations and one and one-half times the rate for all turbine-powered helicopters. For the report, Safety Study—Commercial Emergency Medical Service Helicopter Operations (NTSB 1988), the NTSB investigated and evaluated 59 helicopter accidents in the rapidly growing commercial EMS helicopter industry. The Board determined that marginal weather conditions and inadvertent flight into IMC remain the most serious hazard that VFR helicopters encounter. "The Board believes that although the IFR system is not designed optimally for IFR helicopters and that the nature of the EMS helicopter mission further complicates this problem, the safety advantages offered by IFR helicopters flown by current and proficient pilots are great enough that EMS programs should seriously consider obtaining this capability."

The Alaska Air Carriers Association in its petition for exemption has stated, and the NTSB study confirmed, that in many areas, only single-engine aircraft can be operated because of the limitations of the landing strips, which severely restrict the availability of air transport in these areas. The petitioners further stated that under the current rule, unless clear weather is forecast over the entire route from 15 minutes from the departure airport to the destination, passenger-carrying, single-engine commercial operations are not permitted. In many areas, aircraft are the only means of transportation; weather forecasts, when available, rarely predict continuing VFR conditions. Alaska, they stated, was particularly disadvantaged by the current rule.

The FAA reviewed accident data from 1983 to 1996 on both reciprocating and turbine engines. Data indicated that there were 67 accidents in on-demand operations that involved VFR flight into IFR conditions; single-engine aircraft were involved in 75 percent of these accidents. Although the number of such accidents is known, the rate of such accidents cannot be determined because the FAA does not collect data on the number of flights or flight hours for on-demand operations under part 135.

Based on its analyses, the FAA, on December 3, 1996 (61 FR 64230), issued a notice of proposed rulemaking (NPRM) to amend part 135 to allow passenger-carrying SEIFR operations subject to the following conditions:

- Each certificate holder should incorporate into their manufacturer's recommended maintenance program or FAA-approved maintenance program an engine trend monitoring program including an oil analysis at each 100 hours interval and a record of the findings; and
- Each aircraft should have two independent electrical power generating sources or a standby battery that can maintain 150 percent of the minimum electrical load for at least one hour to operate navigation and communication equipment.

The FAA proposed to eliminate the limited IFR provisions, permitted under the previous rule, for both single and multi-engine aircraft. In addition, the FAA sought comments on the need for redundant power sources for gyroscopic instruments. As the NPRM noted, allowing SEIFR operations also imposed on such operations all of the existing requirements for IFR operations, including additional equipment, an autopilot or second pilot, increased pilot experience, and more pilot training.

In response to the NPRM, the FAA received over 200 comments from government entities, trade associations, pilots, air carriers, manufacturers, and individuals. Seven comments opposed all or part of the proposed rule. Today's final rule reflects a consideration of the comments received, which are discussed in Section III.

II. Overview of the Final Rule

The rule promulgated today allows SEIFR operations in both turbine-powered and reciprocating engines subject to the following conditions:

- The certificate holder must incorporate into its maintenance program either the manufacturer's recommended engine trend monitoring program, which includes oil analysis, if appropriate, or an FAA approved engine trend monitoring program that includes an oil analysis at each 100 hour interval or at the manufacturer's suggested interval, whichever is more frequent; the certificate holder must maintain a record of the results from these trend monitoring programs in the engine maintenance records.
- Each aircraft must have two independent electrical power generating sources each of which is able to supply all probable combinations of continuous inflight electrical loads for required instruments and equipment; or in addition to the primary electrical power generating source, a standby battery or an alternate source of electric power that is capable of supplying 150% of the electrical loads of all required instruments and equipment necessary for safe emergency operation of the aircraft for at least one hour.
- Each aircraft must have two independent sources of energy (with means of selecting either), of which at least one is an engine-driven pump or generator, each of which is able to drive all gyroscopic instruments and installed so that failure of one instrument or source does not interfere with the energy supply to the remaining instruments or the other energy source unless, for single-engine aircraft in all-cargo operations only, the rate-of-turn indicator has a source of energy separate from the bank and pitch and direction indicators.

Allowing SEIFR operations means that any certificate holder conducting such operations must meet all existing requirements for IFR operations, including those for equipment (e.g., vertical speed indicator, free-air temperature indicator, heated pilot tube, marker beacon receiver), crew (a second pilot or autopilot), pilot training and testing (proficiency check every six months), and pilot experience (1,200 hours). The new requirements will ensure that operators have an engine trend monitoring program, as well as written maintenance instructions. In addition, the rule requires that aircraft have redundant systems to provide needed power to maintain critical flight instruments as well as the necessary navigation and communications capability.

Because the FAA is deleting the limited IFR provision, this rule will not take effect until May 3, 1998. This will allow operators the time to obtain the required equipment, retrofit aircraft, and revise their operations authority and manuals. Limited IFR provisions will remain in effect until that time. The FAA is also adopting a Special Federal Aviation Regulation (SFAR) No. 81 that will allow operators who can meet the requirements of the rule to begin SEIFR operations prior to the effective date of the rule, provided an information collection is approved and an OMB control number is assigned. Therefore, the SFAR will not take effect until the FAA has published a notice in the **Federal Register** specifying the effective date. It is anticipated that this notice will be published within 60 days.

As explained in the NPRM, in the past, the rationale against SEIFR passenger-carrying operations centered on the hazards of losing an engine. Analysis indicates, however, a far more significant accident category: Flight under VFR into IMC. As discussed above, a recent NTSB study of aviation in Alaska indicated that VFR flight into IMC caused a disproportionate number of fatal accidents in part 135 operations in that state. Multi-engine airplanes are able to file and fly with passengers under IFR, while single-engine airplanes are only able (with few exceptions) to carry passengers under VFR. Thus, multi-engine airplanes have the advantage of contact with ATC, position following, en route and terminal weather information, and the higher altitude ensuring obstacle clearance and radio reception in the IFR system. Further, for IFR operations, part 135 requires additional fuel to be carried, and more stringent weather reporting requirements.

The FAA Administrator, in a November 18, 1994 letter to pilots ("Winter Operations Emphasis Program 1994," available in the docket), expressed his concern about the number of accidents that occur when pilots are flying just below a low ceiling and collide with the terrain. He stated that one of the safest steps available was to take advantage of the IFR system. Aircraft flying at a published cruising altitude that guarantees obstacle clearance and radio reception have considerably more time to glide to a landing and maneuver to a safe landing area, whether VMC or IMC, than those flying below the ceiling.

The number of accidents involving VFR flight into IMC is substantial. It is concern with this safety hazard that prompted the FAA to reconsider its limitations on single-engine IFR flight with passengers under part 135. Additionally, the FAA has considered the action of Canada that allowed single-engine passenger-carrying IFR under certain conditions, and the petitions for exemption of the Alaska Air Carrier Association and individual operators. The FAA concluded that this rule will reduce the number of accidents by allowing operators to take advantage of the IFR system and the significant safety benefits it provides.

The FAA is aware that other nations have either not allowed SEIFR or have limited it to turbine-powered aircraft. In the U.S., however, single-engine aircraft are already allowed to conduct passenger-carrying operations under VFR in both day and night, and in IFR conditions under the limited IFR provisions, if they meet existing requirements for IFR operations. Also, single engine cargo operations are presently authorized under IFR. The limited IFR rules have created a situation where pilots who encounter IMC must either file an IFR flight plan while en route or attempt to maintain VFR by flying below the ceiling. The FAA determined that safety would be improved if operators could complete adequate preflight planning and a file a flight plan in advance, take advantage of the IFR system while en route, and maintain the obstacle clearance provided by flying at higher altitudes.

Paragraph 5.1.2 of Annex 6, Part 1 of the ICAO standard states, "Single engine aeroplanes shall only be operated in conditions of weather and light, and over such routes and diversions therefrom, that permit a safe forced landing to be executed in the event of engine failure." The ability to make such a safe landing will be enhanced if the aircraft is in the IFR system because it will be flying at a higher altitude, which provides more time to select a location and glide to a landing. In addition, the aircraft would be on an established route, with guaranteed communications, with ATC assistance readily available to select an appropriate landing area, or advise/direct search and rescue.

III. Discussion of Comments

The FAA received over 200 comments on the SEIFR proposed rule. Seven of the commenters oppose the rule; all of these commenters propose changes to the rule. The remaining commenters state their support for the rule based on the reasons given in the NPRM for the proposal. A number of rule supporters suggest changes to the rule, or requested clarification of the technical requirements.

A. General Opposition

The Air Line Pilots' Association (ALPA) and Raytheon Aircraft Corporation both oppose the rule as a whole on the grounds that VFR flight into IMC is illegal and could be prevented by other means. They state that the FAA's solution is inherently unsafe. The commenters state that VFR flight into IMC could be prevented by increasing weather minimums or imposing penalties for illegal operations. They state that single-engine aircraft will never be as safe as multi-engine aircraft in the same operating conditions. They further state that the rule would increase the accident rate and that FAA data indicate the accident rate from propulsion system failure is eight times higher for single-engine than for multi-engine aircraft. A commenter states that more than 18 percent of single-engine propulsion failures occur in IMC.

The FAA notes that the current VFR standards represent a level of safety which experience has shown to be acceptable. Increasing VFR minimums would not address the problem of VFR flight into IMC. An increase in the current VFR minimums could, unnecessarily, restrict part 135 operators who are limited only to VFR operations. Adequate penalties already exist for violations of these regulations.

VFR flight into IMC is generally the result of inaccurate weather reports or unavailable forecasts. In deteriorating conditions, pilots are forced to fly at lower altitude to maintain VMC (or VFR conditions). The FAA determined that this rule will improve this situation by requiring additional fuel reserves and weather reporting necessary for IFR operations; by providing immediate assistance by ATC to the affected crew; by guaranteeing radio communication

from a minimum enroute altitude; by providing quicker notification of search and rescue assistance, all the while having additional assistance in the cockpit of another crewmember or autopilot. Therefore, the FAA has determined that this amendment will create a safer flying environment than the environment provided for in the current rules.

The number of engines is only one factor of many that leads to a successful flight. The FAA is improving the total operating environment with this amendment. The single engine IFR passenger-carrying operation will be a planned operation (IFR preflight planning of routes, weather, fuel, and alternates), conducted in an ATC controlled environment, with better trained and qualified pilots, with additional equipment (autopilot if not two pilots, backup electrical and pneumatic sources), and backed by an improved maintenance program that includes engine health monitoring. It also is important to note that single-engine aircraft are already permitted under the current regulations to carry passengers during both day and night in VFR conditions, and under limited IFR conditions. Also, single engine cargo operations are presently authorized without having to meet the limited IFR provisions. Thus, the FAA has already endorsed the use of single-engine aircraft in air transportation. This amendment will make the total operating environment for these aircraft safer for the traveling public.

B. Turbine Versus Reciprocating Engines

Although many commenters support the extension of this rule to all single-engine aircraft, several commenters state that the rule should be limited to turbine-powered aircraft. These commenters state that adequate data on engine reliability exist only for turbine-powered aircraft. Transport Canada states that the NPRM is "almost totally lacking in the safeguards we included in our rule to mitigate the risks inherent in SEIFR."

Further, Transport Canada states that it is not convinced that opening SEIFR to all single-engine aircraft without restriction will achieve the FAA's safety goals. Transport Canada also is not convinced that trend monitoring for reciprocating engines can provide the same reliable information and warnings that similar programs for turbine engines provide. It states the belief that only turbine-powered engines offer sufficient reliability.

The Joint Aviation Authority of Europe (JAA) states that it has no intention of including reciprocating-powered engines in its proposal to allow limited commercial travel and IMC flight for single-engine aircraft. JAA's proposal will be limited to turbine-powered engines and require a flight proficiency test, an area navigation system, autopilot or two pilots, specific approval on the air operator certificate, a radio altimeter, airborne weather equipment, a continuous ignition system, a shoulder harness for passengers, and supplemental oxygen for pressurized aircraft. In addition, terrain onto which a forced landing can be made should be available at all phases of flight. JAA states that "the absence of any consideration of the ability to carry out a forced landing in the event of an engine failure seems to the JAA not to accord with the Standard in ICAO Annex 6, Chapter 5, Paragraph 5.1.2."

In response, the FAA understands the concerns expressed by these commenters, but upon consideration, has determined that this amendment should apply to both reciprocating and turbine-powered aircraft. In examining the types of accidents that were occurring, the FAA determined that there would be a positive benefit to extending the rule to all properly certificated airplanes. The amendment addresses a number of factors, i.e., improved maintenance programs, more detailed preflight planning, operations in the IFR system, immediate assistance from ATC, second pilot or autopilot, and improved pilot training and qualifications. When combined, the FAA expects these improvements to save lives. Additionally, in their comment to the proposed rule change, the NTSB supported the proposal stating that the "Board accepts the FAA's conclusion that a positive effect on safety would be obtained by approving commercial, passenger-carrying IFR operations in single-engine airplanes powered by both turbine and reciprocating engines, subject to the additional equipment and operating limitations."

SEIFR operations under part 135 are not without restrictions. Operators who choose to use single-engine aircraft in part 135 passenger-carrying operations must comply with all the additional equipment and training requirements that apply to IFR operations.

In response to JAA's concerns regarding harmonization, the FAA fully supports harmonization efforts with JAA and Transport Canada, where appropriate. JAA's proposal is concerned largely with a European aeronautical and geographical environment. The FAA has required in this rulemaking many of the items proposed by JAA; however, the FAA believes that JAA's full proposal would have the effect of deterring participation of operators of single-engine part 135 aircraft in the IFR system and by so doing, contribute to the type of safety situation that this rule seeks to improve.

Additionally, the FAA recognizes that Transport Canada has taken the lead with allowing operations with single engine turbine aircraft. In fact, the FAA considered Transport Canada's work as it developed its proposal. The FAA will continue to support harmonization efforts to the maximum extent practicable; however, because of its large aircraft population operating under part 135 and its extensive IFR system, the FAA will continue to address aviation safety issues in the United States in light of its unique situation. The FAA notes, however, that to the extent that Canada's aviation rules preclude the use of single-engine aircraft powered by reciprocating engines in IFR operations, then such U.S. certificated single-engine operations may not be able to conduct single engine, passenger-carrying operations in Canadian airspace.

Therefore, the FAA intends to file a difference to the single-engine operational standard of Annex 6, Chapter 5, Paragraph 5.1.2. to become effective upon the effective date of the SFAR.

C. Equipment Requirements

Independent Generators/Second Battery Requirement

A number of commenters state that it would be too costly for electrical systems to provide a second battery capable of supplying 150 percent of the minimum electrical load for a least one hour, as proposed. One commenter says that such a battery would weigh 30 pounds and result in a more complex electrical system increasing the probability of electrical failure. Another commenter writes that he does not know of such a system that is widely available, reliable, and reasonable in cost. Instead of requiring a standby battery system, the commenter proposed requiring an "easily noticeable warning light," which indicates immediately that the power generating source is failing. Several commenters suggest a requirement to carry a handheld transceiver, perhaps with an alkaline battery pack, to address concerns about the loss of the airplane battery or alternator/generator. In general, commenters who disagree with the requirement for a backup power supply argue that there is enough redundancy currently required.

In response to comments, the FAA, in the final rule, requires either two independent electrical generating sources, or a standby battery or an alternate electrical source to serve as a second power source (as opposed to specifying only a battery) if that source can supply 150% of the electrical loads necessary for emergency operations of the aircraft for at least one hour. This requirement introduces redundancy for the generator and alternator and ensures that, if a generator or alternator fails, the aircraft will still be able to use certain equipment for a period of time in which to make a safe approach and landing.

A handheld transceiver is not on the aircraft equipment list; because such equipment is not permanently installed, its presence on an aircraft could not be assured and, therefore, it would not meet the regulatory requirement. In reference to the comment recommending a warning light system, the FAA has determined that such a system provides no redundancy and would only identify a failure as it is happening rather than providing the aircraft with electrical power for needed equipment for at least one more additional hour after the failure of the primary system has occurred.

Further, the FAA believes that an alternate electrical source, such as a standby battery, that would be approved for use in a single-engine IFR will be a cost effective means of providing a level of safety equivalent to an aircraft with a dual electrical system. The FAA has used the phrase "alternate source of electric power" in this amendment. Although the FAA envisions that alternate source to be a battery or an electrical storage unit, the wording provides for future technology that may replace a simple battery.

The NPRM proposed, as an alternative to having two independent electrical generating sources installed on the aircraft, a single generating source and a standby battery capable of supplying 150% of the minimum electrical load for at least one hour to operate navigation and communication equipment. Commenters raised questions as to what was meant by the term "minimum electrical load" as it pertains to the capacity of the standby battery. Upon further review, the Agency recognizes that the proposed § 135.163(f)(2) regulatory language did not comport with its intent regarding the electrical loads that the standby battery must be capable of providing.

Therefore, in this final rule, the Agency is clarifying its intent that the standby battery be capable of supplying 150% of the electrical loads for all required instruments and equipment necessary for the safe emergency operation of the aircraft for one hour. This is consistent with the redundancy requirements specified for multiengine aircraft in § 135.163(g). The FAA further recognizes that in an actual emergency situation, the pilot will shed electrical loads to the minimum required for safe operation. Required instruments and equipment could include single navigation and communication equipment, but could also include other equipment necessary for the safe operation of the aircraft in the actual environment, such as pilot heat or instrument lighting. The FAA is therefore deleting both the phrase "minimum" and "to operate navigation and communication equipment" from the regulatory language to clarify that the battery capacity is not limited solely to the capacity needed to operate navigation and communication equipment, but other necessary equipment as well. Thus, should an operator choose not to install two independent electrical power generating sources on the aircraft, this alternate minimum electrical power source will provide the necessary system redundancy for safe emergency operation of the flight.

The FAA further finds that although it did not propose this precise language in the NPRM, it is unnecessary and not in the public interest to delay the entire single-engine IFR rulemaking on this minor technical issue. Nevertheless, the FAA invites comment on the final regulatory language in § 135.163(f)(2).

Redundant Power Source for Gyroscopic Instruments

The FAA specifically sought comments on whether a redundant power source for gyroscopic instruments is needed. One commenter responds that requiring dual engine-driven, pneumatic pumps would go a long way to precluding loss of air-driven gryos. If both pumps were lost because the engine stopped, the battery should last long enough to allow the aircraft to glide to a landing. One commenter states that French IFR rules achieve redundant gyroscopic instruments with one attitude indicator and a second attitude indicator or a turn indicator and a slip indicator powered by a source independent of the first attitude power source. Another commenter states that a third attitude indicator should be installed with at least 3-minute self-contained electrical source independent of the aircraft's main electrical system. The NTSB recommended a requirement for a redundant source of power for attitude gyroscopic instrumentation. The Board stated that despite requirements for partial panel training, the fatal accident record indicates that many pilots have experienced difficulty maintaining aircraft control during actual partial panel situations. Another commenter, however, states that because there are so few system failures in IFR flight, redundant systems for gyroscopes are unnecessary.

By this amendment, the FAA has adopted the proposed requirement for redundant power sources for gyroscopic instruments to the final rule. Although the NPRM did not contain the regulatory language, the Agency proposed the redundant power source requirement in the preamble. The FAA recognized that the failure of the vacuum/pressure pump of the pneumatic system during IFR in IMC can lead to spatial disorientation of the pilot and loss of aircraft control. The redundancy or the pneumatic system will put single-engine aircraft systems on parity with existing twin-engine aircraft. Because the FAA proposed redundancy for passenger-carrying operations, but not for all-cargo operations, the final rule requirement for redundancy of power source for gyroscopic instruments is limited to passenger-carrying operations.

Autopilot/Co-pilot Requirement

Several commenters state that the proposed rule does not substantiate the need for two pilots or a single pilot with autopilot. There are concerns because the vast majority of single engine aircraft do not have an autopilot installed that meets the requirements of § 135.105, and retrofitting such aircraft may cost up to $20,000 and add up to 30 pounds to the empty weight of an aircraft. In addition, according to the commenter, if another crewmember is added to comply with the regulation, one less seat would be available on the small planes, which would be a "severe economic burden." Another commenter states that the FAA should allow two-axis autopilots; a requirement for a three-axis autopilot would eliminate most single-engine aircraft currently equipped with autopilots.

In response, the FAA disagrees that an autopilot or second pilot is not needed. The complexity and workload in IMC is such that a three-axis autopilot as opposed to a two-axis autopilot, or second pilot is necessary for safety in air transportation. Section 135.105 currently establishes a standard for an autopilot capable of operating the aircraft controls about three axes.

Concerning the comment on weight penalty and the cost issue, the FAA has determined that these requirements, as well as the other requirements for

equipment, training and checking, operations, maintenance, etc., are based on experience and are considered necessary for safety. The FAA has determined that they remain valid for any air carrier involved in commercial passenger-carrying operations. Therefore, the FAA is adopting the autopilot or second pilot as proposed.

Other Equipment

Commenters suggest other equipment that should be required for SEIFR operations. One commenter states that a radar altimeter should be required because it shows actual height above the terrain. Another commenter states that for planes with six or more passengers, the FAA should mandate an emergency cockpit checklist, a cockpit voice recorder, and weather radar. For turbine-powered airplanes, TCAS and GPWS should be required when carrying six or more passengers. Area navigation systems provide an additional margin of safety where radar coverage is minimal. A third commenter states that the NPRM does not adequately address pitot system anti-icing. Any flight where flight temperatures will be below 40° F should require dual heated pitot systems to ensure that the pilot will have airspeed and static system operation in IMC. Fuel tank vents and stall warning systems need to be ice protected. Windshield de-ice is needed for winter operations in Alaska. The commenter also suggests self-powered attitude indicators should be added to single-engine aircraft used for SEIFR operations.

To respond, the FAA notes that radar altimeters are only required for Category II and III operations. As for the emergency cockpit checklist, a cockpit voice recorder, weather radar, TCAS, GPWS, and area navigation systems, the FAA has decided that this equipment is not necessary for the planned operations affected by this rule.

Regarding the comment on icing, flight into icing conditions is already prohibited by § 135.227 unless the aircraft is adequately equipped. This rule does not change the equipment requirements for flight into icing conditions. Also, this rule does not relieve an operator from having an aircraft certified for flight into icing conditions, if those operations are anticipated.

D. Oil Analysis/Maintenance/Trend Monitoring/Engine Health

Several commenters are concerned about the oil analysis requirements. Several letters mention that while oil analysis as part of a maintenance program may be justified, expensive engine maintenance should not be required based solely on this one parameter. According to the commenter, one "bad" sample is not sufficient reason for maintenance until further analysis is performed. Oil samples may be misleading because it is possible to have sample contamination; as the commenter noted, a single operation on a dusty day with the carburetor heat left on accidentally allowing unfiltered air into the engine may create a contaminated sample. The commenter suggests that other tools, such as compression checks and borescopes, should be used in conjunction with oil analyses.

Another commenter states that oil analysis has never enabled him to predict, and therefore avoid, engine problems. He gave an example of one instance where a turbocharger broke down, filling the engine's oil screen with metal. After contacting the oil lab to find out why the oil analysis tests had not predicted the failure, the lab indicated to him that the particles of metal in the oil were "too big" to be detected by regular analysis.

One commenter says that those in the oil analysis business are concerned about their liability insurance if their opinion is mandated rather than advisory. Another commenter writes that oil analysis should not be required at each 100 hours of inspection, but rather at 100 hours of operations because not all oil changes are made at 100-hour inspections. Other commenters suggest replacing "oil analysis" with "trend monitoring and/or oil analysis." Finally, two commenters suggest requiring "oil analysis" and an oil and filter change every 50 hours rather than 100 hours. Another commenter states that spectrographic oil analysis is not a predictor of fatigue failures, which are the most common cause of piston-engine power loss.

FAA has determined that engine health trend monitoring can play an important part in preventive maintenance by providing an early warning of potential problems. The final rule gives operators the option of adopting the manufacturer's trend monitoring program or an FAA-approved trend monitoring program that includes oil analysis. The FAA is currently updating its advisory materials on trend monitoring programs (AC 21–105A, "Engine Power Loss Accident Prevention," dated 11/20/80).

While the FAA recognizes that the possibility exists for misleading oil analyses, each laboratory analysis report must be treated individually and in conjunction with previous reports. If the data indicate a possible problem exists, further inspection and/or maintenance is necessitated. This approach is consistent with the current practice of inspection if one of the engine's cylinders had a bad compression reading because carbon deposits were keeping a valve from properly seating.

FAA has determined that a spectrographic oil analysis, properly performed, provides the owner/operator with a reliable, advance warning of a potential failure based on the amount of metal and bearing material in the oil sample. Although contamination can occur at any stage, in a comprehensive maintenance inspection program, oil analysis will provide useful trend information. The FAA agrees with the comment that oil analysis will not always give advance warning of fatigue failures, such as crankshaft separation, but neither do other inspection techniques, such as borescope inspections and compression tests.

Regarding the recommendation to change the interval of oil sampling from 100 hours to 50 hours, the FAA notes that 100-hour interval is considered an "industry standard." Under the final rule, operators must follow the manufacturer's monitoring program recommendations if they call for more frequent checks.

The FAA also recognizes that oil analysis may not be applicable to certain engine types, e.g. Pratt and Whitney PT–6. Therefore, in the final rule, the operator is given the option to choose between the manufacturer's published trend monitoring program, which may or may not contain a provision for oil analysis based on the engine type and design, or the FAA-approved program that must include oil analysis. Published manufacturer's trend monitoring programs are available for turbine engines, however, the FAA is not aware of any published trend monitoring program for reciprocating aircraft.

To clarify the recordkeeping requirements, the FAA has added a new § 135.421(e) to require the recordation and maintenance of the results of each test, observation, or inspection required by the applicable engine monitoring program in the engine maintenance records. Although the FAA proposed a recordkeeping requirement for the engine trend monitoring, the FAA requests comment on the modification to the recordkeepng requirement to be codified in § 135.421(e). The required recordation is subject to OMB approval, as required by the Paperwork Reduction Act. An information collection control number will be assigned for it if and when OMB approval is given; that

number would be listed in part 1?, subpart F, of Title 14.

E. Training

One commenter suggests that training should emphasize partial panel operations and systems failure recognition; such training could be included in part 135 training manuals. Another commenter states that an ATP certificate should be required for SEIFR operations. Commenters also suggest that simulator training and a six-month IFR check should be required.

The FAA agrees with the commenter that additional emphasis and checking in partial panel and system failure recognition are necessary. Existing regulations require training in systems failures. The FAA will review and update its handbooks and training related material to ensure that partial panel operations are evaluated on the instrument competency checks for the affected operators and that proper attention is given when operators' training programs are approved and reviewed.

In addition, the FAA notes that an ATP certificate is required for pilot-in-command positions on large airplanes usually operated under part 121. The experience and skill level required for single-engine air transportation under IFR are not equivalent to those required for large transport category airplanes. The FAA maintains that a commercial pilot certificate and appropriate ratings are sufficient qualification for operations conducted under this rule; part 135 requires 1,200 hours of flight time for IFR operations. On simulator training, the FAA notes that part 121 does not require simulator training. Simulators are not available for most of the types of aircraft that will operate under this rule. For those aircraft that have simulators available, operators are encouraged to use them. Also, some training may be accomplished in a training device (§ 135.347). The FAA does not believe that required simulator training is necessary for adequate safety for the anticipated operations. Last, a six-month instrument proficiency check is already required (§ 135.297) by the existing regulations.

F. Removal of Limited IFR

Several commenters believe that the elimination of the present "limited IFR" rules would not be in the best interest of safety. They believe that operations in limited IFR conditions allowed by §§ 135.103 and 135.181 should still apply to single-engine airplanes without autopilots because the rules allow a qualified pilot to make an approach if, due to unforecast weather, the intended destination goes below VFR minimums. Another commenter does not favor eliminating these sections because pilots would lose the ability to climb out of the low level fog layer that often persists at some airports during the morning hours of the day. One commenter argues for maintaining the "limited IFR" rule because it is safer to offer the ability to operate under limited IFR rather than to force a pilot to scud run in and out of an uncontrolled field, or face delays at a tower controlled field, all the while watching the weather conditions worsen. Another commenter suggested amending § 135.103 to exempt the autopilot for this section.

Current data, as discussed in the NPRM, for on-demand Part 135 accidents involving single-engine aircraft indicate that poor inflight planning and decision-making, and other weather-related errors resulting from attempts to maintain VFR flight are the major causes of accidents. While the possibility of a failure of the single engine exists, the FAA has, it believes, reduced that possibility further by additional maintenance requirements. The possibility of pilot mishandling has also been reduced, in the judgment of the FAA, by emphasizing training in partial panel emergency procedures and system failure recognition when combined with equipment redundancies.

As mentioned above, the FAA is improving the total operating environment with this amendment. A single-engine passenger-carrying operation will be a planned operation (IFR preflight planning of routes, weather, fuel, and alternates), conducted in an ATC controlled environment, with better trained pilots, with additional equipment (autopilot if not two pilots, redundant electrical and vacuum systems), backed by an improved inspection program that includes engine trend monitoring. Therefore, the FAA has not retained the limited IFR rule because the FAA concluded, based on available data, that planned flight under IFR provides a higher standard of safety than unplanned flight under the limited IFR rule.

G. Weather and Terrain Issues

Transport Canada states that flight under IFR requires that the aircraft be certified for flight into known icing for at least the northern U.S.; few existing single-engine aircraft in commercial service are so certified. Another commenter states that icing is a greater problem than VFR flight into IMC. The greater number of accidents due to inadvertent encounters with icing will more than offset any improvements in the VFR to IMC accident rate. Reciprocating engine aircraft certification rules do not require a demonstration of any ability to continue to operate in icing conditions. In addition, a few commenters state the SEIFR over mountainous terrain should be barred.

The FAA recognizes that authorizing an aircraft to operate in IFR conditions neither converts an aircraft to "all-weather," nor allows it to do anything for which it is not certificated or equipped. Under § 135.227, operators using aircraft not certified for known icing conditions may not operate in those conditions. An aircraft that does not meet the requirements for flying in icing conditions may not be operated in those conditions. Additionally, the FAA notes that part 135 operators can already operate under IFR in U.S. airspace using aircraft that are not certified for known icing as long as the operations anticipated are outside of known icing conditions.

Single-engine aircraft limited by service ceiling or lack of pressurization or oxygen will not be capable of using the IFR system over some mountainous terrain. In addition, the FAA notes that finding a suitable landing place in mountainous terrain, if a forced landing is necessary, may not be very much different from finding a suitable landing place in a wide, densely populated area. Single engine aircraft are not presently restricted from either area. Thus, single engine operations addressed in this amendment will not be so restricted either.

H. National Application of the Rule

A commenter suggests that the FAA should limit all SEIFR operations to only Alaska (turbine or reciprocating engine) or, at least, limit SEIFR with reciprocating-engine aircraft to only Alaska. A commenter states that if specific operations in remote areas require exemptions, these should be handled on a case-by-case basis, not by adopting a national standard. Several commenters state that this rule will result in operators trading in multi-engine aircraft and replacing them with reciprocating engine, single-engine aircraft.

The FAA considered the conditions of weather and terrain in Alaska to be a "worst-case" operating environment. Authorization in the regulations for use of single-engine air transportation under IFR in Alaska would justify single-engine air transportation under IFR in the contiguous U.S. where operating conditions are generally less severe. The FAA's regulatory evaluation indicates

that this rule will create a net safety benefit in the other 49 states as well as Alaska. Exemptions are handled on a case-by-case basis; however, the rationale that the FAA would use to justify an exemption would also apply to all similarly-situated operators.

The FAA does not expect the operators currently flying multi-engine aircraft will switch to single-engine aircraft simply because of this rule change. Decisions about the type of aircraft to operate are complex. Operators must weigh numerous factors when selecting aircraft, for example, aircraft availability and age, customer base, and geographical location. Whatever choice operators make, the FAA remains convinced that the rule will increase safety of single-engine, passenger-carrying operations.

I. Other Comments

Several comments support the ARAC proposals. One commenter states that the FAA received only 12 petitions for exemptions since 1978, which is not a significant number. Finally, one commenter states the proposal would result in slower, single-engine aircraft at metropolitan airports, taxing the ATC system, and in more inexperienced pilots flying in hazardous conditions. To overcome these problems, they suggest that any aircraft that cannot maintain 140 knots on final approach should be excluded from Class B airspace and that pilot qualifications should include 2,000 hours of flight time.

The FAA commends the ARAC for its detailed work on the SEIFR proposal; as is evident, the ARAC proposal formed a basis for this action. In fact, the FAA notes that this final rule incorporates a number of the ARAC proposals. Other ARAC proposals are not needed because they duplicate existing requirements. The ARAC proposals, although not technically limited to a particular type of aircraft, cited conditions that are met at present by only turbine-powered aircraft. The ARAC also recommended that the FAA grant the Alaska Air Carriers Association's petition for exemption, which covers all single-engine aircraft.

FAA rulemaking is not contingent only upon public petition. In the case of this rule, the petitions for exemption, one of which was submitted by a trade association, were only part of an overall, growing awareness by industry and FAA that the limited IFR rule was no longer serving its original purpose and that the better safety alternative would be to allow all qualified part 135 operators to use the IFR system from departure to termination of the flight.

Finally, the FAA is unaware of any evidence that this rule would place an excessive burden on the ATC system or result in delays in the terminal area.

IV. Maintenance of Required Equipment

Section 135.411 requires an operator of an aircraft type certificated for 9 or fewer passengers to have that aircraft maintained, at a minimum, in accordance with parts 91 and 43 of Title 14. The maintenance is performed on the basis of 100-hour and annual inspections, as those inspections are described in part 43, appendix D. For an aircraft type certificated for 9 or fewer passengers, § 135.411 also accepts an approved aircraft inspection program (AAIP), as described in § 135.419.

Section § 135.419(a) provides that, when the FAA finds that the aircraft inspections required under part 91 are not adequate to meet part 135, the FAA may amend the operator's operations specifications to require an AAIP. Section § 135.419(f) provides that, when the FAA finds that revisions to an AAIP are necessary for the continued adequacy of the program, the operator must, after notification from the FAA, make the necessary revisions. Long-standing rules, therefore, enable the FAA to make even major adjustments to an operator's maintenance program that are necessary to maintain the level of safety appropriate for carrying passengers or cargo for compensation or hire.

Section 135.421(a) describes additional maintenance requirements for each operator of an aircraft type certificated for 9 or fewer passengers; it requires the operator to comply with the manufacturer's recommended maintenance program, or with an AAIP, for each aircraft, engine, propeller, rotor, and item of emergency equipment. In Notice 96–14, the FAA proposed to add paragraph (c) to § 135.421 to require the single engine aircraft operator to incorporate into its manufacturer's recommended maintenance program or AAIP, an engine trend monitoring program that includes a 100-hour oil analysis and record of findings.

The equipment required under § 135.105 and new § 135.163 (f) and (h) will frequently be installed in accordance with a supplemental type certificate (STC); the holder of that certificate may be required by 14 CFR § 21.50 to furnish instructions for continued airworthiness (ICAW), in which case, it is important that the operator maintain the equipment in accordance with those instructions to maintain the level of safety appropriate for carrying passengers for compensation or hire. It is imperative for each part 135 operator, no matter what the method of approval of the installation, to have the equipment required by this rule maintained to the level of safety appropriate for carrying passengers for compensation or hire.

Accordingly, the FAA has decided to adopt new § 135.421(d). New § 135.421(d) will require the operator to ensure that the equipment required by § 135.105 and new § 135.163 (f) and (h) is maintained in accordance with written maintenance instructions that will provide a level of safety equivalent to ICAW. If the manufacturer provides ICAW, the operator may use those; to deviate from the ICAW, the operator will be required to obtain FAA approval. New § 135.421(d) applies to operators who have 100-hour and annual inspection based programs, and operators who have AAIPs. Therefore, if operator does not utilize the applicable manufacturer's maintenance manual or instructions for continued airworthiness prepared by the manufacturer, then it must have written maintenance instructions, acceptable to the Administrator, containing the methods, techniques, and practices to maintain the equipment required in §§ 135.105 and 135.163 (f) and (h).

Although this modification to the maintenance requirements was not explicitly stated in Notice 96–14, the FAA has decided to adopt it in this final rule. As explained above, long-standing rules enable the FAA to make necessary adjustments to an operator's maintenance program. Furthermore, operators should realistically expect to be required to properly maintain all equipment that is critical to SEIFR operations. The FAA has determined that many operators already have the items of equipment installed in their aircraft, and are maintaining those items in accordance with instructions that are not stated in the amount of detail necessary for the level of safety expected for SEIFR operations. New § 135.421(d) will require those instructions to be written and acceptable to the Administrator.

Because the FAA did not explicitly propose § 135.421(d), the FAA invites comment on that section's final regulatory language. The required written maintenance instructions are subject to OMB approval, as required by the Paperwork Reduction Act. An information collection control number will be assigned for them if and when OMB approval is given; that number would be listed in part 11, subpart F, of Title 14.

Section 135.411 requires an operator of an aircraft type certificated for 10 or

more passengers to have that aircraft maintained in accordance with a program that meets the requirements of §§ 135.415, 135.417, and 135.423 through 135.443. That program is referred to as a continuous airworthiness maintenance and inspection program (CAMP). Section 135.425(c) requires that a CAMP ensure that each aircraft released to service has been properly maintained for operation under part 135. Section 135.427(b) requires the CAMP to include the programs required by § 135.425 that must be followed in performing maintenance, preventive maintenance, and alteration of the operator's aircraft, including the airframe, engines, propellers, rotors, appliances, emergency equipment, and parts. Instructions for maintaining the equipment required by §§ 135.105 and 135.163 (f) and (h) will be incorporated into operators' CAMPs.

V. Section-by-Section Discussion of Changes

Special Federal Aviation Regulation (SFAR) No. 81 is added to allow operators who can meet the requirements of this rule before the effective date to begin SEIFR operations. The SFAR is not effective until the FAA publishes a notice specifying the effective date in the **Federal Register**. The SFAR terminates on the effective date of the Commercial Passenger-Carrying Operations in Single-Engine Aircraft Under Instrument Flight Rules rule.

As proposed, § 135.101 is revised to eliminate the reference to § 135.103, which is deleted, and to delete the word "conditions" after IFR. Deletion of the word "conditions" clarifies that any operation for which an IFR flight plan is filed must have a second pilot or an autopilot, even if the flight can be conducted in VFR conditions.

As proposed, § 135.103 is deleted because it is no longer needed.

Section 135.163 is revised to add, for multi-engine aircraft, reference to alternators. For single-engine aircraft, a requirement is added for two independent electrical power generating sources or a standby battery or alternate source of electric power. A requirement is also added for a redundant energy system for gyroscopic instruments; the existing exception in paragraph (h) for single-engine aircraft is not limited to single-engine aircraft in all-cargo operations.

As proposed, § 135.181 is revised by dropping all of the limited IFR conditions. Only the performance requirements for multi-engine aircraft and over-the-top requirements remain.

Section 135.411 is revised to add a reference to § 135.421 as it pertains to the maintenance requirements for single engine passenger-carrying aircraft under IFR.

Section 135.421 is revised to add the requirement for engine trend monitoring for aircraft used in passenger-carrying SEIFR operations, and the requirement for written maintenance instructions, acceptable to the Administrator, for the equipment required in §§ 135.105, and 135.163 (f) and (h).

Regulatory Evaluation Summary

The Federal Aviation Administration (FAA) is updating and revising the regulations to allow single-engine, passenger carrying aircraft to operate under the instrument flight rules. The rule will reduce the incentive for operators to conduct low altitude operations under marginal weather conditions. However, this rule will also require operators to meet the more stringent requirements for such flights including additional aircraft equipment.

The cost of this final rule is estimated at $170.3 million ($127.6 million, discounted). The most costly provision is on the requirement for an autopilot, which is estimated at $94.9 million discounted and represents about 74.3 percent of the total. The FAA concludes that the expected quantitative benefits will be $354.6 million or $249.1 million, discounted. If the rule is 75 percent effective in reducing fatalities and injuries, then the expected quantitative benefits will be $284.3 million or $199.5 million discounted over ten years. The benefits estimate should be considered low because the added equipment, etc. required for single-engine aircraft should result in fewer overall fatalities. The benefits analysis does not take this into account.

If fewer disruptions, cancellations, etc. were considered a cost-savings instead of a benefit, then both the benefit estimate and the cost estimate should be reduced by $156.9 million ($110.2 million discounted). The cost of the rule, net of these costs savings, will be $13.4 million or $17.4 million, discounted, and the benefits of this rule, namely safety benefits (assuming 75 percent effectiveness), will be $127.7 million or $89.3 million discounted over ten years. While the discounted costs and benefits are lower than the undiscounted costs and benefits, respectively, the discounted net costs are higher than the undiscounted net costs.

Under the guidelines presented in FAA Order 2100.14A, the FAA has determined that the final rule will not have a significant economic impact, positive or negative, on small operators.

This final rule is not expected to have any impact on trade opportunities for U.S. firms doing business overseas or foreign firms doing business in the United States. The final rule will primarily affect U.S. operators of aircraft for hire that provide domestic service.

This final rule does not contain any Federal intergovernmental or private sector mandate. Therefore, the requirements of Title II of the Unfunded Mandates Reform Act of 1995 do not apply.

Regulatory Flexibility Assessment

The Regulatory Flexibility Act of 1980 (RFA) was enacted by Congress to ensure that small entities are not unnecessarily or disproportionately burdened by Federal Regulations. The RFA requires an analysis if a final rule will have "a significant economic impact on a substantial number of small entities." The definitions of small entities and guidance material for making determinations required by the RFA are contained in the **Federal Register** (47 FR 32825, July 29, 1982). Federal Aviation Administration (FAA) order 2100.14A outlines the agency's procedures and criteria for implementing the RFA.

With respect to the final rule, a "small entity" is an operator of aircraft for hire with nine or fewer aircraft. A "significant economic impact on a small entity" is defined as an annualized net compliance cost for operators of aircraft for hire which in 1996 dollars is $126,100 for scheduled operators whose aircraft have more than 60 seats. It is $70,490 for scheduled operators whose fleets have aircraft with seating capacities of 60 or fewer seats (other scheduled operators) and $4,960 for unscheduled operators. A substantial number of small entities is defined as a number that is 11 or more and which is more than one-third of small operators subject to the final rule.

The FAA estimates that the annualized cost of the final rule is about $4,708 per aircraft and that the annualized cost savings to the operator is about $2,142 per aircraft. Therefore, the net annualized cost is about $2,566 per aircraft.

The FAA has initially determined that if every operator were defined as unscheduled, then operators with two aircraft or more will incur a significant impact.

The cost for an operator with two aircraft is slightly over the threshold of $4,960 by approximately three and a half percent. However, in the regulatory evaluation and the above regulatory

flexibility analysis, the FAA has made conservative assumptions that could result in costs per aircraft being overestimated. For example, the FAA has assumed that none of the aircraft are in partial compliance with any of the equipment requirements of this regulation. To the extent that some operators have aircraft that are in partial compliance, then costs per aircraft have been overestimated and the FAA believes that compliance costs per aircraft are overestimated by more than five percent. An example of this are the weight penalty costs. The FAA assumed that a battery and related hardware would add 30 pounds to the weight of the aircraft. A Gill 25 amp battery weighing 22 pounds plus hardware would be adequate and weighs about 25 pounds. Therefore, the difference in weight (5 pounds × 15 gallons/pound × $2.32/gallon=$174) would result in aircraft being under the threshold. Consequently, operators with two or fewer aircraft would not likely to be significantly impacted. The FAA has concluded that this is the case and, therefore, the rule will not affect a substantial number of small entities. In addition, many operators that the FAA considered as being potentially impacted may choose not to carry passengers under IFR. For these reasons, the FAA has determined that a substantial number of operators will not be positively or negatively impacted in a significant way.

International Trade Impact Statement

This final rule is not expected to have any impact on trade opportunities for U.S. firms doing business overseas or foreign firms doing business in the United States. The final rule will primarily affect U.S. operators of aircraft for hire that provide domestic service.

Unfunded Mandates Reform Act Assessment

Title II of the Unfunded Mandates Reform Act of 1995 (the Act), enacted as Pub. L. 104–4 on March 22, 1995, requires each Federal agency, to the extent permitted by law, to prepare a written assessment of the effects of any Federal mandate in a proposed or final agency rule that may result in the expenditure by State, local, and tribal governments, in the aggregate, or by the private sector, of $100 million or more (adjusted annually for inflation) in any one year. Section 204(a) of the Act, 2 U.S.C. 1534(a), requires the Federal agency to develop an effective process to permit timely input by elected officers (or their designees) of State, local, and tribal governments on a proposed "significant intergovernmental mandate." A "significant intergovernmental mandate" under the Act is any provision in a Federal agency regulation that will impose an enforceable duty upon State, local, and tribal governments, in the aggregate, of $100 million (adjusted annually for inflation) in any one year. Section 203 of the Act, 2 U.S.C. 1533, which supplements section 204(a), provides that before establishing any regulatory requirements that might significantly or uniquely affect small governments, the agency shall have developed a plan that, among other things, provides for notice to potentially affected small governments, if any, and for a meaningful and timely opportunity to provide input in the development of regulatory proposals.

This final rule does not meet the cost thresholds described above. Furthermore, this final rule will not impose a significant cost on small governments and will not uniquely affect those small governments. Therefore, the requirements of Title II of the Unfunded Mandates Reform Act of 1995 do not apply.

Paperwork Reduction Act of 1995

The proposed recordkeeping requirements for the engine trend monitoring (new § 135.421(e)) and the written maintenance instructions (new § 135.421(d)) are subject to OMB approval, as required by the Paperwork Reduction Act. Pending OMB clearance on the paperwork requirements, SFAR No. 81 is not effective until the FAA publishes in the **Federal Register** a notice specifying the effective date. An information collection control number will be assigned if and when OMB approval is given; that number would be listed in part 11, subpart F of Title 14.

Conclusion

For the reasons discussed in the Preamble, and based on the findings in the Regulatory Flexibility Assessment and the International Trade Impact Analysis, the FAA has determined that this rule is not a "significant regulatory action" under Executive Order 12866. In addition, the FAA certifies that this regulation does not have a significant economic impact, positive or negative, on a substantial number of small entities under the criteria of the Regulatory Flexibility Act of 1980. This amendment is not considered significant under Order DOT 2100.5, Policies and Procedures for Simplification, Analysis, and Review of Regulations. A regulatory evaluation of the regulation is available in the docket.

List of Subjects in 14 CFR Part 135

Air carriers, Air taxis, Air transportation, Aircraft, Airmen, Airworthiness, Aviation safety, On-demand operations, Pilots, Rotorcraft, Safety, Single-engine aircraft, Single-engine airplane.

For the reasons set out in the preamble, 14 CFR part 135 is amended as set forth below:

PART 135—OPERATING REQUIREMENTS: COMMUTER AND ON-DEMAND OPERATIONS

1. The authority citation for part 135 continues to read as follows:

Authority: 49 U.S.C. 106(g), 40113, 44701–44702, 44705, 44709, 44711–44713, 44715–44717, 44722.

2. Special Federal Aviation Regulation No. 81 is added to read as follows:

SFAR No. 81—PASSENGER-CARRYING SINGLE-ENGINE IFR OPERATIONS.

1. Purpose and Eligibility.

(a) This Special Federal Aviation Regulation provides for the approval of single-engine passenger-carrying operations under instrument flight rules (IFR) during the month prior to the effective date of the Commercial Passenger-Carrying Operations in Single-Engine Aircraft Under Instrument Flight Rules rule.

(b) This SFAR terminates on May 3, 1998.

(c) Only those single-engine, passenger-carrying operations meeting all the applicable requirements of part 135 and those requirements set forth in paragraph 2 of this SFAR may operate under IFR.

2. Contrary provisions of §§ 135.103 and 135.181 notwithstanding, a person may conduct passenger-carrying operations under IFR in single-engine aircraft if the following conditions are met:

(a) The aircraft has two independent electrical power generating sources each of which is able to supply all probable combinations of continuous inflight electrical loads for required instruments and equipment; or in addition to the primary electrical power generating source, a standby battery or an alternate source of electric power that is capable of supplying 150% of the electrical loads of all required instruments and equipment necessary for safe emergency operation of the aircraft for at least one hour;

(b) The aircraft has two independent sources of energy (with means of selecting either), of which at least one is an engine-driven pump or generator, each of which is able to drive all gyroscopic instruments and installed so that failure of one instrument or source does not interfere with the energy supply to the remaining instruments or the other energy source;

(c) The aircraft meets the autopilot requirements of § 135.105 or has a second in command;

(d) The certificate holder's maintenance inspection program incorporates either the manufacturer's recommended engine trend

monitoring program, which includes an oil analysis, if appropriate, or an FAA approved engine trend monitoring program that includes an oil analysis at each 100 hour interval or at the manufacturer's suggested interval, whichever is more frequent.

(e) The results of each test, observation, and inspection required by the applicable engine trend monitoring program are recorded and maintained in the engine maintenance records; and

(f) Written maintenance instructions containing the methods, techniques, and practices necessary to maintain the equipment specified in paragraph 2 (a), (b), and (c) are prepared.

3. Section 135.101 is revised to read as follows:

§ 135.101 Second in command required under IFR.

Except as provided in § 135.105, no person may operate an aircraft carrying passengers under IFR unless there is a second in command in the aircraft.

§ 135.103 [Removed and reserved]

4. Section 135.103 is removed and reserved.

5. Section 135.163 is amended by revising paragraphs (f), (g), and (h) to read as follows:

§ 135.163 Equipment requirements: Aircraft carrying passengers under IFR.

* * * * *

(f) For a single-engine aircraft:

(1) Two independent electrical power generating sources each of which is able to supply all probable combinations of continuous inflight electrical loads for required instruments and equipment; or

(2) In addition to the primary electrical power generating source, a standby battery or an alternate source of electric power that is capable of supplying 150% of the electrical loads of all required instruments and equipment necessary for safe emergency operation of the aircraft for at least one hour;

(g) For multi-engine aircraft, at least two generators or alternators each of which is on a separate engine, of which any combination of one-half of the total number are rated sufficiently to supply the electrical loads of all required instruments and equipment necessary for safe emergency operation of the aircraft except that for multi-engine helicopters, the two required generators may be mounted on the main rotor drive train; and

(h) Two independent sources of energy (with means of selecting either), of which at least one is an engine-driven pump or generator, each of which is able to drive all gyroscopic instruments and installed so that failure of one instrument or source does not interfere with the energy supply to the remaining instruments or the other energy source unless, for single-engine aircraft in all-cargo operations only, the rate-of-turn indicator has a source of energy separate from the bank and pitch and direction indicators. For the purpose of this paragraph, for multi-engine aircraft, each engine-driven source of energy must be on a different engine.

* * * * *

6. Section 135.181 is amended by revising paragraphs (a)(1) and (c) to read as follows:

§ 135.181 Performance requirements: Aircraft operated over-the-top or in IFR conditions.

(a) * * *

(1) Operate a single-engine aircraft carrying passengers over-the-top; or

* * * * *

(c) Without regard to paragraph (a) of this section, if the latest weather reports or forecasts, or any combination of them, indicate that the weather along the planned route (including takeoff and landing) allows flight under VFR under the ceiling (if a ceiling exists) and that the weather is forecast to remain so until at least 1 hour after the estimated time of arrival at the destination, a person may operate an aircraft over-the-top.

* * * * *

§ 135.411 [Amended]

7. Section 135.411 is amended by adding paragraph (c) to read as follows:

* * * * *

(c) Single engine aircraft used in passenger-carrying IFR operations shall also be maintained in accordance with § 135.421 (c), (d), and (e).

8. Section 135.421 is amended by adding paragraph (c), (d), and (e) to read as follows:

§ 135.421 Additional maintenance requirements.

* * * * *

(c) For each single engine aircraft to be used in passenger-carrying IFR operations, each certificate holder must incorporate into its maintenance program either:

(1) the manufacturer's recommended engine trend monitoring program, which includes an oil analysis, if appropriate, or

(2) an FAA approved engine trend monitoring program that includes an oil analysis at each 100 hour interval or at the manufacturer's suggested interval, whichever is more frequent.

(d) For single engine aircraft to be used in passenger-carrying IFR operations, written maintenance instructions containing the methods, techniques, and practices necessary to maintain the equipment specified in §§ 135.105, and 135.163 (f) and (h) are required.

(e) No certificate holder may operate a single engine aircraft under IFR, carrying passengers, unless the certificate holder records and maintains in the engine maintenance records the results of each test, observation, and inspection required by the applicable engine trend monitoring program specified in (c) (1) and (c) (2) of this section.

Issued in Washington, DC on July 31, 1997.

Barry L. Valentine,

Acting Administrator.

[FR Doc. 97-20641 Filed 8-1-97; 11:49 am]

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December 3, 1996

Part IV

Department of Transportation

Federal Aviation Administration

14 CFR Part 135

Commercial Passenger-Carrying Operations in Single-Engine Aircraft under Instrument Flight Rules; Proposed Rule

DEPARTMENT OF TRANSPORTATION

Federal Aviation Administration

14 CFR Part 135

[Docket No. 28743; Notice No. 96–14]

RIN 2120–AG22

Commercial Passenger-Carrying Operations in Single-Engine Aircraft under Instrument Flight Rules

AGENCY: Federal Aviation Administration, DOT.

ACTION: Notice of Proposed Rulemaking.

SUMMARY: The Federal Aviation Administration (FAA) is proposing to revise the conditions and limitations in Part 135 for instrument flight rule (IFR), passenger-carrying operations in single-engine aircraft. The proposed rule will expand the passenger-carrying provisions of the current rule, add equipment requirements, as well as maintenance requirements to monitor engine reliability, and delete the limited IFR provisions of the existing rule for both single and multi-engine aircraft. Currently, operation of single-engine aircraft carrying passengers is authorized for visual flight rules (VFR) or for limited operations in instrument meteorological conditions (IMC). Single-engine cargo operations are authorized to operate under IFR without these limitations. VFR flight into IMC is the most significant cause of fatal accidents in Alaska and is a serious problem for single-engine aircraft nationally. This action would increase the safety of single-engine, passenger-carrying operations by allowing planned instrument flight in the IFR system and by imposing certain other conditions and limitations.

DATES: Comments must be received by February 3, 1997.

ADDRESSES: Comments on this notice should be submitted in triplicate to: Federal Aviation Administration, Office of the Chief Counsel, Attn: Rules Docket (AGC–200), Room 915–G, Docket No. 28743, 800 Independence Ave., SW, Washington, DC 20591. Comments must be marked Docket No. 28743. Comments also may be submitted electronically to the following Internet address: nprmcmts@faa.dot.gov. Comments may be examined in room 915G weekdays between 8:30 a.m. and 5 p.m. except on Federal holidays.

FOR FURTHER INFORMATION CONTACT: Ms. Katherine Hakala, Flight Standards Service, Federal Aviation Administration, 800 Independence Ave, SW, Washington, DC 20591 (202) 267–8166/3760.

SUPPLEMENTARY INFORMATION:

Comments Invited

Interested persons are invited to participate in the making of the proposed rule by submitting such written data, views, or arguments as they may desire. Comments relating to the environmental, energy, federal, or economic impact that might result from adopting the proposals in this notice are also invited. Substantive comments should be accompanied by cost estimates, if appropriate. Comments should identify the regulatory docket or notice number and should be submitted in triplicate to the Rules Docket address specified above. All comments received on or before the specified closing date for comments will be considered by the Administrator before taking action on this proposed rulemaking. The proposals contained in this notice may be changed in light of comments received. All comments received will be available, both before and after the closing dates for comments, in the Rules Docket, for examination by interested persons. A report summarizing each substantive contact with FAA personnel concerned with this rulemaking will be filed in the docket. Commenters wishing the FAA to acknowledge receipt of their comments submitted in response to this notice must include a pre-addressed, stamped postcard on which the following statement is made: "Comments to Docket No. 28743." The postcard will be date stamped and returned to the commenter.

Availability of NPRMs

An electronic copy of this document may be downloaded, using a modem and suitable communications software, from the FAA regulations section of the Fedworld electronic bulletin board service ((703) 321–3339), the **Federal Register's** electronic bulletin board service ((202) 512–1661), or the FAA's Aviation Rulemaking Advisory Committee Bulletin Board service ((800) 322–2722 or (202) 267–5948).

Internet users may reach the FAA's web page at http://www.faa.gov or the **Federal Register's** web page a http://www.access.gpo.gov/su_docs for access to recently published rulemaking documents.

Any person may obtain a copy of this NPRM by submitting a request to the Federal Aviation Administration, Office of Rulemaking, ARM–1, 800 Independence Ave, SW, Washington, DC 20591, or by calling (202) 267–9677. Communications must identify the notice number or docket number of this NPRM.

Persons interested in being placed on the mailing list for future NPRMs should request from the above office a copy of Advisory Circular No. 11–2A, Notice of Proposed Rulemaking Distribution System, which describes the application procedure.

Rationale

In the past, the rationale against single-engine IFR passenger-carrying operations centered on the hazards of losing an engine. Analysis indicates, however, a far more significant accident category: flight under visual flight rules (VFR) into instrument meteorological conditions (IMC). A recent NTSB study of aviation in Alaska indicated that VFR flight into IMC caused a disproportionate number of fatal accidents in part 135 operations in that state. Multi-engine airplanes are able to file and fly with passengers under IFR, while single-engine airplanes are only able (with few exceptions) to carry passengers under VFR. Thus, multi-engine airplanes have the advantage of contact with ATC, position following, en route and terminal weather information, and the higher altitude ensuring obstacle clearance and radio reception in the IFR system. The FAA Administrator, in a November 18, 1994, letter to pilots ("Winter Operations Emphasis Program 1994," available in the docket), expressed his concern about the number of accidents that occur when pilots are flying just below a low ceiling and collide with the terrain. He stated that one of the safest steps available was to take advantage of the IFR system. Aircraft flying at published cruising altitude that guarantees obstacle clearance and radio reception have considerably more time to glide to a landing and maneuver to a safe landing area than those flying below the ceiling.

The number of accidents involving VFR flight into IMC is substantial. It is concern with this safety hazard that prompted the FAA to reconsider its limitations on single-engine IFR flight with passengers under part 135. Additionally, the FAA has considered the action of Canada that allowed single-engine passenger-carrying IFR under certain conditions, and the petitions for exemption of the Alaska Air Carrier Association and individual operators. While this action will not eliminate VFR flight into IFR conditions accidents, it is expected that it will reduce the accident rate.

Background

Prior to October 10, 1978, passenger-carrying, single-engine instrument flight rule (SEIFR) operations were permitted

if an aircraft could descend to VFR conditions in the event of an engine failure. This provision allowed operations in IMC or over-the-top of a ceiling, as long as VFR conditions existed below that ceiling (i.e., a buffer zone). In 1978, part 135 was substantially revised for passenger-carrying operations over the top or in IFR conditions to require an aircraft to be able to descend under VFR if its engine fails (43 FR 46742, October 10, 1978). This revision also provided for "limited IFR" operations which, if VFR conditions were forecast within 15 minutes flying time, allowed flight in IMC for the first 15 minutes of flight, and thereafter only if those IFR conditions were unforecast. The pilot can operate in IFR conditions if unforecast weather conditions are encountered while en route on a flight planned to be conducted under VFR. The pilot can make an IFR approach at the destination airport if unforecast weather conditions are encountered that do not allow an approach under VFR. This rule had the effect of eliminating the buffer zone provisions, restricting planned flights under IFR in IMC, and restricting VFR over-the-top flights to scattered or broken sky conditions. An exception to the two-pilot requirement, or autopilot requirement, is provided for limited IFR operations in § 135.103. Limited IFR can be conducted as a single-pilot operation in aircraft with nine or fewer passenger seats. Cargo-only, single-engine aircraft can operate under IFR or over the top without these restrictions.

Since 1978, the FAA has received 12 petitions for exemptions from or amendments to § 135.181 to allow the use of all or specific models of single-engine aircraft in passenger-carrying IFR operations. The most recent petitions are still pending. Internationally, commercial operators in several countries have sought permission to conduct passenger operations in IMC with single-engine aircraft. Canada, following a cooperative effort with the engine manufacturers, aircraft manufacturers, and users that produced a well-documented case, has allowed SEIFR passenger-carrying operations in turbine-powered airplanes since February 1993, with a number of specific requirements for equipment and training. Other countries are also considering permitting SEIFR passenger-carrying operations.

In response to the petitions, the Canadian action, and changes in technology that have resulted in increasingly reliable engines and aircraft systems, the FAA asked its Office of Integrated Safety Analysis to conduct a study to determine if demonstrable differences exist between single- and multi-engine aircraft in visual meteorological conditions (VMC) and IMC. The study, Part 135 Single-Engine Instrument Flight Rules Operations in Instrument Meteorological Conditions, February 24, 1994, (available in the docket) reviewed the basis for the Canadian action and available data from a number of sources on powerplant/systems reliability and activity exposure data.

In September 1994, the FAA asked the Aviation Rulemaking Advisory Committee (ARAC) to review the Canadian policy on SEIFR, re-examine FAA policies for commercial IMC and night operations by single-engine aircraft, determine conditions or limitations that such operations should meet, and recommend any changes. The ARAC formed a working group that included representatives of the FAA, Transport Canada-Aviation, the European Joint Aviation Authority, Australian Civil Aviation, several European national aviation authorities, aircraft and engine manufacturers, trade associations, pilot unions, and commercial operators. The committee recommended that § 135.181 be revised to permit SEIFR passenger-carrying operations provided certain requirements for equipment and training were met. The ARAC proposal, although not technically limited to a particular type of aircraft, proposed certain conditions that are met at present only by turbine-powered aircraft. The ARAC also recommended approval of the Alaska Air Carrier Association's (AACA) petition for exemption, which covers both turbine-powered and reciprocating engine aircraft. Both the ARAC and the FAA study focused on the issue of engine reliability.

Recently, the National Transportation Safety Board (NTSB) completed a study of operations in Alaska Aviation Safety In Alaska, (Safety Study NTSB/SS–95/03, PB95–917006). The NTSB noted that unlike the rest of the U.S., commuter airline service in Alaska is "dominated by single-engine airplanes powered by a reciprocating engine operating under VFR and crewed by one pilot." After reviewing Alaska aviation accidents from 1988 to 1993 (which include single and multi-engine aircraft), the NTSB concluded that "VFR flight into IMC that results in fatal accidents continues to be the most significant safety problem in Alaskan aviation." VFR flight in IMC in Alaska accounted for 67 percent (6 of 9) fatal commuter airline accidents and 47 percent (7 of 15) fatal air taxi accidents. Overall, in Alaska, VFR flight into IMC accounted for only 15 percent of the total accidents, but 54 percent of the fatal accidents. The NTSB recommended that the FAA proceed with rulemaking to allow SEIFR passenger-carrying operations in turbine-powered aircraft and evaluate whether extending the rule to all single-engine aircraft would provide a positive effect on safety.

Prior to the Alaska aviation study, the NTSB conducted a study of the emergency medical service (EMS) helicopters because their accident rate was twice the rate experienced by part 135 on demand helicopter operations and one and half times the rate for all turbine-powered helicopters. For the report, "Safety Study—Commercial Emergency Medical Service Helicopter Operations" (NTSB 1988), an exploration of the rapidly growing commercial EMS helicopter industry and its operations, the NTSB investigated and evaluated 59 helicopter accidents. The Board determined that marginal weather conditions and inadvertent flight into IMC remain the most serious hazard that VFR helicopters encounter. "The Board believes that although the IFR system is not designed optimally for IFR helicopters and that the nature of the EMS helicopter mission further complicates this problem, the safety advantages offered by IFR helicopters flown by current and proficient pilots are great enough that EMS programs should seriously consider obtaining this capability."

The Alaska Air Carriers Association in its petition for exemption has stated, and the NTSB study confirmed, that in many areas, only single-engine aircraft can be operated because of the limitations of the landing strips, which severely restrict the availability of air transport in these areas. The petitioners further stated that under the current rule, unless clear weather is forecast over the entire route from 15 minutes from the departure airport to the destination, passenger-carrying, single-engine commercial operations are not permitted. In many areas, aircraft are the only means of transportation; weather forecasts, when available, rarely predict continuing VFR conditions. Alaska, they stated, was particularly disadvantaged by the current rule. Recent legislation requires the FAA to consider the special needs of Alaska when developing its rules.

As suggested by the NTSB, the FAA reviewed accident data from 1983 to 1996 on both reciprocating and turbine engines. Data indicated that there were 67 accidents in on-demand operations that involved VFR flight into IFR

conditions; single-engine aircraft were involved in 75 percent of these accidents. Although the number of such accidents is known, the rate of such accidents cannot be determined because the FAA does not collect data on the number of flights or flight hours for on-demand operations under part 135; therefore, it is not possible to evaluate existing data on accidents involving turbine-powered and reciprocating-powered single-engine aircraft.

Disposition of Pending Petitions

The FAA currently has similar petitions for exemptions to § 135.181 from the Alaskan Air Carriers Association, Mid-Atlantic Freight, Atlantic Aero, Wright Air Service, Inc., Taquan Air Service, Inc., and Telford Aviation, Inc. In developing this Notice of Proposed Rulemaking, the FAA considered the merits of each of the individual petitions and proposed appropriate points and recommendations from them. This notice formally disposes of those petitions.

Discussion of the Proposed Rule

The purpose of this rule is to improve the safety of single-engine, passenger-carrying operations by allowing operators to take advantage of the IFR system. This proposal would allow planned flight at a minimum en route altitude that ensures obstacle clearance and ATC communications over a published route, thereby reducing the occurrence of continued VFR flight into IMC. Parts 91 and 135 currently require additional aircraft equipment, pilot training, experience, and qualification, and weather and fuel requirements to operate under IFR. Operations under the existing limited IFR rules must meet the requirements for IFR operations with the exception that a second pilot or autopilot authorization is not needed. The current equipment, pilot, weather, fuel, and other differences for VFR and IFR operations are outlined in the Table at the end this section. This NPRM proposes to remove the limited IFR operations and allow SEIFR operations with additional conditions and limitations that will further enhance the safety of SEIFR operations over VFR and limited IFR operations.

The FAA is proposing to change part 135 to allow passenger-carrying SEIFR subject to the following conditions:

- A means of engine trend monitoring would be required in addition to the inspection requirements of 14 CFR part 91; and
- Two independent electrical power generating sources or, in addition to the original electrical power source, a standby battery that can maintain 150 percent of the minimum electrical load for at least one hour would be required.

In addition, the limited IFR conditions of current § 135.181 would be eliminated. The proposed rule changes would not affect cargo-only operations.

The FAA originally limited passenger-carrying SEIFR operations because of concern about the consequences of engine loss. The February 1994 FAA study, which focused on the difference between single-engine and multi-engine aircraft, found that data that specifically address the issue of the reliability of single-engine aircraft in IMC under part 135 are necessarily limited to cargo-only operations because relatively few passenger-carrying operations occur under these conditions. In addition, the FAA does not require manufacturers and operators of small aircraft and powerplants to have established databases capable of providing information needed to support reliability evaluations. Data available collected from various sources were found to be frequently incomplete and inconsistent in reporting format, limiting their usefulness.

The 1994 FAA study analysis of NTSB data for part 135 on-demand airplane accidents for 1988 to 1990 indicated that although propulsion system accidents account for a higher percent of total accidents for single-engine (18 percent) than for multi-engine airplanes (6 percent), only 2 of the 24 accidents caused by propulsion systems occurred in IMC. Accidents involving propulsion system failure in IMC appear to be very infrequent occurrences. This can be attributed in part to the limits on passenger-carrying operations of aircraft in IMC; however, cargo-only IFR operations are included in these data. Weather was a casual factor in 24 percent of all accidents; improper flightcrew actions contributed to 95 percent of weather-related accidents. Mechanical problems, however, were a factor in only one-single-engine and one multi-engine weather-related accident, suggesting that accidents involving equipment failure during flight in instrument conditions are relatively rare events in on-demand air carrier operations. The data also show that most accidents in IMC result in fatal or serious injuries, regardless of the type of flight plan or class of airplane. FAA data on part 135 accidents involving single-engine aircraft from 1985 to 1992 indicated that the most common causes of accidents were weather, poor in-flight planning and decision-making, and other weather-related errors resulting from attempts to maintain VFR flight.

Analysis of part 135 scheduled airplane accident data revealed patterns in accident causal factors that are very similar to those for on demand operations. Analysis of business airplane accidents that occurred during part 91 operations provided additional perspective on the relative contribution of systems and equipment reliability problems to accidents. Accidents involving propulsion and other system failures in IMC were infrequent occurrences even though part 91 operators are not subject to the same restrictions or level of regulation and oversight as part 135 operators.

The FAA recognizes that engine failure in a single-engine aircraft results in an inability to sustain flight. The FAA has determined, however, that allowing SEIFR passenger-carrying operations will enhance safety over VFR flights in marginal weather conditions and over flights under the limited IFR provisions of part 135. Aircraft operating under IFR are part of the national IFR system, which includes air traffic monitoring and control system; this system ensures that both pilots and air traffic controllers know where the aircraft is and can work together to avoid hazards and complete the flight safely. Immediate emergency assistance is available in the event of an emergency. Data from the Rescue Coordination Center have shown that should an accident occur, aircraft that were operating under the IFR system are located within a few hours; aircraft that were operating under the VFR system often take days to locate.

The FAA does not expect that operators currently flying multi-engine aircraft will switch to single-engine aircraft simply because of this rule change; decisions about the type of aircraft to operate are complex. Operators must weigh numerous factors when selecting aircraft, including customer base and geographical location. Whatever choice operators make, the FAA remains convinced that the proposed rule change will increase safety of single-engine, passenger-carrying operations.

New Requirements

In addition to the inspections requirements of part 43, the FAA is proposing to adopt the ARAC suggestion for engine wear and trend monitoring. Such monitoring provides an early indication of engine wear and increases engine reliability. The engine trend monitoring system would require an oil analysis at 100-hour inspection or every

annual inspection if less than 100 hours have accrued.

The oil analysis program is an important tool in determining the relative state of engine health. Samples of engine oil are collected at selected intervals (usually around the 100-hour interval or less) The oil samples are identified by make and model of engine, total time on the engine, and last oil and filter change. The sample is then sent to a laboratory in which the oil is subjected to a series of tests in which the amount of trace elements, such as iron and aluminum, are identified. A report is sent back to the operator recommending another 100 hours of operation or, because of an abnormal amount of a particular element found in the oil, a particular maintenance action; this action may be a simple filter change, or a borescope inspection, other maintenance inspection/test, or a complete teardown and rebuild of the engine. Regular oil analysis allows the operator to track the engine's condition accurately and predict failures before they would occur.

Current IFR requirements require a generator or generators (or alternator) able to supply all probable combinations of continuous in-flight electrical loads for required equipment and for recharging the battery. The FAA is also proposing to adopt a modification of the ARAC suggestion for two independent electrical power generating sources; the proposed rule would specifically allow a standby battery to serve as a second power source if the battery can maintain 150 percent of the minimum electrical load for at least one hour. This requirement introduces redundancy for the generator and alternator and ensures that, if a generator or alternator fails, the aircraft will still be able to use critical navigation and communication equipment, for a period of time in which to effect a safe approach and landing. The FAA will consider, and requests comments on other redundant or standby electrical systems.

Section 135.163 (h) currently requires two independent sources of energy (with means of selecting either) for powering all gyroscopic instruments. Of these sources, at least one must be an engine-driven pump or generator; each source must be capable of driving all gyroscopic instruments, and installed so that failure of one instrument or source does not interfere with the energy supply to the remaining instruments or the other energy source, unless, for single-engine aircraft, the rate-of-turn indicator has a source of energy separate from the bank and pitch and direction indicators.

The FAA considered requiring electrical or vacuum redundancy to drive the gyroscopic instruments, however, the precise configuration of that redundancy is not proposed. The FAA is requesting comments on the feasibility, benefit, and cost of two independent sources of energy for gyroscopic instruments for single engine aircraft. If, for single-engine aircraft, the rate of turn exception is maintained as stated in the current 135.163(h), the FAA will require that training and testing on emergency and partial panel operations be provided and evaluated. Comments are further requested on whether the rate-of-turn indicator powered from a separate source, coupled with required training and testing, should be considered adequate for single-engine IFR passenger operations.

Based on the comments received, the FAA may adopt additional provisions for a redundant source of power for the gyroscopic instruments or electrical systems in the final rule.

The FAA is proposing to delete the existing limited IFR provisions, which allow opeators to take off in IFR conditions if VFR conditions are forecast for the remainder of the route from a distance no further than 15 minutes flight time for the departure airport. This revision eliminates safety deficiencies of the conduct of "unplanned" IFR flight. Under the limited IFR rule, pilots can only conduct IFR operations en route and on an approach if weather conditions were unforecast, which means the pilots may not have planned for IFR and may have to develop and file a flight plan in flight, while coping with unexpected weather conditions. Limited IFR also allows these operations to be conducted as a single pilot operation, without a second pilot or autopilot that is required for other IFR operations. In addition, the limitations on weather forecasting have made this provisions impractical in many parts of the U.S.

It is the FAA's intent that, because multi-engine operators can already avail themselves of unrestricted IFR, the proposed removal of the limited IFR provision in § 135.181(c) (2) and the exception to the second-in-command requirement for limited IFR operations in § 135.103 would not impact these operators. The FAA invites comments from operators who used the limited IFR provision regarding the economic impact of this proposal.

The proposed changes would allow SEIFR operations in single-engine airplanes and turbine-powered helicopters that can be equipped for IFR flight. A number of single-engine reciprocating-powered airplanes will not be able to upgrade for IFR or would find the cost prohibitive. Single-engine, reciprocating-powered helicopters as they currently exist are not certificated for IFR operations. Consequently, they would not be affected by this rule change.

Other Issues Considered

The FAA reviewed suggestions made by the ARAC and the petitions submitted, but decided against adopting other limitations on SEIFR passenger-carrying operations. Some of the ARAC suggestions would have limited the rule to turbine-powered aircraft (e.g., use of auto-ignition/continuous ignition system); the suggested requirement for mean time between failure data and simulator training would have severely limited the rule, at least in the short-term, to a single aircraft, the Cessna Caravan. The FAA does not believe that such a limitation is justified because flying IFR improves the safety of all operations over flying VFR in marginal weather conditions and flight under the current limited IFR provisions.

A number of suggested requirements were not adopted because they are already covered under existing rules; for example, autopilot training and proficiency checks are currently required. The FAA decided that the suggested requirement for an air transport pilot certificate for commuter operations was unnecessary because of size and complexity of single-engine aircraft. Current requirements for single-engine, IFR provide for at least a commercial certificate with appropriate category and class ratings, and if required, type ratings, 1,200 hours of flight time including 500 hours of cross country, 100 hours of night, and at least 50 hours of actual instrument flight time. Other ARAC suggestions were not proposed because they go beyond what is required for aircraft certification (e.g., manual throttles and auto ignition); the FAA decided that it was inappropriate to alter certification rules through this rulemaking. The ARAC proposal for IFR-approved area navigation equipment that provides immediate identification of and heading to the nearest airport was not proposed in this NPRM. The safety benefit of this equipment has not been established. Finally, the FAA has not proposed the ARAC and other petitioners' suggestion for a radar altimeter. Such altimeters are only required for Category II and III operations; the FAA believes that the benefits of such altimeters for other operations have not been established to a sufficient degree to justify the considerable costs.

Canada adopted a limitation on flights in mountainous areas in its SEIFR rule; the AACA in its petition proposed a limitation for mountainous areas as defined by § 95.17. The Atlantic Aero, Inc. and Mid-Atlantic Freight Inc. 1994 petition for exemption proposed to limit SEIFR operations to routes where the minimum en route altitude (MEA) was no greater than 10,000 feet mean sea level (MSL). Taquan Air proposed to limit SEIFR operations to routes where the MEA was no greater than 12,000 feet MSL. The FAA decided that a mountainous terrain restriction was not needed. The definition of mountainous terrain in part 95 is very broad and would limit flight unnecessarily. Under part 95, almost all of Alaska, Hawaii, and the western third of the country are classified as mountainous. Single-engine cargo IFR operations and limited IFR operations are not similarly restricted. The FAA notes that some single-engine airplanes are limited by their service ceilings; others are limited by the lack of pressurization or oxygen. In some areas, the lack of navigational equipment also will limit flight over mountainous terrain. The FAA further notes that some pressurized single-engine aircraft can cruise at altitudes that provide much more time for making a safe landing should the engine fail. Finally, the difficulties of finding a safe landing area for all aircraft are not unique to mountainous terrain; densely populated areas may pose similar problems.

Section-by-Section Discussion of Proposed Changes

Section 135.83 would be amended to change the reference to § 135.181 to make it consistent with the revised rule.

Section 135.101 would be revised to eliminate the reference to § 135.103, which would be deleted, and to delete the work "conditions" after IFR. Deletion of the word "conditions" clarifies that any operation for which an IFR flight plan is filed must have a second pilot or an autopilot, even if the flight can be conducted in VFR conditions.

Section 135.103 would be deleted because it is no longer needed.

Section 135.163 would be revised to add, for single-engine aircraft reference to alternators as well as the proposed requirement for two independent electrical power generating sources or a standby battery.

Section 135.181 would be revised by dropping all of the limited IFR conditions. Only the performance requirements for multi-engine aircraft would remain.

Section 135.421 would be revised to add the requirement for engine trend monitoring for aircraft used in passenger-carrying SEIFR operations.

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TABLE 1 - CURRENT EQUIPMENT REQUIREMENTS FOR IFR AND VFR OPERATIONS

	SEIFR--PASSENGER OPERATIONS	MULTIENGINE IFR-PASSENGER OPERATIONS	VFR- PASSENGER OPERATIONS
EQUIPMENT: CARRYING	135.163(a)- Vertical speed indicator	Same	Not required by operating rules
PASSENGERS			
	135.163(b)- Free-air temperature indicator	Same	Not required by operating rules.
	135.163(c)- Heated pitot tube for each airspeed indicator	Same	Not required by operating rules.
	135.163(d)- Power failure warning device or vacuum indicator to show power available for gyro instruments from each power source	Same	Not required by operating rules.
	135.163(e)- Alternate source of static pressure for altimeter,airspeed, & vertical speed indicators	Same	Not required by operating rules.
	135.163(f) -Generator or generators able to supply all probable combinations of continuous in-flight electrical loads for required equipment and for recharging battery--91.205(d) - Generator or alternator of adeq. capacity	135.163(g) - 2 generators each on a separate engine, of which any combi of 1/2 of total no. are rated sufficiently to supply elec loads of all required instruments and equipment for safe emerg. ops--ME Hel-generators mounted on main rotor drive train	91.205(c)- VFR Night-Adeq source of elec energy for all installed elec and radio equip/ 135.159(e) -VFR carrying pax at Night/ VFR over the top: Generator(s) able to supply all prob combi of contin. inflight elec loads for req. equip & recharge battery
	135.163(h)- 2 independent sources of energy, at least 1 engine-driven pump or generator, each able to drive all gyro instr/installed so fail. of 1 inst. or source does not interfere with energy supply unless rate of turn source separate from pitch & bank	Same except each engine-driven source of energy must be on separate engine	Not specified in operating rules.
	135.165(b) -A transmitter, except additional transmitter required for extended overwater operations	Same, except for 10+ turbojet or multi engine airplane in commuter ops: 2 transmitters-135.165(a)	135.161 -VFR carrying pax at night or over the top: 2 way radio communications to transmit and receive from ground facilities 25 miles away
	135.165(b)- Two microphones	Same	135.161-One required to meet communications requirement for VFR carrying pax at night or over the top
	135.165(b)- Two headsets or one headset and one speaker	Same	Not specified in operating rules
	135.165(b) -Marker beacon receiver	Same	Not required

	135.163(b)- 2 independent receivers for navigation --91.205(d)- nav equip approp to ground facilities to be used	Same	135.161(b) -Aircraft carrying pax VFR over top- radio nav equip to receive ground facility to be used/ 135.161(c)- Airplane carrying pax VFR night- radio nav equip to receive ground fac. to be used
	91.205(d)- Gyro rate-of-turn except for airplanes and rotorcraft with a third attitude inst. system	Same	135.159 -Carrying pax VFR at Night or VFR over the top:Gyro rate-of-turn except airplanes and helicopters with a third attitude instrument system or helicopters with a max cert TO wt of 6000 pounds or less
	91.205(d)- Slip skid indicator	Same	135.159(b)- Carrying pax VFR at Night or VFR over the top: slip skid indicator
	91.205(d)- Sensitive altimeter	Same	91.205 (b)- Altimeter
	91.205(d)- Clock	Same	Not required
	91.205(d)-Gyroscopic pitch and bank indicator (artificial horizon)	Same	135.159(c)- Carrying pax VFR at night or VFR over the top: Gyroscopic bank and pitch indicator
	91.205(d)- Gyroscopic direction indicator (directional gyro or equivalent)	Same	135.159(d)- Carrying pax VFR at night or VFR over the top: Gyroscopic direction indicator
	135.105- IFR conditions-Operative approved autopilot system authorized by ops specs. Autopilot capable of operating a/c controls to maintain flight and maneuver it about 3 axes(OR 2 pilots or limited IFR-135.101, 135.103)	Same	Not required
PILOT REQUIREMENT	135.101, 135.105, 135.103-IFR conditions-2nd in command required or single pilot with autopilot or in limited IFR	Same, except 2 pilots required if 10+ pax seats-135.99	One pilot
PILOT QUALIFICATIONS	135.243-Commercial and appropriate category and class and type rating, and instrument rating or ATP	135.243-Same, except PIC of turbojet, airplane with 10+ pax seats, or multiengine airplane in: commuter ops must have ATP--Helicopter in scheduled interstate ops-ATP, appropriate type ratings and instrument rating	135.243-Same, except instrument rating or ATP not required for SE recip airplanes when non-scheduled(5 or less round trips a week) and does not transport mail
	135.243-1200 hours flight time, inc. 500 x-country,100 night,75 actual or sim. instrument time of which 50 were in flight	Same	135.243-500 hours of flight time, 100 x-country, 25 of which were at night
PILOT TESTING	135.293- Competency check each type aircraft ea yr for PIC and SIC, if req.	Same	Same

	135.297-Instrument proficiency check ea 6 mo. PIC- Includes autopilot check if authorized(Inst. prof. check may subst. for type a/c competency check/ can rotate check in types of authorized a/c)	Same	Not required
	135.299- Line check ea yr. for PIC	Same	Same
WEATHER AND AIRSPACE/AIRPORT REQUIREMENTS	135.215-Controlled airspace, airport must have approved instrument approach procedure (outside of controlled airspace as authorized by op specs)	Same	Can operate in uncontrolled airspace/no instrument approaches required
	135.213- Weather observations for IFR must be taken at the airport where ops are conducted/made by approved source	Same	135.213- PIC can use wx info based on own observations or on those of persons competent to supply observations
	135.219-Cannot takeoff unless reports or forecasts indicate wx at ETA will be at or above authorized IFR min.	Same	135.211-VFR over the top carrying pax: Wx at point of termination of over the top must allow descent to beneath ceiling under VFR or allows IFR approach & landing with flight clear of clouds unless radar appr./Descent under VFR if engine fails
	135.223- Alternate required if 1 hr before/after, ceiling less than 1500 ft above lowest circling MDA or above lowest published min. or 2000 ft above airport, whichever higher and vis is less than 3 miles or 2+lowest vis min, whichever greater	Same	No alternate required
	135.225- Can't begin approach without weather observer & wx above IFR landing min.	Same	Weather observer not required/ 135.213- PIC can use wx based on own observations or on those of persons competent to supply observations
	135.181- If reports or forecasts indicate VFR in 15 min,can takeoff in IFR conditions & fly in IFR to pt. no more than 15 min; operate in IFR conditions if unforecast wx encountered and make IFR appr if unfrcst wx./ All cargo can fly IFR cond.	Can operate in IFR conditions	135.181 -VFR over the top if wx rep or forecasts indicate VFR under ceiling. Must be able to descend under VFR if engine fails. Also see 135.211
	135.225- MDA or DH and vis increased by 100 ft and1/2mile for ea PIC of turbine airplane who does not have 100 hours as PIC in that type	Same	Not applicable
PERFORMANCE	No performance specified.	135.181- Weight that allows ME airplane to climb with critical eng. inop at least 50 ft/min at MEA or 5000 whichever higher/ 135.181(b) ME helic. same except MEA or 1500 ft whichever higher	No performance specified.
FUEL REQUIREMENTS	91.167- Complete flight + fuel to alternate (if required)+ 45 minutes reserve or, for helicopters, 30 minutes reserve	Same	135.209-30 min reserve day/ 45 night/ Helicopter 20 min. reserve

CRUISING ALTITUDE	Published MEA/ published approach min.	Same	135.203-Day- 500 feet/ Night-1000 feet, Mountainous terrain-2000 feet
FLIGHT PLAN	IFR	Same	VFR flight plan or 135.179- provide certificate holder with info required to be on a VFR flight plan

22

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Regulatory Evaluation Summary

Proposed changes to Federal regulations must undergo several economic analyses. First, Executive order 12866 directs that each Federal agency shall propose or adopt a regulation only upon a reasoned determination that the benefits of the intended regulation justify its costs. Second, the Regulatory Flexibility Act of 1980 requires agencies to analyze the economic effect of regulatory changes on small entities. Third, the Office of Management and Budget directs agencies to assess the effect of regulatory changes on international trade. In conducting these analyses, the FAA has determined that this rule: (1) Would generate benefits that justify its costs and is not "significant regulatory action" as defined in the Executive Order; (2) is not significant as defined in Department of Transportation Regulatory Policies and procedures; and (3) would not constitute a barrier to international trade. These analyses, available in the docket, are summarized below.

Cost-Benefit Analysis

The FAA proposes to update and revise the regulations to allow single-engine, passenger carrying aircraft to operate under the safer instrument flight rules. This proposal would require additional conditions and requirements that will further enhance the safety of single engine instrument flight rules (SEIFR) operations.

The cost of this proposed rule is estimated at $33.9 million ($27.5 million, discounted). The most costly provision is on the requirement for an autopilot, which is estimated at $25.6 million ($20.9 million discounted) and represents about 76 percent of the total. The FAA concludes that the expected quantitative benefits would be a minimum of $185.0 million or $129.9 million discounted. This action would increase the safety of single-engine passenger-carrying operations because it would allow them to operate under instrument flight rules. The proposal would reduce the incentive for operators to conduct low altitude operations under marginal weather conditions in order to not lose business. It would require operators to meet the more stringent requirements for such flights including additional aircraft equipment.

Initial Regulatory Flexibility Assessment

The Regulatory Flexibility Act of 1980 (RFA) was enacted by Congress to ensure that small entities are not unnecessarily or disproportionately burdened by Federal Regulations. The RFA requires an analysis if a proposed rule would have "a significant economic impact on a substantial number of small entities." The definitions of small entities and guidance material for making determinations required by the RFA are contained in the **Federal Register** (47 FR 32825, July 29, 1982). Federal Aviation Administration (FAA) order 2100.14A outlines the agency's procedures and criteria for implementing the RFA.

With respect to the propose rule, a "small entity" is an operator of aircraft for hire with nine or fewer aircraft. A "significant economic impact on a small entity" is defined as an annualized net compliance cost for operators of aircraft for hire which in 1996 dollars is $125,100 for scheduled operators whose aircraft have more than 60 seats. It is $69,900 for scheduled operators whose fleets have aircraft with seating capacities of 60 or fewer seats (other scheduled operators) and $4,900 for unscheduled operators. A substantial number of small entities is defined as a number that is 11 or more and which is more than one-third of small operators subject to the proposed rule:

The analysis shows that the annualized cost of the proposed rule (assuming no cost savings) is about $1,400 per aircraft and the annualized safety and non-safety benefits is about $2,050 per aircraft. Therefore, the annualized net savings is about $650 per aircraft.

The FAA has determined that operators with eight aircraft or more would incur a significant positive impact. However, fewer than one-third of the entities would incur a significant positive cost impact. Therefore, the FAA has determined that a substantial number of operators would not be positively or negatively impacted in a significant way.

International Trade Impact Statement

This proposed rule is not expected to have any impact on trade opportunities for U.S. firms doing business overseas or foreign firms doing business in the United States. The proposed rule would primarily affect U.S. operators of aircraft for hire that provide domestic service.

Unfunded Mandates Reform Act Assessment

Title II of the Unfunded Mandates Reform Act of 1995 (the Act), enacted as Pub. L. 104–4 on March 22, 1995, requires each Federal agency, to the extent permitted by law, to prepare a written assessment of the effects of any Federal mandate in a proposed or final agency rule that may result in the expenditure by State, local, and tribal governments, in the aggregate, or by the private sector, of $100 million or more (adjusted annually for inflation) in any one year. Section 204(a) of the Act, 2 U.S.C. 1534(a), require the Federal agency to develop an effective process to permit timely input by elected officers (or their designees) of State, local, and tribal governments on a proposed "significant intergovernmental mandate." A "significant intergovernmental mandate" under the Act is any provision in a Federal agency regulation that would impose an enforceable duty upon State, local, and tribal governments, in the aggregate, of $100 million (adjusted annually for inflation) in any one year. Section 203 of the Act, 2 U.S.C. 1533, which supplements section 204(a), provides that before establishing any regulatory requirements that might significantly or uniquely affect small governments, the agency shall have developed a plan that, among other things, provides for notice to potentially affected small governments, if any, and for a meaningful and timely opportunity to provide input in the development of regulatory proposals.

This proposal rule does not meet the cost thresholds described above. Furthermore, this proposed rule would not impose a significant cost on small governments and would not uniquely affect those small governments. Therefore, the requirements of Title II of the Unfunded Mandates Reform Act of 1995 do not apply.

Paperwork Reduction Act

This proposed rule contains not information collection requests requiring approval of the Office of Management and Budget pursuant to the Paperwork Reduction Act (44 U.S.C. 3507 *et seq.*).

International Civil Aviation Organization and Joint Aviation Regulations

In keeping with U.S. obligations under the Convention on International Civil Aviation, it is FAA policy to comply with International Civil Aviation Organization Standards and Recommended Practices to the maximum extent practicable. The FAA has determined that this proposal, if adopted, would not present any major differences.

Federalism Implications

The changes proposed by this NPRM would not have a substantial direct effect on the States, on the relationship between the National Government and

the States, or on the distribution of power and responsibilities among the various levels of government. Therefore, in accordance with Executive Order 12612, it is determined that the proposed amendments would not have federalism implications requiring the preparation of a Federalism Assessment.

Conclusion

For the reasons discussed in the preamble, and based on the findings in the Initial Regulatory Flexibility Determination and the International Trade Impact Analysis, the FAA has determined that this proposed regulation is not significant under Executive Order 12866. In addition, the FAA certifies that this proposal, if adopted, will not have a significant economic impact on a substantial number of small entities under the criteria of the Regulatory Flexibility Act. This proposal is not considered significant under DOT Order 2100.5, Policies and Procedures for Simplification, Analysis, and Review of Regulations.

List of Subjects in 14 CFR Part 135

Air taxis, Aircraft, Aviation safety, Safety, Single-engine aircraft.

For the reasons set out in the preamble, 14 CFR part 135 is proposed to be amended as set forth below:

PART 135—AIR TAXI OPERATORS AND COMMERCIAL OPERATORS

1. The authority citation for part 135 continues to read as follows:

Authority: 49 USC 106(g), 40113, 44701–44702, 44705, 44709, 44711–44713, 44715–44717, 44722.

2. Section 135.101 is revised to read as follows:

§ 135.101 Second in command required under IFR.

Except as provided in § 135.105, no person may operate an aircraft carrying passengers under IFR unless there is a second in command in the aircraft.

3. Section 135.103 is removed and reserved.

4. Section 135.163 is amended to revise paragraphs (f) and (g) to read as follows:

§ 135.163 Equipment requirements: Aircraft carrying passengers under IFR.

* * * * *

(f) For a single-engine aircraft:

(1) two independent electrical power generating sources each of which is able to supply all probable combinations of continuous inflight electrical loads for required instruments and equipment; or

(2) in addition to single electrical power generating source, a standby battery that is capable of providing 150 percent of the minimum electrical load for at least one hour to operate navigation and communication equipment.

(g) For multi-engine aircraft, at least two generators or alternators each of which is on a separate engine, of which any combination of one-half of the total number are rated sufficiently to supply the electrical loads of all required instruments and equipment necessary for safe emergency operation of the aircraft except that for multi-engine helicopters, the two required generators may be mounted on the main rotor drive train; and

* * * * *

5. Section 135.181 is amended to revise paragraph (a)(1) and (c) to read as follows:

§ 135.181 Performance requirements: Multi-engine aircraft operated over-the-top or in IFR conditions.

(a) * * *

(1) Operate a single-engine aircraft carrying passengers over-the-top; or

* * * * *

(c) Without regard to paragraph (a) of this section, if the latest weather reports or forecasts, or any combination of them, indicate that the weather along the planned route (including takeoff and landing) allows flight under VFR under the ceiling (if a ceiling exists) and that the weather is forecast to remain so until at least 1 hour after the estimated time of arrival at the destination, a person may operate an aircraft over-the-top.

* * * * *

6. Section 135.421 is amended to add paragraph (c) to read as follows:

§ 135.421 Additional maintenance requirements.

* * * * *

(c) For each single engine aircraft to be used in passenger-carrying IFR operations, each certificate holder must incorporate into the manufacturer's recommended maintenance program or FAA approved maintenance program, an engine trend monitoring program including an oil analysis at each 100 hour interval and a record of the findings.

Issued in Washington, DC. on November 21, 1996.

Thomas C. Accardi,

Director, Flight Standards Service.

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