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 11, 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]

BILLING CODE 4910–13–M