Proposed Rules

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This section of the FEDERAL REGISTER contains notices to the public of the proposed issuance of rules and regulations. The purpose of these notices is to give interested persons an opportunity to participate in the rule making prior to the adoption of the final rules.

DEPARTMENT OF AGRICULTURE

Rural Utilities Service

7 CFR Part 1703

RIN 0572–AB31

Distance Learning and Telemedicine Loan and Grant Program

AGENCY: Rural Utilities Service, USDA.

ACTION: Proposed rule.

SUMMARY: The Rural Utilities Service (RUS) is proposing an amendment to its regulations for its Distance Learning and Telemedicine (DLT) Loan and Grant Program. These proposed amendments will clarify the requirements for the different types of financial assistance offered; streamline policies and procedures for obtaining loans and expanding the purposes for which loan funds can be used; and award grants on a competitive basis.

In the final rules section of the **Federal Register**, RUS is publishing this action as a direct final rule without prior proposal because RUS views this as a non-controversial action and anticipates no adverse comments. If no adverse comments are received in response to the direct final rule, no further action will be taken on this proposed rule and the action will become effective at the time specified in the direct final rule. If RUS receives adverse comments or notice of intent to submit adverse comments, a document will be published in the **Federal Register** withdrawing the direct final rule and all public comments received will be addressed in a subsequent final rule based on this action. Any parties interested in commenting on this action should do so at this time.

DATES: Comments on this proposed rule must be received by April 26, 1999.

ADDRESSES: Submit any written comments or notice of intent to submit adverse comments to Roberta D. Purcell, Assistant Administrator, Telecommunications Program, Rural Utilities Service, 1400 Independence Ave., SW., STOP 1590, Room 4056, South Building, Washington, DC 20250–1590. RUS requires a signed original and three copies of all comments (7 CFR part 1700). All comments received will be made available for public inspection at room 4056, South Building, U.S. Department of Agriculture, Washington, DC, between 8:00 a.m. and 4:00 p.m. (7 CFR part 1.27(b)). Telephone number (202) 720–9554.

FOR FURTHER INFORMATION CONTACT: Jonathan P. Claffey, Deputy Assistant Administrator, Telecommunications Program, Rural Utilities Service, 1400 Independence Ave., SW., STOP 1590, Room 4056, South Building, Washington, DC 20250–1590. Telephone number (202) 720–9556.

SUPPLEMENTARY INFORMATION: See supplementary Information provided in the direct final rule located in the final rules section of the **Federal Register** for applicable supplementary information on this section.

Dated: March 16, 1999.

Jill Long Thompson,

Under Secretary, Rural Development.

[FR Doc. 99–6996 Filed 3–24–99; 8:45 am]

BILLING CODE 3410–15–P

DEPARTMENT OF TRANSPORTATION

Federal Aviation Administration

14 CFR Part 23

[Docket No. CE149; Notice No. 23–98–05–SC]

Special Conditions: Soloy Corporation Model Pathfinder 21 Airplane; Airframe

AGENCY: Federal Aviation Administration (FAA), DOT.

ACTION: Notice of proposed special conditions.

SUMMARY: This notice proposes special conditions for the Soloy Corporation Model Pathfinder 21 airplane. The Model Pathfinder 21 airplane is a Cessna Model 208B airplane as modified by Soloy Corporation to be considered as a multiengine, part 23, normal category airplane. The Model Pathfinder 21 airplane will have a novel or unusual design feature associated with installation of the Soloy Dual Pac propulsion system, which consists of two Pratt & Whitney Canada Model PT6D–114A turboprop engines driving a single, Hartzell, five-blade propeller. The applicable airworthiness regulations do not contain adequate or appropriate safety standards for this design feature. These proposed special conditions contain the additional safety standards for this design feature. These proposed special conditions contain the additional safety standards that the Administrator considers necessary to establish a level of safety equivalent to that established by the existing airworthiness standards for multiengine airplanes.

DATES: Comments must be received on or before April 26, 1999.

ADDRESSES: Comments on this proposal may be mailed in duplicate to: Federal Aviation Administration, Regional Counsel, ACE–7, Attention: Rules Docket, Docket No. CE149,601 East 12th Street, Kansas City, Missouri 64106, or delivered in duplicate to the Regional Counsel at the above address. Comments must be marked: Docket No. CE149. Comments may be inspected in the Rules Docket weekdays, except Federal holidays, between 7:30 a.m. and 4:00 p.m.

FOR FURTHER INFORMATION CONTACT: David Keenan, Federal Aviation Administration, Aircraft Certification Service, Small Airplane Directorate, ACE–112, 601 East 12th Street, Kansas City, Missouri, 816–426–5688, fax 816–426–2169.

SUPPLEMENTARY INFORMATION:

Comments Invited

Interested persons are invited to participate in the making of these proposed special conditions by submitting such written data, views, or arguments as they may desire. Communications should identify the regulatory docket or notice number and be submitted in duplicate to the address specified above. All communications received on or before the closing date for comments will be considered by the Administrator. The proposals described in this notice may be changed in light of the comments received. All comments received will be available in the Rules Docket for examination by interested persons, both before and after the closing date for comments. A report summarizing each substantive public contact with FAA personnel concerning this rulemaking will be filed in the docket. Persons wishing the FAA to acknowledge receipt of their comments

submitted in response to this notice must include with those comments a self-addressed, stamped postcard on which the following statement is made: ''Comments to Docket No. CE149.'' The postcard will be date stamped and returned to the commenter.

Background

On February 6, 1992, Soloy Corporation applied for a supplemental type certificate (STC) for the Model Pathfinder 21 airplane, which would notify the Cessna Model 208B airplane by installing the Soloy Dual Pac propulsion system. This propulsion system consists of two Pratt & Whitney Canada (PWC) Model PT6D–114A turboprop engines driving a single, Hartzell, five-blade propeller through a combining gearbox. Soloy Corporation is seeking approval for this airplane, equipped with a Soloy Dual Pac propulsion system, as a multiengine airplane Title 14 CFR part 23 is not adequate to address a multiengine airplane with a single propeller. Hence, the requirement for these proposed special conditions, which will be applied in addition to the applicable sections of part 23.

The Soloy Dual Pac population system is mounted in the nose of the Model Pathfinder 21 airplane. With this arrangement, an engine failure does not cause an asymmetric thrust condition that would exist with a conventional twin turboprop airplane. This asymmetric thrust compounds the flightcrew workload following an engine failure. The Model Pathfinder 21 airplane configuration has the potential to substantially reduce this workload.

Since the Model Pathfinder 21 airplane produces only centerline thrust, the only direct airplane control implications of an engine failure are the change in torque reaction and propeller slip stream effect. These transient characteristics require substantially less crew action to correct than an asymmetric thrust condition and do not require constant effort by the flightcrew to maintain control of the airplane for the remainder of the flight.

Safety Analysis

The FAA has conducted a safety analysis that recognizes both the advantages and disadvantages of the proposed Model Pathfinder 21 airplane. The scope of this safety analysis was limited to the areas affected by the unique propulsion system installation and assumes compliance with the design-related requirements of these proposed special conditions. The FAA examined the accident and incident history of small twin turboprop operations for the years of 1983 to 1994 in the United States and United Kingdom. The FAA evaluated each event and determined if the outcome, given the same pilot, weather, and airplane except with centerline thrust and one propeller, would have been more favorable, less favorable, or unchanged. Examination of the incident data revealed a number of failure modes that, if not addressed as part of the Model Pathfinder 21 airplane design, could result in a potential increase in the number of accidents for the Model Pathfinder 21 airplane compared to the current fleet. Examples of such failure modes include loss of propeller blade tip or failure of the propeller control system. Although these proposed special conditions contain provisions to prevent catastrophic failures of the remaining non-fail-safe components of the Model Pathfinder 21 airplane after compliance with the design related requirements, the analysis assumes that these components will fail in a similar manner to the failures contained in the incident data. Given these assumptions, the FAA determined that the projected accident rate of the Model Pathfinder 21 airplane would be equal to or lower than the current small twin turboprop airplane fleet. Considering that analysis, the FAA has determined that the advantages of centerline thrust compensate for the disadvantages of the non-fail-safe-design features. Once that determination was made, these proposed special conditions were formulated with the objective of substantially reducing or eliminating risks associated with the non-redundant systems and components of the Model Pathfinder 21 airplane design that have been identified and providing a level of safety equivalent to that of conventional multiengine airplanes.

The FAA data review conducted to prepare these proposed special conditions is applicable only to the Model Pathfinder 21 airplane. For the concept of a single-propeller, multiengine airplane to be extended to other projects, a separate analysis of the accident and incident data for similarly sized airplanes would be required. If the advantages of centerline thrust compensated for the disadvantages of the non-fail-safe components, based on the service history of similarly sized airplanes, development of separate special conditions would be required.

Type Certification Basis

Under the provisions of 14 CFR part 21, § 21.101, Soloy Corporation must show that the Model Pathfinder 21 airplane continues to meet the applicable provisions of the regulations incorporated by reference in Type Certificate (TC) Data Sheet A37CE or the applicable regulations in effect on the date of application for change. The regulations incorporated by reference are commonly referred to as the ''original type certification basis.'' The regulations incorporated by reference in TC No. A37CE are as follows:

The type certification basis for Cessna Model 208B airplanes shown on TC Data Sheet A37CE for parts not changed or not affected by the changes proposed by Soloy Corporation is part 23 of the Federal Aviation Regulations dated February 1, 1965, as amended by Amendments 23–1 through 23–28; part 36 dated December 1, 1969, as amended by Amendments 36–1 through 36–18; Special Federal Aviation Regulations (SFAR) 27 dated February 1, 1974, as amended by Amendments 27–1 through 27–4. Soloy Corporation must show that the Model Pathfinder 21 airplane meets the applicable provisions of part 23, including multiengine designated sections, as amended by Amendment 23–42 (the Pathfinder 21 type certification basis is based on the date of STC application: February 6, 1992) for parts changed or affected by the change. Soloy Corporation has also elected to comply with § 23.561, Emergency Landing Conditions—General (Amendment 23–48); § 23.731, Wheels (Amendment 23–45); § 23.733, Tires (Amendment 23–45); § 23.783, Doors (Amendment 23–49); § 23.807, Emergency Exits (Amendment 23–49); § 23.811, Emergency Exit Marking (Amendment 23–46); § 23.901, Installation (Amendment 23–51); § 23.955, Fuel Flow (Amendment 23–51); § 23.1041, Cooling—General (Amendment 23–51); § 23.1091, Air Induction System (Amendment 23–51); § 23.1181, Designated Fire Zones; Regions Included (Amendment 23–51); § 23.1189, Shutoff Means (Amendment 23–43); § 23.1305, Powerplant Instruments (Amendment 23–52); and § 23.1351, Electrical Systems and Equipment—General (Amendment 23–49). The type certification basis for the Model Pathfinder 21 airplane also includes parts 34 and 36, each as amended at the time of certification. Soloy Corporation may also elect to comply with subsequent part 23 requirements to facilitate operators' compliance with corresponding part 135 requirements. The type certification basis for this airplane will include exemptions, if any; equivalent level of safety findings, if any; and the special conditions adopted by this rulemaking action.

If the Administrator finds that the applicable airworthiness regulations

(part 23, as amended) do not contain adequate or appropriate safety standards for the Model Pathfinder 21 airplane because of a novel or unusual design feature, special conditions are prescribed under the provisions of § 21.16.

Special conditions, as appropriate, are issued in accordance with § 11.49 after public notice, as required by § 11.28 and § 11.29(b), and become part of the type certification basis in accordance with § 21.101(b)(2).

Special conditions are initially applicable to the model for which they are issued. Should the applicant apply for an STC to modify any other model included on the same TC to incorporate the same novel or unusual design feature, the special conditions would also apply to the other model under the provisions of § 21.101(a)(1).

The Soloy Dual Pac was certified as a propulsion system under part 33 and special conditions in Docket No. 93–ANE–14; No. 33–ANE–01 (62 FR 7335, February 19, 1997) under STC No. SE00482SE to the PWC Model PT6 engine TC E4EA. Those special conditions were created in recognition of the novel and unusual features of the proposal, specifically the combining gearbox.

Novel or Unusual Design Features

The Model Pathfinder 21 will incorporate a noval or unusual design feature by installing the Soloy Dual Pac propulsion system, which consists of two PWC Model PT6D–114A engines driving a single, Hartzell, five-blade propeller through a Soloy-designed combining gearbox. The combining gearbox incorporates redundant freewheeling drive, governing, and lubricating systems. A system of one-way clutches both prevents the propeller shaft from driving the engine input shafts and allows either engine to drive the propeller should the other engine fail.

Airplane Design Features

The Model Pathfinder 21 airplane is a modified Cessna Model 208B airplane converted to a multiengine, normal category, combination nine-passenger/freight airplane. The proposed modification includes the installation of the Soloy Dual Pac engine, installation of a different propeller, addition of a six-foot fuselage extension and integral belly-mounted cargo compartment, alterations to the langing gear, and an increase of the maximum gross weight to 12,500 pounds. The proposed changes to the Cessna Model 208B airplane are discussed below.

Powerplant

The original PWC Model PT6A–114 engine is replaced with the Soloy Dual Pac propulsion system, consisting of two Model PT6D–114A engines and a Soloy Corporation-designed propulsion drive system. The FAA has issued STC No. SE00482SE approving the Soloy Dual Pac propulsion system. A Hartzell propeller part number HC–B5MA–3H1/M11296NK–5, which is a steel-hubbed, five-blade, aluminum, constant-speed, single-acting, reversible-pitch propeller, is replacing the original three-blade Hartzell or McCauley propeller. The propulsion installation and associated systems, mounts, instrumentation, firewall, exhaust stacks, and cowling are all impacted by this modification.

Fuselage Extension

The most significant structural modification is a 72-inch extension in the fuselage aft of the wing trailing edge. The new fuselage section is designed and manufactured using the same conventional formed sheet metal bulkhead, stringer, and skin methods used by Cessna in the basic airplane. The section has a constant cross section and is positioned in the widest and tallest portion of the rear fuselage. Also, the control cables are extended due to the fuselage extension.

Airframe Structure

Structural reinforcements are added to the basic fuselage structure to accommodate the higher increased takeoff gross weight. Reinforcement of wing structure is also required to accommodate the higher wing loading. The empennage structure is unchanged from the basic airplane.

Cargo Pod

A cargo pod is added to the underside of the fuselage. New lower fuselage reinforcement angles serve as the attachment means for the cargo pod that runs the full width of the fuselage. The fuselage/engine compartment bulkhead is extended to form the forward end of the cargo pod.

Cabin

The cabin arrangement places the nine passengers directly behind the flightcrew. Cargo is secured in the aft portion of the cabin. The floor of the fuselage extension is equipped with the Brownline seat tracks and cargo attachment fittings that are used in the Cessna Model 208B airplane. Features to satisfy current crashworthiness regulations are being added to the cabin, including cargo retention barriers and relocation of the passenger door. The cargo door is unchanged.

Landing Gear

The original main landing gear is placed with larger land gear, wheels, and brakes. The nose gear support structure is replaced and the nose gear strut is pressurized for shock absorption.

Instrumentation

The flight deck is being modified to include an additional set of engine instruments, propulsion drive system instrumentation, and other flight deck indications required for multiengine airplanes.

Engine Controls

The flight deck modifications include an additional power lever and condition lever to accommodate the second engine.

Fuel System

The fuel system is being modified to provide independent fuel feed capability to each engine. In addition, pilot selectable crossfeed function is available. The two fuel wing tanks remain unchanged.

Electrical System

A dual redundant electrical system with independent batteries is being added as part of this modification. All components are located in the cargo pod immediately aft of the engine firewall, except for the generators that are installed on the engines.

Maximum Takeoff Weight

The maximum gross takeoff weight of the aircraft is increased from 8,750 pounds to 12,500 pounds.

Discussion

Elements of these proposed special conditions have been developed to replace part 23 standards for which the Model Pathfinder 21 airplane design, because of the single propeller system, cannot comply using the criteria usually applied to multiengine airplanes, namely § 23.903(c), Engines. Other elements of these proposed special conditions have also been developed to supplement part 23 standards that are considered inadequate to address the Model Pathfinder 21 airplane design, namely §§ 23.53, 23.67, 23.75, 23.903(b), 23.1191, 23.1305, 23.1545, 23.1585, and 23.1587.

The part 23 requirement that is most affected by the multiengine, single propeller Model Pathfinder 21 airplane arrangement is § 23.903(c). Section 23.903(c) states, ''The powerplants must be arranged and isolated from each other to allow operation, in at least one configuration, so that the failure or

malfunction of any engine, or the failure or malfunction (including destruction by fire in the engine compartment) of any system that can affect an engine (other than a fuel tank if only one fuel tank is installed), will not: (1) prevent the continued safe operation of the remaining engines; or (2) require immediate action by any crewmember for continued safe operation of the remaining engines.'' This is a fail-safe requirement since it takes advantage of the redundancy provided by having multiple engines that are isolated from each other, which is intended to ensure that no single failure affecting one engine will result in the loss of the airplane. In conventional twin turboprop airplanes, this isolation is, in part, provided by the inherent separation of having each engine mounted on opposite sides of the airplane driving its own propeller. Installation of the engines on either side of the airplane automatically provides a degree of separation of critical systems, such as the electrical and fuel systems, and minimizes the effect of high vibration, rotor burst failures, and engine case burn-through from the opposite engine. This separation aids in preventing any single failure from jeopardizing continued safe operation of the airplane. In contrast, the nearness of the engines to each other driving a combining gearbox with a single propeller in the Model Pathfinder 21 airplane arrangement is inherently less isolated from certain types of failure modes. As a result, many failure modes that do not pose a significant hazard on conventional multiengine airplanes could threaten continued safe operation of the Model Pathfinder 21 airplane unless specific additional precautions are taken to prevent hazardous secondary effects.

To ensure a level of safety equivalent to that provided by conventionally arranged twin turboprop airplanes, the FAA evaluated the relative advantages and disadvantages of each arrangement while striving to maintain, as much as possible, the fail-safe and isolation design requirement of § 23.903(c). Only for those areas of the design where the fail-safe and isolation design philosophy could not be maintained did the FAA consider other options, such as requiring components with a proven reliability, an enhanced maintenance program, and additional testing. The FAA's analysis and derivation of each of the special condition requirements is discussed in the Description of Proposed Requirements section below.

Soloy Corporation Soloy Dual Pac Engine Special Conditions (Docket No. 93–ANE–14; No. 33–ANE–01) were developed for the propulsion system to maintain the fail-safe and isolation design philosophy up to the propeller shaft. They include the design requirement that the propulsion system must be able to provide controllable power, which is at least fifty percent of rated power, for any probable engine failure. This includes failures in the propulsion drive system.

Even after complying with the part 33 special conditions, Soloy Corporation's design still contains several single failure modes of non-redundant components that could cause a total loss of thrust. These components include the single propeller hub and blade assembly, propeller shaft, and propeller control system. Common propeller system failure modes are eliminated or the hazard significantly reduced by the design and maintenance requirements contained in these proposed special conditions, which are intended to reduce the risk of these failures to an acceptable level. Rotorcraft techniques, including development of a critical parts plan, are used to mitigate the risks associated with the non-fail-safe components because Soloy Corporation's propulsion system concept is similar to twin engine, single rotor propulsion systems of twin engine rotorcraft in certain aspects.

The propulsion system installation design of the Model Pathfinder 21 airplane is potentially more critical when assessing the rotorburst and engine case burn-through design requirements set forth in § 23.903(b)(1). Section 23.903(b)(1) states, ''Turbine engine installations. For turbine engine installations—(1) Design precautions must be taken to minimize the hazards to the airplane in the event of an engine rotor failure or of a fire originating inside the engine which burns through the engine case.'' For conventional twin turboprop airplanes, compliance with this regulation has involved a degree of inherent protection by having the engines installed some distance apart from one another and on opposite sides of the airplane fuselage. This level of inherent protection is not provided as part of the Pathfinder 21 configuration.

In addressing propeller assembly structural failures, uncontained engine failures, and engine case burn-through, these proposed special conditions allow Soloy Corporation to select components with excellent service histories. While compliance to part 23 establishes adequate safety standards, in-service operations identify long term durability problems and problems associated with operations that the condensed evaluation of the critical conditions during a certification program cannot. Propeller assembly structural failures, uncontained engine failures, and engine case burn-through will most likely be catastrophic for the Model Pathfinder 21 airplane, but are only occasionally catastrophic for conventional twin turboprop airplanes. The probability of each of these events occurring on conventional small twin turboprop airplanes is on the order of one in ten million hours based on the service history as discussed in the Safety Analysis section. Therefore, for the purposes of these special conditions, it is reasonable and appropriate to require ten million hours free of specific failure modes as an acceptable level of proven reliability needed to establish a level of safety equivalent to that of conventional multiengine airplanes.

Description of Proposed Requirements

The FAA has reviewed the part 23 standards and identified that § 23.53, Takeoff Speeds, § 23,67(c) and (d), Climb: one engine inoperative, § 23.69, Enroute Climb/Descent, and § 23.75(g), Landing Distance, are inadequate to address the effects of propeller control system failure modes in a manner consistent with how these sections address specific engine failure conditions. Sections 23.1191(a) and 23.1191(b), Firewalls, do not adequately define the locations of firewalls needed to isolate the engines and propulsion drive system of the Soloy Dual Pac propulsion system. Additionally, the FAA has identified that § 23.1305(c), Powerplant Instruments, is inadequate because it does not recognized a propulsion system installation with a combining gearbox whose oil system is separate from either engine. Furthermore, the FAA has identified that § 23.1545(b)(5), Airspeed Indicator, § 23.1585(c), Operating Procedures and § 23.1587(a), Performance Information; do not recognize a propeller system installation independent from either engine. Elements of these proposed special conditions have been developed to ensure that these unique aspects of the Model Pathfinder 21 airplane are addressed in a manner equivalent to that established by part 23 standards.

Propulsion System

The propulsion drive system includes all parts necessary to transmit power from the engines to the propeller shaft. This includes couplings, universal joints, drive shafts, supporting bearings for shafts, brake assemblies, clutches, gearboxes, transmissions, any attached accessory pads or drives, and any cooling fans that are attached to, or mounted on, the propulsion drive system. The propulsion drive system for

this multiengine installation must be designed with a ''continue to run'' philosophy. This means that it must be able to power the propeller after failure of one engine or failure in one side of the drive system, including any gear, bearing, or element expected to fail. Common failures, such as oil pressure loss or gear tooth failure, in the propulsion drive system must not prevent the propulsion system from providing adequate thrust. These design requirements, and other propulsion drive system requirements, are included in the part 33 special conditions, and, therefore, are required as part of these proposed special conditions.

Special 23.903(b)(1) states, in part, ''Design precautions must be taken to minimize the hazards to the airplane in the event of a rotor failure.'' Part 33 containment requirements address blade failures but do not require containment or failed rotor disks; therefore, § 23.903(b)(1) requires that airplane manufacturers minimize the hazards in the event of a rotor failure. This is done by locating critical systems and components out of impact areas as much as possible. The separation inherent in conventional twin engine arrangements by locating the engines on opposite sides of the fuselage provides good protection from engine-to-engine damage. Although most multiengine installations have the potential for an uncontained failure of one engine damaging the other engine, service history has shown that the risk of striking the opposite engine is extremely low.

The Model Pathfinder 21 airplane propulsion system installation does not have the inherent engine-to-engine isolation of a conventional twin turboprop airplane. For the Model Pathfinder 21 airplane to obtain a level of safety equivalent to that of a conventional multiengine airplane, the effects of rotor failure must be addressed. Soloy Corporation must demonstrate that the engine type in relevant installations has at least ten million hours of service time without a high energy rotor failure (for example, disks, hubs, compressor wheels, and so forth). Additionally, for any lower energy fragments released during this extensive service life of the engine (for example, blades), a barrier must be placed between the engines to contain these low energy fragments. Even after installation of a barrier, engine-to-engine isolation following failure of either engine could be compromised through the common mount system or shared system interfaces such as firewalls, electrical busses, or cowlings. Soloy Corporation must, therefore, demonstrate any loads transmitted through the common mount system as a result of an engine failure do not prevent continued safe flight and landing with the operating engine.

Section 23.903(b)(1) also addresses damage caused by engine burn-through. Engine case burn-through results in a concentrated flame that has the capacity to burn through the firewall mandated by § 23.1191; therefor, § 23.903(b)(1) requires that design precautions must be taken to minimize the hazards to the airplane in the event of a fire originating in the engine that burns through the engine case. Similar to uncontained engine failures, the conventional multiengine airplane arrangement provides inherent protection from engine-to-engine damage associated with engine case burn-through by placing the engines on opposite sides of the fuselage. The Model Pathfinder 21 airplane propulsion system does not have this inherent isolation; therefore, the FAA is requiring that engine type in a relevant installation to have at least ten million hours of service time without an engine case burn-through, or that a firewall able to protect the operating engine from engine case burn-through be installed between the engines.

Soloy Corporation is not required to show compliance to § 21.35, per § 21.115 because the Model Pathfinder 21 airplane certification is being conducted under an STC project. Section 21.35(f)(1), Flight Tests, requires aircraft incorporating turbine engines of a type not previously used in a type certificated aircraft operate for at least 300 hours with a full complement of engines that conform to a type certificate as part of the certification flight test. The propulsion system installation is, however, different from any other airplane previously certified; therefore, the FAA is requiring as part of these proposed special conditions that Soloy Corporation show compliance with § 21.35(f)(1).

Propeller Installation

As demonstrated by the data discussed in the Safety Analysis section, propeller blade failures near the hub result in substantial airplane damage on a conventional twin turboprop airplane. One of the eight events was catastrophic. Blade debris has damaged critical components and structure of the airplane, and large unbalanced loads in the propeller have led to engine, mount, and wing structural failure. In contrast, service history has demonstrated that blade tip failures are not necessarily catastrophic on a conventional multiengine airplane because the flightcrew is able to secure the engine with the failed propeller and safely land the airplane. However, if the Model Pathfinder 21 airplane's single propeller failed near the tip, the failure would be likely to result in a catastrophic accident caused by the total loss of thrust capability and severe vibration. Other propeller system structural failures would be equally catastrophic; therefore, steps must be taken to reduce the potential for propeller system structural failures.

As discussed earlier, the FAA has determined additional testing is required for non-redundant components to ensure that equivalency to the fail-safe and isolation requirements of § 23.903(c) is met. The Model Pathfinder 21 airplane's single propeller system must be installed and maintained in such a manner as to substantially reduce or eliminate the occurrence of failures that would preclude continued safe flight and landing. To ensure the propeller installation and production and maintenance programs are sufficient to achieve the fail-safe equivalency requirement, these proposed special conditions include a 2,500 cycle validation test. This corresponds to the FAA's estimated annual usage for a turboprop airplane operating in scheduled service. An airplane cycle includes idle, takeoff, climb, cruise, descent, and reverse. The test must utilize production parts installed on the engine and should include a wide range of ambient and wind conditions, several full stops, and validation of scheduled and unscheduled maintenance practices.

Furthermore, these proposed special conditions require identification of the critical parts of the propeller assembly, which are components whose failure during ground or flight operation could cause a catastrophic effect on the airplane, including loss of the ability to produce controllable thrust. The FAA is proposing to require that a critical parts plan, modeled after plans required by Joint Aviation Requirements 27 and 29 for critical rotorcraft components, be established and implemented for the critical components of the propeller assembly. This plan draws the attention of the personnel involved in the design, manufacture, maintenance, and overhaul of a critical part to the special nature of the part. The plan should define the details of relevant special instructions to be included in the Instructions for Continued Airworthiness. The Instructions for Continued Airworthiness, required by § 23.1529, should contain life limits, mandatory overhaul intervals, and conservative damage limits for return to

service and repair, as appropriate, for the critical parts identified in accordance with these proposed special conditions.

On a conventional multiengine airplane, the flightcrew will secure an engine to minimize effects of propeller imbalance. Most of these airplanes also incorporate quick acting manual or automatic propeller feathering systems that further reduce the time the airplane is exposed to the effects of propeller imbalance. In addition to the propeller blade failures discussed earlier, the unbalanced condition could be caused by a propeller system failure such as loss of a de-icing boot, malfunction of a de-icing boot in icing conditions, an oil leak into a blade butt, asymmetric blade pitch, or a failure in counterweight attachment. The Model Pathfinder 21 airplane design does not provide any means to reduce the vibration produced by an unbalanced propeller; therefore, these proposed special conditions require that the engines, propulsion drive system, engine mounts, primary airframe structure, and critical systems must be designed to function safely in the high vibration environment generated by those less severe propeller failures. In addition, the degree of flight deck vibration must not jeopardize the crew's ability to continue to operate the airplane in a safe manner. Component failures that generate vibrations beyond the capability of the airplane must be addressed as a critical part in the same manner as required for propeller blade failures.

Propeller Control System

Propeller control system failures on a conventional twin engine airplane may result in a one-engine-inoperative configuration. To ensure an equivalent level of safety in the event of a propeller control system failure, these proposed special conditions require that the Model Pathfinder 21 airplane propulsion system be designed such that the airplane meets the one-engine-inoperative requirements of § 23.53 and § 23.67 after the most critical propeller control system failure.

There are several means to accomplish these proposed special condition elements. Soloy Corporation plans to address them by providing a mechanical high-pitch stop, which would be set to a ''get home'' pitch position, thereby preventing the propeller blades from rotating to a feather-pitch position when oil pressure is lost in the propeller control system. This would allow the propeller to continue to produce a minimum amount of thrust as a fixed-pitch propeller. These proposed special conditions provide design requirements that the FAA has determined are critical to a default fixed-pitch position feature. These include maintaining engine and propeller limits following an automatic or manual pitch change, the ability to manually select and deselect the default fixed-pitch position in flight in the event of a propeller control system failure that does not result in a loss of oil pressure, and the means to indicate to the flightcrew when the propeller is at the default fixed-pitch position.

Propulsion Instrumentation

On a conventional multiengine airplane, the pilot has positive indication of an inoperative engine created by the asymmetric thrust condition. The airplane will not yaw when an engine or a portion of the propulsion drive system fails because of the centerline thrust of the Model Pathfinder 21 airplane propulsion system installation. The flightcrew will have to rely on other means to determine which engine or propulsion drive system element has failed in order that the correct engine is secured; therefore, these proposed special conditions require that a positive indication of an inoperative engine or a failed portion of the propulsion drive system must be provided.

Section 23.1305 requires instruments for the fuel system, engine oil system, fire protection system, and propeller control system. This rule is intended for powerplants consisting of a single-engine, gearbox, and propeller. To protect the portions of the propulsion drive system that are independent of the engines, additional instrumentation, which includes oil pressure, oil quantity, oil temperature, propeller speed, gearbox torque, and chip detection, is required.

Fire Protection System

On a conventional twin engine airplane, the engines are sufficiently separated to eliminate the possibility of a fire spreading from one engine to another. Since the Soloy Dual Pac propulsion system is installed in the nose of the airplane, the engines are separated only by a firewall. The fire protection system of the Model Pathfinder 21 airplane must include features to isolate each fire zone from any other zone and the airplane in order to maintain isolation of the engines during a fire; therefore, these proposed special conditions mandate that the firewall required per § 23.1191 be extended to provide firewall isolation between either engine and the propulsion drive system. These proposed special conditions require that heat radiating from a fire originating in any fire zone must not affect components in adjacent compartments in such a way as to endanger the airplane.

Airplane Performance

Section 23.67, and paragraphs in § 23.53, § 23.69 and § 23.75, provide performance requirements for multiengine airplanes with one engine inoperative. These rules are not adequate for multiengine, single propeller airplanes. In these proposed special conditions, the airplane configuration requirements specified in § 23.53(b)(1), § 23.67(c)(1), § 23.69(b), and § 23.75(g) have been adapted to accommodate the propeller system of the Model Pathfinder 21 airplane to ensure a level of safety equivalent to that of conventional multiengine airplanes.

Airspeed Indicator

Section 23.1545(b)(5) provides one-engine-inoperative marking requirements for the airspeed indicator. This rule is not adequate to address critical propeller control system failures on the Model Pathfinder 21 airplane. As a result, these proposed special conditions require that the airspeed markings required by § 23.1545(b)(5) be based on the most critical flight condition between one engine inoperative or a failed propeller control system in order to ensure a level of safety equivalent to that of conventional multiengine airplanes.

Airplane Flight Manual

Sections 23.1585 and 23.1587 require pertinent information to be included in the Airplane Flight Manual (AFM). These rules are not adequate to address critical propeller control system failures on the Model Pathfinder 21 airplane. As a result, these proposed special conditions require that the critical procedures and information required by § 23.1585, paragraph (c), and § 23.1587, paragraphs (c)(2) and (c)(4), include consideration of these critical propeller control system failures in order to ensure a level of safety equivalent to that of conventional multiengine airplanes.

Applicability

As discussed above, these special conditions are applicable to the Model Pathfinder 21 airplane. Should Soloy Corporation apply at a later date for an STC to modify any other model included on TC No. A37CE to incorporate the same novel or unusual design feature, the special conditions

would apply to that model as well under the provisions of § 21.101(a)(1).

Conclusion

This action affects only certain novel or unusual design features on one model of airplane. It is not a rule of general applicability, and it affects only the applicant who applied to the FAA for approval of these features on the airplane.

List of Subjects in 14 CFR Part 23

Aircraft, Aviation safety, Signs and symbols.

Citation

The authority citation for these special conditions is as follows:

Authority: 49 U.S.C. 106(g), 40113 and 44701; 14 CFR 21.16 and 21.101 and 14 CFR 11.28 and 11.29(b).

The Proposed Special Conditions

Accordingly, the Federal Aviation Administration (FAA) proposes the following special conditions as part of the type certification basis for the Soloy Corporation Model Pathfinder 21 airplane modified by Soloy Corporation.

(a) *Propulsion System.*

(1) *Engine Requirements.* The propulsion system must comply with the Soloy Corporation Soloy Dual Pac Engine Special Conditions (Docket No. 93–ANE–14; No. 33–ANE–01), published in **Federal Register**, Volume 62, Number 33, dated February 19, 1997.

(2) *Engine Rotor Failure.* In addition to showing compliance with § 23.903(b)(1) (Amendment 23–40), compliance must be shown with the following:

(i) The engine type to be installed must be shown to have demonstrated a minimum of ten million hours of actual service experience in installations of equivalent or higher disk rotation loading without an uncontained high energy rotor failure; and, a shield capable of preventing all fragments of an energy level that have been released during uncontained engine failures experienced in service from impacting the adjacent engine must be installed; and,

(ii) It must be shown that the adjacent engine is not affected following any expected engine failure.

(3) *Engine Case Burn-Through.* In addition to showing compliance with § 23.903(b)(1) (Amendment 23–40), the engine type to be installed must be shown to have demonstrated a minimum of ten million hours of actual service experience in installations of equivalent or higher combustor pressures and temperatures without an engine case burn-through event; or a firewall capable of containing a fire originating in the engine that burns through the engine case must be installed between the engines.

(4) *Propulsion System Function and Reliability Testing.* The applicant must complete the testing required by § 21.35(f)(1) (Amendment 21–51).

(b) *Propeller Installation.*

(1) The applicant must complete a 2,500 airplane cycle evaluation of the propeller installation. This evaluation may be accomplished on the airplane in a combination of ground and flight cycles or on a ground test facility. If the testing is accomplished on a ground test facility, the test configuration must include sufficient interfacing system hardware to simulate the actual airplane installation, including the engines, propulsion drive system, and mount system.

(2) *Critical Parts.*

(i) The applicant must define the critical parts of the propeller assembly. Critical parts are those parts whose failure during ground or flight operation could cause a catastrophic effect to the airplane, including loss of the ability to produce controllable thrust. In addition, parts, of which failure or probably combinations of failures would result in a propeller unbalance greater than that defined under paragraph (b)(3), are classified as critical parts.

(ii) The applicant must develop and implement a plan to ensure that the critical parts identified in paragraph (b)(2)(i) are controlled during design, manufacture, and throughout their service life so that the risk of failure in service is minimized.

(3) *Propeller Unbalance.* The applicant must define the maximum allowable propeller unbalance that will not cause damage to the engines, propulsion drive system, engine mounts, primary airframe structure, or to critical equipment that would jeopardize the continued safe flight and landing of the airplane. Furthermore, the degree of flight deck vibration caused by this unbalance condition must not jeopardize the crew's ability to continue to operate the airplane in a safe manner.

(c) *Propeller Control System.*

(1) The propeller control system must be independent of the turbine engines such that a failure in either turbine engine or an engine control system will not result in loss of propeller control.

(2) The propeller control system must be designed so that the occurrence of any single failure or probable combination of failures in the system which would prevent the propulsion system from producing thrust at a level required to meet § 23.53(b)(1)(ii) (Amendment 23–34) and § 23.67(c) (Amendment 23–42) is extremely improbable.

(3) The propeller control system must be designed to implement a default fixed-propeller pitch position in the event of a propeller control system failure.

(i) An automatic or manual pitch change to the default fixed-pitch position must not exceed any limitation established as part of the engine and propeller type certificates;

(ii) A means, independent of the primary propeller control system, to manually select and deselect this position in flight must be provided and designed to prevent inadvertent operation; and

(iii) A means to indicate to the flightcrew when the propeller is at the default fixed-pitch position must be provided.

(d) *Propulsion Instrumentation.*

(1) *Engine Failure Indication.* A positive means must be provided to indicate when an engine is no longer able to provide torque to the propeller. This means may consist of instrumentation required by other sections of part 23 or these special conditions if it is determined that those instruments will readily alert the flightcrew when an engine is no longer able to provide torque to the propeller.

(2) *Propulsion Drive System Instrumentation.* In addition to the requirements of § 23.1305 (Amendment 23–52), the following instruments must be provided for any power gearbox or transmission:

(i) An oil pressure warning means and indicator for each pressure-lubricated gearbox;

(ii) A low oil quantity indicator for each gearbox, if lubricant is self-contained;

(iii) An oil temperature indicator;

(iv) A tachometer for the propeller;

(v) A torquemeter for the transmission driving a propeller shaft if the sum of the maximum torque that each engine is capable of producing exceeds the maximum torque for which the propulsion system has been certified under 14 CFR part 33; and

(vi) A chip detecting and indicating system for each gearbox.

(e) *Fire Protection System.*

(1) In addition to § 23.1191(a) and (b) (not amended),

(i) Each engine must be isolated from the other engine and the propulsion drive system by firewalls, shrouds, or equivalent means; and

(ii) Each firewall or shroud, including applicable portions of the engine cowling, must be constructed so that no

hazardous quantity of liquid, gas, or flame can pass from the isolated compartment to the other engine and the propulsion drive system and so that firewall temperatures under all normal or failure conditions would not result in auto-ignition of flammable fluids and vapors present in the other engine and the propulsion drive system.

(2) Components, lines, and fittings located in the engine and propulsion drive system compartments must be constructed of such materials and located at such distances from the firewall that they will not suffer damage sufficient to endanger the airplane if a fire is present in an adjacent engine compartment.

(f) *Airplane Performance.*

(1) In addition to § 23.53(b)(1) (Amendment 23–34), the airplane, upon reaching a height of 50 feet above the takeoff surface level, must have reached a speed of not less than 1.3 V_{S1}, or any lesser speed, not less than V_X plus 4 knots, that is shown to be safe under all conditions, including turbulence and the propeller control system failed in any configuration that is not extremely improbable.

(2) In lieu of § 23.67(c)(1) (Amendment 23–42), the steady climb gradient must be determined at each weight, altitude, and ambient temperature within the operational limits established by the applicant, with the airplane in the following configurations:

(i) Critical engine inoperative, remaining engine at not more than maximum continuous power or thrust, wing flaps in the most favorable position, and means for controlling the engine cooling air supply in the position used in the engine cooling tests required by § 23.1041 (Amendment 23–7) through § 23.1045 (Amendment 23–7);

(ii) Both engine operating normally and the propeller control system failed in any configuration that is not extremely improbable, the engines at more than maximum continuous power or thrust, wing flaps in the most favorable position, and means for controlling the engine cooling air supply in the position used in the engine cooling tests required by § 23.1041 (Amendment 23–7) through § 23.1045 (Amendment 23–7).

(3) *Enroute climb/descent.*

(i) Compliance to § 23.69(a) (Amendment 23–50) must be shown.

(ii) The steady gradient and rate of climb/descent must be determined at each weight, altitude, and ambient temperature within the operational limits established by the applicant with—

(A) The critical engine inoperative, the engines at not more than maximum continuous power, the wing flaps retracted, and a climb speed not less than 1.2 V_{S1}.

(B) Both engines operating normally and the propeller control system failed in any configuration that is not extremely improbable, the engines at not more than maximum continuous power, the wing flaps retracted, and a climb speed not less than 1.2 V_{S1}.

(4) In addition to § 23.75 (Amendment 23–42), the horizontal distance necessary to land and come to a complete stop from a point 50 feet above the landing surface must be determined as required in § 23.75 (Amendment 23–42) with both engines operating normally and the propeller control system failed in any configuration that is not extremely improbable.

(g) *Airspeed Indicator.* In lieu of the requirements of § 23.1545(b)(5) (Amendment 23–23), for one-engine inoperative or the propeller control system failed in any configuration that is not extremely improbable, whichever is most critical, the best rate of climb speed V_Y, must be identified with a blue sector extending from the V_Y speed at sea level to the V_Y speed at an altitude of 5,000 feet, if V_V is less than 100 feet per minute, or the highest 1,000-foot altitude (at or above 5,000 feet) at which the V_Y is 100 feet per minute or more. Each side of the sector must be labeled to show the altitude for the corresponding V_Y.

(h) *Airplane Flight Manual.*

(1) In addition to the requirements of § 23.1585(c) (Amendment 23–34), the following information must be included in the Airplane Flight Manual (AFM):

(i) Procedures for maintaining or recovering control of the airplane at speeds above and below V_{S1} with the propeller control system failed in any configuration that is not extremely improbable.

(ii) Procedures for making a landing with the propeller control system failed in any configuration that is not extremely improbable and procedures for making a go-around with the propeller control system failed in any configuration that is not extremely improbable, if this latter maneuver can be performed safely; otherwise, a warning against attempting the maneuver.

(iii) Procedures for obtaining the best performance with the propeller control system failed in any configuration that is not extremely improbable, including the effects of the airplane configuration.

(2) In lieu of the requirements of § 23.1587(c)(2) and (c)(4) (Amendment 23–39), the following information must be furnished in the Airplane Flight Manual:

(i) The best rate-of-climb speed or the minimum rate-of-descent speed with one engine inoperative or the propeller control system failed in any configuration that is not extremely improbable, whichever is more critical.

(ii) The steady rate or gradient of climb determined in paragraph (f)(2)(i) or paragraph (f)(2)(ii) of these special conditions, whichever is more critical, and the airspeed, power, and airplane configuration.

(3) The steady rate and gradient of climb determined in paragraph (f)(3) of these special conditions must be furnished in the Airplane Flight Manual.

(4) The landing distance determined under § 23.75 (Amendment 23–42) or in paragraph (f)(4) of these proposed special conditions whichever is more critical.

Issued in Kansas City, Missouri on March 9, 1999.

Marvin Nuss,

Acting Manager, Small Airplane Directorate, Aircraft Certification Service.

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DEPARTMENT OF TRANSPORTATION

Federal Aviation Administration

14 CFR Part 25

[Docket No. NM152; Notice No. 25–99–01–SC]

Special Conditions: Boeing Model 717–200 Airplane; Operation Without Normal Electrical Power

AGENCY: Federal Aviation Administration (FAA), DOT.

ACTION: Notice of proposed special conditions.

SUMMARY: This notice proposes special conditions for the Boeing Model 717–200 airplane. This airplane will have novel or unusual design features associated with its electronic flight and engine control systems. The applicable airworthiness regulations do not contain adequate or appropriate safety standards for these design features. These proposed special conditions contain the additional safety standards that the Administrator considers necessary to establish a level of safety equivalent to that established by the existing airworthiness standards.

DATES: Comments must be received on or before April 26, 1999.

ADDRESSES: Comments on this proposal may be mailed in duplicate to: Federal