Memorandum

U.S. Department
of Transportation
Federal Aviation Administration

Subject: **ACTION**: Request for Review and Concurrence with Equivalent Level of Safety (ELOS) ACE-03-02, for the PZL-Mielec PZL M28 05 Airplane to 14 CFR part 23, § 23.1361(a), Master Switch Arrangement.

Date: JAN 1 2 2004

From: PZL M28 05 Project Officer, Project Support Branch, ACE-112

Reply to Attn. of: Doug Rudolph (816) 329-4059

To: Manager, Small Airplane Directorate, ACE-100

This memorandum documents concurrence for the subject ELOS, we request your office review and concur with the proposed ELOS findings to the Master Switch requirements of 14 CFR part 23, § 23.1361(a).

Background:
The U.S. Type Certification project for the PZL M28 05 Airplane is being conducted as a Validation project between the FAA and the Polish Aviation Authority, the CAO, in accordance with the U.S.-Polish Bilateral Aviation Agreement (BAA) and the amended Annex between the State Departments of the two countries.

The Model PZL M28 05 SKYTRUCK is an 18 Place, all metal, braced high wing, double vertical tail, fixed tri-gear, unpressurized, twin turboprop engine airplane with a maximum weight of 16,535 pounds in the Commuter Category.

The certification basis for this project in accordance with 14 CFR part 21, § 21.17 is: 14 CFR part 23 dated February 1, 1965, as amended through Amendment 23-42 effective February 4, 1991, with the exception of 14 CFR part 23 § 23.203, § 23. 205, § 23.207 and § 23.1545, which will be Amendment 50; 14 CFR part 23, § 23.1309 will be at Amendment 49; 14 CFR part 34 dated September 10, 1990, as amended through Amendment 34-3 effective February 3, 1999; and 14 CFR part 36, dated December 1, 1969, as amended through amendment in effect on the date of issuance of the U.S. type certificate (currently Amendment 36-24, effective August 7, 2002).

During the technical meeting in Mielec, Poland during October 8-10, 2003, between the FAA, the CAO and PZL-Mielec, the procedure for requesting an Equivalent Level of Safety from the FAA was presented. Also, during the meeting the FAA reviewed the originally submitted PZL report for the Master Switch and explained the requirements for an ELOS approval.

The FAA suggested the following seven (7) topics be included in the revised ELOS substantiation report No. POK-1/3/M28/022/2000, titled "Equivalent Safety Level of Main Switch of M28 Skytruck":

- Specification of the length of the power cable.
- Explanation of the extra protection to the power cable.
- AFM requirement to check before flight.
- Verification that the system is not near flammable items.
- Explanation of the short circuit test.
- Statement in the ELOS report that the cable is also used for starter referencing § 23.1357 a(2).
- Statement that Main Switch complies with § 23.1365 (b) on the ELOS substantiation letter and report.

Based on the information provided during the above-mentioned meeting, the CAO has sent a letter, dated December 15, 2003, requesting the ELOS on behalf of PZL. The ELOS request is substantiated by the attached report No. POK-1/3/M28/022/2000 Issue 1, dated October 2003.

The Polish Civil Aviation Office granted an Equivalent Level of Safety during the Polish Type Certification. This Equivalent Level of Safety allowed a specific arrangement of the Master Switch with the point of disconnection located about 7 meters apart from the alternators.

Applicable Regulations: The applicable regulation is 14 CFR part 23, § 23.1361(a) at amendment 23-20, effective date 09/01/77:

Master Switch Arrangement.

(a) There must be a Master Switch Arrangement to allow ready disconnection of electric power sources from the main bus. The point of disconnection must be adjacent to the sources controlled by the switch.

(b) Load circuits may be connected so that they remain energized after the switch is opened, if they are protected by circuit protective devices, rated at five amperes or less, adjacent to the electric power source. [These circuits must be isolated, or physically shielded, to prevent their igniting flammable fluids or vapors that might be liberated by the leakage or rupture of flammable fluid systems.]

(c) The Master Switch or its controls must be so installed that the switch is easily discernible and accessible to a crewmember in flight.

Applicant's Position: (the CAO concurs)

Description of compensating design features from the CAO letter:

1) The power cable between the generator and the point of disconnection is additionally protected by EXNL protective pipes that guard it against mechanical damage and act as a second layer of insulation. Such a protection is neither required nor used for standard cables, which are equipped with fuses or circuit breakers.

2) The power cable is led in entire length in separate bands and in a distance of min. 20 mm from other harnesses. Such a feature increases degree of protection of the said cable when compared with the standard configuration.

3) The power cable is protected by a short-circuit protective system - though it is a starter cable and no protection is required for such a cable by 14 CFR part 23, § 23.1357(a)(1).

4) Any equipment associated with the electrical cable installation is flame-resistant and will not emit dangerous quantities of toxic fumes in the event of circuit overload in accordance with the requirements of 14 CFR part 23, § 23.1365 (b).

Explanation of how design features described above provide an ELOS:

The compensating design features described above provide an equivalent level of safety and meet the intent of the regulation. The full description and details are included in Report No. POK-1/3/M28/022/2000 Issue 1, dated October 2003.

FAA Position: The FAA concurs with the applicant and the CAO regarding the granting of an ELOS to 14 CFR part 23, § 23.1361(a) for the Master Switch Arrangement for the M28 05 airplane. The compensating design features described on the first page and paragraphs 2.3, 2.4 and 3 of M28 Report No. POK-1/3/M28/022/2000 Issue 1, dated October 2003, provide justification for an ELOS.

Recommendation: We concur that the above described features of the PZL M28 05 airplane provide an Equivalent Level of Safety (ELOS) as envisioned in the regulation of 14 CFR part 23, § 23.1361(a) at Amendment 23-20.

Concurred by:

Doug Rudolph Acting for — 12/29/03
Manager, Project Support Branch, ACE-112 — Date

12/30/03
Manager, Standards Office, ACE-110 — Date

1/12/04
Manager, Small Airplane Directorate, ACE-100 — Date