Exemption No. 3732

UNITED STATES OF AMERICA
DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION
KANSAS CITY, MISSOURI 64106

In the matter of the petition of	*	
PILATUS BRITTEN-NORMAN	*	Regulatory Docket No. 23466
for an exemption from § 23.1303(e)(1) of the Federal Aviation Regulations	*	

GRANT OF EXEMPTION

By letter dated December 3, 1982, the Civil Aviation Authority (CAA) of the United Kingdom, on behalf of Pilatus Britten-Norman, Bembridge Airport, Bembridge, Isle of Wight, England, petitioned for an exemption from § 23.1303(e)(1) of the Federal Aviation Regulations (FAR) to permit type certification of the Pilatus Britten-Norman Model BN-2T airplane without a speed warning device installed.

Sections of the FAR affected:

Section 23.1303(e) which provides, in pertinent part, that a speed warning device is required for turbine engine powered airplanes and other airplanes with maximum operating limit speeds (V_{MO}) and design dive speeds established under §§ 23.335(b)(4) and 23.1505(c).

Section 23.335(b)(4) which provides, in pertinent part, that the design diving speed (V_D) be greater than the speed attained when the airplane, flying at design cruising speed, is dived at a 7.5 degree angle for 20 seconds.

Section 23.1505(c) which provides, in pertinent part, that the established V_{MO} be sufficiently below V_D such that it is unlikely to be exceeded in operations and that the speed differential between V_{MO} and V_D be less than that established in § 23.335(b)(4).

The petitioner's supportive information is as follows:

1. If the Model BN-2T (Islander) airplane had been reengined with 350 brake horsepower (BHP) turbo-charged piston engines, instead of the DDA 250-B17C 320 shaft horsepower turbine engine, there would not have been a requirement to provide an overspeed warning. Worldwide, there is a large fleet of unpressurized aircraft with twin piston engines delivering more than 320 BHP with performance capability at least as great as the Turbine Islander which have been operated safely and not found to be at risk of hazardous overspeed. None of these aircraft types is equipped with aural overspeed warning.

2. Introduction of the requirement for overspeed warning arose from the development of new high performance, high altitude, pressurized turbojet aircraft capable of cruising close to their maximum permissible Mach number at altitude and, due to their clean aerodynamic shapes, capable in the event of brief inattention by the crew or mild atmospheric upset of exceeding M_{MO} and being in some cases then exposed to undesirable handling characteristics, such as degraded lateral control and nose down longitudinal instability. None of these considerations apply to the BN-2T airplane.

3. The amendments to Part 23 of the FAR and Section K of the British Civil Air Regulations, which added standards appropriate to high performance jets, introduced the V_{MO} concept in place of the previous V_{NO}/V_{NE} philosophy. In the case of the BN-2T airplane, this change is not necessitated by the altitude and speed performance of the aircraft but the resulting low V_{MO}, compared to the V_{NE} red line of the piston engined aircraft, obviously makes "overspeed" more readily achieved. This in turn results in the practical problem that the low dynamic pressure makes the permitted tolerance of -0/+6 knots for the pressure switch difficult to achieve.

4. The type certificated airspeed limits (KIAS) of the Islander airplane variants are for the piston engined, V_{NO} = 141 knots, V_{NE} = 184 knots, and V_{DF} = 204 knots, whereas for the turbine engined, BN-2T, V_{MO} = = 152 knots and V_{DF} = 219 knots.

5. To demonstrate that the BN-2T airplane cannot readily achieve hazardous speeds, Pilatus Britten-Norman conducted flight tests to the requirement of § 23.335(b)(4)(i) of the FAR. Flight test data included four conservatively timed maneuvers in which the aircraft was established on a -7.5 degree flight path (with power in excess of 75%) before the stop watch was started and recovery was not initiated until 20 seconds had elapsed. In the worst case, the aircraft reached a maximum indicated airspeed of 196 KIAS. This speed is 23 knots below V_{DF} to which each BN-2T aircraft is tested.

6. The history of the piston engined Islander fleet of some 920 aircraft has, to the best of the manufacturer's knowledge, no example of any untoward incident attributed to flight at high IAS in the speed range resulting from the upset maneuver of § 23.335(b)(4)(i) as flown by the BN-2T aircraft.

7. The CAA concluded in certificating the BN-2T aircraft that an aural warning of speed in excess of V_{MO} was not necessary due to the combination of performance capability, relative slowness to accelerate, and proven safe speed margins. CAA endorses the request for exemption from § 23.1303(e)(1) and deletion of the aural speed warning device in the BN-2T airplane.

Comments on published petition:

A summary of the CAA of the United Kingdom on behalf of Pilatus Britten-Norman petition was published in the FEDERAL REGISTER on January 20, 1983 (48 FR 2617), and the FAA received no comments from the public.

The Federal Aviation Administration's (FAA) analysis/summary is as follows:

The FAA has carefully reviewed the information contained in the petitioner's request for exemption.

1. The purpose of the overspeed warning is to alert pilots of an impending condition that could degrade airplane handling characteristics.

2. This warning requirement was directed primarily toward aerodynamically clean, high performance, turbine powered airplanes. Lower performance, fixed gear airplanes were not taken into consideration.

3. The Pilatus Britten-Norman Model BN-2T airplane exhibits drag characteristics representative of fixed gear airplanes and the manufacturer has demonstrated in flight tests, that when dived in accordance with § 23.335(b)(4), this airplane did not experience a speed increase inconsistent with § 23.1505(e).

The FAA agrees that the proposed exemption would be in the public interest because:

1. The Pilatus Britten-Norman Model BN-2T airplane has inherent drag characteristics which make it unlikely that a rapid speed increase will not be perceived by the pilot.

2. The airplane manufacturer has shown by flight tests that the airplane is not subject to rapid speed increases when subjected to a simulated minor upset.

3. Complying with the requirements of § 23.1303(e), in this case, places an undue burden on the public without compensating safety benefits.

4. The airplane, with this exemption to the applicable rules, will meet the level of safety intended by the rules.

In consideration of the foregoing, I find that a grant of exemption is in the public interest and will not adversely affect safety. Therefore, pursuant to the authority contained in Sections 313(a) and 601(c) of the Federal Aviation Act of 1958, as amended, (the Act), delegated to me by the Administrator (14 CFR 11.53), and Section 603 of the Act, Pilatus Britten-Norman is granted an exemption from § 23.1303(e)(1) to the extent necessary to allow type certification of Pilatus Britten-Norman Model BN-2T airplanes without an aural speed warning device. This exemption is subject to the following conditions and limitations:

It is valid only for Model BN-2T airplanes in their present configuration which includes fixed landing gear, turbopropeller engines flat rated to 320 shaft horsepower, and an established maximum operating limit speed of 152 knots.

Issued in Kansas City, Missouri, on May 20, 1983.

Murray E. Smith
Director, Central Region