This page intentionally left blank.

DANGEROUS?

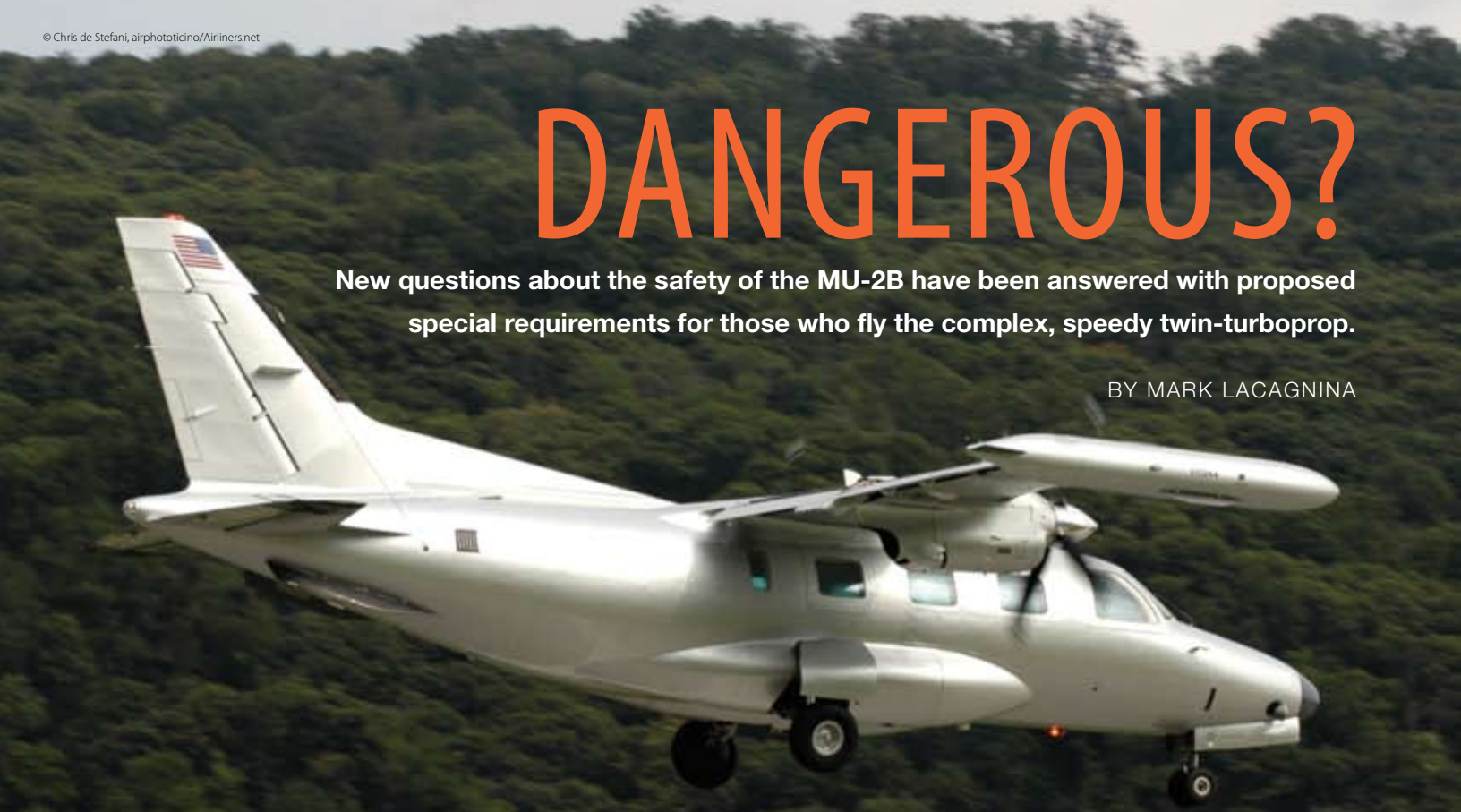
New questions about the safety of the MU-2B have been answered with proposed special requirements for those who fly the complex, speedy twin-turboprop.

BY MARK LACAGNINA

Despite political pressure to ground the Mitsubishi MU-2B in the United States, the Federal Aviation Administration (FAA) has found, again, that the airplane is not inherently unsafe but that special experience, training and operating requirements are needed for pilots, instructors and examiners.[1]

On Sept. 28, 2006, the FAA published a notice of proposed rule making (NPRM) for a special federal aviation regulation (SFAR) that would impose the following key requirements:

- A minimum of 100 hours of experience as pilot-in-command (PIC) of multiengine airplanes to act as PIC of an MU-2B;
- FAA-approved initial or transition training for pilots who have not flown an MU-2B in two years;
- Approved requalification training for pilots who have flown an MU-2B in the previous two years but have not received the approved training;
- Approved differences training for pilots who operate more than one model;
- Approved recurrent training every 12 months;
- Mandatory use of MU-2Bs by pilots, designated pilot examiners and check airmen to accomplish biennial flight reviews and conduct the landings required to meet recent flight experience standards;
- Manipulation of controls only by pilots who meet the SFAR requirements;
- A minimum of 2,000 hours as PIC, including at least 800 hours as PIC of multiengine airplanes and 300 hours as PIC of MU-2Bs to provide flight instruction in the airplane. At least 50 of the 300 hours of required PIC time would have to be logged in the previous 12 months;
- At least 100 hours as PIC of MU-2Bs for designated pilot examiners and check airmen; and,



- A "functioning" autopilot aboard the airplane for flight under instrument flight rules or in instrument meteorological conditions or nighttime visual meteorological conditions.

Accident Spikes

As with special certification reviews (SCRs) of the MU-2B conducted by the FAA in 1983–1984 and 1996–1997, an increase in accidents was cited as the reason for the recent "safety evaluation" (Figure 1).

Lacking activity, or flight hour, estimates, the FAA compiled accident rates based on the number of airplanes on the U.S. registry. The agency found that the MU-2B's accident rate from 1966 through September 2005 is twice as high as similar twin-turboprop airplanes — Beech 90 and 100 series King Airs, Cessna 425 and 441 Conquests, Commander 680s and 690s, and Piper PA-31T Cheyennes. Analyses of data, including those shown in Table 1 (page 34), indicated that the frequency of fatal MU-2B accidents involving loss of control is 3.5 times greater than airplanes in the comparison group.

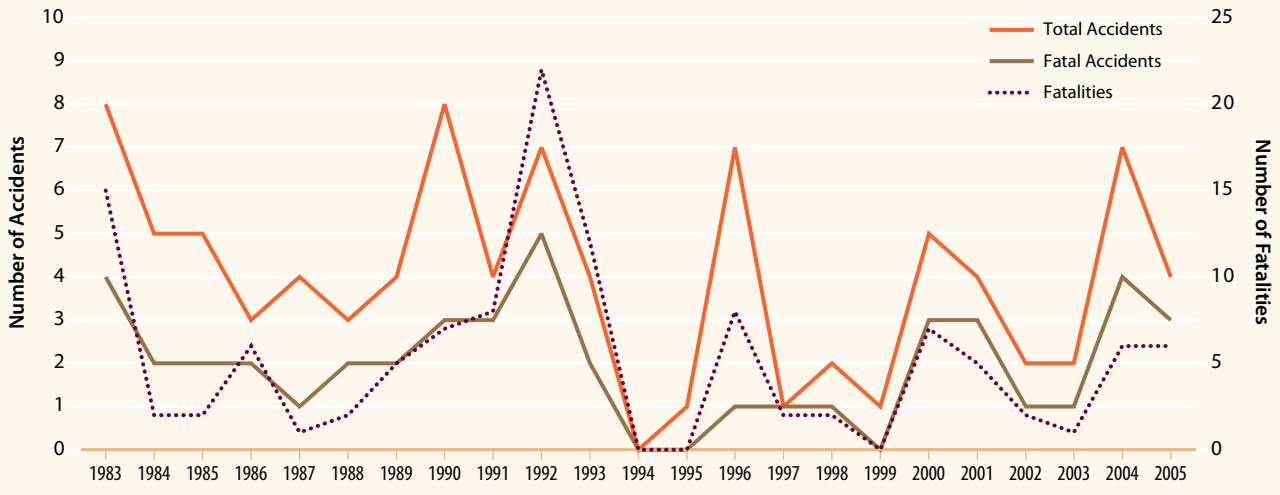
"The most frequent and fatal type of accident … involves uncontrolled descent from altitude during and after flight in reported or suspected icing conditions," the FAA said.

Under the Microscope

The safety evaluation was launched in July 2005 and focused on certification, maintenance, operations and training. The evaluation concluded that the airplane meets its certification requirements and that current maintenance requirements are sufficient. However, a flight standards information bulletin for airworthiness was issued in November 2005, directing FAA aviation safety inspectors to ensure that proper procedures and equipment are used by maintenance technicians during critical procedures,

or just different?

Mitsubishi MU-2B Accidents in the United States, 1983–2005



Source: U.S. Federal Aviation Administration

Figure 1

Comparative U.S. Fatal Accident Data, 1966–September 2005

	MU-2B			Contemporary Twin-Turboprop Airplanes						
				Commander		Beech		Cessna	Piper	
Accident Type	Short Body	Long Body	Total	680	690	90	100	425/441	PA-31T	Total
Loss of control	27	26	**53**	10	33	54	12	20	24	**153**
CFIT	1	10	**11**	3	1	7	1	3	4	**19**
Emergency maneuver	4	4	**8**	1	0	2	0	0	3	**6**
Ramp	1	3	**4**	0	0	2	1	0	0	**3**
Midair collision	1	1	**2**	0	3	1	0	1	2	**7**
Ground collision	0	0	**0**	0	0	1	1	1	0	**3**
Missing/unknown	0	2	**2**	0	0	0	0	0	0	**0**
Other	0	1	**1**	0	2	0	0	0	1	**3**
Total	**34**	**47**	**81**	**14**	**39**	**67**	**15**	**25**	**34**	**194**

CFIT = Controlled flight into terrain

Source: U.S. Federal Aviation Administration

Table 1

including the adjustment and rigging of fuel controls, propeller blade angles and flaps.

A flight standardization board (FSB) was convened to study training requirements. The board reviewed 20 existing training programs and found little standardization. "Only a few emphasized the different handling characteristics of the MU-2B or specialized operational techniques," the FAA said. A standardized training program developed by Mitsubishi Heavy Industries America (MHIA) was adopted after being revised by the FAA to meet the proposed SFAR requirements.

FSB flight test data analyzed by human factors personnel at the Civil Aerospace Medical Institute showed that use of an autopilot significantly reduces workload and stress, and improves pilot performance. The resulting proposed requirement for a functioning autopilot during specific operations was adopted in lieu of proposing a requirement for a second flight crewmember. The SFAR does not require that the autopilot be *used*, just that it be available to reduce pilot workload. The FAA and MHIA both recommend that the autopilot *not* be used in icing conditions because it could mask detrimental effects of icing on the airplane's performance and handling characteristics.

The FAA also considered requiring a type rating, which long has been recommended by MHIA, but concluded that the requirement would not ensure that pilots receive recurrent training in the MU-2B. During the evaluation, the FAA surveyed and held meetings with MU-2B pilots, operators, training providers and special-interest groups. "All participants agreed that something needed to be done to improve the safety record of the MU-2B," the FAA said. "Everyone supported mandatory type-specific, recurrent, standardized training for pilots."

Many participants said that the airplane flight manuals (AFMs) need to be reviewed and revised, and that a standardized cockpit checklist be developed for the airplane. The FAA agreed, and the proposed SFAR includes requirements to have and use an AFM that is up-to-date with revisions and a standardized cockpit checklist developed by MHIA.

Political Pressure

Two fatal accidents in 2004 — on May 14 and Dec. 10 (see appendix, page 36) — prompted numerous congressional inquiries about the safety of the MU-2B. The FAA's Web site includes 13 letters from members of the U.S. Congress, most of whom forwarded correspondence from constituents — relatives of pilots killed in the accidents — and requested information about the airplane.[2] At least six letters said that the airplane should be grounded until its safety record is thoroughly analyzed.

In the NPRM, the FAA said that it found no justification to ground the airplane. "The airplane meets its original type certification basis as found in three type certification analyses," the agency said.

After the NPRM was published, Tom Tancredo, a representative from Colorado, called on President George Bush to replace the FAA administrator and the chairman of the U.S. National

Transportation Safety Board because they "consistently failed to take appropriate action on this issue." Tancredo also introduced legislation that would force the FAA to ground the airplane until it "certifies that the aircraft is safe and a law is enacted approving the certification." However, proposed legislation such as this rarely becomes law.

Bird of a Different Feather

The MU-2B was certified in the United States under Civil Aviation Regulations (CAR) 10, which included CAR 3 standards for normal category airplanes and special conditions applicable to turboprop airplanes. Mitsubishi Heavy Industries produced 764 MU-2Bs between 1965 and 1986. The most significant model change came in 1970, with the introduction of the "long-body" MU-2B.[3]

The FAA estimates that there are 397 of the airplanes — 194 short-body models and 203 long-body models — and about 600 MU-2B pilots in the United States. There once were 675 MU-2Bs on the U.S. registry; the FAA said that 213 have been "withdrawn from use or written off" and 65 have been registered in other countries.

Initially popular among corporate/business aircraft operators, most MU-2Bs

Tancredo

in the United States today are being operated for personal use under Federal Aviation Regulations (FARs) Part 91. The FAA estimates that 64 MU-2Bs are being flown by 18 Part 135 operators, primarily for on-demand cargo service.

"This shift to air-taxi and personal-flight operations increased the exposure of the MU-2B to certain known hazards: more frequent night flights; a significantly higher number of hours flown than in previous operations; an increase in single-pilot operations; and operation by pilots who may not be getting the level and frequency of training that corporate pilots typically receive," the FAA said.

The 2005–2006 safety evaluation concluded that the MU-2B is "a complex airplane requiring operational techniques not typically used in other light turboprop airplanes but more similar to those of turbojet aircraft that require a type rating."

Double-slotted Fowler flaps along the full span of the trailing edge of the wing provide short-field takeoff and landing capability. Spoilers provide roll control, and the outboard flap section on each wing incorporates a trim aileron. Wing loading is relatively high — 59 lb/sq ft (288 kg/sq m) for the short-body models and 65 lb/sq ft (317 kg/sq m) for the long-body models — compared with about 39 lb/sq ft (191 kg/sq m) for the F90 King Air, Conquest II, Commander 690 and Cheyenne II. Several pilots who participated in the safety evaluation said that because of the high wing loading and other design characteristics, the airplane must be "flown by the numbers" — that is, according to the AFM.

Feedback

The FAA received about 70 public comments on the NPRM. Most said that the proposed compliance time — 180 days after publication of the SFAR — should be extended to at least one year. MHIA, which provides spare parts and technical services, administers service centers and conducts free Pilot's Review of Proficiency seminars, said that an extension is necessary to train more instructors.

The proposed requirement that only SFAR-qualified pilots manipulate the controls was roundly criticized. Many comments said that a multiengine- and instrument-rated pilot should be allowed to manipulate the controls under the supervision of a qualified PIC.

Several commenters, including two of the largest fleet operators — American Check Transport and Bankair, cited the difficulty of maintaining the original autopilots and called for retention of the current master minimum equipment list provisions for operating the airplane with an inoperative autopilot.

The potential economic impact was criticized by several commenters who called for less burdensome requirements, such as training to proficiency instead of a set number of hours. Epps Air Service, which operates 10 MU-2Bs, said that the market value of the airplanes has dropped substantially since publication of the NPRM and that because of the high turnover in the employment of Part 135 pilots, training costs will be higher than estimated by the FAA.

Many commenters applauded the FAA for resisting the political pressure to ground the airplane. According to U.S. legal requirements, the agency has until April 2008 to publish a final rule or withdraw the proposed SFAR. ●

Notes

1. The recent safety evaluation of the MU-2B by the U.S. Federal Aviation Administration (FAA) followed special certification reviews (SCRs) conducted in 1983–1984 and

1996–1997. The first SCR focused on the airplane's engines, fuel system, autopilot, flight control system and handling characteristics during approaches in instrument meteorological conditions and with one engine inoperative. The second SCR focused on flight in icing conditions. All three reviews concluded that the airplane complies with the regulatory standards under which it was certified.

2. The letters are included in the FAA's "MU-2 FOIA [Freedom of Information Act] Reading Library," which can be accessed by conducting an Internet search for "MU-2." The safety evaluation docket can be accessed by conducting a keyword search for "MU-2" on the U.S. Department of Transportation's docket management system site, <dms.doc.gov>.

3. Mitsubishi Heavy Industries (MHI) produced about 13 different models of the MU-2. The prototype, which had the marketing designation MU-2A, first flew in 1963 with Turbomeca Astazou engines but was not produced. Production models have Honeywell — formerly Garrett AiResearch — TPE331 engines. The first production model, the MU-2B, was introduced in 1965. Although "MU-2B" is the generic name for the production airplanes, subsequent models have series identifications as well as marketing designations: for example, the MU-2B-10/MU-2D, which was introduced in 1968 with wet-wing tanks replacing fuel bladders. The first of the "long-body" models, the MU-2B-30/MU-2G — which is slightly more than 6 ft (2 m) longer and has what MHI calls "bulges" to house the main landing gear — was introduced in 1970, joining the "short-body" MU-2B-20/MU-2F. In 1978, the models were renamed the MU-2B-60 "Marquise" and the MU-2B-40 "Solitaire." Production ended in 1986.

Appendix
Mitsubishi MU-2B Fatal Accidents, United States, 2004–2005

Date	Location	Aircraft Model	Aircraft Damage	Fatalities
March 11, 2004	Napa, California	MU-2B-40	destroyed	2
The aircraft crashed during an approach in visual meteorological conditions (VMC) to Napa County Airport at 2030 local time. The preliminary report by the U.S. National Transportation Safety Board (NTSB) said that the wreckage was found in a river 3 mi (5 km) south of the airport seven days after the accident.				
March 25, 2004	Pittsfield, Massachusetts	MU-2B-36	destroyed	1
The aircraft was on a cargo flight in VMC when it descended rapidly from 17,000 ft. Several witnesses said that the aircraft was in a flat spin with the engines operating when it struck terrain at 0533. The pilot had about 6,500 flight hours, including more than 2,000 flight hours in type. NTSB said that the probable cause of the accident was "the pilot's loss of aircraft control for undetermined reasons."				
May 14, 2004	Ferndale, Maryland	MU-2B-60	destroyed	1
The pilot, who had more than 6,800 flight hours, was conducting a nighttime cargo flight to Baltimore–Washington International Airport and was cleared to land on Runway 33R. The report said that the pilot attempted to reverse course after entering a "modified downwind" for Runway 15L. Witnesses saw the aircraft enter a steep left bank at about 700 ft and descend to the ground. NTSB said that the probable cause of the accident was "the pilot's failure to maintain airspeed during a sharp turn, which resulted in an inadvertent stall."				
Dec. 10, 2004	Englewood, Colorado	MU-2B-60	destroyed	2
Soon after departing from Runway 35R at Centennial Airport for a nighttime cargo flight, the pilot told the tower controller that he needed to return to the airport. The aircraft was on downwind for Runway 35R when the pilot reported that he had shut down one engine. The aircraft overshot the turn to final, entered a steep left bank and descended to the ground. NTSB said that the probable cause of the accident was "the pilot's failure to maintain minimum controllable airspeed [V_{MC}]." The pilot had 2,496 flight hours, including 364 flight hours in type. The report said that a pilot-rated passenger was aboard to receive aircraft-familiarization training.				
May 24, 2005	Hillsboro, Oregon	MU-2B-25	destroyed	4
After takeoff, the pilot was conducting a steep climb at an airspeed below V_{MC} when a partial power loss occurred in the left engine. The aircraft rolled into a steep left bank, pitched nose-down and spun to the ground. NTSB said that "the pilot's failure to obtain minimum controllable airspeed" was the probable cause of the accident and that "the pilot's lack of recent experience and recurrent training in type" was a factor.				
Aug. 4, 2005	Parker, Colorado	MU-2B-60	destroyed	1
The preliminary report said that the aircraft struck terrain after descending below the glideslope during an instrument landing system (ILS) approach to Centennial Airport. The accident occurred at 0206 in instrument meteorological conditions. The pilot had more than 4,800 flight hours, including 1,200 flight hours in type.				
Sept. 22, 2005	West Memphis, Arkansas	MU-2B-36	destroyed	1
About 20 minutes after departing from West Memphis for a positioning flight in nighttime VMC, the pilot told air traffic control that he needed to return to the airport "to have something checked out," the preliminary report said. A witness, a professional pilot, saw the aircraft flying "way too low" and "excessively slow" before it struck a large earthmoving vehicle and terrain near the airport. The pilot had 12,600 flight hours, including 1,900 flight hours in type.				

Source: U.S. National Transportation Safety Board