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# National Transportation Safety Board

Washington, D.C. 20594  
Safety Recommendation

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Date: November 10, 1993

In reply refer to: A-93-132

To the National Business Aircraft Association,  
the National Association of Flight Instructors,  
the Experimental Aircraft Association, and the  
Aircraft Owners and Pilots Association

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On September 11, 1992, about 1457 central daylight time, a Mitsubishi MU-2B-60 (MU-2), N74FB, and a Piper PA-32-301 Saratoga (PA-32), N82419, collided at 2,100 feet mean sea level, approximately 2 miles northeast of the Greenwood Municipal Airport, Greenwood, Indiana. The PA-32 was descending from 2,500 feet en route to Greenwood Airport in accordance with visual flight rules (VFR). The MU-2, also operating under visual flight rules, was climbing out of the Greenwood Municipal Airport en route to Columbus, Ohio. The pilots of both airplanes and the four passengers aboard the MU-2 were fatally injured. The two other occupants of the PA-32 were seriously injured. Both airplanes were destroyed. The accident occurred in daylight visual meteorological conditions.<sup>1</sup>

The National Transportation Safety Board has determined that the probable cause of the accident was the inherent limitations of the see-and-avoid concept of separation of aircraft operating under VFR that precluded the pilots of the MU-2 and the PA-32 from recognizing a collision hazard and taking actions to avoid the midair collision. Contributing to the cause of the accident was the failure of the MU-2 pilot to use all of the air traffic control (ATC) services available by not

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<sup>1</sup>For more detailed information, read Aircraft Accident Report--"Midair Collision, Mitsubishi MU-2B-60, N74FB, and Piper PA-32-301, N82419, Greenwood Municipal Airport, Greenwood, Indiana, September 11, 1992" (NTSB/AAR-93/05).

activating his instrument flight rules (IFR) flight plan before takeoff. Also contributing to the cause of the accident was the failure of both pilots to follow recommended traffic pattern procedures, as recommended in the Airman's Information Manual (AIM), for airport arrivals and departures.

There is little regulation or guidance relating to arrival and departure procedures at uncontrolled airports. Moreover, like most uncontrolled airports, there are no specified VFR arrival or departure procedures for the Greenwood Municipal Airport. The AIM recommends arrival and departure procedures under a section entitled "Airport Operations." However, to access the AIM guidelines concerning traffic pattern entries, the pilot must reference another section entitled "ATC Clearances/Separations." To access the AIM-recommended traffic advisory practices, the pilot must reference yet another AIM section entitled "Services Available to Pilots." Four local pilots, including the MU-2 backup pilot, were interviewed concerning the arrival and departure procedures for the airport. These pilots produced four procedures, none of which resembled the procedures outlined in the AIM.

It should be noted that there is no requirement for pilots to follow these recommended procedures. According to his backup pilot, the MU-2 pilot involved in the accident had developed his own arrival and departure procedures at the airport: Departing on runway 36, he would climb straight out 500 feet to 700 feet and then initiate a right turn, preventing inadvertent penetration into the Indianapolis airport radar service area (ARSA), allowing for passenger comfort, and, for the accident flight, placing the airplane on a heading toward its destination of Columbus, Ohio.

Because the limited amount of guidance on arrivals and procedures is difficult to access and because pilots do not always adhere to this guidance, the Safety Board believes that the Federal Aviation Administration (FAA) should develop, publish, and disseminate VFR departure and arrival procedures for uncontrolled airports near controlled air space, irrespective of the provisions contained in Part 91 of the Federal Aviation Regulations (FARs).

The airport is 2 miles from the southeast boundary of the Indianapolis ARSA, and the traffic pattern at the airport may not take into consideration the flight characteristics of high-performance turbopropeller aircraft that use the airport. Therefore, the Safety Board believes that the FAA should also review entry and

departure procedures at uncontrolled airports for high-performance airplanes that are separate from low-performance airplanes.

The MU-2 pilot filed his IFR flight plan for departure at 1400 and called for his clearance at 1456:47, after he was airborne. It is possible that he expedited his departure to obtain his clearance while he was airborne before he had to file his flight plan again. Nonetheless, airborne receipt of the IFR clearance increased his workload and could have distracted him from looking for traffic. It also delayed the controller's ability to identify the airplane by radar before the collision. The Safety Board believes that it would have been prudent for the pilot to have activated the IFR flight plan before takeoff so that controllers could have provided traffic advisories. The Safety Board believes that the pilot failed to take full advantage of the ATC services available and that this failure contributed to the cause of the accident.

The responsibility to "see and avoid" other aircraft is assigned to the pilot under 14 Code of Federal Regulations, Part 91. To interpret and facilitate the see-and-avoid concept, the FAA published Advisory Circular (AC) 90-48C, "Pilot's Role in Collision Avoidance." This AC reinforces the concept of pilot responsibility and instructs the pilot on how to scan for traffic. Unfortunately, the title of the AC does not adequately indicate the information contained in it. It can be found in the AIM but in a section not normally associated with traffic avoidance, under Chapter 8, "Medical Facts for Pilots." The probability is high that the information would be more readily utilized if it was moved to a section that pilots refer to for collision avoidance.

The Safety Board is aware that the FAA has emphasized improving pilot education about air space and that it has taken action against pilots who violate air space. However, the Safety Board also believes that there is a lack of emphasis on proper scanning techniques. Therefore, the Safety Board believes that the FAA should assume a more active role in ensuring that flight instructors are informed, during training and biennial flight reviews, about the necessity for emphasizing scanning techniques.

On the responsibility for the separation of aircraft, the AIM states, in part:

#### 4-81. CLEARANCE

a. ....An ATC clearance means an authorization by ATC, for the purpose of preventing collision between known aircraft, for an aircraft to proceed under specified conditions within controlled airspace....

#### Pilot/Controller Glossary

AIR TRAFFIC CLEARANCE-An authorization by air traffic control, for the purpose of preventing collision between known aircraft,..

#### PILOT/CONTROLLER ROLES AND RESPONSIBILITIES

#### 5-71. GENERAL

c. The air traffic controller is responsible to give first priority to the separation of aircraft....

e. The responsibilities of the pilot and the controller intentionally overlap in many areas, providing a degree of redundancy. Should one or the other fail in any manner, this overlapping responsibility is expected to compensate, in many cases, for failures that may affect safety.

None of these excerpts specify whether the aircraft are being operated under VFR or IFR. The AIM and Air Traffic Control Handbook 7110.65G do prioritize controllers' separation responsibilities--primary separation responsibility is IFR aircraft from IFR, secondary is IFR from VFR, and, on a time available basis, VFR from VFR. However, the Safety Board believes that from the excerpts given above, it would be difficult for a pilot to discern that separation of VFR airplanes from IFR airplanes is given lower priority.

The Safety Board believes that the circumstances of this accident emphasize the inherent limitations of the see-and-avoid concept of separation of aircraft operating under VFR, especially in congested areas near airports. In this

case, the pilots had extremely limited time to detect a threat and to take evasive action. The existing regulations permit such operations, which have a small margin of safety for avoiding midair collisions; however, there are many recommended practices that would have provided a greater margin of safety. Therefore, the Safety Board concludes that the inherent limitations of the see-and-avoid concept are directly causal to this accident.

As a result of its investigation of this accident, the National Transportation Safety Board recommends that the National Business Aircraft Association, the National Association of Flight Instructors, the Experimental Aircraft Association, and the Aircraft Owners and Pilots Association:

Inform your members of the circumstances of this accident, and encourage them to institute the recommended practices discussed in the accident report, especially the need for flight instructors to emphasize scanning techniques during training and biennial flight reviews, and the need for pilots to clearly understand their responsibilities in view of the limits of controller responsibility for separating IFR from VFR aircraft. (Class II, Priority Action) (A-93-132)

Also, as a result of the investigation of this accident, the Safety Board issued Safety Recommendations A-93-127 through A-93-131 concerning these issues to the Federal Aviation Administration.

In addition, the National Transportation Safety Board reiterated the following safety recommendation to the Federal Aviation Administration:

A-88-27

Expedite the development, certification, and production of various low-cost proximity warning and conflict detection systems for use aboard general aviation aircraft.

The National Transportation Safety Board is an independent federal agency with the statutory responsibility "...to promote transportation safety by conducting independent accident investigations and by formulating safety improvement recommendations" (Public Law 93-633). The Safety Board is vitally interested in any actions taken as a result of its safety recommendations and would appreciate a response from you regarding action taken or contemplated with respect

to the recommendation in this letter. Please refer to Safety Recommendation A-93-132 in your reply.

Chairman VOGT, Vice Chairman COUGHLIN, and Members LAUBER, HAMMERSCHMIDT and HART concurred in this recommendation.



By: Carl W. Vogt  
Chairman

Mr. John W. Olcott, President  
National Business Aircraft Association  
1200 - 18th Street, N.W., Suite 200  
Washington, D.C. 20036

Mr. Bernard A. Geier, Executive Director  
National Association of Flight Instructors  
5021 Powell Road  
Fairfax, Virginia 22032

Mr. Thomas P. Poberezny, President  
Experimental Aircraft Association  
P. O. Box 3086  
Oshkosh, Wisconsin 54903

Mr. Phil B. Boyer, President  
Aircraft Owners and Pilots Association  
421 Aviation Way  
Frederick, Maryland 21701