

NATIONAL TRANSPORTATION SAFETY BOARD
WASHINGTON, D.C.

Log 966

ISSUED: October 26, 1978

Forwarded to:

Honorable Langhorne M. Bond
Administrator
Federal Aviation Administration
Washington, D.C. 20590

SAFETY RECOMMENDATION(S)

~~A-78-79~~

~~A-78~~ through -81

At 1210 on May 18, 1978, N6423K, a Cessna 150, and N121GW, a Falcon Fan Jet, collided in midair about 3 1/2 miles west of Memphis International Airport, Memphis, Tennessee. At the time of the collision both aircraft were operating under the control jurisdiction of Memphis Tower at an assigned altitude of 2,000 feet m.s.l. and were in radio/radar contact with different facility controllers on separate radio frequencies. Visual meteorological conditions prevailed at the time.

Investigation disclosed that N6423K was a VFR arrival from the west and was receiving stage III radar service; N121GW was operating in a closed traffic pattern on an IFR flight plan and was conducting multiple ILS approaches to runway 17R. Further, investigation revealed that ATC failed to effect the required separation minima applicable to known VFR and IFR traffic operating within the designated terminal radar service area (TRSA), because controller personnel responsible for the control of the two aircraft did not coordinate the particular operation being conducted with each other. As a result of this lack of coordination, neither of the two controllers controlling N121GW had any knowledge that N6423K was inbound traffic, and the third controller, who was providing control service to N6423K, had no knowledge of N121GW's traffic pattern operation within his airspace at 2,000 feet. Therefore, no one recognized that a conflict existed until the two aircraft were seen on radar about 1 mile apart. At that point, insufficient time was available for corrective action.

The Safety Board is concerned that a single coordination procedural error effectively negated the control capability of an ATC system which utilizes modern automated radar equipment and procedural concepts. Therefore, we have examined facility procedures, automated equipment,

and TRSA requirements carefully to determine (1) if additional safeguards are feasible and (2) how such measures would have prevented this accident. Based on our analysis of ATC operations, we conclude that there are two problem areas worthy of corrective action. The first area involves the local operating procedures used at Memphis for closed traffic pattern IFR operations, and the second involves the current rules for aircraft operations in a TRSA and related transponder requirements.

Both aircraft were being controlled in accordance with prescribed procedures and standard practices at an assigned altitude of 2,000 feet. The airspace within a 5-mile radius of the airport, from the surface to 2,000 feet, is designated for and utilized by the facility for local control operations. Thus, responsibility for the control of air traffic within that airspace is the responsibility of the local controllers (LC 1 and 2). To effect procedural control, the LC-1 controller is responsible for traffic operating in the east and west quadrants of a 5-mile circle around the airport which are formed by bisecting lines NW/SE and NE/SW that pass through the center of the airport. The LC-2 controller is responsible for traffic operating in the north and south quadrants. Any traffic operating in a closed traffic pattern at 2,000 feet or below will traverse the airspace of both the LC-1 and LC-2 controllers. Every circuit of the closed traffic pattern for runway 17R at Memphis requires coordination between the LC-2 and LC-1 controllers to acquire knowledge of mutual traffic and potential conflicts. Also, these controllers are obligated to separate traffic in accordance with applicable criteria for TRSA traffic.

The Safety Board believes that closed traffic pattern operations at Memphis International Airport should be discontinued within the designated airspace for local control operations. The additional workload imposed on local controllers by the requirement to coordinate and effect stage III/ IFR separation minima between these aircraft compromises their ability to perform their primary duties. Since the physical layout of the Memphis Airport and control procedures utilized by the facility are somewhat unique, the Safety Board believes that ideally any closed traffic pattern operation wherein the aircraft will be executing multiple ILS approaches should be conducted at an assigned altitude of 2,500 feet or above. Appropriate radar control personnel in the TRACON are better suited to provide radar separation service than the local controller. Accordingly, control responsibility should be transferred to Memphis TRACON.

The Safety Board is extremely concerned by existing requirements for an aircraft transponder for flight operations in certain designated controlled airspace. We understand that a transponder with altitude encoder is required for flight operations conducted above 12,500 feet m.s.l. and within designated group I TCA's. Group II-type TCA's require a transponder without altitude encoder. Such equipment is not required for flight within a designated TRSA, nor is there any requirement that a pilot establish radio contact with ATC when traversing a TRSA.

Based on its investigation of this accident, the Safety Board concludes that the transponder requirements for flight operations within a TRSA and TCA II should be revised. In view of the ever increasing availability of ATC automated equipment and the future development of Beacon Collision Avoidance System, Discreet Address Beacon System, and Automated Traffic Advisory and Resolution Service (ATARS), we believe that failure to reevaluate the operational benefits and safety enhancement the altitude encoder Mode "C" transponder could provide in TRSA and TCA II operations would be untenable.

It is evident to the Board that if an operating transponder had been installed aboard Cessna 6423K identification of that aircraft with altitude data would most likely have been detected by controller personnel and the accident would not have occurred. At locations where the conflict alert system is operational, a Mode "C" transponder would provide another safeguard which could serve to prevent the type of accident that occurred at Memphis.

With respect to those civil airports that have a designated TRSA with stage III service provided, the Safety Board recognizes that traffic operations differ greatly between such airports as Phoenix, Arizona, and Roanoke, Virginia. Because some of the larger airports, such as Phoenix, now generate high volume traffic which closely approximates the criterion used for the establishment of a TCA II, we believe that TRSA locations should be classified into two groups based upon traffic count and carrier operations. Like the TCA's they could be classified as TRSA I & TRSA II locations. We believe that TRSA I locations with the higher volume traffic and ATC automation should require (1) a Mode "C" transponder to conduct flight operations within the TRSA and (2) VFR aircraft operating en route through the TRSA to establish radio communication with ATC before entering the TRSA. Because of the large number of transponder equipped aircraft that operate from the airports affected by the change in existing transponder requirements recommended, we believe such action feasible, timely, and justified in the interest of safer flight operations.

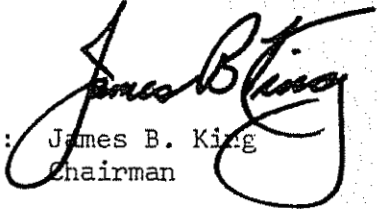
Accordingly, the National Transportation Safety Board recommends that the Federal Aviation Administration:

Evaluate the closed traffic pattern operations conducted at Memphis International Airport and consider establishment of a procedure whereby high performance or turbine jet aircraft conducting multiple approaches for training purposes be assigned an altitude of 2,500 feet or above, which would place responsibility for control of the aircraft with TRACON personnel. (Class II, Priority Action)(A-78-79.)

Evaluate operational data for each TRSA location and establish two categories of TRSA's. Those locations handling the largest volume of traffic with automated ATC equipment available should be designated TRSA I locations. The remaining areas would be designated TRSA II locations (Class II, Priority Action)(A-78-80.)

Require Mode "C" transponder equipment for operations within a TRSA I and Group II TCA and require that a pilot of a VFR flight traversing a TRSA I establish radio contact with the appropriate ATC facility before entering the designated airspace. (Class II, Priority Action)(A-78-81.)

KING, Chairman, DRIVER, Vice Chairman, McADAMS and HOGUE, Members, concurred in the above recommendations.

By:  James B. King
Chairman