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National Transportation Safety Board
Washington, D.C. 20594

Safety Recommendation

Date: December 18, 1998

In reply refer to: A-98-127 through -128

Honorable Jane F. Garvey
Administrator
Federal Aviation Administration
Washington, D.C. 20591

On April 18, 1997, at 1824 Pacific daylight time, America West flight 66 (AWE66), a Boeing 737, and Ameriflight 1898 (AMF1898), a Beech 99, were involved in a near-midair collision approximately 25 miles south of McCarran International Airport, Las Vegas, Nevada. A flight attendant in the cabin fell and was seriously injured as AWE66 maneuvered to avoid the Ameriflight aircraft. Both flights were operating in visual meteorological conditions at the time of the accident.[1]

AMF1898 had departed Las Vegas, en route to Burbank, California, as a nonscheduled, domestic cargo flight under 14 Code of Federal Regulations (CFR) Part 135. AWE66 had departed from John Wayne - Orange County Airport as a scheduled passenger flight operating under 14 CFR Part 121. The pilot of AMF1898 had elected to depart Las Vegas on a visual flight rules (VFR) flight plan and to fly at 10,500 feet. A review of the recorded voice communications between the radar controller at the Las Vegas terminal radar approach control (TRACON) and the crews of each airplane indicated that the controller terminated radar services with AMF1898 at the lateral limit of the Las Vegas class B[2] airspace. AWE66 contacted the Las Vegas radar controller about 40 seconds later, about 45 miles southwest of Boulder City at 12,000 feet. The flight was directed to descend to an altitude of 10,000 feet on heading 020. One minute later, the controller issued traffic to the crew of AWE66, "twelve o'clock three miles

[1] In accordance with 49 CFR Part 830.2, the Safety Board classified this event as an aircraft accident because of the serious injury to the flight attendant.

[2] Class B airspace is generally defined as that airspace from the surface to 10,000 feet mean sea level surrounding the nation's busiest airports in terms of airport operations or passenger enplanements. The configuration of each Class B airspace area is individually tailored and consists of a surface area and two or more layers (some Class B airspace areas resemble upside down wedding cakes). An air traffic control (ATC) clearance is required for all aircraft to operate in class B airspace, and all aircraft that are so cleared receive separation services within the airspace.

opposite direction, altitude indicates nine thousand three hundred," and then instructed the crew to "climb as you wish." Twenty seconds later, the controller advised AWE66 that the traffic was no longer a factor. The pilot replied, "That was close."

On initial contact with Las Vegas TRACON, the controller issued AWE66 a descent clearance and vector that placed it in direct conflict with AMF1898. The controller then issued a traffic advisory to AWE66 and authorized a climb, if necessary, to comply with an anticipated traffic alert and collision avoidance system (TCAS) resolution advisory (RA),[3] recognizing that at least one of the two aircraft would need to maneuver to avoid the other. AMF1898 had been receiving radar advisories from the Las Vegas TRACON until less than 2 minutes before the accident. ATC services were terminated at the class B airspace boundary despite an earlier pilot request to continue VFR radar traffic advisory services for the duration of the flight.

After a departing VFR aircraft leaves charted class B airspace, controllers are no longer required to provide radar advisory service. Although fully within the scope of her authority under current rules, the controller's decision to terminate service to AMF1898 immediately after the aircraft exited class B airspace eliminated the possibility of providing either a traffic advisory to the pilot or a suggestion that AMF1898 remain at or below 9,500 feet until passing AWE66. Instead, AWE66 received a late advisory, AMF1898 received no ATC assistance at all, and an accident occurred.

This accident points out an anomaly in the level of service provided to VFR aircraft operating in terminal areas. Air traffic controllers are required to provide advisories to aircraft departing airports located within class B airspace areas only until the aircraft exits class B airspace, which could in some cases result in termination of radar service as soon as 5 to 7 miles after departure. The same aircraft departing an airport located in class C[4] airspace, normally of lower traffic density and complexity than class B, would be entitled to radar advisory service until at least 20 miles after departure because controllers are prohibited from terminating radar service within the class C outer area without pilot request. It seems reasonable that aircraft operating near class B airspace, by definition the most complex terminal airspace in the United States, should receive at least the same level of service as aircraft operating near less complex class C airports. Extending the availability of mandatory advisory services to cover the most likely areas for encounters between VFR aircraft and those operating under IFR would improve

[3] RAs are visual and aural warnings from TCAS that alert pilots to a nearby aircraft presenting a collision threat. RAs direct pilots to pitch the airplane nose-up or nose-down, as required, to resolve the collision threat.

[4] Class C airspace is generally defined as that airspace from the surface to 4,000 feet above the airport elevation surrounding those airports that have an operational control tower, are serviced by a radar approach control, and have a certain number of instrument flight rules (IFR) operations or passenger enplanements. Although the configuration of each class C area is individually tailored, the airspace usually consists of a charted area of 5 nautical mile radius extending from the surface to 4,000 feet above airport elevation, a charted outer circle from 5 to 10 nautical miles radius extending from 1,200 feet to 4,000 feet above airport elevation, and an uncharted outer area generally including the remainder of the airport approach control's airspace to a minimum radius of 20 miles from the airport. Each person must establish and maintain two-way radio communications with the ATC facility providing air traffic services prior to entering the charted class C airspace. Class C services include separation of VFR aircraft from IFR aircraft.

safety by reducing the chance of conflicts, such as the one that precipitated this accident. The Safety Board believes that the Federal Aviation Administration (FAA) should revise Handbook 7110.65, "Air Traffic Control," to require that controllers provide pilots of aircraft departing class B terminal areas under VFR the option of continuing to receive radar advisory services until leaving airspace delegated to the applicable terminal radar approach control facility.

The design of the CRESO 3 standard terminal arrival[5] (STAR) into Las Vegas appears to have contributed to this near-midair collision. Because of the surrounding high terrain, southbound VFR flights departing Las Vegas are concentrated in the location of this accident. The CRESO 3 STAR routing directs air carrier traffic into the same area, descending in a direction opposite to the departing VFR flights. Arrival procedures, such as the CRESO 3, are developed in accordance with FAA Order 7100.9B, "Standard Terminal Arrival (STAR)." This order does not address known concentrations of VFR traffic as a consideration in the selection of STAR routes, except possibly through the interpretation of a general direction that STARs be "compatible with local traffic flow management requirements." However, in light of the known limitations of visual traffic separation, the placement of VFR and IFR traffic flows in close proximity should be minimized in high density areas where conflicts are likely.

As the result of an inquiry from the Safety Board regarding this accident, on October 15, 1997, the manager of the Las Vegas TRACON stated:

> In response to the request for information regarding planned airspace changes that would alleviate the possibility of another incident involving a VFR aircraft climbing in the path of an IFR aircraft on the CRESO arrival, such as the aircraft accident involving AWE66, the changes involved encompass a long-term project, require much more planning and development, and have yet to be instituted.

As of July 1998, the CRESO arrival remains unchanged. The Safety Board would welcome further information on the FAA's progress on the modification of airspace and procedures in the Las Vegas area. The Safety Board believes that the FAA should revise Order 7100.9, "Standard Terminal Arrival (STAR)," to provide a specific instruction to STAR designers to segregate concentrated IFR traffic from concentrated VFR traffic unless no reasonable alternative is available. Further, existing procedures, including the CRESO 3 STAR, should be reviewed to ensure compliance with this requirement and revised if necessary.

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

> Revise Handbook 7110.65, "Air Traffic Control," to require that controllers provide pilots of aircraft departing class B terminal areas under visual flight rules the option of continuing to receive radar advisory services until leaving airspace delegated to the applicable terminal radar approach control facility. (A-98-127)

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[5] A planned air traffic control IFR arrival procedure published for pilot use in graphic and/or textual form. STARs provide transition from the en route structure to an outer fix or an instrument approach fix/arrival waypoint in the terminal area.

Revise Order 7100.9, "Standard Terminal Arrival (STAR)," to provide a specific instruction to STAR designers to segregate concentrated instrument flight rules traffic from concentrated visual flight rules traffic unless no reasonable alternative is available. Further, existing procedures should be reviewed to ensure compliance with this requirement and revised if necessary. (A-98-128)

Chairman HALL, Vice Chairman FRANCIS, and Members HAMMERSCHMIDT, GOGLIA, and BLACK concurred in these recommendations.

By: Jim Hall
Chairman