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National Transportation Safety Board

Washington, D.C. 20594

Safety Recommendation

DCA-90 M-A011

Date: September 26, 1990

In reply refer to: A-90-133 and -134

Honorable James B. Busey
Administrator
Federal Aviation Administration
Washington, D.C. 20591

On December 26, 1989, United Express flight 2415, (airborne call sign Sundance 415), a British Aerospace BA-31, Jetstream, crashed about 2230 local time while executing an Instrument Landing System (ILS) approach to runway 21R at the Tri-Cities Airport, Pasco, Washington. The flight was operating under an instrument flight rules (IFR) flight plan and in accordance with air traffic control (ATC) clearances issued by a radar controller at the Seattle Air Route Traffic Control Center (Seattle Center). The airplane crashed about 200 feet short of the runway, and was destroyed by ground impact and the ensuing fire. All six occupants received fatal injuries.

On April 7, 1990, N3674B, a Beech BE-36, crashed about 1135 local time near Kneeland, California. The accident occurred during an ILS approach to the Arcata, California, airport under instrument meteorological conditions. The airplane was operating on an IFR flight plan and in accordance with ATC clearances issued by a radar controller at the Seattle Center. The airplane was destroyed by impact forces and postcrash fire. The pilot and two of the three passengers received fatal injuries. The third passenger received serious injuries.

Following the accident at Pasco, Washington, the Safety Board analyzed ATC recorded radar data from the Seattle Center to reconstruct the track of Sundance 415. These data, from the National Track Analysis Program (NTAP), showed that the flight did not intercept the final approach course until it was about 1 mile inside the outer marker (DUNEZ) and at an altitude above the glide slope. As a result of this information, Safety Board investigators interviewed controllers from the Pasco ATC tower and from the Seattle Center and determined that the Seattle Center controller, who was providing radar vectors to the flightcrew of Sundance 415 to intercept the final approach course for runway 21R, was working three sectors combined. The controller stated that it was necessary to operate the radar at an expanded range of 150 miles to provide radar coverage for this area of responsibility. He also advised Safety Board investigators that, according to his radar scope, he believed that Sundance 415 had intercepted the localizer and was established on the final approach course outside the outer marker. Another controller, who was at the position monitoring the operation in preparation to relieve the working controller, also believed that the flight had intercepted the localizer before reaching the outer marker.

During the investigation at the Seattle Center, Safety Board investigators observed a radar display that was set to an expanded range of 150 miles. Investigators noted that the video map, in use at the time of the accident, did not depict the approach gate, which normally is used as a reference point for the controller to determine the distance from the final approach fix at which an inbound flight should intercept the final approach course. It was also noted that when using the expanded range and its associated video map, the distance from the airport to the final approach fix (DUNEZ 5.9 miles) is reduced to about 3/8 inches; and the distance from the airport to the 14-mile fix (RYENS intersection) is reduced to about 7/8 inches. Safety Board investigators also learned that when using the expanded range of 150 miles, the secondary (beacon) target is approximately 3/16 inches (2 miles) wide.

Also, while at the Seattle Center, Safety Board investigators were briefed on the circumstances of the airplane accident at Arcata, California. It was learned that the controller who provided radar services to the pilot of N3674B was also using a radar display that was set to an expanded radar range of 150 miles in order to work three sectors simultaneously. Investigators were told that the controller at the Oakland Center had terminated radar service on the airplane and had instructed the pilot to contact the Seattle Center radar controller. After establishing radio communications, the flight was identified on radar, and the pilot advised the controller that he was on a heading of 300 degrees. The Seattle Center controller then cleared the pilot of N3674B for the ILS approach to runway 32 at Arcata and to cross the YAGER intersection at or above 8,000 feet. Radar data indicate that, when the approach clearance was issued, the airplane was descending through 9,700 feet and that it continued its descent through 8,000 feet. When the airplane was about 2 miles southeast of YAGER at an altitude of 7,500 feet, the minimum safe altitude alert warning (MSAW) activated. This alarm continued for about 28 seconds until it was suppressed by the controller while the flight was descending through about 7,300 feet.

During an interview with Safety Board investigators, the controller stated that he suppressed the MSAW alarm because he believed that the airplane was over the YAGER intersection and was descending to an altitude of 5,200 while on the localizer in accordance with the instrument approach procedure. He also stated that it was not unusual to receive MSAW alarms on aircraft in this area.

When interviewing the Assistant Air Traffic Manager of the Seattle Center, Safety Board investigators asked if any corrective actions had been initiated by the facility since the time of the accident involving Sundance 415 at Pasco, Washington. He replied that he had appointed personnel to examine possible solutions to correct the problems associated with using a radar display set to an expanded range while providing vectors to the final approach course. Safety Board investigators were also advised that, following the accident, the radar controller who provided the radar vectors to the flightcrew of Sundance 415 was decertified and reassigned for remedial training. Following this training, which lasted for 3 to 4 weeks, the controller was recertified and returned to normal control duties. The Air Traffic Manager said that this action was taken as a result of the accident.

As a matter of standard procedure, staff from the FAA's Office of Accident Investigation accompanied Safety Board investigators during the investigation of the accident involving Sundance 415. Subsequently, that office developed recommendations for corrective action and forwarded them to the FAA's Associate Administrator for Air Traffic on April 25, 1990. The recommendations included a requirement that a standard be established for radar range settings to be used when providing vectors to the final approach course. The objective of this recommendation was to provide the controller with a display size that would allow accurate evaluation of vectors provided to aircraft operating in the terminal environment. It also suggested that in lieu of establishing this standard, an alternative method, such as using an adjacent radar scope set to a lesser range, be considered. In addition, recommendations were made to request that controllers be briefed on the potential for complacency resulting from "nuisance" [false] MSAW alerts.

The FAA's Acting Director for Air Traffic Rules and Procedures Service responded to these recommendations on May 10, 1990, citing in part FAA Handbook 7220.2A, which specifies that, "radar range parameters are to be set to conform to the responsibilities of the sector/position," and also specifies "to make changes to accommodate operational requirements when operating the radar position." He added, "We believe this is sufficient to assist controllers in determining the proper configuration of their radar display." He also stated that future editions of the Air Traffic Service Bulletin would contain articles regarding en route MSAW "nuisance" alerts and the importance of selecting the proper radar range setting when operating a control position.

The Safety Board is encouraged with the FAA's efforts to increase controller awareness of MSAW alerts, and notes that, because the MSAW alert functioned as designed during the accident at Arcata, California, no corrective action is warranted. However, the Safety Board does believe that the controller's perception of receiving a "nuisance" alert would not have occurred had the controller been able to precisely determine the position of the airplane. In this regard, the Safety Board is disappointed with the FAA's position relating to the radar display range setting. Although these two accidents remain under investigation, the Safety Board believes that in light of the facts and circumstances, the practice of using a radar display set to an expanded range while providing vectors to a final approach course is detrimental to air safety. The Safety Board believes that the track plot data that depicted the flight paths and altitudes of Sundance 415 and N3674B are evidence that target resolution is not adequate when viewed on a radar display set to an expanded range. The Safety Board is concerned that the recorded radar data do not corroborate the statements of the controllers, who maintain that the airplanes were established on the course(s) and at the altitude(s) required by the approach procedure(s).

The Safety Board notes that controllers who provide approach control services in the terminal environment normally use a radar range of 55 miles or less when providing ATC services, including radar vectors to the final approach course. The Safety Board believes that controllers at air traffic control facilities that provide en route service are placed in an untenable situation when confronted with having to decide the range that will

"accommodate operational requirements" when they are responsible for three sectors, as well as for providing approach control service to users of the National Airspace System (NAS).

Because of the disparity between controller observations and track plot data, the Safety Board believes that, at ATC facilities that provide en route service, the practice of providing vectors to a final approach course, based on the viewing of targets on a radar display set to an expanded range, should be terminated immediately. In addition, the Safety Board believes that the depiction of the approach gate is an essential aid to controllers to determine whether vectors that are issued to aircraft will allow a final approach course intercept at a distance that permits a stabilized approach. Therefore, the Safety Board believes that the video map in use should have this graphic item of information depicted.

Also, the Safety Board is concerned that these practices may be common at other ATC facilities that provide en route service to users of the NAS. If such practices are indeed taking place routinely, the Safety Board believes that the FAA should take immediate action to terminate them.

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

Immediately terminate the practice, at the Seattle Air Route Traffic Control Center, of providing radar vectors to the final approach course when using a radar display set to an expanded range and when using a video map on which the approach gate is not depicted. (Class II, Priority Action)(A-90-133)

At air route traffic control centers that provide en route service, immediately terminate the practice of providing radar vectors to the final approach course when using a radar display set to an expanded range and when using a video map on which the approach gate is not depicted. (Class II, Priority Action)(A-90-134)

KOLSTAD, Chairman, COUGHLIN, Vice Chairman, and LAUBER, BURNETT, and HART, Members, concurred in these recommendations.



James L. Kolstad
Chairman