National Transportation Safety Board

Washington, DC 20594

Safety Recommendation

Date: May 4, 2015

In reply refer to: A-15-9 and -10

The Honorable Michael P. Huerta
Administrator
Federal Aviation Administration
Washington, DC 20590

The National Transportation Safety Board (NTSB) urges the Federal Aviation Administration (FAA) to take action on the safety recommendations issued in this letter. These recommendations address the issuance of landing clearances with multiple airports in the vicinity and minimum safe altitude warning (MSAW) software limitations. The recommendations are derived from our investigations of wrong airport landing events. As a result of these investigations, we have issued two safety recommendations, both of which are addressed to the FAA. Information supporting these recommendations is discussed below.

Wrong Airport Landing Events

Branson, Missouri

On January 12, 2014, about 1810 central standard time,[1] Southwest Airlines flight 4013, a Boeing 737-7H4, N272WN, mistakenly landed at M. Graham Clark Downtown Airport (PLK), Branson, Missouri, which was 6 miles (mi) north of the intended destination of Branson Airport (BBG), Branson, Missouri. The flight had been cleared to land on runway 14 at BBG, which was 7,140 ft long. Instead, the flight landed on runway 12 at PLK, which was 3,738 ft long. There were no injuries to the 124 passengers and 7 crewmembers, and the airplane was not damaged. The airplane was being operated under the provisions of 14 *Code of Federal Regulations* (CFR) Part 121 as a regularly scheduled passenger flight from Chicago Midway International Airport (MDW), Chicago, Illinois. Night visual meteorological conditions (VMC) prevailed at the time.[2]

Southwest Airlines flight 4013 departed MDW for a regularly scheduled flight to BBG about 1654. The flight crew contacted the terminal radar approach control facility at Springfield-Branson National Airport (SGF), Springfield, Missouri, about 1752 when the airplane was about 60 nautical mi northeast of BBG and descending from 18,000 ft to 16,000 ft. At 1802:50, the SGF approach controller advised the pilot that "the airport" was at his 11 o'clock position and 15 mi. Radar data indicated that the airport at the airplane's 11 o'clock at 15 mi was

[1] All times in this letter are central standard time, based on a 24-hour clock.

[2] Information about this event, NTSB case number DCA14IA037, can be found in the Aviation Accident Database at www.ntsb.gov.

actually PLK, not the destination airport of BBG. (BBG was at the airplane's 10 o'clock and was about 20 mi from the airplane.)

At 1802:58, the pilot reported "field in sight." The SGF approach controller cleared the pilot for the visual approach to runway 14 at BBG, advised that radar services were terminated, and directed the pilot to contact the Branson tower; the pilot acknowledged the instruction. At 1803:15, the pilot checked in with the BBG tower, reporting out of 6,600 ft descending to 3,000 ft and going direct to the final approach fix for the visual approach to runway 14. The BBG controller issued Southwest Airlines flight 4013 a landing clearance for runway 14, which was 7,140 ft long. However, the airplane touched down on runway 12 at PLK, which was only 3,738 ft long. Visible tire marks indicated that the airplane stopped 3,109 ft from the displaced approach threshold.

PLK and BBG were both located below SGF radar coverage. According to SGF controller interviews, radar coverage ceased and radar contact was lost for aircraft arriving at BBG between 2,200 and 2,600 ft. Accordingly, there were no MSAW alerts associated with this event.

Wichita, Kansas

On November 21, 2013, about 2120, Atlas Air flight 4241, a Boeing 747-400LCF (Dreamlifter), N780BA, registered to Boeing Aircraft Holding Company, mistakenly landed at Colonel James Jabara Airport (AAO), Wichita, Kansas, instead of its intended destination of McConnell Air Force Base (IAB), Wichita, Kansas.[3] VMC prevailed, and an instrument flight rules (IFR) flight plan was filed. There were no injuries to the two flight crewmembers, and the airplane was not damaged. The airplane was being operated under the provisions of 14 CFR Part 121 as a domestic cargo flight from John F. Kennedy International Airport, New York, New York, to IAB.[4]

The pilot of Atlas Air flight 4241 contacted approach control at Wichita Mid-Continent Airport (ICT), Wichita, Kansas, at 2110:50, reporting that the airplane was leveling at 10,000 ft. The ICT approach controller responded that the pilot should expect vectors to the tactical air navigation approach for runway 19L at IAB unless the pilot preferred the visual approach. At 2111:10, the pilot replied that he preferred the area navigation (RNAV) approach to runway 19L; the ICT approach controller cleared the pilot for the RNAV approach to runway 19L. At 2114:00, the ICT approach controller transmitted, "…4241 heavy, you're 25 miles from the airport, cross WITBA at 4,000, cleared RNAV/GPS runway 19L approach." At 2118:45, with the airplane at 3,900 ft, 12 mi north of IAB and 4.6 mi north of AAO, the controller instructed the pilot to contact the IAB tower.

At 2118:54, the pilot contacted the IAB tower and stated, "on the vis or uh GPS, RNAV GPS approach at runway 1 9 left." At 2119:05, the IAB tower controller cleared the airplane to land on runway 19L, which was about 12,000 ft long. However, at 2120:38, the airplane touched down on the runway at AAO, which was only about 6,100 ft long. During the 25 minutes after

[3] AAO is located just east of the final approach course for runway 19L, about 8 mi north of IAB.

[4] Information about this event, NTSB case number DCA14IA016, can be found in the Aviation Accident Database at www.ntsb.gov.

landing, several other operations occurred at AAO while the 747 was on the runway, further negatively impacting flight safety.[5]

Other Events

The NTSB is also aware of the following wrong airport landing events involving both civil and military aircraft:

- On July 20, 2012, a US Air Force C-17 Globemaster landed on the 3,580-ft runway at Peter O. Knight Airport, Tampa, Florida, 4 mi northeast of the 11,420-ft runway at the flight's intended destination, MacDill Air Force Base (AFB).
- On August 7, 2012, a Silver Airways Saab 340 operating as a United Express flight landed on the 3,200-ft runway at Fairmont Airport, Fairmont, West Virginia, instead of the 7,000-ft runway 10 mi north at North Central West Virginia Airport, Clarksburg, West Virginia, the flight's intended destination.
- On November 24, 2014, a Beech Bonanza, N8285M, landed at Barksdale AFB, Shreveport, Louisiana, instead of its intended destination, Shreveport Regional Airport, Shreveport, Louisiana. FAA review of the event found that the airplane's premature descent did not result in an MSAW alert because the associated software was configured to effectively treat Shreveport and Barksdale as the same airport for alerting purposes.[6]

Issuance of Landing Clearances with Other Airports in the Vicinity

FAA Order 7110.65, *Air Traffic Control*, addresses controller requirements when clearing aircraft for a visual approach to an airport that is located in close proximity to another airport. Paragraph 7-4-3, "Clearance for Visual Approach," states the following:

> *ARTCCs* [air route traffic control centers] *and approach controls may clear aircraft for visual approaches using the following procedures:*
>
> *3.g. In those instances where airports are located in close proximity, also provide the location of the airport that may cause the confusion.*
>
> *EXAMPLE-*
>
> *Cessna Five Six November, Cleveland Burke Lakefront Airport is at 12 o'clock, 5 miles. Cleveland Hopkins Airport is at 1 o'clock 12 miles. Report Cleveland Hopkins in sight.*

The controller in the Southwest Airlines flight 4013 event did not provide the location of the nearby airport that could have potentially caused confusion. The SGF approach controller provided the pilot with an incorrect location and distance from BBG and did not advise the pilot of the location of an airport in close vicinity (PLK) that may cause confusion during landing. PLK and BBG are located 5.8 mi from each other and have a similar runway configuration. Similarly, in the Atlas Air flight 4241 event, the IAB tower controller issued the landing

[5] A Cessna Conquest operating under visual flight rules and following the incident airplane executed a low approach over the runway, entered the traffic pattern, and landed. A Beech Baron requested and received an IFR clearance to depart from AAO and took off about 2139. About 2150, a Cessna Caravan intending to land at AAO diverted because the incident airplane was occupying the runway.

[6] Information about this event can be found in the docket for NTSB case number DCA14IA016, which can be accessed at www.ntsb.gov/investigations/SitePages/dms.aspx.

clearance before the airplane passed nearby AAO and Beechcraft Airport. After this event, the IAB tower chief prohibited controllers from issuing landing clearances to nonIAB-based aircraft before the aircraft pass the final approach fix, which would mean that the aircraft would already be past AAO and Beechcraft Airport.

While the controllers should have provided the locations of the airports that could potentially cause confusion and the pilots should have more closely monitored their flightpaths relative to the intended destination airports, these events suggest that the issuance of a landing clearance to the pilot far away from the destination airport and with the destination airport in close proximity to other airports exacerbates the potential for human error. Had the BBG controller withheld the landing clearance until Southwest Airlines flight 4013 was past PLK and had the IAB tower controller waited until Atlas Air flight 4241 passed both AAO and Beechcraft Airport before issuing the landing clearance, the wrong airport landings may have been avoided.

The NTSB acknowledges that flight crews need to remain vigilant and ensure that they are landing at the correct airport. In fact, the NTSB issued a safety alert in March 2014 titled, "Landing at the Wrong Airport," which offers advice to flight crews on how to avoid wrong airport landings.[7] However, the NTSB concludes that issuing a landing clearance for an aircraft to land at an airport when it has not yet passed other nearby airports may confuse pilots, particularly when executing a visual approach, and amending air traffic control (ATC) procedures could provide another measure of protection to avoid wrong airport landings. Therefore, the NTSB recommends that the FAA amend ATC procedures so that controllers withhold landing clearance until the aircraft has passed all other airports that may be confused with the destination airport.

Minimum Safe Altitude Warning Software

Regarding the Atlas Air flight 4241 event, the flight crew failed to correctly identify the destination airport and complete the RNAV approach to runway 19L at IAB in compliance with the ATC clearance. Instead, the flight crew effectively executed a visual approach to AAO after misidentifying AAO as their destination of IAB. Review of MSAW software showed that in circumstances such as this, the MSAW software automatically treats aircraft within the MSAW eligibility area for an airport as arrivals to that airport. Consequently, even though Atlas Air flight 4241 was incorrectly descending several miles before its planned destination of IAB, the MSAW software assumed that the airplane was intentionally landing at AAO and did not warn the IAB tower controller of the airplane's premature descent. The MSAW software essentially automatically reclassified the airplane as an AAO arrival instead of an IAB arrival. Because the airplane was well above the glidepath for AAO, no MSAW alert was issued. If the MSAW software had continued to treat the airplane as an IAB arrival, MSAW would have recognized that the airplane was well below the expected glidepath and generated a warning.

The NTSB concludes that the current MSAW software design, allowing an aircraft's flight-planned destination to be automatically changed to a different airport based on an observed trajectory, renders MSAW less effective at providing a warning when an aircraft's altitude falls below its intended flightpath, which is likely to occur when an aircraft executes an approach at the wrong airport. If the MSAW software uses the destination airport in the current flight plan (unless the destination information is amended by ATC), the MSAW software would provide

[7] Safety Alert SA-033 can be found online at www.ntsb.gov/safety/safety-alerts/Pages/default.aspx.

timely alerts to ATC to provide sufficient time for controllers to intervene and help prevent wrong airport landings. The NTSB notes that controllers would have to keep destination information updated (which is currently done in some facilities but not others). Therefore, the NTSB recommends that the FAA modify the MSAW software to apply the MSAW parameters for the flight plan destination airport to touchdown, rather than automatically reassigning the flight to another airport based on an observed (and possibly incorrect) trajectory.

Therefore, the National Transportation Safety Board makes the following recommendations to the Federal Aviation Administration:

> Amend air traffic control procedures so that controllers withhold landing clearance until the aircraft has passed all other airports that may be confused with the destination airport. (A-15-9)
>
> Modify the minimum safe altitude warning (MSAW) software to apply the MSAW parameters for the flight plan destination airport to touchdown, rather than automatically reassigning the flight to another airport based on an observed (and possibly incorrect) trajectory. (A-15-10)

Chairman HART, Vice Chairman DINH-ZARR, and Members SUMWALT and WEENER concurred in these recommendations.

The NTSB is vitally interested in these recommendations because they are designed to prevent accidents and save lives. We would appreciate receiving a response from you within 90 days, as required by 49 *United States Code* section 1135, detailing the actions you have taken or intend to take to implement them. When replying, please refer to the safety recommendations by number and submit your response electronically to correspondence@ntsb.gov.

[Original Signed]

By: Christopher A. Hart,
Chairman