



# National Transportation Safety Board

Washington, D.C. 20594

## Safety Recommendation

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**Date:** March 18, 2010

**In reply refer to:** A-10-42 and -43

The Honorable J. Randolph Babbitt  
Administrator  
Federal Aviation Administration  
Washington, D.C. 20591

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Two recent events—an incident in October 2009 and an accident in March 2009—have raised concerns about air traffic control (ATC) procedures for documenting communications with flight crews. The October incident also raises concerns about ATC procedures for identifying emergency communications.

### **Documentation of Air Traffic Control Communications**

On October 21, 2009, Northwest Airlines flight 188 (NWA188), an Airbus A320, N374NW, did not communicate with ATC for approximately 1 hour 17 minutes. Almost 30 minutes passed between the flight's last radio contact and ATC's realization of the flight's no radio communications (NORDO) status. While the flight was NORDO, it flew past its intended destination but landed without further incident after radio communication was reestablished.<sup>1</sup> There were no injuries to the 2 pilots, 3 flight attendants, and 144 passengers onboard. The flight was a regularly scheduled passenger flight operating under 14 *Code of Federal Regulations* (CFR) Part 121 from San Diego International Airport, San Diego, California, to Minneapolis-St. Paul International/Wold-Chamberlain Airport, Minneapolis, Minnesota.

The NTSB determined that the probable cause of this incident was the flight crew's failure to monitor the airplane's radio and instruments and the progress of the flight after becoming distracted by conversations and activities unrelated to the operation of the flight. The NTSB also found that air traffic controllers did not follow procedures to ensure NWA188 was on the correct frequency, which delayed the identification of NWA188 as NORDO, and that no national standardized procedures exist when automated information transfers are used instead of the paper flight-progress strips to nonverbally document and confirm ATC information among controllers.

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<sup>1</sup> More information about this incident, National Transportation Safety Board case number DCA10IA001, is available online at <<http://www.ntsb.gov/ntsb/query.asp>>.

While NWA188 was in cruise flight at 37,000 feet, ATC directed the flight crew to change radio frequency as the airplane approached one of the sectors in Denver Air Route Traffic Control Center (ARTCC) airspace. The first officer acknowledged the frequency change and read back the correct frequency. However, the flight crew did not contact the next sector on the new frequency. As the airplane entered that sector and the following sector, radio contact was not established. The controllers in each sector's airspace, respectively, were preparing for a shift change as the flight entered the sectors' airspace, and neither sector controller was told during his and her position relief briefings that communication had not been established with the flight.<sup>2</sup> NWA188 continued from Denver ARTCC airspace to Minneapolis ARTCC airspace without radio communication with ATC.

A traditional method to document control information, such as radio communications to and from flight crews, is the use of flight-progress strips. Unless otherwise authorized by a facility directive, controllers use paper flight-progress strips to document control information such as directions to pilots to contact ATC on another frequency. This method allows for subsequent relieving controllers to read the previous controllers' actions and associated pilot actions that are completed or pending. As described in Federal Aviation Administration (FAA) Order 7110.65, "Air Traffic Control," Chapter 2, Section 3, Flight Progress Strips, Paragraph 2-3-1, these strips are used to "post current data on air traffic and clearances required for control and other [ATC] services." However, the Denver and Minneapolis ARTCC involved in this incident, like many ATC facilities nationwide, now use automated systems to track and hand off flights between controllers more efficiently. Facilities that use these systems are not required to use flight-progress strips to record information if the facilities meet specific requirements, including, among others, the audio recording of radio and interphone transmissions.<sup>3</sup> FAA Order 7210.3, which allows this exception, notes, however, that "posting control information onto the flight-progress strip serves as an important nonverbal communications tool between members of the control team." The order also requires the posting of computer-generated flight-progress strips, but it does not require control instructions and coordination to be documented on these strips, or in any other written form.

Rather than paper flight-progress strips, the Denver and Minneapolis ARTCC facilities used a user request evaluation tool (URET). This automated tool provided to each radar associate position flight and radar data to determine present and future trajectories for all active and proposal aircraft<sup>4</sup> and provides enhanced, automated flight data management. In accordance with FAA directives, URET allows air traffic controllers to perform the majority of required tasks without manually documenting control information.

In the case of NWA188, controllers did not document, and under FAA directives were not required to document, control information that the flight crew had been directed to contact subsequent sectors or that the flight crew had not yet made that contact.

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<sup>2</sup> A position relief briefing is conducted each time one controller relieves another using a checklist to cover general issues such as traffic and weather.

<sup>3</sup> See FAA Order 7210.3, Facility Operation and Administration, Chapter 6, Enroute Operations and Service.

<sup>4</sup> Proposal aircraft are aircraft that are expected (have been proposed) to enter an air traffic controller's area of jurisdiction but have not yet done so.

The controllers interviewed after this incident indicated that they often used one of several techniques with the URET to identify that an aircraft was on frequency or directed to contact another controller. These techniques included electronically highlighting the associated radar data block,<sup>5</sup> relocating the associated radar data block on the radar presentation to a cardinal compass point, or relocating the associated radar data block closer to or farther away from the radar target. Some, including the Denver controllers involved in this incident, did not use any of the above techniques.

Modifying the radar data block in these ways provides a visual indication to the controller of some aspect of the flight. For example, a controller may highlight a radar data block to indicate the aircraft associated with that radar data block has established communications with ATC. To another controller, such highlighting might indicate something different. The meanings of such data block modifications are established informally by individual controllers for their own benefit and vary from controller to controller. The NTSB found no standard method at the Denver or Minneapolis ARTCC facility and no FAA instruction to document control information when using an automated system, such as a URET. As stated previously, the NTSB has concluded that no national standardized procedures exist when automated information transfers are used instead of the paper flight-progress strips to nonverbally document and confirm among controllers that communication with an airplane has been directed and accomplished. This lack of standardization allowed NWA188 to pass through two Denver ATC sectors without controllers being aware that it was NORDO. If a procedure had been in place to document that the pilot had been requested to make radio contact with ATC and had not done so, the relieving controller likely could have reiterated the instruction and would have quickly realized that NWA188 was NORDO.

While NWA188 was NORDO, ATC controllers would not have been able to quickly communicate with the flight crew in the event of a conflict with another aircraft or the occurrence of some other emergency. Thus, the NTSB is concerned that the lack of national standard procedures for documenting and sharing information about radio contact with flights may result in flights that are out of contact being out of contact for longer periods (because their NORDO status is not detected), thereby, degrading safety of flight.

Another recent event shows evidence of a related deficiency in ATC communication documentation procedures. On March 22, 2009, about 1430 mountain daylight time, a Pilatus PC-12/45, N128CM, owned and operated by Eagle Cap Leasing of Enterprise, Oregon, crashed near the approach end of runway 33 at Bert Mooney Airport (BTM), Butte, Montana. All 14 persons onboard the airplane were killed, and the airplane was destroyed. The flight was being operated as a personal flight under the provisions of 14 CFR Part 91. The flight departed Oroville Municipal Airport, Oroville, California, about 1210 Pacific daylight time on an instrument flight rules flight plan and was destined for Gallatin Field Airport (BZN), Bozeman, Montana. The airplane was diverting to BTM for unknown reasons at the time of the accident. Visual meteorological conditions prevailed at both BZN and BTM.<sup>6</sup>

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<sup>5</sup> A radar data block contains flight data that are displayed on air traffic controllers' monitors.

<sup>6</sup> Preliminary information about this accident, NTSB case number WPR09MA159, is available online at <<http://www.nts.gov/ntsb/query.asp>>.

The accident pilot contacted the Salt Lake City ARTCC and requested to change the airplane's destination from BZN to BTM; the air traffic controller approved the request. The controller directed the pilot to report receipt of the BTM weather and notices to airmen (NOTAMs). The pilot responded, "wilco"<sup>7</sup> but did not report that he had obtained the BTM weather and NOTAM information. The Salt Lake City ARTCC, like the Denver and Minneapolis ARTCCs, was using a URET and, thus, was not required to document such instructions.

Sometime after his interaction with the accident pilot, the controller was relieved of duties as part of a normal shift rotation. The controller in contact with the flight did not advise the relieving controller that he had directed the pilot to report obtaining the current weather and NOTAMs for BTM and that the pilot had failed to do so.

The pilot did not receive the current weather conditions or NOTAMs for BTM from ATC while in flight and did not report receiving the information from another source as directed.<sup>8</sup> Unless the relieving controller had repeated the previous controllers' question to the pilot, the relieving controller could not know, using URET, whether or not the pilot had been directed to report, or had reported, receipt of this weather and NOTAM information.

Although pilots can obtain weather and NOTAMs for a destination airport while in flight in a number of ways,<sup>9</sup> air traffic controllers are required by FAA Order 7110.65, "Air Traffic Control," Chapter 4, Section 7, Arrival Procedures, Paragraph 4-7-10, Approach Information, to ensure that pilots have received specific information about the destination airport. Such information includes weather and visibility information. However, neither FAA Order 7110.65, "Air Traffic Control," nor FAA Order 7210.3, "Facility Operations and Administration," requires controllers to document that a pilot has been issued, been directed to acquire, or reported receiving weather and NOTAMs for the destination airport. If controllers do not document that a pilot has been directed to obtain weather and NOTAMs for the destination airport and that the pilot has not done so, relieving controllers may not identify the need to ensure that a pilot has the most current weather and NOTAM information for the destination airport.

In the case of the accident flight, if a procedure had been in place to document that the pilot had been directed to report receipt of weather information and NOTAMs for BTM and that the pilot had not yet done so, the relieving controller could have reiterated to the pilot the need to obtain the relevant weather and NOTAM information and ensured that the pilot did so.

Although the weather information and NOTAMs for BTM likely did not affect the outcome of the flight, the NTSB is concerned that the circumstances of this accident indicate that controllers are not documenting and, thus, not ensuring that pilots obtain critical weather or NOTAM information regarding the destination airport. Even if flight crews have current weather

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<sup>7</sup> "Wilco" is short for "will comply."

<sup>8</sup> ATC recordings and transcripts do not reflect the pilot soliciting weather information for any airport other than the original destination of BZN. It is possible, but not likely, that the pilot received the information from a nonATC source. ATC is responsible for ensuring that pilots have received specific weather and NOTAM information for the destination airport.

<sup>9</sup> Pilots can obtain weather and NOTAM information in flight through an automatic terminal information service broadcast (if available), automated surface observing system, automated weather sensor system, automated weather observation system, or via telephone.

information before takeoff, they need to receive the current weather and NOTAM information for the destination or alternate airport in flight so that they are aware of the most current conditions. This information allows flight crews to make sound safety-of-flight decisions, including decisions about the need for an alternate destination airport.

Similar to the NWA188 circumstances, there was no requirement to document that this accident flight was directed to obtain weather information and NOTAMs for the destination airport but had not done so. This heightens NTSB concern about the lack of standardization in documenting control information.

On December 2, 2009, the NTSB requested that the FAA provide written notification of any corrective action taken in response to the NWA188 NORDO event. On March 11, 2010, the FAA responded that it had, among other actions, asked En Route and Oceanic Services<sup>10</sup> to issue a memorandum requiring en route facilities to develop an acceptable procedural and visual cue that indicates the communication status of each aircraft and to ensure that facilities implement those cues, placing them in standard operating procedures by April 16, 2010. Further, the FAA asked En Route and Oceanic Services to develop a plan to include in future builds of en route data processing systems a visual indicator of aircraft communication status on the radar scope by October 15, 2010, and to require all future FAA automation systems to include such an indicator by January 13, 2011.

Although the implementation of these FAA actions will improve the documentation of aircraft communication status, the actions only apply to en route facilities, not all ATC facilities. Further, these actions do not address other types of control information that should be documented, such as the issuance of an instruction that would typically require the controller to confirm that the instruction had been completed.

Therefore, the NTSB recommends that the FAA establish and implement standard procedures to document and share control information, such as frequency changes, contact with pilots, and the confirmation of the receipt of weather information, at ATC facilities that do not currently have such a procedure. These procedures should provide visual communication of at least the control information that would be communicated by the marking and posting of paper flight-progress strips described in FAA Order 7110.65, "Air Traffic Control."

## **Emergency Communications**

During the NWA188 incident, an air traffic controller at Minneapolis ARTCC attempted to contact the flight on the universal emergency frequency of 121.5 MHz. However, review of the ATC audio recordings and ATC transcripts revealed that the controller did not announce during the transmission that he was transmitting on an emergency frequency. No regulatory requirements require ATC to identify an emergency radio transmission as such.

Similar to a mayday call where the person in distress begins the transmission with "mayday," the identification of an emergency transmission through the use of standard

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<sup>10</sup> Air traffic controllers in En Route and Oceanic Services manage aircraft at the highest levels over the United States and far out into the Atlantic and Pacific oceans.

phraseology, such as “on guard,”<sup>11</sup> would contribute to the saliency of the message and the overall awareness by all parties within radio range that an unusual event is occurring. Such identification highlights the importance of the transmission and increases the likelihood that flight crews and air traffic controllers monitoring multiple frequencies would give attention to emergency transmissions.

In the case of NWA188, the pilots did not respond to calls from ATC on 121.5 MHz, even though one of their radios was tuned to that frequency. The reason for this is undetermined; possible reasons include that the volume may have been turned down, the pilots may have been distracted by an in-depth conversation that they were having at the time, or the airplane may have been out of range of the transmitters. However, if the pilots’ distracting conversation contributed to the pilots’ failure to hear and recognize the transmission, then the explicit identification of that transmission as emergency could have increased the likelihood that the transmission would capture their attention.

The NTSB concludes that standard phraseology would increase the likelihood that emergency transmissions are recognized. Therefore, the NTSB recommends that the FAA require air traffic controllers to use standard phraseology, such as “on guard,” to verbally identify transmissions over emergency frequencies as emergencies.

## **Recommendations**

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

Establish and implement standard procedures to document and share control information, such as frequency changes, contact with pilots, and the confirmation of the receipt of weather information, at air traffic control facilities that do not currently have such a procedure. These procedures should provide visual communication of at least the control information that would be communicated by the marking and posting of paper flight-progress strips described in Federal Aviation Administration Order 7110.65, “Air Traffic Control.” (A-10-42)

Require air traffic controllers to use standard phraseology, such as “on guard,” to verbally identify transmissions over emergency frequencies as emergencies. (A-10-43)

In response to the recommendations in this letter, please refer to Safety Recommendations A-10-42 and -43. If you would like to submit your response electronically rather than in hard copy, you may send it to the following e-mail address: [correspondence@ntsb.gov](mailto:correspondence@ntsb.gov). If your response includes attachments that exceed 5 megabytes, please e-mail us asking for instructions on how to use our secure mailbox. To avoid confusion, please use only one method of submission (that is, do not submit both an electronic copy and a hard copy of the same response letter).

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<sup>11</sup> Although not required to, pilots and controllers have historically used the phrase “on guard” when beginning transmissions on designated emergency frequencies.

Chairman HERSMAN, Vice Chairman HART, and Member SUMWALT concurred in these recommendations.

*[Original Signed]*

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Chairman