



Submission of the
Air Line Pilots Association, International
to the
National Transportation Safety Board
Regarding the Incident Involving

Northwest Flight 188
A320
DCA10IA001
Minneapolis, Minnesota
October 21, 2009



Table of Contents

1.0 EXECUTIVE SUMMARY	1
2.0 ANALYSIS	2
2.1 HUMAN FACTORS.....	2
2.2 AIR TRAFFIC CONTROL.....	3
2.2.1 ATC Communications Transfer Procedures	3
2.2.2 Use of Emergency Frequency 121.5	3
2.2.3 Flight Tracking.....	4
2.2.4 ATC – Airline Dispatch Communications	4
2.3 NORTHWEST DISPATCH	4
2.4 AIRCRAFT COMMUNICATION / ALERTNESS TOOLS	5
2.5 ADDITIONAL AREAS OF INVESTIGATION	5
3.0 FINDINGS	7
4.0 RECOMMENDATIONS.....	8



1.0 Executive Summary

On October 21, 2009, Northwest Airlines flight 188 (NW188), an Airbus A320, was out of voice communications for over 1 hour during cruise at FL370. After radio communication was reestablished, NW 188 landed without further incident approximately 15 minutes behind schedule. During this period, other aircraft systems, notably the transponder and Traffic Collision Avoidance System (TCAS) functioned normally. ATC continuously monitored the transponder signal and no traffic conflicts occurred. 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 Air Regulation Part 121 from San Diego International Airport (SAN), San Diego, California, to Minneapolis-St Paul International/Wold-Chamberlain Airport (MSP), Minneapolis, Minnesota.

The Air Line Pilots Association's analysis of this event identifies a variety of factors, which contributed to this event.

1. The crew became distracted by a discussion of significant changes in policies, procedures and practices affecting their daily professional lives, resulting from the merger of Northwest Airlines with Delta Air Lines.
2. Air Traffic Control (ATC) procedure changes over a period of time have eliminated historically effective safeguards which could potentially have led to reestablished communications with Northwest flight 188 in a more timely manner.
3. The incident aircraft did not have an aural alert for an ACARS (Aircraft Communications Addressing and Reporting System).
4. The incident aircraft did not have a means to alert flight crews of a period of extensive inactivity.
5. Explicitly defined procedures for handling loss of communication in Air Traffic Control Facilities did not exist.
6. There was no written policy for handling loss of contact between a 121 aircraft and the airline dispatcher.



2.0 Analysis

2.1 Human Factors

On October 29, 2008, Delta Air Lines formally began its merger with Northwest Airlines. In early 2009, Delta began a six-phase integration process for pilots to align the policies and procedures of the two airlines.¹ The Northwest pilots' manuals were changed extensively.² On October 1, 2009, Phase 4 of the integration process was implemented at Northwest following training to cover several hundred changes to company manuals. During the same period of time, former Northwest crews were also required to learn and use a new vacation bidding system, monthly scheduling system, upgrade bidding system, as well as a new company computer system. As an example, pilots were issued a 155 page Bidding Guide with 26 separate multi-page briefing papers to explain changes to administrative policies and procedures.

Another area of major change for former Northwest pilots was in the area of operational policies. These were located in the Flight Operations Manual (FOM). Under the Phase of Flight plan, a new Northwest FOM went into effect on August 1, 2009 during Phase 3. The Northwest pilots were given the "new" Delta FOM in its entirety (white pages). The pilots then inserted these behind "old" Northwest pages (red pages). This new manual became a combination of white and red pages with both Delta and Northwest formats. During Phase 4 alone, there were 142 separate policy changes to the manual.³

Additionally, all training for new policies, procedures, and processes, was conducted via online "distributed training" or bulletin. All instruction was individual and self-paced and, for the Airbus fleet, there were no instructor-led sessions, nor simulator training.

All of these issues significantly affect each pilot's professional and personal life. During the event flight, the pilots described becoming distracted when talking about the new monthly scheduling bidding system.⁴ The merger of Northwest and Delta presented challenges for, and added an unquantifiable level of stress to the lives of all employees of the newly merged airline, but specifically to the former Northwest pilots, due to sheer magnitude of changes. Several studies have looked at the relationship between added stress and job performance. James Young, a NASA researcher, points to several stressors in his paper, *The Effects of Life-Stress on Pilot Performance*. He found that "research suggests that impairment from acute stress results from altered cognitive processes (e.g., "tunneling" of attention, decreased working memory, and degraded judgment and decision-making). The life-stressors experienced by these pilots would impair performance in a similar fashion."⁵ Both pilots reported that they were having difficulty with aspects of the merger with direct impact on their personal lives.

¹ Operations Group Factual, Page 29

² Operations Group Factual – Attachment 1, Page 18

³ Operations Group Factual – Attachment 1, Page 18

⁴ Operations Group Factual – Attachment 1

⁵ Young, James A., *The Effects of Life-Stress on Pilot Performance*. NASA, 2008



Of note during the incident flight, the Captain left the flight deck for a short period of time to use the lavatory. The ATC transcript shows that at 2357Z, ATC gave NW188 a frequency change to frequency 132.17, which was not acknowledged. ATC repeated the call 14 seconds later, and Flight 188 acknowledged the second call.⁶ This was the last call from flight 188 prior to the prolonged period of no voice contact and was the approximate time that the captain was departing to use the lavatory and returning to the flight deck.

One of the changes to Delta policy from former Northwest policy was directly applicable to this portion of the flight. This specific procedural change required manipulation of the Radio Control Panel (RCP) in order to comply with Delta's flight deck door security policy and cockpit entry procedures. ALPA believes that this procedure, which was new to the Northwest crew, may have created a situation in which a single pilot on the flight deck was more likely to miss an ATC call and the RCP may inadvertently not be returned to its normal VHF1 position.

2.2 Air Traffic Control

2.2.1 ATC Communications Transfer Procedures

The safeguards intended to ensure continuous two-way radio contact with aircraft under IFR did not function effectively. After one handoff, the receiving air traffic controller (Denver ARTCC Sector 18R) did not ensure communications had been established with NW188 in a timely manner. For 8 minutes and 30 seconds NW188 operated in Sector 18R's airspace without contact to the aircraft from the Center.

There is no specific requirement for a "receiving controller" to ensure continuous radio communications. JO 7110.65S ATC specifies only that, "Radio communications transfer procedures may be specified by a letter of agreement..." This statement would allow facilities not to establish radio communication transfer procedures. No letter of agreement defining these procedures was provided to the investigation.

The responsibility for the ATC receiving controller to ensure communications have been established in a timely manner (or begin NORDDO procedures) is not sufficiently defined in current FAA guidance. This lack of clear guidance for ensuring two-way communications is properly established may well have contributed to the amount of time that passed before controllers were aware that communications had been lost with NW188.

2.2.2 Use of Emergency Frequency 121.5

The emergency frequency, 121.5 MHz, is to be monitored by all aircraft, if capable.⁷ The flight crew of NW188 said that they were monitoring 121.5 in their VHF2 Radio.⁸ There is no record of any attempt to contact flight 188 on 121.5 MHz during the time NW188 was not in VHF communication with ATC.

⁶ Air Traffic Control Group Factual, Page 4

⁷ FAA Aeronautical Information Manual (AIM) 5-6-2

⁸ Operations Group Factual – Attachment 1, Page 6



The guidance in JO 7110.65S⁹ requires use of “all available means” to contact a NORDO aircraft, but does not delineate specific processes to follow for handling a NORDO aircraft. ALPA believes that all available means were not utilized. If detailed procedures existed to define various means and ensure their use, those attempts would have likely led to reestablished communications.

2.2.3 Flight Tracking

Minneapolis ARTCC called Denver ARTCC to request the last known frequency of NW188. The Denver controller inadvertently relayed an erroneous frequency to Minneapolis Center. Before the advent of electronic flight progress monitoring, a paper flight progress strip would have contained this information and would have been available as a reference. With the transition to electronic flight progress “strips,” some data is no longer captured for immediate use or future reference. FAA noted that using electronic flight progress strips, there was no easy way for a controller to note when an aircraft had checked-in on frequency.¹⁰ A directive specifying standardized strip marking or a system upgrade to ensure needed capabilities should be considered to address this lack of important information available to the controller, that was readily available when “strips” were in use.

2.2.4 ATC – Airline Dispatch Communications

Controllers can normally contact company dispatch to relay messages to aircraft that have lost voice communication with ATC. When Delta Air Lines relocated Northwest Airlines dispatch to Atlanta on October 9, 2009, Delta notified all ATC facilities and provided new telephone contact numbers. In this specific event, Denver Center attempted to contact Northwest dispatch using a disconnected number. While contact was eventually established with Northwest dispatch, it did not occur in a timely manner. To provide a communication path between controller and airlines that is reliable and available for the timely dissemination of critical flight control instructions, procedures should be established to ensure all ATC facilities have up-to-date phone numbers and processes are in place to ensure numbers are checked for operability and properly updated.

2.3 Northwest Dispatch

Coordination between dispatchers and specific policy or guidance for handling a NORDO aircraft was not well defined and precluded a more effective response. Various attempts to contact the aircraft were made by several dispatchers using several methods, however, the dispatcher responsible for NW188 was not fully aware of the scope of the contact attempts and the aircraft’s lack of response. Improved coordination during a NORDO event would be aided by having a single position responsible for notification of all contact attempts to the NORDO flight.

Northwest dispatchers stated that a specific NORDO response procedure did not exist. With the variety of communications systems in a large fleet such as the merged Delta-Northwest, a well-defined procedure would aid in a standardized, prompt and thorough response to this type of event.

⁹ FAA Order JO 7110.65S 10-4-4 Communications Failure

¹⁰ Air Traffic Control Group Factual, Page 10



2.4 Aircraft Communication / Alertness Tools

The A-320 is a highly automated aircraft and while in cruise flight, the majority of the manipulation of the aircraft is accomplished by making selections on the Mode Control Panel (MCP) and the Flight Management System (FMS) when changes are desired or requested by ATC. If there are no modifications required, the pilots must continue to actively monitor the automation. Studies show that in general, sustained attention is difficult when workload is very low¹¹ and this is generally the case during the cruise phase of flight. To mitigate this difficulty in maintaining alertness, some aircraft have been outfitted with a “crew alertness monitor.” If a crew does not make a radio call or activate a specifically monitored switch or system for a specified period of time an advisory message is displayed. If a pilot does not respond to this message, the advisory changes to a caution message, which typically includes an aural tone. If no action is taken in response to this caution it escalates to a warning message. A warning message is normally accompanied by a flashing warning light and a conspicuous aural alert. This aircraft, along with the majority of aircraft today do not have such a system installed. ALPA believes that such a system could be valuable in mitigating similar incidents and should be investigated.

ACARS is a communication system that airlines use to send textual messages to the pilots. In this Airbus A-320, an ACARS message does not activate an aural tone. This is an option in the A-320 fleet¹² and perhaps in many aircraft. ALPA believes that an aural tone for an ACARS message would aid in situational awareness and its required use should be evaluated. In this event, had an aural tone sounded when attempts were made to contact the crew via ACARS, it is likely the crew’s attention would have been captured.

Another communication device that can be installed in aircraft is a SELCAL. This allows an entity on the ground using an aircraft-specific four-tone transmission to notify an aircraft of a desired voice radio contact. This relieves the pilots from having to simultaneously monitor multiple radio voice communications. The radio must be on the same frequency as the SELCAL transmission, but the aircraft can alert the crew of an incoming transmission regardless of the radio volume or audio selection. SELCAL is typically used by Oceanic Radio operators to contact aircraft transiting their airspace on High Frequency (HF) radio bands, which are difficult to monitor due to static and infrequency of calls. ALPA believes that this system is currently being underutilized. Domestic ATC controllers should be able to use SELCAL to contact an aircraft on their communication frequencies or on the emergency frequency 121.5 MHz. The use of this simple technology would have allowed ATC to reestablish communications with NW188 directly.

2.5 Additional Areas of Investigation

This event has illustrated several areas within the aviation system that could be easily improved to afford the safety redundancy on which commercial aviation is based, but ALPA believes that there are additional areas, which need to be investigated or researched. This event has significant Human Factors

¹¹ Abbott, K. et al. *The Interfaces Between Flightcrews and Modern Flight Deck Systems*. Federal Aviation Administration Human Factors Team Report. 1996.

¹² Operations Group Factual, Page 24



components and additional Human Factors investigation would likely yield significant safety benefits. Mergers and acquisitions invariably lead to considerable distractions and stress on all company personnel, including pilots. However, there is minimal research to show what can be done to minimize the impact that these organizational events have on an employee group.

James Young, a NASA researcher, states that “[o]nly limited research has examined the effects of life stress on skilled performance.”¹³ Distractions and time compression perceptions are very relevant to this event. ALPA believes that the Operations/ Human Performance Group should interview experts¹⁴ in these areas to provide additional data for a thorough analysis of this event.

¹³ Young, James A., *The Effects of Life-Stress on Pilot Performance*. NASA, 2008

¹⁴ ALPA Party Coordinator and Operations Group member made repeated requests for these interviews to the NTSB Investigator-in-Charge and NTSB Operations Group Chairman.



3.0 Findings

1. Delta and Northwest were in the process of merging the two airlines' operational and administrative procedures at the time of the event.
2. 75% of the changed policies and procedures, including a number impacting basic "quality of life, work and associated scheduling procedures" affected former Northwest pilots.
3. Northwest flight 188 was not in two-way voice communications with air traffic control for a period of over 1 hour.
4. The initial loss of communications appears to have occurred during the period that one pilot was leaving the flight deck and subsequently returning to the flight deck.
5. The pilots became involved in a discussion focused on understanding the multiple changes to policies/procedures impacting their professional lives.
6. A320 aircraft operated by Northwest/Delta are not equipped with any form of crew alertness monitor.
7. The JO 7110.65S procedure or process for the handling of a lost communications aircraft is not prescriptive and does not identify specific and consistent procedures for ATC to follow to attempt to regain communications.
8. Denver ARTCC controllers did not make a positive attempt to ensure continuous communications after an ATC handoff, and there were no attempts to contact the flight on the emergency frequency 121.5 MHz.
9. The initial phone number used by Denver ARTCC to contact Northwest dispatch was disconnected.
10. Northwest dispatchers sent ACARS messages to Northwest flight 188 and they were sent from several different dispatchers without adequate coordination.
11. There were no established, consistent procedures Northwest dispatchers used for handling a lost communications aircraft.
12. ACARS messages were sent to the aircraft but Northwest A320's do not produce an aural tone for received ACARS messages.
13. The pilots eventually re-established contact with ATC and completed an uneventful landing.



4.0 Recommendations

ALPA suggests the following recommendations to promote human factors research and improve current policies and practices to ensure an event like this does not occur again.

To the Federal Aviation Administration

1. Evaluate the feasibility of providing aural tones for communication devices (e.g. ACARS, SELCAL), provided they are inhibited during critical phases of flight.
2. Evaluate the feasibility of requiring crew alertness monitors, particularly on highly automated aircraft.
3. Ensure airlines develop lost communication procedures and these procedures are integrated with Air Traffic Control procedures, including ensuring that airlines provide Air Traffic Control facilities with a current phone number that is a direct line to an operations supervisor.
4. Develop a database with dispatch phone numbers that is disseminated to all Air Traffic Control facilities. Part 121 and 135 carriers should be provided with a contact to update their respective phone number in that database.
5. Evaluate the effectiveness of requiring pilots to use headsets when there is only one pilot left at the flight deck station.
6. Amend JO 7110.65S to include receiving controller responsibilities in the ATC communications transfer procedures.
7. Provide air traffic controllers prescriptive guidance to follow for NORDO aircraft in JO 7110.65S.
8. Evaluate the feasibility and effectiveness of improving the placement of appropriate ARTCC sector frequencies on enroute navigation charts. This would provide pilots with ready access to correct frequencies in the event of a loss of communication.
9. Conduct a comprehensive human factors review concerning the effects on pilot performance due to significant changes in policies, procedures and practices due to a merger or acquisition.