American Airlines

U·S AIRWAYS

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December 14, 2015

Daniel R. Bower
Investigator-in-Charge
National Transportation Safety Board
[redacted]
Washington, DC 20594

Re: US Airways Party Submission regarding US Airways Flight 1702
Date of Occurrence: March 13, 2014
NTSB Investigation Number: DCA14MA081

Dear Mr. Bower:

The purpose of this letter is to provide our recommendations regarding the final National Transportation Safety Board (NTSB) report in this matter, in accordance with 49 C.F.R. § 831.14.

US Airways appreciates the opportunity to submit its comments as well as the professional and cooperative environment amongst the parties to this investigation in our common pursuit of aviation safety.

I. INTRODUCTION

On March 13, 2014, at approximately 1830 Eastern Daylight Time (EDT), US Airways Flight 1702, an Airbus A320 (N113UW), rejected its takeoff on runway 27L at Philadelphia International Airport (PHL) in Philadelphia, Pennsylvania shortly after becoming airborne. The aircraft experienced a tail strike, touched down hard on the runway, after which the nose gear collapsed, and then contacted the edge of the runway as it came to a stop. The captain called for an evacuation, and all 149 passengers and five crewmembers exited the aircraft via the emergency slides. No significant injuries were reported; however, the aircraft sustained substantial damage.

US Airways Flight 1702 was a regularly-scheduled passenger flight between Philadelphia International Airport (PHL) and Fort Lauderdale/Hollywood International Airport (FLL) and operated pursuant to Part 121 of the Federal Aviation Regulations.

Through this submission, we wish to describe some of the rigorous safety protocols that are in place at US Airways, now part of American Airlines[1], and call attention to several issues that we believe are not only important to understanding this occurrence but also to enhancing safety throughout the airline industry.

II. SUMMARY

- At the time of the occurrence, US Airways had in place a robust safety culture, a sound A320 training program, well-proven Standard Operating Procedures (SOPs), and effective Threat and Error Management (TEM) barriers. These were designed, if followed, to prevent an occurrence such as Flight 1702.

- Other contributing factors to this occurrence include the aircraft's systems design and inadequate communication to operators by the manufacturer of known conditions.

- The design of the Flight Management System (FMS) impeded the flight crew from intuitively making the appropriate entries while attempting to input a change of the departure runway in the Flight Management Computer (FMC).

- Because of the flight crew's inability to correctly reprogram the FMC, the Flight Warning Computer (FWC) activated the aircraft's aural "RETARD" callout. This callout, which is meant to alert the pilot flying to take a specific action during the landing phase, does not apply during the takeoff phase. In fact, the aural "RETARD" callout prompts the pilot to take action (retard the thrust levers to the idle position) which is counter to what should happen on takeoff.

- The manufacturer's operating and training manuals do not address the possibility of receiving an unwarranted aural "RETARD" callout or the appropriate response to the callout during the takeoff phase. Additionally, the manufacturer ineffectively communicated to A320 operators what little information that it knew about this possibility.

III. US AIRWAYS PRIORITIZES SAFETY

US Airways was the first Part 121 Air Carrier to voluntarily achieve the highest level Safety Management System implementation. US Airways has a strong safety record and is committed to continuously improving its systems and enhancing its safety culture. The extent of safety management and its participation in all FAA voluntary safety programs demonstrate US Airways' commitment to cultivating a positive organizational safety culture at all levels of the company. Indeed, the FAA Principal Operations Inspector noted during the investigation that US Airways has maintained a "good safety

[1] After a rigorous integration process to harmonize all aspects of US Airways' and American Airlines' operations, the FAA issued the new American Airlines a single operating certificate on April 8, 2015.

culture and a strong program". NTSB Group Chairman's Factual Report ("OPS Report"), p. 78.

In the aftermath of the Flight 1702 occurrence, US Airways thoroughly reviewed the relevant SOPs, TEM barriers, A320 manuals, and A320 ground and flight training curriculum and analyzed the circumstances that potentially caused or contributed to the occurrence.

At the time of the occurrence, US Airways had in place a robust safety culture, a sound A320 training program, well-proven SOPs, and effective TEM barriers. These were designed, if followed, to prevent an occurrence such as Flight 1702. The NTSB Operational Factors Group Chairman's Factual Report provides an in-depth discussion of the relevant SOPs and the TEM barriers then in place. US Airways does not have any substantive comments to add to the Operational Factors Factual Report.

Notwithstanding the robustness of its training program and SOPs before the occurrence, US Airways has since implemented the following operational improvements as proactive safety measures.

A. Increased the amount of time for the "Before Taking the Runway Flow"

US Airways increased the amount of time allocated between the flight crew's completion of the Before Taking the Runway Flow and the aircraft physically taking the runway. According to the post-occurrence policy, the Flow shall be completed no later than two minutes before the aircraft takes the runway. The previous policy called for their completion one minute before taking the runway. This change was implemented in conjunction with a requirement to complete all Below the Line items on the Taxi Checklist before entering the takeoff runway. US Airways A319/320/321 Flight Crew Operating Manual ("OM") Vol. I TR 11.6, 2c.3.10, 2c.2.13.

B. Earlier input of takeoff performance information into the FMS

US Airways now requires the flight crew to input takeoff performance information into the FMS before the aircraft is pushed back from the gate. OM Vol. I, 2b.1.6. The pre-occurrence procedure allowed for performance information to be input after pushback while taxiing to the runway.

C. Planned runway added to ATC Route Clearance Verification

US Airways added the verification of the planned takeoff runway to the Air Traffic Control Route Clearance Verification process. OM Vol. I, 2b.1.6. Before, flight crew generally verified the takeoff runway during this Verification, but the SOPs did not make runway verification an explicit requirement. The post-occurrence SOP now expressly requires the flight crew to check and verify the planned takeoff runway.

D. Planned runway added to Departure Briefing Checklist

US Airways also added the "planned takeoff runway" item to the Departure Briefing Checklist. OM Vol. I, 2b.5.2.

E. Added "Change of Runway or Departure Procedures"

The new Change of Runway or Departure Procedure is as follows: After a change of runway is inserted into the primary flight plan, the amber message "CHECK TAKE OFF DATA" is displayed on the FMS MCDU scratchpad. This message is a reminder to either revise or confirm the takeoff data on the PERF TAKEOFF page. The previous data (e.g. V1, VR, V2, FLEX TO values) appear in small, blue font beside the corresponding fields. If no data change is necessary, the flight crew may simply select CONFIRM TO DATA, which reinserts the data into the corresponding fields.

If changes to the data are required, the flight crew may manually enter new speeds referencing the takeoff performance system. The flight crew must ensure that this performance data is correct for the runway to be used. If the runway or departure procedure changes from what was planned, crews are required to step through the F-PLN page to verify that all fixes, altitudes, and speeds are correct for the new runway and/or departure procedure. OM Vol. I, 2c.3.10.

F. Added aural "RETARD" callout to abort criteria between 80 knots and V_1.

On September 5, 2014, US Airways published Bulletin 21-14 as a policy change to its A320 Pilot Handbook. US Airways has added the aural "RETARD" callout to the list of abort criteria during takeoff between speeds of 80 knots and V_1. The aural "RETARD" callout joins items such as engine failure, aircraft aural fire callout, predictive wind shear callout or caution, and the perception that the aircraft is unsafe or unable to fly as criteria recommending a rejected takeoff between speeds of 80 knots and V_1.

G. Revised language for completing Below the Line items on Taxi Checklist

New language has been adopted for completing Below the Line items on the Taxi Checklist. The previous language read:

> At this point, the Taxi Checklist is referred to as "Down to the Line." Normally the remainder of the checklist will be called for and accomplished prior to taking the runway.

The language now takes into account the possibility for contingencies arising after Down to the Line, rather than assuming a complication-free process. It does so by requiring crew members to complete the remaining steps before entering the runway. The new language reads:

> At this point, the Taxi Checklist is referred to as "Down to the Line." Call for and complete the remainder of the checklist prior to entering the takeoff runway.

As a result both a runway and FMS check must be performed before entering the takeoff runway. OM Vol. I, 2c.13.

H. Runway Change and Taxi Checklist

To ensure that the FMS flight plan, takeoff data, and aircraft configuration are set and entered correctly, the Taxi Checklist must now be re-accomplished in its entirety following any runway change or flap configuration change. OM Vol. I TR 11.6, 2c.3.10, 2c.2.13.

I. Effectively communicated safety concerns with pilots

Just two weeks after this occurrence, the US Airways Director Airbus Flight Training and Standards sent a Crew Broadcast System (CBS) message to all US Airways pilots titled "Changing Takeoff Runway" to reiterate the SOPs and to describe the previously unknown aural "RETARD" warning during takeoff and the proper actions to take if it is triggered. OPS Report, pp. 81-82.

IV. AIRCRAFT-RELATED ISSUES

A. Relevant omissions from Airbus' Flight Crew Operating Manual and Flight Crew Training Manual about "RETARD" callout during takeoff.

As is typical in the industry, US Airways bases its flight training for A319/320/321 aircraft on the manufacturer's Flight Crew Training Manual (FCTM). The Airbus FCTM for the A319/320/321 aircraft addresses the aural "RETARD" callout during the landing phase. This callout, which is meant to alert the pilot flying to take a specific action during the landing phase, does not apply during the takeoff phase. In fact, the aural "RETARD" callout prompts the pilot to take action (retard the thrust levers to the idle position) which is counter to what should happen on takeoff.

However, Airbus' operating manuals fail to address the possibility of receiving, and the appropriate response to, an aural "RETARD" callout during the takeoff phase. The Airbus Flight Crew Operating Manual (FCOM) does not state that the FWC will go from Flight Phase 2 directly to Flight Phase 8, which causes this aural "RETARD" callout during takeoff.

Interestingly, this design feature does not exist on takeoff within the A330 fleet. This difference was noted by both Robert Willson, FAA US Airways Aircrew Program Manager, and John Hope, US Airways Airbus Fleet Director, in post-occurrence interviews with the NTSB. NTSB Interview Summaries: Operational Factors ("Interview Summaries"), pp. 36 and 70.

B. Airbus had not directly relayed relevant information to US Airways

Airbus' World In-Service Experience ("WISE") technical article entitled "Flight Warning Computer (FWC) - RETARD call-out during T.O. acceleration," dated December 27, 2013, was not provided to US Airways before or after the occurrence. Airbus published the article on its Airbus World webpage, but did not notify US Airways or other operators of the technical article or the underlying aural "RETARD" callout issue. OPS, p. 70.

Moreover, Airbus' own training curriculum failed to address the aural "RETARD" callout on takeoff. Following Airbus' own post-occurrence investigation, it learned that personnel at its training facility in Miami were neither familiar with nor were they teaching the "RETARD" callout as part of their own training curriculum.

C. Inherent Human Factor design flaws in the FMS

The FMS does little to intuitively guide a pilot to initiate appropriate entries once a takeoff runway change is made. Currently, only a simple silent FMS scratchpad message is issued rather than a FWC message. At a minimum, automatic switching to the FMS "PERF" page once a new runway is inserted should be a mandatory programming feature. Such a feature would appropriately account for human factors by immediately directing the pilot's attention to the proper page as well as prompt the pilot to make the inputs needed.

V. CONCLUDING REMARKS

US Airways had in place at the time of the occurrence a robust safety culture, sound A320 training program, well-proven SOPs, and effective TEM barriers. These were designed, if followed, to prevent an occurrence such as Flight 1702.

US Airways' believes that it would not be in the best interest of aviation safety for the NTSB to focus solely on the pilots' actions during this occurrence without also addressing other factors associated with the aircraft's systems design. Automation properly implemented should always enhance a pilot's ability to safely fly and monitor the aircraft. We encourage the NTSB to evaluate these man-machine interface issues.

We thank the NTSB for its work and our opportunity to contribute to this investigation.

Sincerely,

[redacted]

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