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USAIR B-737 FLIGHT 427

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IIC STATEMENT

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On September 8, 1994, at about 7:03 Eastern Daylight Time, USAir Flight 427, a Boeing 737-300, registration N513AU, crashed while descending to land at the Pittsburgh International Airport, Pittsburgh, Pennsylvania. The airplane was being operated as a scheduled passenger flight under an instrument flight rules from Chicago-O'Hare International Airport, Chicago, Illinois, to the Pittsburgh International Airport. During the approach to landing, control of the airplane was lost and the airplane crashed near Aliquippa, Pennsylvania. The airplane was destroyed by impact forces and fire. All 132 persons on board the airplane were fatally injured.

During the previous public hearing held in January of this year, I provided a detailed description of the events leading up to the accident and the status of the investigation. I would now like to provide the events that have transpired since January.

Several of the investigative groups have competed their work, these areas are: Structures, Powerplants, Weather, Air Traffic Control, Survival Factors, Operations, Witnesses, Flight Data Recorder, Cockpit Voice Recorder, and Maintenance Records. A partial technical review was held with the parties to the investigation and it was agreed that the investigation into these areas was completed. The investigative groups that are still active are: Systems, Aircraft Performance, Acoustics, and the Human Performance.

The wreckage of flight 427 was released to USAir on April 3, 1995. Several components were retained by the Safety Board such as the rudder Power control unit or PCU, the standby rudder actuator, actuator rods, trim system components, and autopilot systems. The Safety Board may obtain additional parts from the wreckage if needed. In fact, electrical connectors from the electronics bay were recently retrieved to be examined for evidence of "blue water" contamination.

On May 3, 1995, the FAA released the findings of its critical design review team which was tasked to examine the control systems of the B737 from a certification standpoint. The report will be discussed during this public hearing. The report augments the Safety Board's investigation findings to date. The team made 27 recommendations intended to enhance the safety of the B-737 and other transport category airplane through design, maintenance, and operational means. However, the team did not identify any specific design deficiency or failure mode that would result in an uncommanded flight control deflection of the magnitude necessary to explain the flight 427 accident.

During the week of September 25, 1995, the airplane performance group conducted a series of tests that collected "real world" data on the effects of a B-737 entering the wake vortices of a B-727. The tests used a highly instrumented USAir B-737 and the FAA's B-727, which had been equipped with smoke generators. During the tests, over 160 wake vortex encounters were accomplished at distances of about 4, 3, and 2 miles. Prior to the wake vortex flight tests, simulator validation tests were performed with the B-737. Based upon the initial findings of the flight tests, it was found that further refinement of the Boeing 737 engineering simulator model and kinematic studies is required. The initial results of the wake vortex flights, the simulation validation tests, and the kinematic studies will be discussed at this hearing.

With assistance of representatives from the Air Accident Investigation Branch in England, a program was established to examine Quick Access Recorder (QAR) data from B-737's operated in Europe and the United Kingdom. The data will be examined to determine if there are any events where the rudder exceeds the yaw damper authority or pilot input or if there are any unexplained rudder events.

The systems group completed the detailed dimensional analysis of the rudder power control unit from flight 427, there were no discrepancies found. Additionally, the group examined the possible effects of locking up or restricting the motion of several hinge points in the PCU feedback loop and simulating a jam of the input rod to the PCU. In all cases the unit behaved as anticipated. The tests found that jamming the input rod would not result in a runaway condition when the yaw damper was exercised.

The systems group has identified a B-737-200 that was being removed from service and provided to a museum. The systems group plans to use this airplane to conduct several tests of the complete rudder system. These tests will include back-driving the rudder power control unit, cable cuts, and dynamic inputs and impulse loads to the rudder system. Some of these tests could result in structural damage to an airplane, therefore it is fortuitous that a B-737 became available that is going out of service.

Data are continuing to be collected and analyzed on all reported "unusual events" regarding the Boeing 737. These events will be discussed at this hearing

The Human Performance group is examining all possible pilot reactions to unexpected events, such a sudden severe roll, and unusual attitude recovery procedures. There is considerable anecdotal information on these issues but little factual or statistical information. The group used NASA's vertical motion simulator to develop a better understanding of the forces experienced by the pilots of flight 427 at the on-set of the upset. During the hearing, we will take testimony from a NASA expert on spatial orientation and disorientation.

During the previously mentioned simulation validation and wake vortex flight tests, recordings were made of the cockpit sounds. These have been useful for comparing with the cockpit voice recorder sounds from flight 427. In a moment, Mr. Jim Cash will provide a presentation on the findings of the acoustics group. Additionally, the group has examined the CVR sounds from United 585 accident at Colorado Springs, Colorado and several other CVR recordings from other 737s.

I wish to report that all of the 19 investigative tasks identified during the January 1995, public hearing have been completed and many of those issues will be discussed at this hearing.

Additionally, on February 22, 1995, the Safety Board issued recommendations to the FAA to enhance the number to parameters recorded on the Boeing 737's and other transport category airplanes. The FAA and industry actions on this issue will be discussed at this hearing.

Areas that are no longer being actively pursued in the investigation are: Criminal intent (bomb); engine reverser deployment; slat/flap extension; spoiler extension; cargo door, service door or entry door opening in flight; cargo shifting; electromagnetic interference, engine mount\pylon failure; floor beam failure; and bird strikes.

A key part of the investigation is that the fight data recorder provides that there was a heading change or yawing of the airplane which preceded the upset. This would indicate a movement of the rudder or the introduction of an unknown yawing force. The investigation continues in the following issues to determine the source of the yaw, such as: a pull, break or jam of the rudder cable; wake turbulence/vortices; pilot inputs; hydraulic fluid contamination; yaw damper failure; dual hydraulic failure; standby rudder actuator; rudder PCU and servo valve; structural failure; and electrical short circuits.

Mr. Chairman this completes my statement. Mr. Jim Cash will now present the findings of the acoustic examination of the cockpit voice recorder data.