



## **AIR LINE PILOTS ASSOCIATION, INTERNATIONAL**

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November 22, 2006

Mr. Bob Benzon  
National Transportation Safety Board  
Office of Aviation Safety  
490 L'Enfant Plaza East, SW  
Washington, D.C. 20594

Dear Mr. Benzon:

In accordance with the Board's rule the Air line Pilots Association offers the following comments and safety recommendations regarding the aircraft accident (DCA05MA099) involving Spirit Airlines Flight 171 which occurred on September 18, 2005 at Hollywood International Airport in Fort Lauderdale, Florida.

### **History of flight**

On September 18, 2005, at 1812 eastern daylight time, a Spirit Airlines Airbus A321, registered in the United States as N583NK, sustained substantial damage after experiencing a tail strike upon landing at Fort Lauderdale International Airport (FLL), Florida. The flight was operating under CFR 14 part 121 as Spirit Flight 171, Visual Meteorological Conditions prevailed. Neither the two pilots, four flight attendants nor the 191 passengers were injured. The flight originated at La Guardia Airport (LGA), New York City, at 1518 eastern daylight time.

### **Flight Crew Training**

Both crew members were trained by Airbus in October of 2004 at their Miami facility while Spirit was trying to develop its own in house training program. The Airbus aircraft was a new addition to the Spirit Airlines fleet and conceptually very different from the MD 80 aircraft the crew had previously been flying. The Airbus ground school and

simulator training was provided by Airbus staff instructors who had experience and training backgrounds from various other airlines but no experience with Spirit Airlines' operational procedures. The training followed the generic Airbus curriculum rather than a program customized by Spirit Airlines for their crews and operational environments.

During the initial training the flight crew received the Airbus Flight Crew Operating Manuals (FCOM) from Spirit Airlines. The manuals did not contain any of the operational bulletins issued by Airbus to operators of their aircraft as a supplement to the FCOM. These bulletins provided critical guidance on various operational issues such as bounced landings and tail strike avoidance techniques. Airbus data, as reflected in one of these Operational Bulletins indicated that tailstrikes were twice as likely to occur on landing as on takeoff. Though tail strikes were discussed during the ground school portion of training, the captain said the impression created during the training was that tail strikes were more likely to occur on takeoff than on landing. Compounding the problem of the limited information provided on tail strikes during ground school, was the fact that the crew did not receive simulator training on bounced landing recovery techniques or on tail strike avoidance procedures.

The Airbus Initial Training program the crew attended included instruction on the characteristics and proper operation of the flight controls, which differ significantly from the MD 80 aircraft the crew, had previously flown. The training demonstrated that if both pilots moved their respective control sticks at the same time, the aircraft would take the control stick inputs from both control sticks and algebraically sum the commands. The summed command would then be sent to the flight control computers. It is this flight control feature of the Airbus that makes it critically important that only one pilot at a time make control stick inputs. As neither pilot can see the inputs being made to the opposite control stick, Airbus incorporates a visual and optional aural alert if inputs are simultaneously made from the left and right control stick. The visual alert system, standard on all Airbus 320 series aircraft, consists of a red arrow on the glare shield which illuminates when dual inputs are detected. The optional aural alert system incorporates an electronically generated "DUAL INPUT" annunciation if control inputs are detected from both control sticks without the takeover pushbutton being pushed.

In spite of the criticality of the prohibition of dual control stick inputs, training on dual input and the consequential summing function of the flight control computer was demonstrated in a cruise flight mode with just the basics of the sight and sound of the warnings. The dangers of dual flight control use and the necessity for using the flight control takeover pushbutton in specific situations where one pilot might need to take control from the other pilot were not incorporated into realistic simulator training scenarios.

Complicating the situation is the fact that there is only a small margin between the landing attitude of the Airbus 321 5.5 degrees of pitch and the critical attitude at which a tail strike can occur 9.5 degrees of pitch with the struts fully compressed. Unfortunately, the critical attitude awareness training provided to the crews was not adequately reinforced during simulator training.

In January of 2005, Spirit Airlines implemented an in-house training curriculum utilizing their own company instructors. The curriculum was identical to the curriculum taught at the Airbus training facility. However during the first five months of training under the Spirit Airlines program, classes were still not provided with the FCOM bulletins. The FCOM bulletins were finally issued to crew members in June of 2005, with no classroom or simulator training to reinforce the meaning and content of the bulletins.

Though Spirit Airlines saw the necessity for the check airmen to receive additional training on the use of the priority take over push button since it was assumed that they would be more likely to use this function in critical times when they were training pilots new in the aircraft, this additional training was not afforded to the Spirit Airbus line pilots. Thus, the crew involved in the tailstrike incident had never had the benefit of adequate training, either on the potential severe negative consequences of making dual inputs or in the procedure of taking control of the aircraft by use of the priority take-over pushbutton. In addition with the implementation of in house training, no critical attitude awareness training was provided to the crews and no procedures were implemented to direct the Pilot Monitoring (Pilot Not Flying) to monitor the landing attitude and announce if it approached the critical tail strike attitude.

### **Training At Spirit Airlines Now**

Since the event, flight training has not issued any changes to the FCOM to highlight bounced landing recovery or tail strike avoidance techniques. No additional training on the appropriate use of the priority take over push button or the negative consequences of dual inputs has been added to the training agenda. Though ground school recurrent training is now showing the Airbus produced tail strike video, and including a short discussion on tail strikes by the instructor, there is still no critical attitude awareness training or procedure being provided to help mitigate the chances of a tail strike occurring. Spirit has given no additional guidance or training to its pilots in response to NTSB's September, 2005 safety recommendation A05-30 thru 32 pertaining to bounced landing recovery guidance and training. The walk around pictorial training aid does not have any information about inspecting for tail strike damage.

### **Aircraft Flight Performance**

The FMGC/FADEC and MCDU calculate the VAPP and VLS speeds. This is covered in Bulletin 810-1a, which was not given to the crew until well after they were out of the training environment and never reinforced through ground school instruction or full motion simulator training. Consequently the operational significance of the time for engine thrust increase was never taught to the crews. The logic in Speed mode which is the mode the aircraft is in during the landing phase states "The N1 rate is 20% per second max; however it can be lower depending on the current speed and the target speed. When the pilot is flying manually, a temporary speed loss can occur if an increased load factor is required." (Reference 810-1a) Given these parameters as the crew came into flare and increased the G load on the aircraft with the Autopilot off, this could have caused enough

of a loss of speed and subsequent energy loss to cause the first “Firm” touchdown.

### **Touchdown**

During the interviews with the NTSB, the crew stated that they felt the landing was firm but not bad. There was some concern that they may have blown a tire on the landing due to the quickness at which the brake temperatures increased after the landing. After arriving at the gate the FO inspected the landing gear which appeared normal to him. The crew stated during their NTSB interviews that they did not hear any aural warnings sound on approach (dual input, EGPWS sink rate or glide slope deviation). This was confirmed by the Cockpit Voice Recorder (CVR) readings.

### **Accident aircraft differences with fleet standard**

The accident aircraft when introduced into the Spirit fleet in September of 2004 was a leased aircraft 4 to 5 years old. Spirit Airlines had ordered their new aircraft from Airbus with a starting delivery date of April 2005, but Spirit leased 3 older Airbus A321 aircraft to start up the Airbus program prior to the delivery dates of the new aircraft. The new aircraft were the basis for the Spirit Airlines fleet standard, which was being taught in the ground school. The fleet standard had an activated aural “DUAL INPUT” alert. All Spirit crew members have been trained to expect the “DUAL INPUT” aural warning to sound in the event of dual inputs from the control sticks.

After listening to the CVR and not hearing the “dual input” aural warning, ALPA safety committee members initiated a fleet campaign to check all aircraft for the dual input aural warning. It was discovered that these three aircraft had no aural warning for dual input. Spirit was unaware that these 3 aircraft did not comply with the fleet standard aural warning system and hence the aircrews had no information in their FCOM about these differences nor received any training. Because these three aircraft were bought used and not built by Airbus to meet the Spirit fleet standards, the aural warning function, which is an optional feature provided by Airbus, was never activated. The dual input warning was subsequently activated on the three aircraft to bring them up to fleet standard.

### **Summary**

Spirit Airlines flight crew did not receive any bounced landing and tail strike avoidance or recovery training prior to the accident on September 18, 2005. Minimal training was provided on the small attitude margin between landing attitudes and the critical attitude at which a tail strike could occur. Additionally, the flight crew’s training included only superficial instruction on the use of the take-over pushbutton or dual input effects in realistic simulator flight scenarios. Specifically, the flight crew’s training included the fact that both pilots making inputs would result in an aural warning of “dual input” in spite of the fact that Spirit’s original A321 aircraft did not have this feature activated.

### **Safety Recommendations**

FAA require all operators of A321 aircraft to ensure that the material presented in any operation bulletins that pertain to flight operations or flight procedures is included in the transition and recurrent flight crew training.

FAA require all operators of A321 aircraft to provide full-motion simulator training to pilots when bulletins are issued to the FCOM that impact pilot handling skills during critical phases of flight for which the pilot has not been previously trained.

FAA requires all operators of A321 aircraft to provide specific training on the A320's dual input effects and take-over pushbutton control. In particular, the training should include full motion simulator training with realistic flight scenarios. The flight scenarios should be in the Takeoff/Departure and the Arrival/Landing phases of flight where pilots normally hand fly the aircraft.

FAA requires all operators of A321 aircraft to provide training on the critical attitude of the Airbus 321 with respect to normal take-off and landing attitudes. In addition, Spirit Airlines should develop procedures for the Pilot Not Flying to monitor aircraft attitude on take-off and landing and announce when the aircraft attitude approaches a critical attitude.

FAA requires all operators of A321 aircraft to ensure that all flight deck oral and visual warnings and cautions are activated on all aircraft within each fleet. If any discrepancies are found, an "anomaly" bulletin or equivalent should be published and distributed to all pilots in the affected fleet for any discrepancies that can not be corrected immediately.

Sincerely,

A handwritten signature in black ink, appearing to read "J. Perin". The signature is written in a cursive, flowing style.

Captain Jeffrey Perin  
ALPA Coordinator