AIR LINE PILOTS ASSOCIATION, INTERNATIONAL
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December 17, 2004

Ms. Lorenda Ward
National Transportation Safety Board
Major Investigations (AS-10)
490 L'Enfant Plaza East, SW
Washington, DC 20594

Re: Executive Airlines (d.b.a. American Eagle) flight 5401
Accident Number: DCA04MA045
San Juan, Puerto Rico

Dear Ms. Ward:

The Air Line Pilots Association, Intl. (ALPA) submits the attached comments concerning the accident involving Executive Airlines (d.b.a. American Eagle) flight 5401, which occurred on May 9, 2004 at Luis Munoz Marin International Airport in San Juan, Puerto Rico.

The attached submission contains ALPA's analysis of the facts obtained from the NTSB's investigation and additional post accident research. This submission contains several safety recommendations that are intended to prevent similar future accidents. ALPA may make an additional submission upon receipt of any or all information not yet received from the NTSB.

The factual evidence shows that the entire flight was normal up through the first bounce on landing. Bouncing on landing an ATR-72, especially for a pilot new to the aircraft, is common. After the first bounce the captain took control of the aircraft from the first officer. The captain's actions were consistent with the training he had received. However, the wind speed fluctuations that occurred during the landing attempt sometimes counteracted the captain's inputs, and other times compounded the captain's inputs. These wind speed fluctuations were the primary contributors of the accident.

ALPA appreciates the opportunity to have participated as a party to the investigation and hopes the attached submission, findings and recommendations will be of assistance as the Board concludes its investigation.

Sincerely,

Paul Brady KC

Captain Paul Brady, Coordinator
Accident Investigation Board

Attachments

ATTACHMENT 1

FINDINGS

1. The flight crew was in compliance with all applicable flight experience and training requirements.

2. The first officer (F/O) was the pilot flying (PF) the accident leg from Eugenio Maria De Hostos Airport (MAZ), Mayagaez, Puerto Rico to Luis Munoz Marin International Airport (SJU) in San Juan, Puerto Rico.

3. This leg was the F/O's first flight leg as PF after he had completed his initial operating experience (IOE) training.

4. The Captain did a good job of coaching the F/O.

5. The aircraft was found to have no mechanical failures that could have led to the accident.

6. The Executive Airlines training program was in compliance with FAA requirements. However, Executive Airlines uses ATR-42 simulators despite the airline primarily flying ATR-72 aircraft.

7. While preparing for approach to SJU, the flight crew intentionally set the power management (PWR MGT) selector to 'Climb'. This was likely done for passenger comfort.

8. While this PWR MGT switch position is not consistent with the Before Landing Checklist, there is no factual evidence to indicate that this contributed to the accident.

9. The winds at SJU were shifting and gusting.

10. The entire flight was normal up through the first bounce on landing.

11. Bouncing on landing an ATR-72, especially for a pilot new to the aircraft, is common.

12. Subsequent to the first bounce, the captain correctly and appropriately took control of the aircraft.

13. The crew controlled the aircraft prior to and during landing as trained, utilizing good judgment, decision making skills and demonstrating proper techniques through the bounces up to the aircraft coming to rest.

ATTACHMENT 1

14. The wind gust that amounted to an increase of approximately 12 knots during the first two bounces on landing countered the captain's power reduction and resulted in the aircraft bouncing due to the excessive lift. The loss of approximately 8 knots wind compounded the power reduction leading up to the third bounce. The timing of these wind fluctuations made the aircraft unpredictable and were the primary contributor to the accident.

15. It is likely that the damage incurred during the third touchdown rendered the aircraft uncontrollable.

16. Prior to the accident, Executive Airlines did not have, or provide, any bounce recovery guidance or training.

17. Executive Airlines does not have any simulator training where there is a transfer of control at a low altitude.

18. In the post-accident documentation process, the Rudder Travel Limit Unit (TLU) switch was found set to HI Speed, which is inconsistent with the Aircraft Operating Manual (AOM) and Before Landing Checklist. However, DFDR data indicates that this switch was positioned correctly for the approach and landing, and therefore it must have been moved or dislodged during or after the accident sequence.

19. During the accident sequence, the Captain's seat failed, and the Captain received the most serious injury of all the aircraft occupants, with a fracture of the L-2 vertebra.

20. There is no evidence to indicate that the F/O's use of a prescription medication adversely affected his performance or contributed to this accident.

21. The digital Fairchild model F800 Flight Data Recorder (DFDR) manufactured by L-3 Communications is difficult to acquire data from and therefore creates problems in conducting a thorough accident investigation in a timely manner.

ATTACHMENT 2

SAFETY RECOMMENDATIONS

ALPA offers the following Safety Recommendations to attempt to correct deficiencies identified during the course of this accident investigation.

To the Federal Aviation Administration (FAA):

1. The FAA should require airborne windshear alerting systems for turbo-props flying Part 121 or 135 operations.

2. All pilot seats should be retrofit with seats meeting the standards of 14 CFR 25.562.

3. Training programs should be required to include scenarios where the pilot not flying (PNF) takes control from the pilot flying (PF) at a low altitude (e.g. 20 ft.) in the simulator.

4. If a transfer of control becomes necessary when extremely close to the ground some general guidance and/or training regarding continuing the landing or abandoning it should be developed and taught.

5. Training programs for ATR-72 pilots should be conducted in ATR-72 simulators.

6. The FAA should not accept the digital Fairchild model F800 Flight Data Recorder (DFDR) manufactured by L-3 Communications as required by 121.343 & 135.152 and require a retrofit to a better functioning DFDR for all aircraft so equipped.

SUBMISSION OF THE

AIR LINE PILOTS ASSOCIATION

TO THE

NATIONAL TRANSPORTATION SAFETY BOARD

REGARDING THE ACCIDENT INVOLVING

Executive Airlines (d.b.a. American Eagle) Flight 5401

At San Juan, Puerto Rico

ON MAY 9, 2004

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A. HISTORY OF FLIGHT

On May 9, 2004, about 1450 Atlantic Standard Time, Executive Airlines (d.b.a. American Eagle) flight 5401 (hereafter referred to as EGL 5401), an ATR 72-212, N438AT, experienced a landing with multiple bounces coming to rest in the grass alongside runway 08 at the Luis Munoz Marin International Airport (SJU) in San Juan, Puerto Rico. The nose gear collapsed aft into the fuselage. The left main landing gear (LMG) departed the aircraft after the third touchdown, and the airplane ended up about 217 feet to the left of the runway 08 centerline and about 4317 feet from the runway threshold. There was no post-crash fire, and the aircraft received substantial damage. There were 4 crewmembers and 22 passengers on board; there was one serious injury (the Captain) and 15 minor injuries reported. The weather was reported as 10 miles visibility, with the wind from 060 degrees at 14 knots gusting to 22 knots.

The flight crew was in compliance with all applicable flight experience and training requirements. The first officer (F/O) was the pilot flying (PF) the accident leg from Eugenio Maria De Hostos Airport (MAZ), Mayagaez, Puerto Rico to SJU. This leg was the F/O’s first flight leg as PF after he had completed his initial operating experience (IOE) training. The captain did a good job of coaching the F/O throughout the flight and the aircraft was found to have no mechanical failures that could have led to the accident.

The following figure and associated text is used to describe the events as they occurred during landing:

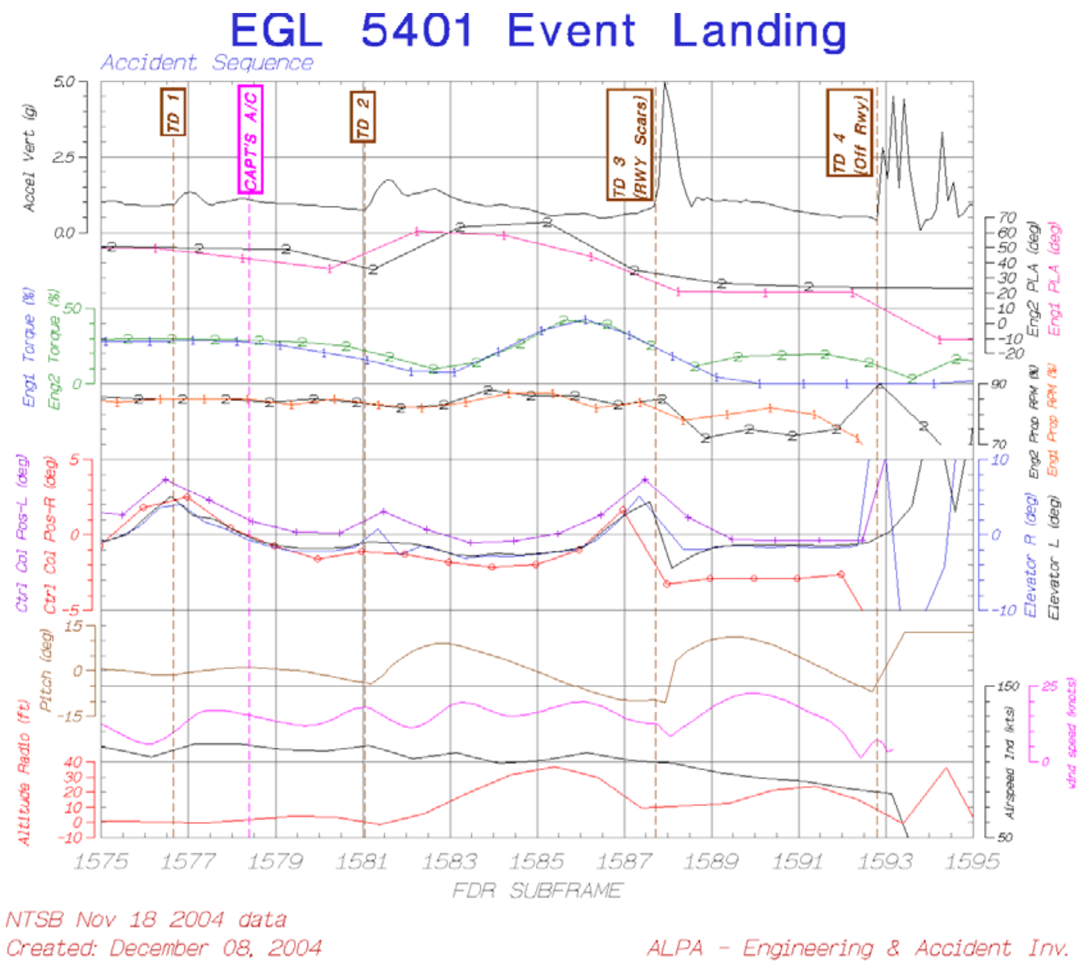

Figure 1

The data used to generate Figure 1 is data supplied by the NTSB FDR and Aircraft Performance Groups. The following paragraphs describe the significant events during the accident sequence, and the items in single quotes refer to the text boxes seen in figure 1. As noted above, initially the F/O was the PF.

1. <u>First Bounce ('TD 1'):</u>

   As the F/O attempted the landing the wind speed decreased suddenly by 7 knots and as he attempted to arrest the resultant sink rate the wind increased back another 10 knots, which resulted in a touchdown and bounce at approximately 1576 seconds DFDR subframe time as indicated in Figure 1 (i.e. 1173 ET[1] + 403[2] also equal to 18:49:39[3]). According to interviews

[1] From the Performance Study - Radar Elapsed Time (ET). 0.0 ET = 18:30:06.9 UTC.
[2] Per FDR Study page 5.
[3] From the FDR Study - All 24 hour clock time references are in Coordinated Universal Time (UTC).

with other pilots after the accident, bouncing on landing an ATR-72 is common[4], especially for a pilot new to the aircraft. This first touchdown was unremarkable, recorded at 1.3 vertical g's. The gust that began less than a second before the first touchdown assisted in the plane going airborne again.

2. Captain takes the aircraft ('CAPT'S A/C'):

At approximately 1578, just a fraction over one second after the first bounce, the captain took control of the aircraft[5]. One second later (two seconds after the first bounce) the power is reduced as can be seen by the DFDR Engine Power Lever Angle (PLA) data showing a movement from approximately 50^o to 35^o, just 5^o over the flight idle position. This indicates an initial attempt by the captain to land the airplane.

3. Second Bounce ('TD 2'):

The captain's power reduction was combined with increasing the pitch attitude in an attempt to flare, but was counteracted by the wind gust. Therefore, at approximately 1581 the aircraft bounced a second time. This touchdown resulted in 1.7 vertical g's, which is insufficient to cause any aircraft damage. The 11 knot gust that began just before the first bounce continued and peaked for a total 20 knots wind velocity. This extra 11 knots contributed to the aircraft becoming airborne again rather than remaining on the ground.

4. 9^o Nose Up Pitch Attitude:

After the second bounce the pitch rapidly increases to 9^o ANU (airplane nose up) pitch attitude at approximately 1582.5. The captain applied a small ANU control column movement that started just prior to the second bounce that primarily reduced the AND (airplane nose down) pitch attitude command. The elevators remained in an AND position except for a brief moment and then immediately returned to its previous position of about 2^o AND. The aircraft's pitch attitude increased to 9^o nose up during a time when the captain commanded a less nose down pitch attitude, not a nose up pitch attitude.

Due to the nose up pitch attitude the Captain advanced the throttles to approximately 70^o PLA (Power Lever Angle) at the same time pushing forward on the control column to arrest the climb. After leveling the aircraft, with the altitude at 37 feet, the captain started reducing the power (at approximately 1585). The throttles were reduced to a PLA of approximately 35^o over about 2 seconds. 35^o PLA should have been an appropriate position to attempt a landing. However, at the same time, the wind speed dropped 8 knots. The wind decrease compounded the effects of the power reduction and the aircraft quickly descended.

5. 11^o Nose Down Pitch Attitude:

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[4] See Operations Factual Report; FO interview, page 10; Captain interview, page 33 & 34; & Ground/Simulator Instructor interview, page 44.
[5] See Performance Study, Figure 9.

Between the second and third bounces the aircraft ended up in an 11^{o} nose down pitch down attitude at approximately 1587 due to the combination of a loss of wind and the captain's power reduction. The captain attempted to counter the quick descent with aft movement of the control column (approximately 4^{o}), which is approximately one third of the total control column movement available. However, the backpressure was not sufficient due to the loss of wind, which the captain had no way of knowing about. The aircraft's performance at this point was confusing to the captain[6]. This is reasonable, particularly because just a small amount of backpressure (approximately 1.5^{o}) at the second bounce was followed by the aircraft pitching up to 9^{o} and climbing to 37 feet, yet three times that amount of backpressure at this point didn't even slow the descent sufficiently to prevent a hard impact. ALPA believes that any pilot would have had a concern at this point to not over control the aircraft and bounce again. Therefore, there was likely some apprehension to increase the aft control column movement even more or faster than was done.

6. <u>3rd Bounce ('TD 3 (RWY Scars)'):</u>

   At about 1588 the aircraft impacts the ground very hard (5 vertical g's) and bounces back into the air for the 3rd time. This third impact resulted in the Left Main Landing Gear (LMG) breaking off from the aircraft, as evidenced by the scars that were left on the runway. In addition, the nose gear collapsed aft into the fuselage. This likely caused significant damage to the flight and engine control linkages, and rendered the aircraft uncontrollable.

7. <u>4th Touchdown ('TD 4 (Off Rwy)'):</u>

   After the third touchdown which rendered the aircraft partially or completely uncontrollable, the crew was essentially 'along for the ride' until the aircraft came to rest. Due to the flight and engine control linkage damage that occurred at the third touchdown, the DFDR data after the third bounce provides no insight to the cause(s) of the accident.

In summary, the 12 knot wind gust occurring during the first two bounces between 1576 - 1581 countered the captain's power reduction and resulted in the aircraft becoming airborne again. The loss of 8 knots wind occurring between 1586 – 1587.5 compounded the effect of the power reduction leading up to the third bounce at approximately 1588. The timing of these wind fluctuations made the aircraft unpredictable and were the primary contributors to the accident.

B. WIND AND WINDSHEAR GUIDANCE

[6] See Operations Group Factual Report, Page 30-31, Captain's interview statement "…it felt like a microburst or windshear. The situation did not make sense to him at the time."

1) AFM Ambiguity:

There is ambiguous language in the guidance to the pilots of Executive Airlines in their manuals. Flight Manual Part 1 (FM-1) page 12-22, paragraph 7.1 C says to avoid areas of known wind shear in excess of 20 knots. However, Flight Manual Part 1 (FM-1) page 12-23, paragraph 7.1 G. 3) offers a wind change in excess of 15 knots as a parameter to “recognize” wind shear. In addition, Flight Manual Part 1 (FM-1), page 3-15, paragraph 4.6 B. 2) f) instructs the captain to fly whenever the F/O has fewer than 100 hours in the type aircraft being flown and there is reported windshear. The preceding B-727 reported a 10 knot loss of airspeed on a one mile final to runway 10. It is unclear whether a captain with an F/O having fewer than 100 hours in type should fly an approach if a PIREP indicating a loss of 10 knots, but not specifically specifying “windshear,” is received. It is also unclear whether the captain should take over if a 15 knot, vice 10 knot, PIREP is received. Language in FM-1, 4.6 B. 2) f) should clarify what constitutes “windshear” requiring the captain to fly rather than an F/O with fewer than 100 hours in type.

2) On-board windshear alerting system:

Ambiguity in crew interpretation of manuals and other guidance regarding the presence of windshear could be reduced or eliminated through the use of on-board windshear alerting systems. FAR 121.358 requires all turbine powered aircraft to be equipped with an on-board wind shear alerting system. However, it does not require an on-board wind shear alerting system for an ATR-72 because turbo-prop aircraft are excluded. All transport category aircraft should be equipped similarly. The FAA committed to One Level of Safety (OLS) in 1996 when the FARs were changed to incorporate what used to be Part 135 scheduled air carriers with aircraft carrying 10 or more passengers and non-scheduled on-demand air carriers with more than 30 passengers into FAR 121. ALPA believes the omission of turbo-prop aircraft from FAR 121.358 is in conflict with OLS. All aircraft operating under Part 121 should be required by the FAA to be equipped with on-board windshear alerting systems to offer an equivalent level of safety for the passengers and crew. SJU has Terminal Doppler Weather Radar (TDWR), however an airborne system provides additional detection capability.

C. TRAINING

1) Bounce Recovery:

Prior to the accident Executive Airlines did not have any bounce recovery training. In addition, the simulator representation of bounces is unrealistic[7]. Since then the ATR 42/72 AOM Volume 1 has been updated with "Bounced Landing or Bounced Landing Recovery" procedures. However, the inability for the simulator to replicate a bounce remains an issue.

2) Transfer of Control:

The training program at Executive Airlines does not include any specific scenarios in the simulator where the pilot not flying (PNF), takes control from the PF the approach at a low altitude (e.g. 20 ft.) and having to make a decision to land or initiate a go-around. In addition, if a transfer of control becomes necessary when extremely close to the ground some general guidance and/or training regarding continuing the landing or abandoning it should be developed and taught. (Note: ALPA prefers to refer to the PNF as the Pilot Monitoring (PM) because the term better represents the importance and responsibilities of active "PNF" duties. We use PNF in this document to be consistent with the factual reports and to reduce any chance of misunderstanding.)

3) ATR-42 Simulator:

Although there is insufficient evidence to rule it in or out as a factor in the accident, a deficiency we have discovered at Executive Airlines is the use of ATR-42 simulators to train ATR-72 pilots despite the airline primarily flying ATR-72 aircraft. While the ATR-42 and ATR-72 share a common type rating they have significant differences. Due to the differences, training would benefit from the use of an ATR-72 simulator.

Some of the differences between the ATR-42 and ATR-72 are:

a) In the ATR-42 the condition levers get set to 100% during the Before Landing Checklist. Prior to the accident the condition levers of the ATR-72 could be set to either 86% or 100%. Since the accident this has been changed on the Executive Airlines Before Landing Checklist so that only the 100% option is available.

b) The ATR-42 has no Rudder Travel Limit Unit (TLU). Since a large portion of the training is done in the ATR-42 simulator, very little experience is gained with the TLU until actually in revenue flight. The pilot interaction with the TLU system primarily only requires verification of the "TLU LO speed" light during the Before Landing Checklist unless there is a malfunction. However, it is an additional system the pilot must ensure is utilized correctly.

c) Due to the greater fuselage length of the ATR-72, the same flare in an ATR-72 in line operations that was done in simulator training in an ATR-42 could result in a tail strike in the 72. A pilot new to the ATR-72 could have become used to (in training) flaring the aircraft in a way that presented no problems in the ATR-42

[7] See Operations Group Factual Report, page 13.

simulator but would have resulted in an ATR-72 tail strike. Despite conducting IOE in the ATR-72 aircraft, it is possible that the initial training in the ATR-42 simulator could create habits inappropriate for landing an ATR-72 that are not discovered during IOE or not completely corrected during IOE.

d) As in all aircraft there are different handling characteristics between model variants. Some are less responsive to control inputs at slow speeds than others. Some aircraft land in flatter attitudes than others, resulting in a different pilot perspective with the horizon, etc. Some aircraft are more prone to bounce upon landing than others. This is the case for the ATR-72 as compared to the ATR-42, as well.

These differences reveal how training would benefit if an ATR-72 simulator were utilized for ATR-72 pilots.

D. FLIGHT CREW SEATS

During the accident sequence, the Captain's seat failed, and the Captain received the most serious injury of all the aircraft occupants, with a fracture of the L-2 vertebra[8]. Analysis of DFDR data indicates that the Captain's seat was subjected to a load of approximately 11.6 vertical g's[9]. In the investigation it was found the seat design met the applicable design requirements[10] but that only requires the seat to withstand a 6 g vertical load. ALPA believes that the captain's injury was exacerbated by the seat failure during the accident. The current standard for new aircraft seats (crew and cabin) is 14 vertical g's. Therefore, if the seat had been retrofit to meet current standards, then the seat would have stayed intact through the impact sequence. Since the human body is generally capable of withstanding much more than 14 g's in the vertical plane, then it is likely that the captain was injured as a result of the seat breaking and imposing higher forces on his back. Thus, if the seats had been retrofit, then the captain would have not been injured.

The FAA first proposed a retrofit plan for all air carrier aircraft seats in 1988. That NPRM was withdrawn and the FAA subsequently issued a modified NPRM in 2002. However, that modified NPRM excluded flight crew seats and still has not been made final even though the comment period closed on December 3, 2002. As noted, the 2002 NPRM specifically excluded flight crew seats from the proposal for increasing seat strength, using the argument that flight deck seats had not been shown to cause injuries. This accident provides evidence contrary to that conclusion. Therefore, this accident should support a recommendation that flight crew seats be retrofit with seats protecting the occupants in the 14 g dynamic impact scenarios of FAR 25.562.

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[8] See Survival Factors Group Factual Report, page 11.
[9] See Performance Study, page 3.
[10] According to Survival Factors Group Factual Report, page 7, an IPECO Test Report No. 1057, issued March 25, 1983, indicated the crew seat design met the static load requirements contained in TSO C-39a.

E. AIRCRAFT SYSTEMS

1) Rudder Travel Limit Unit (TLU):

According to the ATR-72 Airplane Operating Manual (AOM), the TLU limits rudder travel to +/- 4^{o} [11] whenever set to Auto and above 185 knots or when set to HI speed in order to prevent damage to the Rudder and Vertical Stabilizer. The rudder travel when set to auto and below 185 knots or when set to LO speed is +/- 27^{o}. The TLU has three positions: Auto, HI Speed and LO speed. The only time the TLU would be manually set to HI or LO speed is if the Auto control had failed.

The Before Landing Checklist requires that the TLU light be illuminated indicating "LO SPD" or "OK." This ensures that if the system is in Auto that the system is operating properly by not restricting the rudder travel or if in manual mode that the crew has set the TLU to LO speed for landing/operations below 185 knots.

During the accident investigation the TLU switch was found in the HI speed position. However, as can be seen in Figure 2 below, the Rudder reaches greater than a 10^{o} deflection at 1587.5. This 10^{o} deflection occurs prior to any impact that could have damaged the aircraft and exceeds the +/- 4^{o} limits imposed when the TLU is set to HI-speed. Therefore, the TLU could not have been set to HI-speed during the approach and must have ended up in this position sometime later in the accident sequence or after the accident, such as during evacuation.

[11] See System Group Factual Report, page 10

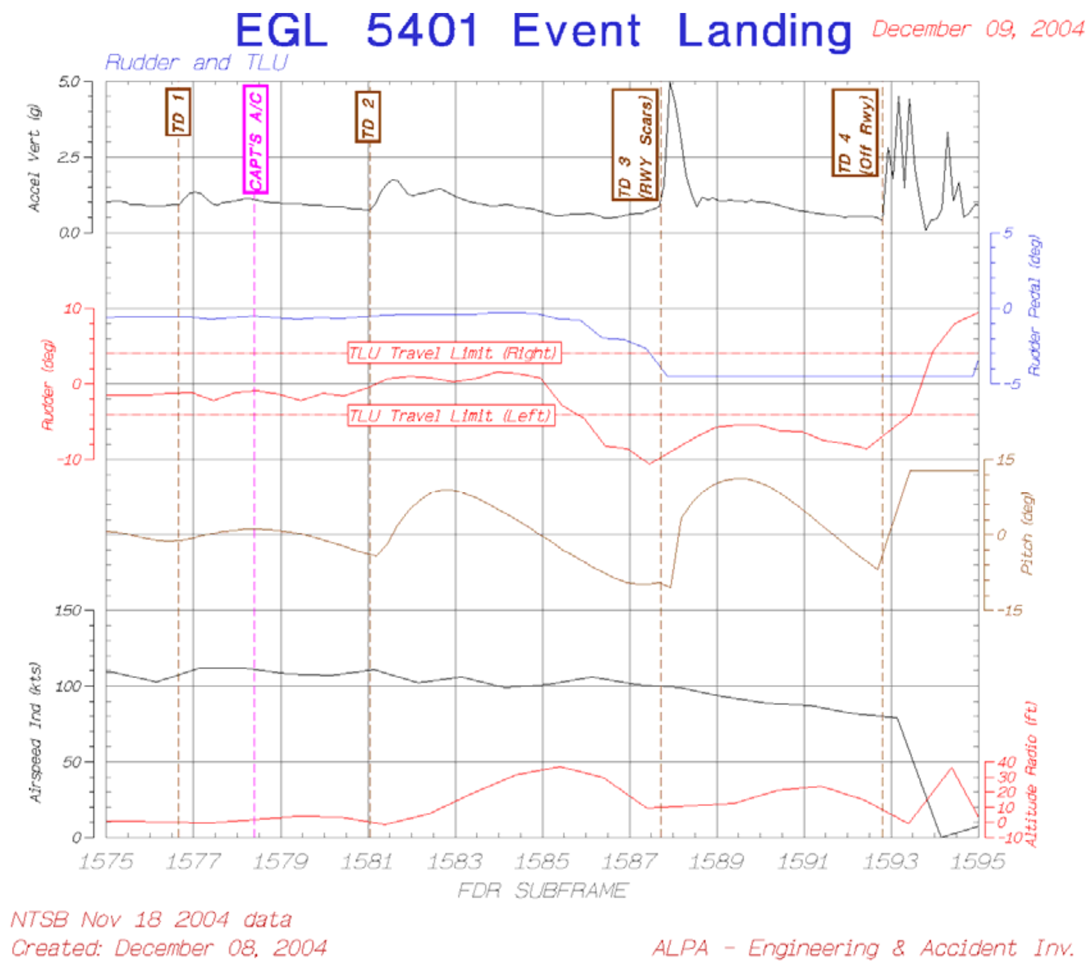

Figure 2

2) Power Management (PWR MGT) Selector:

The PWR MGT Selector located on the center instrument panel provides maximum torque limit *indications* on each Torque indicator for the selected mode of operation. The PWR MGT is *not* a torque limiting device. Four operating modes are labeled: TO (Takeoff), MCT (Maximum Continuous), CLB (Climb), and CRZ (Cruise).

The Before Landing Checklist calls for the PWR MGT to be set to TO. While preparing for approach to SJU, the flight crew intentionally set the power management (PWR MGT) selector to CLB[12]. According to the ATR 42/72 AOM Volume 2, when the PWR MGT is set to TO the condition levers automatically advance to MAX RPM when the associated Power Lever is moved above 56^{o} [13]. This can sometimes result in asymmetrical thrust and discomfort for the passengers.

[12] See CVR Factual Report, 1845:44.
[13] See Operations Group Factual Report, Attachment 10.

It is clear from the CVR discussion that the crew made a decision to place the PWR MGT to CLB for this reason.

If necessary the pilot could get the same performance out of the aircraft by advancing the power levers above the ‘notch’ and manually advancing the condition levers to MAX RPM. Therefore, data does not support that the PWR MGT setting or lack of auto-advancing control levers had any impact on the accident.

F. UNAUTHORIZED MEDICATION

The F/O was taking a prescription medication without specific authorization from an FAA Medical Examiner. As noted previously, the F/O was the PF for this leg. The flight and his performance were completely normal. Also noted previously, it is not uncommon for the ATR-72 to bounce on landing, and pilots new to this aircraft (as the F/O was) are particularly prone to experiencing bounces on landing. Immediately after the first bounce, the captain took control of the aircraft. Based on these facts and the sequence of events, there is no evidence to indicate that the F/O’s use of this medication adversely affected his performance or contributed to this accident. In addition, the captain, who closely monitored the entire flight, as evident in the CVR Report, saw no performance deficiencies to warrant taking control of the aircraft from the F/O prior to his landing attempt.

ALPA supports the FAR requirement for airmen to have specific authorization from an FAA Medical Examiner prior to operating while taking prescription medication. However, the factual evidence in this investigation demonstrates no connection between the medication and the accident sequence.

G. Digital Flight Data Recorder (DFDR)

The particular digital Fairchild model F800 Flight Data Recorder (DFDR) manufactured by L-3 Communications that was installed on the accident aircraft has a history of data recording problems when it is subjected to high accelerations such as were experienced in this accident. These recording problems cause significant difficulties when attempting to extract post-accident data. Because of this history, the BEA (the French government investigative agency) has developed special software to facilitate extraction of usable flight data. However, as would be expected, this process is extremely labor and time-intensive, and frequently does not yield a full set of continuous data. That was also the case in this event.

These difficulties result in undue delays and the loss of valuable data. Therefore, the Fairchild model F800 DFDR manufactured by L-3 Communications should not be considered as meeting the applicable FAR requirements and should either be modified or removed from service.

H. SUMMARY:

The pilots performed correctly as trained, with the exception of the PWR MGT selection. All the pilot control inputs were appropriate to the indications provided by the aircraft performance, outside references and instrument indications. Based on the facts available it would be inappropriate to place the bulk of the cause of the accident on the flight crew.

The facts do show that the crew did not comply with the Before Landing Checklist by setting the PWR MGT system to Climb. The facts also show that the F/O was inappropriately taking a prescription drug. However, based on the facts obtained in the accident investigation neither of these factors directly caused or even contributed to the accident.

The primary contributors to the accident were the wind shifts that occurred simultaneously with the pilot inputs.

I. FINDINGS

1. The flight crew was in compliance with all applicable flight experience and training requirements.

2. The first officer (F/O) was the pilot flying (PF) the accident leg from Eugenio Maria De Hostos Airport (MAZ), Mayagaez, Puerto Rico to Luis Munoz Marin International Airport (SJU) in San Juan, Puerto Rico.

3. This leg was the F/O's first flight leg as PF after he had completed his initial operating experience (IOE) training.

4. The Captain did a good job of coaching the F/O.

5. The aircraft was found to have no mechanical failures that could have led to the accident.

6. The Executive Airlines training program was in compliance with FAA requirements. However, Executive Airlines uses ATR-42 simulators despite the airline primarily flying ATR-72 aircraft.

7. While preparing for approach to SJU, the flight crew intentionally set the power management (PWR MGT) selector to 'Climb'. This was likely done for passenger comfort.

8. While this PWR MGT switch position is not consistent with the Before Landing Checklist, there is no factual evidence to indicate that this contributed to the accident.

9. The winds at SJU were shifting and gusting.

10. The entire flight was normal up through the first bounce on landing.

11. Bouncing on landing an ATR-72, especially for a pilot new to the aircraft, is common.

12. Subsequent to the first bounce, the captain correctly and appropriately took control of the aircraft.

13. The crew controlled the aircraft as trained, utilizing good judgment, decision making skills and demonstrating proper techniques through the bounces up to the aircraft coming to rest.

14. The wind gust that amounted to an increase of approximately 12 knots during the first two bounces on landing countered the captain's power reduction and resulted in the aircraft bouncing due to the excessive lift. The loss of approximately 8 knots wind compounded the power reduction leading up to the third bounce. The timing of these wind fluctuations made the aircraft unpredictable and were the primary contributor to the accident.

15. It is likely that the damage incurred during the third touchdown rendered the aircraft uncontrollable.

16. Prior to the accident, Executive Airlines did not have, or provide, any bounce recovery guidance or training.

17. Executive Airlines does not have any simulator training where there is a transfer of control at a low altitude.

18. In the post-accident documentation process, the Rudder Travel Limit Unit (TLU) switch was found set to HI Speed, which is inconsistent with the Aircraft Operating Manual (AOM) and Before Landing Checklist. However, DFDR data indicates that this switch was positioned correctly for the approach and landing, and therefore it must have been moved or dislodged during or after the accident sequence.

19. During the accident sequence, the Captain's seat failed, and the Captain received the most serious injury of all the aircraft occupants, with a fracture of the L-2 vertebra.

20. There is no evidence to indicate that the F/O’s use of a prescription medication adversely affected his performance or contributed to this accident.

21. The digital Fairchild model F800 Flight Data Recorder (DFDR) manufactured by L-3 Communications is difficult to acquire data from and therefore creates problems in conducting a thorough accident investigation in a timely manner.

J. SAFETY RECOMMENDATIONS

ALPA offers the following Safety Recommendations to attempt to correct deficiencies identified during the course of this accident investigation.

To the Federal Aviation Administration (FAA):

1. The FAA should require airborne windshear alerting systems for turbo-props flying Part 121 or 135 operations.

2. All pilot seats should be retrofit with seats meeting the standards of 14 CFR 25.562.

3. Training programs should be required to include scenarios where the pilot not flying (PNF) takes control from the pilot flying (PF) at a low altitude (e.g. 20 ft.) in the simulator.

4. If a transfer of control becomes necessary when extremely close to the ground some general guidance and/or training regarding continuing the landing or abandoning it should be developed and taught.

5. Training programs for ATR-72 pilots should be conducted in ATR-72 simulators.

6. The FAA should not accept the digital Fairchild model F800 Flight Data Recorder (DFDR) manufactured by L-3 Communications as required by 121.343 & 135.152 and require a retrofit to a better functioning DFDR for all aircraft so equipped.