NATIONAL TRANSPORTATION SAFETY BOARD
Public Meeting of March 12, 2019
(Information subject to editing)

Departure From Controlled Flight, Trans-Pacific Air Charter, LLC
Learjet 35A, N452DA, Teterboro, New Jersey
May 15, 2017
NTSB/AAR-19/02

This is a synopsis from the NTSB's report and does not include the Board's rationale for the conclusions, probable cause, and safety recommendations. NTSB staff is currently making final revisions to the report from which the attached conclusions and safety recommendations have been extracted. The final report and pertinent safety recommendation letters will be distributed to recommendation recipients as soon as possible. The attached information is subject to further review and editing to reflect changes adopted during the Board meeting.

Executive Summary

On May 15, 2017, about 1529 eastern daylight time, a Learjet 35A, N452DA, departed controlled flight while on a circling approach to runway 1 at Teterboro Airport (TEB), Teterboro, New Jersey, and impacted a commercial building and parking lot. The pilot-in-command (PIC) and the second-in-command (SIC) died; no one on the ground was injured. The airplane was destroyed by impact forces and postcrash fire. The airplane was registered to A&C Big Sky Aviation, LLC, and was operated by Trans-Pacific Air Charter, LLC, under the provisions of Title 14 *Code of Federal Regulations* (*CFR*) Part 91 as a positioning flight. Visual meteorological conditions prevailed, and an instrument flight rules flight plan was filed. The flight departed from Philadelphia International Airport (PHL), Philadelphia, Pennsylvania, about 1504 and was destined for TEB.

The accident occurred on the flight crew's third and final scheduled flight of the day; the crew had previously flown from TEB to Laurence G. Hanscom Field (BED), Bedford, Massachusetts, and then from BED to PHL. The PIC checked the weather before departing TEB about 0732; however, he did not check the weather again before the flight from PHL to TEB despite a company policy requiring that weather information be obtained within 3 hours of departure. Further, the crew filed a flight plan for the accident flight that included altitude (27,000 ft) and time en route (28 minutes) entries that were incompatible with each other, which suggests that the crew devoted little attention to preflight planning. The crew also had limited time in flight to plan and brief the approach, as required by company policy, and did not conduct an approach briefing before attempting to land at TEB.

Cockpit voice recorder data indicated that the SIC was the pilot flying (PF) from PHL to TEB, despite a company policy prohibiting the SIC from acting as PF based on his level of experience. Although the accident flight was likely not the first time that the SIC acted as PF (based on comments made during the flight), the PIC regularly coached the SIC (primarily on checklist

initiation and airplane control) from before takeoff to the final seconds of the flight. The extensive coaching likely distracted the PIC from his duties as PIC and pilot monitoring, such as executing checklists and entering approach waypoints into the flight management system.

Collectively, procedural deviations and errors resulted in the flight crew's lack of situational awareness throughout the flight and approach to TEB. Because neither pilot realized that the airplane's navigation equipment had not been properly set for the instrument approach clearance that the flight crew received, the crew improperly executed the vertical profile of the approach, crossing an intermediate fix and the final approach fix hundreds of feet above the altitudes specified by the approach procedure.

The controller had vectored the flight for the instrument landing system runway 6 approach, circle to runway 1. When the crew initiated the circle-to-land maneuver, the airplane was 2.8 nautical miles (nm) beyond the final approach fix (about 1 mile from the runway 6 threshold) and could not be maneuvered to line up with the landing runway, which should have prompted the crew to execute a go-around because the flight did not meet the company's stabilized approach criteria. However, neither pilot called for a go-around, and the PIC (who had assumed control of the airplane at this point in the flight) continued the approach by initiating a turn to align with the landing runway. Radar data indicated that the airplane's airspeed was below the approach speed required by company standard operating procedures (SOP). During the turn, the airplane stalled and crashed about ½ nm south of the runway 1 threshold.

The NTSB identified the following safety issues as a result of this accident investigation:

- **Need for flight data monitoring (FDM) programs (and supporting recording devices) for 14 *CFR* Part 135 operators.** If this flight had not ended in an accident, Trans-Pacific (a Part 135 operator) would not have had a way to identify the flight crew's deviations from policy and procedures just as it had no way to determine whether this (or any) crew's previous operations were conducted in accordance with company policies and SOPs. The NTSB has long recognized the value of FDM programs for Part 135 operators, having first issued a safety recommendation for data recording devices and monitoring programs for helicopter emergency medical service operators in 2009. More recently, as a result of our investigation of a 2015 fatal accident in Akron, Ohio, involving a Part 135 operator, the NTSB recommended that the Federal Aviation Administration (FAA) require all Part 135 operators to install data recording devices capable of supporting an FDM program and then to establish structured FDM programs (Safety Recommendations A-16-34 and -35, respectively). The Trans-Pacific accident further highlights the need for such programs and recording devices to be required for Part 135 operators.

- **Need for safety management systems (SMS) for Part 135 operators.** Although a safety officer position was included in Trans-Pacific's organizational chart and the company was pursuing an SMS, no formal safety programs were in place at the time of the accident. Therefore, the company did not identify or mitigate the hazards that contributed to this accident (such as an unauthorized SIC acting as PF and pairing two

pilots who had both exhibited difficulties in training). The NTSB has investigated several other Part 135 accidents that highlighted operational safety issues that could have been identified and mitigated by an SMS. As a result of our investigation of the Akron accident, the NTSB also recommended that the FAA require all Part 135 operators to establish an SMS (Safety Recommendation A-16-36).

- **Need for the FAA to develop and implement procedures to identify Part 135 operators whose pilots do not comply with SOPs.** FAA guidance states that cockpit en route inspections are one of the "most effective methods of accomplishing [the FAA's] air transportation surveillance objectives." Despite this statement, the FAA's principal operations inspector for Trans-Pacific at the time of the accident stated that he had never conducted an en route inspection for a Part 135 operator and had no way of knowing if pilots were following SOPs during flights based on the line checks that he performed. Similar to this accident, the NTSB found multiple instances of a flight crew's failure to comply with SOPs during the Akron accident investigation and noted that the FAA had never conducted an en route inspection of any pilots at that company. As part of the Akron investigation, we recommended that the FAA review its Safety Assurance System (SAS) and develop and implement procedures needed to identify Part 135 operators whose pilots do not comply with SOPs (Safety Recommendation A-16-41), but the FAA has not yet taken the requested action, even though the circumstances of the TEB accident demonstrate that noncompliance with SOPs remains a pervasive issue for Part 135 operations.

- **Need for Part 135 operators to monitor pilots with performance deficiencies.** Trans-Pacific was aware that both accident pilots required additional simulator training sessions to complete initial company training. However, after completing the simulator training, both pilots began line operations without any further monitoring or evaluation. During the accident flight, both pilots exhibited performance problems that mirrored some of those noted during their simulator training courses (for example, the PIC did not properly execute the circling approach, and the SIC struggled with aircraft control).

  As a result of our investigation of a 2003 accident in Memphis, Tennessee, the NTSB recommended that the FAA require Part 121 air carriers to establish programs to review the performance history of crewmembers who had performance deficiencies or had experienced failures in training and administer additional oversight and training to ensure that performance deficiencies are addressed and corrected (Safety Recommendation A-05-14, classified "Closed—Acceptable Action"). Part 135 operators would benefit from similar required programs.

- **Inadequate FAA guidance for Part 135 crew resource management (CRM) training.** Beginning in 2013, the FAA required all Part 135 operators to provide CRM training to flight crews. Title 14 *CFR* 135.330 requires operators to cover eight specific topics in CRM training; however, the FAA does not provide clear guidance on how operators can implement required CRM training, even though such guidance is available for Part 121 CRM programs. Both accident pilots participated in Trans-Pacific's CRM training program, which had been approved by the FAA and covered all required topics. However, the training did not seem to influence the crew's

actions during the accident flight. FAA-funded scientific research has identified factors that influence the effectiveness of CRM training. These findings could be used to develop guidance for CRM training programs tailored to the specific characteristics of Part 135 operations.

- **Need for leadership training for Part 135 PICs.** The absence of adequate preflight planning and the omission of required checklists, callouts, and briefings during the accident flight were indications of the PIC's inadequate leadership. Title 14 *CFR* 135.330 requires operators, as part of CRM training, to provide training that addresses the authority of the PIC but does not contain additional details. Trans-Pacific's CRM training did not adequately describe core leadership functions necessary for ensuring effective crew performance. The NTSB has found deficiencies in PIC leadership in previous accident investigations, most notably in the investigation of the 2009 accident in Clarence Center, New York. As a result of that investigation, we recommended that the FAA issue an advisory circular on leadership training for upgrading captains and require all Part 121, 135, and 91K operators to provide such training (Safety Recommendations A-10-13 and -14, respectively). In October 2016, the FAA issued a notice of proposed rulemaking modifying leadership training requirements for Part 121 operators but not Part 135 or 91K operators.

  The NTSB notes that the PIC in this accident had never been employed as a Part 135 PIC before being hired by Trans-Pacific and had never received formal specific leadership training to prepare him for the leadership duties associated with the upgrade to PIC. Specific leadership training for Part 135 and 91K PICs provided during the upgrade process would help standardize and reinforce the critical command authority skills that PICs need.

- **Lack of approach speed wind additive guidance in Trans-Pacific SOPs.** The Learjet 35A airplane flight manual recommends increasing approach speed in gusting wind conditions. However, the approach speeds listed in Trans-Pacific's SOPs did not include these wind additives; gusting wind conditions were present during the accident flight. Although the accident airplane was flown significantly slower than directed by the SOPs during the approach, the airplane remained above the manufacturer-published stall speed. However, the strong, gusting wind might have momentarily reduced the airplane's airspeed below the stall speed. Adding guidance to Learjet 35A operations manuals to include a wind additive (if appropriate) when calculating approach speeds would provide additional stall margin and reduce the risk of a stall.

Findings

1. The flight crew was properly certificated; there was no indication that the flight crew was impaired by medical conditions, alcohol, or other drugs; and there were no preimpact airplane anomalies that would have precluded normal operation.

2. The pilot-in-command's preflight planning was inadequate and incomplete.

3. The flight crewmembers' failure to verify the approach and conduct an approach briefing resulted in confusion and errors that led them to mismanage the vertical profile for the approach and not initiate the circle-to-land maneuver according to air traffic control instructions.

4. The pilot-in-command's inadequate and incomplete preflight planning and the flight crew's lack of an approach briefing contributed to the crew's confusion and lack of situational awareness during the accident flight.

5. The pilot-in-command's decision to allow the second-in-command to act as pilot flying was improper and contrary to company standard operating procedures.

6. The pilot-in-command's (PIC) extensive coaching of the second-in-command in his pilot flying (PF) duties distracted the PIC, interfered with the normal division of PF and pilot monitoring duties, and degraded the flight crew's overall performance.

7. The pilot-in-command's decision to continue the approach was inappropriate because the approach did not meet the company's stabilized approach criteria and the airplane was not in a position to make a safe landing.

8. The pilot-in-command's focus on the visual maneuver of aligning the airplane with the landing runway distracted him from multiple indications of decreasing stall margin, resulting in an aerodynamic stall at low altitude.

9. A flight data monitoring program can help Title 14 *Code of Federal Regulations* Part 135 operators identify and mitigate procedural noncompliance, including the operational deficiencies identified in this accident investigation.

10. Because the Federal Aviation Administration (FAA) was not conducting checks in a manner that allowed observation of routine flight operations, the FAA could not evaluate Trans-Pacific Jets pilots' compliance with standard operating procedures during these operations.

11. A safety management system (SMS) would have improved Trans-Pacific Jets' ability to identify and mitigate risks because an SMS requires operators to incorporate formal system safety methods into their internal oversight programs.

12. Effective oversight procedures within the Safety Assurance System would help the Federal Aviation Administration identify operators that do not ensure flight crew compliance with standard operating procedures.

13. The pilots' performance on the accident flight included deficiencies that were noted during their initial Trans-Pacific Jets training, but the company did not monitor the pilots' subsequent performance to identify and correct any continued deficiencies.

14. Although Trans-Pacific Jets' crew resource management (CRM) training program complied with the requirements of Title 14 *Code of Federal Regulations* (*CFR*) 135.330, the Federal Aviation Administration had not provided adequate guidance for 14 *CFR* Part 135 operators

to develop and implement effective CRM training programs; consequently, Trans-Pacific's training did not result in the flight crew effectively using CRM to mitigate safety risks.

15. Specific leadership training provided to Title 14 *Code of Federal Regulations* Part 135 and 91K pilots at the time of upgrade to pilot-in-command would help standardize and reinforce critical command authority skills and improve flight safety.

16. Because the company did not have a Learjet-qualified management pilot or check airman on staff during the accident second-in-command's (SIC) period of employment, Trans-Pacific Jets' graduated SIC qualification policy could not provide him and the other company Learjet SIC a viable, well-structured path to gain experience as pilot flying.

17. Including the manufacturer-recommended approach speed wind additives in operations manuals for Learjet 35A airplanes could reduce the risk of a stall by requiring pilots to increase the approach speed in weather conditions conducive to rapid and possibly unexpected wind changes.

Probable Cause

The NTSB determines that the probable cause of this accident was the PIC's attempt to salvage an unstabilized visual approach, which resulted in an aerodynamic stall at low altitude. Contributing to the accident was the PIC's decision to allow an unapproved SIC to act as PF, the PIC's inadequate and incomplete preflight planning, and the flight crew's lack of an approach briefing. Also contributing to the accident were Trans-Pacific's lack of safety programs that would have enabled the company to identify and correct patterns of poor performance and procedural noncompliance and the FAA's ineffective SAS procedures, which failed to identify these company oversight deficiencies.

Recommendations

New Recommendations

As a result of this investigation, the National Transportation Safety Board makes the following new safety recommendations to the Federal Aviation Administration:

1. Require all Title 14 *Code of Federal Regulations* Part 135 operators to establish programs for flight crewmembers who have demonstrated performance deficiencies or experienced failures during training and administer additional oversight and training to address and correct performance deficiencies.

2. Develop guidance for Title 14 *Code of Federal Regulations* Part 135 operators to help them create and implement effective crew resource management training programs.

3. Review operators' Learjet 35A operations manuals to determine whether they contain manufacturer-recommended approach speed wind additives and

encourage those operators without that information to add it to their operations documents.

Previously Issued Recommendations Reiterated in This Report

The National Transportation Safety Board reiterates the following recommendations to the Federal Aviation Administration:

1. Issue an advisory circular with guidance on leadership training for upgrading captains at 14 *Code of Federal Regulations* Part 121, 135, and 91K operators, including methods and techniques for effective leadership; professional standards of conduct; strategies for briefing and debriefing; reinforcement and correction skills; and other knowledge, skills, and abilities that are critical for air carrier operations. (A-10-13)

2. Require all 14 *Code of Federal Regulations* Part 121, 135, and 91K operators to provide a specific course on leadership training to their upgrading captains that is consistent with the advisory circular requested in Safety Recommendation A-10-13. (A-10-14)

3. Require all 14 *Code of Federal Regulations* Part 135 operators to install flight data recording devices capable of supporting a flight data monitoring program. (A-16-34)

4. After the action in Safety Recommendation A-16-34 is completed, require all 14 *Code of Federal Regulations* Part 135 operators to establish a structured flight data monitoring program that reviews all available data sources to identify deviations from established norms and procedures and other potential safety issues. (A-16-35)

5. Require all 14 *Code of Federal Regulations* Part 135 operators to establish safety management system programs. (A-16-36)

6. Review the Safety Assurance System and develop and implement procedures needed to identify 14 *Code of Federal Regulations* Part 135 operators that do not comply with standard operating procedures. (A-16-41)

Previously Issued Recommendation Reclassified in This Report

Safety Recommendation A-16-41 is reclassified "Open—Unacceptable Response."