National Transportation Safety Board
Aviation Accident Final Report

Location:	Atlanta, GA	**Accident Number:**	ERA12LA401
Date & Time:	06/18/2012, 1006 EDT	**Registration:**	N826JH
Aircraft:	BEECH 400A	**Aircraft Damage:**	Substantial
Defining Event:	Miscellaneous/other	**Injuries:**	2 Serious, 2 Minor
Flight Conducted Under:	Part 91: General Aviation - Executive/Corporate		

Analysis

The second-in-command (SIC) was the pilot flying for most of the flight (takeoff, climb, cruise, and descent) and was in the left seat, while the pilot-in-command (PIC) was the pilot monitoring for most of the flight and was in the right seat. Before takeoff, the PIC calculated reference speed (Vref) for the estimated landing weight and flaps 30-degree extension was 120 knots, with a calculated landing distance of 3,440 ft. Further, before takeoff, there were no known mechanical difficulties with the brakes, flaps, antiskid, or traffic alert and collision avoidance (TCAS) systems. After takeoff and for most of the flight, the PIC coached/instructed the SIC, including instructions on how to set the airspeed command cursor, a request to perform the after-takeoff checklist, and a comment to reduce thrust to silence an overspeed warning aural annunciation. When the flight was northwest of Dekalb Peachtree Airport (PDK), Atlanta, Georgia, on a right base leg for a visual approach to runway 20L with negligible wind, air traffic controllers repeatedly announced the location and distance of a Cessna airplane (which was ahead of the Beech 400A on a straight-in visual approach to runway 20R). Because the Beech 400A flight crew did not see the other airplane, the controllers appropriately instructed them to maintain their altitude (which was 2,300 ft mean sea level [msl]) for separation until they had the traffic in sight; radar data indicated the Beech 400A briefly descended to 2,200 ft msl then climbed back to 2,300 ft msl. According to the cockpit voice recorder (CVR) transcript, at 1004:42, which was about 12 seconds after the controller instructed the Beech 400A flight crew to maintain altitude, the on board TCAS alerted "traffic traffic." While the Beech 400A did climb back to 2,300 ft msl, this was likely a response to the air traffic control (ATC) instruction to maintain altitude and not a response to the TCAS "traffic traffic" warning. At 1004:47, the CVR recorded the SIC state, "first degree of," likely referring to flap extension, but the comment was not completed. The CVR recorded an immediate increase in background noise, which was likely due to the landing gear extension. The PIC then advised the local controller that the flight was turning onto final approach. The CVR did not record any approach briefing or discussion of runway length or Vref speed.

The PIC stated in a postaccident interview that he took control of the airplane during the base leg on approach to PDK. This likely occurred at 1005:05, when the CVR recorded the PIC state, "let me see a second"; however, the transfer was not explicitly verbalized. According to the CVR

transcript, at 1005:08, the controller advised the Cessna pilot that the Beech 400A had just flown over his airplane, which the Cessna pilot confirmed; about that time, radar data indicated that the Beech 400A was at 2,400 ft msl, and the Cessna was at 1,800 ft msl. However, both the SIC and the PIC of the accident airplane erroneously believed the Cessna was 300 ft above them. The PIC of the accident airplane reported that because of the perceived location of the traffic conflict, he initiated a right turn and descent for the runway without seeing the Cessna and contrary to the instructions from the controller. During the approach, the enhanced ground proximity warning system (EGPWS) sounded the aural caution "sink rate sink rate" and also the aural warning "pull up pull up" several times. The CVR did not record comments from either flight crewmember about the cautions or warnings; they performed no maneuvers in response to the cautions or warnings and elected to continue the approach to the runway rather than perform a go-around, which is what they should have done after they evaluated the situation and per the Flight Manual Supplement. At the last recorded EGPWS position (.5 nautical mile [nm] from the displaced threshold and 153 ft above the displaced threshold elevation of runway 20L), the calculated groundspeed was 194 knots, and the descent rate was greater than 2,150 ft per minute.

During postaccident interviews, neither flight crewmember could recall the airspeed during the approach; however, the PIC reported that he believed the airplane was high and fast on approach, which is consistent with his comment of "way too fast" recorded on the CVR. Witnesses, including PDK tower controllers, reported that the airplane appeared to be fast on approach, and the touchdown point on the runway was consistently reported to be about abeam the very high frequency omnidirectional range/distance measure equipment navigation aid on the airport, which allowed for about 2,970 ft of runway remaining. After touchdown, an unidentified crewmember called for deployment of the thrust reversers, and the SIC called for deployment of the speed brakes. The PIC reported applying the wheel brakes, but the airplane did not decelerate as expected. He stated that he released and then reapplied the wheel brakes with maximum force, again without effect. During a postaccident interview, he attributed the inability to stop the airplane to be a malfunction of the normal brake system; however, both passengers in the accident airplane reported hearing sounds consistent with brake application during the landing roll. Further, skid marks alternating light and dark in color were found on the runway, which are indicative of brake application and antiskid release. The airplane departed the end of the runway and came to rest about 800 ft from the departure end of the runway adjacent to the airport boundary fence. The PIC reported in a postaccident interview that after the accident, he set the airplane back to takeoff configuration.

Given the observed touchdown point, the retracted flaps position, and the excessive speed during the approach, the airplane would not have been able to stop on the runway. Although the PIC reported that he positioned the flap selector to the 30-degree position during the approach and it was found in that position during the investigation, postaccident inspection of the flap system components indicated that the flaps were retracted. The CVR recorded the SIC begin a command to extend the flaps to the first notch; however, the PIC did not verbally respond to the incomplete command for flaps to be set, the before-landing checklist was not verbalized, and there was no discussion of flap position. While the speed during the final portion of the approach and at touchdown could not be determined, it is unlikely the airplane decelerated to or below the maximum 30-degree flap extension speed of 165 knots before touchdown, given that the airplane's groundspeed was 194 knots when the airplane was .5 nm

from the displaced runway threshold. Further, operation of the airplane with 30 degrees of flaps extended at speeds in excess of the maximum allowable speed would have resulted in noticeable vibration; the passengers reported that they did not notice anything unusual about the flight until landing. The estimated high airspeed at landing reported by witnesses also indicated that the flaps were not extended because the flaps set in the 30 degree position would have resulted in aerodynamic deceleration. Additionally, no evidence of preimpact failure or malfunction of the flap system components was noted. Therefore, the as found position of the flap selector most likely occurred after the airplane came to rest and not during flight as reported by the PIC. Calculations by the airplane manufacturer indicate that in the configuration of the airplane on approach (flaps retracted), any speed greater than 142 knots would have resulted in an inadequate distance remaining to stop the airplane from the observed touchdown point.

Postaccident examination and testing of the brake and antiskid system components revealed no evidence of preimpact failure or malfunction, even though the PIC reported that the inability to stop the airplane was caused by a malfunction of the wheel brake system. Further, alternating light and dark-colored marks on the runway indicated braking action and antiskid release of brake pressure consistent with normal operation of both systems. The lack of deceleration was most likely the result of the airplane being at an excessive airspeed with the flaps retracted, rendering a light weight-on-wheels condition and, thus, reduced wheel braking. While the light weight-on-wheels condition could have prevented the deployment of the thrust reversers and speed brakes, it is also possible that the flight crew did not deploy the thrust reversers and speed brakes, despite the comments recorded on the CVR. The PIC's intentional action of setting the airplane in takeoff configuration after the accident prevented the conclusive determination of the thrust reverser and speed brake settings. The deployment of the speed brakes would have increased weight on wheels, resulting in increased braking action.

In a postaccident interview, the PIC stated that he did not consider performing a go around because he did not see the Cessna that was landing on runway 20R. However, several factors should have necessitated a go-around. First, the accident airplane's excessive airspeed was characterized by both the PIC and witnesses as fast. The investigation could not determine the accident airplane's airspeed at touchdown; however, the as-found position of the horizontal stabilizer pitch trim closely matched the position it would have been set to at the last groundspeed value recorded by the EGPWS (194 knots, determined at a point .5 nm from the displaced runway threshold), which was in excess of the calculated Vref speed of 120 knots. At 1005:28, the CVR recorded the PIC state that the airplane was "way too fast," indicating his awareness of the excessive airspeed. Second, the excessive rate of descent that caused the EGPWS to sound the sink rate alarm indicated an unstabilized approach. Third, Flight Manual Supplement 206 to the Airplane Flight Manual states that when an aural "pull up" warning occurs, the flight crew should level the wings, add maximum power, increase pitch to 15 degrees nose up, retract flaps if extended, and climb at the best angle of climb speed. The flight crew did not take these actions in response to the warning. Finally, the runway distance remaining (of about 2,970 ft) at the touchdown point was inadequate for the airplane to stop based on the PIC's preflight calculations and postaccident calculations. Based on the airplane configuration at touchdown, any speed greater than 142 knots would have resulted in a landing overrun. While the PIC recognized the excessive airspeed, neither pilot responded to the excessive airspeed, excessive rate of descent, the EGPWS system alarms, or the insufficient

runway remaining to land and called for a go around, even though the airplane had sufficient altitude and airspeed to safely do so.

The flight crew also demonstrated poor crew resource management (CRM), evidenced by poor communication, lack of crew monitoring, and lack of situation awareness. Regarding poor communication, the PIC's statement of "let me see a second" likely indicated the point when he took control of the airplane from the SIC and deviated from the standard "my airplane" transfer of control command. Further, the flight crew's actions while on the base leg, including the flight crew's failure to adhere to instructions from air traffic controllers not to descend until the Cessna traffic was in sight, show a lack of crew monitoring and cross-checking between the PIC and SIC, important concepts of CRM to ensure the highest levels of safety. Although the SIC reminded the PIC that they were not to descend, the PIC did not respond, and the SIC briefly descended then returned to the appropriate altitude. Further, the PIC and SIC both exhibited poor situation awareness throughout the accident flight. First, they were not able to accurately visualize their position in relation to the Cessna, despite repeated communication from the controller announcing the location and altitude of the Cessna. The PIC and SIC apparently did not realize that the tower transmission to the Cessna of "five eight echo that previous traffic's a mile off your right side [2,300 msl] indicated" was a reference to them since they were at the altitude the transmission described. Second, the on board TCAS issued an audible and visual alert regarding the Cessna, but neither the PIC nor the SIC was able to accurately determine the Cessna's altitude and location despite the information that the TCAS and ATC provided. This lack of situation awareness was likely caused by the SIC's lack of proficiency in the airplane during the accident flight. His lack of proficiency (evidenced by his inability to locate and set the airspeed command cursor, his failure to perform the after-takeoff checklist, the overspeed warning exceedance after takeoff, and his inability to get the vertical speed command to work during the descent) led the PIC to coach/instruct him for most of the flight, which likely distracted the PIC from his pilot monitoring duties, reducing his situation awareness.

Further, the flight crewmembers demonstrated unprofessional behavior, evidenced by a lack of checklist usage. The SIC's lack of experience in the make and model airplane demanded extra vigilance regarding the use of checklists, which did not occur. Before departure, the CVR did not record the use of a before-takeoff checklist; the CVR recorded the pilots stating some individual pre-takeoff items but not as part of a clear challenge/response checklist. In addition, the approach and before-landing checklists and the transfer of control of the airplane from the SIC to the PIC were not explicitly verbalized. Further, the SIC asked for the descent checklist, to which the PIC responded, "hang on a second"; the complete checklist was not verbalized, and there was no challenge and response. Although not required for Part 91 flights, checklists are universally recognized as basic safe aviation practices.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The flight crew's failure to obtain the proper airspeed for landing, which resulted in the airplane touching down too fast with inadequate runway remaining to stop and a subsequent runway overrun. Contributing to the accident were the failure of either pilot to call for a go-around and the flight crew's poor crew resource management and lack of professionalism.

Findings

Aircraft	Airspeed - Not attained/maintained (Cause)
	Descent/approach/glide path - Not attained/maintained (Cause)
	TE flap control system - Not used/operated (Factor)
	Spoilers - Not used/operated (Factor)
	Thrust reverser - Not used/operated (Factor)
Personnel issues	Incorrect action performance - Pilot (Cause)
	Lack of action - Flight crew (Cause)
	Understanding/comprehension - Flight crew (Factor)
	Task monitoring/vigilance - Flight crew
	Total experience w/ equipment - Copilot
	Task monitoring/vigilance - Flight crew
	Task performance - Pilot
	Monitoring other person - Copilot
	Task monitoring/vigilance - Flight crew
	Complacency - Flight crew

Factual Information

HISTORY OF FLIGHT

On June 18, 2012, about 1006 eastern daylight time (EDT), a Beechcraft Corporation 400A, N826JH, collided with terrain following a landing overrun on runway 20L at Dekalb-Peachtree Airport (PDK), Atlanta, Georgia. The airline transport pilot and copilot sustained serious injuries, and the two passengers sustained minor injuries. The airplane was substantially damaged. The airplane was registered to and operated by N79TE, LLC, under the provisions of 14 Code of Federal Regulations (CFR) Part 91 as an executive/corporate flight. Visual meteorological conditions (VMC) prevailed for the flight, which operated on an instrument flight rules (IFR) flight plan. The flight originated at Northeast Alabama Regional Airport (GAD), Gadsden, Alabama, about 0943 EDT (0843 central daylight time [CDT]).

The accident occurred during the first flight of the day, the purpose of which was to transport the airplane owner and an employee of the airplane owner's company to Atlanta for business. The second-in-command (SIC) was the pilot flying for most of the flight and was in the left seat, while the pilot-in-command (PIC) was the pilot monitoring for most of the flight and was in the right seat. (The PIC stated in a postaccident interview that he took control of the airplane from the SIC during the base leg on approach to PDK and became the pilot flying.)

The flight crew received their IFR release from a Birmingham air traffic control tower (ATCT) controller while on the ground at GAD. The flight was released for departure about 0942 and was told to report airborne. At 0942:50, the cockpit voice recorder (CVR) recorded the PIC announce on the GAD common traffic advisory frequency that the flight was on a straight-out departure from runway 6. Before departure, the CVR did not record the use of a before-takeoff checklist; the CVR recorded the pilots stating some individual pre-takeoff items but not as part of a clear challenge/response checklist.

At 0943:32, the CVR recorded the PIC ask the SIC, "who's flying the airplane?" The SIC responded, "I'm flying the airplane," to which the PIC replied, "you say I fly the airplane you take care of the checklists." At 0944:42, the CVR recorded the PIC ask the SIC, "what you want your speed on," to which the SIC initially responded with the maximum continuous thrust setting; when questioned a second time by the PIC, the SIC responded, "two fifty." The SIC then asked the PIC how to set the airspeed command cursor, and at 0945:00, the PIC stated, "turn it turn it turn it...don't fly...stall. two fifty down there." At 0945:16, the PIC advised the Birmingham ATCT that the flight was out of 3,000 feet for 4,000 feet; the controller cleared the flight to 5,000 feet and indicated that they should advise when the flight was established on victor airway 325, which the PIC acknowledged. At 0945:52, the PIC asked the SIC if he forgot anything, to which the SIC replied, "I don't know—checklist—after takeoff checklist." The PIC immediately called out some items from the after-takeoff checklist, including landing gear, flaps, autopilot, maximum continuous thrust setting, and ignition. He instructed the SIC that he needed to call for the checklist.

At 0946:33, the CVR recorded a sound similar to an overspeed warning that lasted for 13.9 seconds. About 6 seconds after the sound of the overspeed warning began, the PIC advised the SIC to reduce thrust. The CVR recorded the airplane owner on the cockpit area microphone (CAM) asking if there was a problem and stating, "I was thinking are we fixing to crash?" The PIC advised the airplane owner that the warning was a reminder that "...you're going too fast." About 0947, the PIC advised the controller that the flight was established on the victor airway

and level at 5,000 feet, and air traffic control (ATC) communications were then transferred to the Atlanta air route traffic control center (ARTCC). The flight remained in contact with the Atlanta ARTCC from about 0947 to 0956. During that time, the flight was cleared to climb to 13,000 feet mean sea level (msl) and was given an altitude crossing restriction. The PIC instructed the SIC how to achieve the crossing restriction. About 0956, the Atlanta ARTCC controller transferred the flight to Atlanta approach control, which the PIC acknowledged.

The PIC established contact with Atlanta approach control, and during that initial contact, the controller advised the flight crew of the altimeter setting, instructed them to descend and maintain 5,000 feet, and asked them to advise when they had automated terminal information service (ATIS) information India. About 0956, the controller advised the flight crew to expect a visual approach to runway 20L, and the CVR recorded the flight crew obtaining ATIS information Juliet and discussing setting the cabin pressurization for landing. At 0957:04, the SIC asked for the descent checklist, to which the PIC responded, "hang on a second." The complete checklist was not verbalized, and there was no challenge and response to the checklist items. The PIC stated during a postaccident interview that they performed the descent, approach, and before-landing checklists but not aloud.

At 0958:48, the controller instructed the flight crew to descend and maintain 4,000 feet, which the PIC acknowledged, and at 0959:05, the CVR recorded the SIC state, "I can't get vertical speed to work at all"; the PIC advised him to disconnect the autopilot, and the CVR recorded a sound consistent with autopilot disconnect. The PIC then stated, "now try your vertical speed. It wasn't on." About 1002, the controller instructed the flight crew to descend and maintain 3,000 feet and to advise when PDK was in sight; the PIC immediately advised the controller that the flight was descending and would advise when the airport was in sight.

At 1003:15, the PDK approach controller was being relieved from position. During the position relief briefing, the departing controller advised the relieving controller that the Beech 400A (the accident airplane) was inbound to land and that a Cessna airplane (N3558E) was at 2,300 feet msl on a straight-in approach to runway 20R. The relieving controller asked the departing controller if the Cessna pilot knew about the Beech 400A; the reply was no. At this time, the Cessna was north of PDK flying in a southerly direction toward PDK, while the Beech 400A was about 8 nautical miles (nm) west northwest of PDK flying in an easterly direction toward PDK.

About 1003, the PIC of the Beech 400A advised the approach controller that PDK was in sight. At that time, the flight was northwest of PDK on a right base leg flying in an easterly heading. About 7 seconds later, the controller advised the Beech 400A flight crew that the flight was cleared for a visual approach to runway 20L and to contact the PDK ATCT on 120.9 MHz, which the PIC immediately acknowledged.

At 1003:40, the PIC contacted the PDK ATCT and advised the controller that the flight was on the frequency. The CVR recorded the local controller immediately advise the flight crew that "...traffic's a Cessna five mile final for the right side. Runway two zero left clear to land. That traffic is at [2,200] indicated." The PIC acknowledged the landing clearance but not the traffic information. According to the CVR, at 1003:53, the local controller advised the Cessna pilot that the Beech 400A was off his right side about 4 miles, at 3,300 feet msl descending for PDK, and cleared the Cessna to land on runway 20R. The Cessna pilot did not immediately respond, and the local controller again contacted the Cessna pilot, advised him of the location of the Beech 400A (3 o'clock, 3 miles, at 2,700 feet), and cleared the Cessna to land. The Cessna pilot

acknowledged the landing clearance but advised the controller that the Beech 400A was not in sight.

According to the CVR, at 1004:23, the local controller advised the Beech 400A flight crew that the previously called traffic was at its 12 o'clock position and 2.5 miles, at 2,000 feet msl indicated, to which the PIC stated, "...we're looking." The CVR indicated that at 1004:30, the controller advised the flight crew to maintain its present altitude until the traffic was in sight, which the PIC acknowledged. (The Beech 400A was at 2,300 feet msl.) Radar data indicated that the flight crew briefly descended to 2,200 feet msl, then climbed back to 2,300 feet msl. At 1004:37, the PIC told the SIC, "alright. What do you want? Don't speed up now you're fixing to land," followed immediately by the SIC stating they were instructed to maintain altitude. At 1004:41, the controller advised the Cessna pilot that the Beech 400A was "a mile off your right side [2,300 msl] indicated."

The PIC stated during a postaccident interview that the traffic alert and collision avoidance system (TCAS) was working normally and that the 10-mile range was selected. At 1004:42, the CVR recorded, "traffic traffic"; the PIC reported during a postaccident interview that a blinking yellow target ahead of their position was depicted on the TCAS display. The SIC reported during a postaccident interview that he did not see the TCAS display because he was looking outside the cockpit. At 1004:47, the SIC stated, "first degree of" followed immediately by the sound of increased background noise; however, the communication was not completed. According to the CVR, at 1004:54, the PIC advised the local controller that the flight was turning from base to final for runway 20L. The National Transportation Safety Board (NTSB) radar study indicated that at that time, the Cessna was at 1,800 feet msl and was nearly due east of the position of the Beech 400A, which was at 2,400 feet msl. The CVR indicated that at 1004:57, the local controller asked the Beech 400A flight crew if they had the Cessna traffic in sight, to which the PIC advised the controller, "negative contact." About that time, the Beech 400A was at 2,400 feet msl, and the Cessna was at 1,800 feet msl.

According to the CVR, at 1005:05, the PIC stated, "let me see a second," to which the SIC responded that he thought the other airplane was "...going to the left side." The PIC stated during a postaccident interview that he took the controls from the SIC during the base leg but did not verbalize that exchange of airplane control. (The SIC stated that it is common on every trip to switch pilot-flying and pilot-monitoring duties; however, he indicated that to further clarify the change of control procedures, the PIC would state "my airplane" and take control.) According to the CVR, at 1005:08, the controller advised the Cessna pilot that the Beech 400A had just flown over his airplane, which the Cessna pilot confirmed and reported the Beech 400A in sight. The Cessna pilot later indicated in a written statement that the Beech 400A was in a steep descent to runway 20L after passing over his position.

Both flight crewmembers later reported that they thought the Cessna was 300 feet above them. The PIC stated during a postaccident interview that he heard a radio call of "traffic 300 feet above" and decided to perform an evasive maneuver by performing a right descending turn to avoid the traffic that he did not yet see. The radio call of "traffic 300 feet above" was not recorded by the CVR, nor was it on the ATC transcript. The NTSB radar study indicated that at 1005:12, the Beech 400A was at 2,300 feet msl, and at 1005:13, the Cessna was at 1,800 feet msl.

According to the CVR, at 1005:14, the controller cleared the Beech 400A to land, which the PIC acknowledged, and about 7 seconds later, the SIC stated, "before landing checklist"; however,

that command was followed 1 second later by an aural caution "sink rate, sink rate" from the enhanced ground proximity warning system (EGPWS). Simultaneous to the sink rate caution, the PIC stated, "done." The PIC reported in a postaccident interview that before landing, he configured the airplane by calling for flaps, then the landing gear, and then additional flap extension; however, he set the flap selector to the 30-degree position himself and verified the flap position. The CVR did not record any call by the PIC for landing gear or flaps. During the approach and landing phases, the CVR did not record an approach briefing by the PIC or SIC to include reference speed (Vref) or runway length.

The PIC stated in a postaccident interview that he could not recall the airspeed maintained during the approach but indicated that he believed the airplane was high and fast. At 1005:28, the CVR recorded the EGPWS aural caution/warning "sink rate sink rate pull up," followed by the PIC stating, "way too fast." At 1005:32, the CVR recorded the EGPWS aural warning "pull up pull up," followed by an expletive by the PIC. About 2 seconds later, the CVR recorded the EGPWS aural warning "pull up pull up," which was repeated 3 seconds later.

The NTSB radar study indicated that from 1005:03 to 1005:36 (the time of the last recorded radar target), the airplane traveled about 1.74 nm at an average ground speed of 190 knots. The last radar target indicated the airplane was at 1,200 feet msl and about 0.68 nm from the runway 20L displaced threshold. The EGPWS last recorded position was at 1005:40, and at that time, the airplane was located about .5 nm from the runway 20L displaced threshold. The data indicated that the ground speed was 194 knots, the GPS altitude was 1,136 feet (about 153 feet above the runway 20L displaced threshold elevation), and the vertical speed was 2,153 feet feet per-minute down.

Witnesses reported that the Beech 400A appeared to be flying at a high rate of speed or fast on final approach, with several witnesses reporting that the touchdown point on runway 20L was near or abeam the very high frequency omnidirectional range/distance measure equipment (VOR/DME) navigation aid, which was 2,031 feet from the displaced threshhold. The tower local controller reported observing the accident airplane touch down about "...midfield at a very high speed and run off the end of the runway."

At 1005:55, an unidentified crewmember stated, "reverse reverse," followed 4 seconds later by "speedbrakes" from the SIC. About 1 second later, an unidentified crewmember stated, "they're out." At 1006:01, the local controller stated to the Beech 400A flight crew, "...not a lot of runway left."

The airplane owner, who was seated in the last row of forward-facing seats, reported that on touchdown, the airplane appeared to be aligned, and he felt deceleration from brake application for about 5 seconds; however, about 3 to 5 seconds after touchdown, the airplane suddenly veered hard to the right, then back to the left. He also reported hearing squealing at various times during the landing roll, which was also reported by the other passenger.

Several PDK ATCT controllers reported that they saw the airplane roll off the departure end of runway 20L, then lost sight of it. The airplane came to rest mostly on airport property, adjacent to the airport boundary fence. There were no ground injuries.

About 15 seconds after the start of the communication from the controller regarding the lack of remaining runway, the sound of an emergency locator transmitter was heard on the tower frequency.

The airplane owner reported that after the airplane stopped, both engines continued to

operate, and the cabin door was initially stuck but was then able to be opened. The airplane owner noticed fuel leakage, and both flight crewmembers were in a daze. He then yelled for them to secure the engines. The PIC reported during a postaccident interview that after the airplane owner yelled to them that the engines were still running, he secured the airplane, shut down the engines, closed the firewall valves, and put the airplane back to takeoff configuration. He then reported turning off the master switch, and the airplane owner reported that he assisted the PIC and SIC out of the airplane; the PIC was at the cabin door when he helped him out of the airplane. All occupants were taken to local hospitals for treatment of their injuries.

The PIC reported in a postaccident interview that he did not consider executing a go around because it would involve a climbout and he did not see the traffic landing on 20R. He stated that he was afraid that if he went around, he would conflict with it. (The SIC indicated in a postaccident interview that he did not know why they did not perform a go-around.) The PIC indicated that the Cessna airplane was a distraction and that he felt rushed to land the airplane; the SIC reported that he believed there was no pressure to land quickly. The PIC also reported that they had used up 25 to 35% of the runway before touchdown. He further stated that after landing, he immediately applied the brakes, but they failed to respond and the airplane did not decelerate as expected. He then released the brakes and reapplied them with maximum force, "...again without effect." He indicated that he was startled by this and, as a result, did not extend the speed brakes or deploy the thrust reversers because he thought the normal brakes should have stopped the airplane. When it became clear to him that the airplane would not stop by the end of the runway, he steered the airplane away from the localizer antenna to minimize the risk of fire. He also stated that the 5 seconds it would have taken to deploy the thrust reversers would have been inadequate because they were "running out of runway."

PERSONNEL INFORMATION

Pilot-In-Command

The PIC, age 66, seated in the right seat, held an airline transport pilot (ATP) certificate with an airplane multiengine land rating issued on February 3, 1989, and a BE-400 type rating issued on October 12, 2007. He also held a commercial pilot certificate with airplane single engine land rating issued on June 9, 1984. He was issued a Federal Aviation Administration (FAA) first-class medical certificate on September 14, 2011, with a limitation that he must wear corrective lenses. He reported 10,800 hours total flight time, 6,000 hours of which were as PIC. He reported 1,500 hours total flight time in BE 400 airplanes, all of which were as PIC. He accrued 100 and 25 flight hours in the 90 and 30 days before the accident, respectively, with no flight time in the 7 days or 24 hours before the accident.

According to records provided by the flight crew's representative, the PIC's most recent training in the accident make and model airplane was a recurrent PIC course provided by SIMCOM and completed on December 22, 2010. A pilot proficiency certificate for the SIMCOM training was obtained, but there were no other records of training for the accident make and model airplane. The PIC also completed a Hawker 800XP 14 CFR Part 135 initial training course at Flight Safety International on September 25, 2011.

The PIC reported during a postaccident interview that he was a contract pilot and provided flying and aircraft management services to the accident airplane owner and another company through his company Flight Level Management LLC, which he had created about 2 years

earlier. He managed the accident airplane for the airplane owner and previously managed a Beech King Air for the same owner.

In the 72 hours before the accident flight, the PIC stated that he went to bed each night about 2100 CDT, watched TV, and was asleep within an hour. He awoke each day around 0500 CDT. His activities were typical and included doing paperwork, updating a database, mowing the yard, and "honey-do's." He was notified of the planned trip on June 16, and there were no special requests for the flight. On the morning of the accident flight, he left home about 0630 CDT and traveled 45 minutes to the airport. The flight departure was planned for 0800 CDT, but the airplane owner and passenger were late.

The PIC reported excellent health and normal hearing and vision, and he did not smoke or drink alcohol. Review of his FAA medical records revealed he had been diagnosed with obstructive sleep apnea and was given a special issuance medical certificate that expired on September 30, 2017. At the time of the accident, the PIC was under the care of a personal physician for this condition. He was prescribed lisinopril for blood pressure and laprazol for stomach acid reflux, which he took daily; he reported no side effects from these drugs. He took no other prescription or nonprescription drugs in the 72 hours before the accident flight that might have affected his performance. He had no major changes in his health, finances, or personal life in the previous 12 months and had no prior accidents or incidents. He stated during a postaccident interview that crew resource management (CRM) was meant to ensure the pilot not flying understood what the other flight crewmember was doing and that both had a good understanding of one another and procedures, including challenge and response to checklists.

Second-in-Command

The SIC, age 68, seated in the left seat, held an ATP certificate with an airplane multiengine land rating issued on December 9, 2006, and a BE-400 type rating for SIC privileges only issued on November 17, 2007. He also held a commercial pilot certificate with an airplane single-engine land rating issued on November 7, 1971. He was issued an FAA second-class medical certificate on April 13, 2012, with a limitation to have glasses available for near vision. The SIC reported 3,500 hours total flight time, 1,800 hours of which were as PIC. He reported 150 hours total flight time in BE-400 airplanes, all of which were as SIC. He reported in statements to the NTSB that he had 10 hours of flight time in the 90 and 30 days before the accident; however, on the NTSB Pilot/Operator Aircraft Accident/Incident Report submitted for this accident, he reported 25 hours of flight time in the past 90 days. The amount could not be verified by flight records.

According to records provided by the flight crew's representative, the SIC's most recent training in the accident make and model airplane was SIC recurrent training given by the PIC from April 2 to 5, 2012. Ground school was conducted for the first 3 days, and a checkride flight was conducted on the last day of training. A certificate of course completion was dated April 5, 2012, and signed by the PIC. The instruction syllabus indicated that 1 hour of ground instruction was devoted to CRM. Before that training, in September 2007, he reportedly attended the initial training course in the accident make and model airplane at SIMCOM, but records from that facility were no longer available. He reported during a postaccident interview that, to him, CRM training consisted of "V speeds, flap speeds, standard callouts, climb outs."

In the 72 hours before the accident flight, the SIC stated that he went to bed each night

between 2200 and 2230 CDT. He awoke each day between 0600 and 0630 CDT. The only activity he recalled during that time was walking his dog. He was notified of the planned trip on June 16. His activities the morning of the accident flight were "typical." He lived about 45 minutes from GAD.

He stated that his health was good, that he had no issues with his hearing, and that he did not smoke or drink alcohol. He used reading glasses and had them along on the accident flight. He took the prescription medication Prilosec once a day and experienced no side effects from it. He did not take any other drugs, prescription or nonprescription, in the 72 hours before the accident flight that might have affected his performance. He had no major changes in his health, finances, or personal life in the previous 12 months and had no prior accidents or incidents.

AIRCRAFT INFORMATION

The transport-category airplane was manufactured in 1993 by Beech Aircraft Corporation (now Beechcraft Corporation) as model 400A, serial number RK-70, and was certificated under 14 CFR Part 25 for flight with two crewmembers. It was equipped with two Pratt & Whitney JT15D-5 turbofan engines each rated at 2,900 pounds of thrust and thrust reversers. The maximum flap extend speed (Vfe)/flaps operating speed (Vfo) for 10 degree of flaps is 200 knots indicated airspeed (KIAS), while the maximum Vfe and Vfo speeds for 30 degree of flaps is 165 and 170 KIAS, respectively.

Primary roll control is accomplished by inboard and outboard spoilers installed on the upper surface of each wing. The spoilers also act as speed brakes, which are hydraulically actuated and electrically controlled by a speedbrake switch mounted on the center pedestal. Deployment of the speed brakes at touchdown creates drag and reduces lift, thereby increasing weight on the main landing gear wheels for increased braking.

The airplane was equipped with hydraulically actuated retractable tricycle landing gear; each main landing gear wheel is equipped with full-powered, multiple-segmented brakes operated by the toe action of the pilot's or copilot's rudder pedals. An electrically controlled antiskid system is also incorporated in the power brake system. A stationary wheel speed transducer is mounted inside each main gear axle and electrically senses any change in wheel rotation speed. By design with the system on, as a skid is detected by the stationary wheel speed transducer, an electrical signal is supplied to the system, which releases brake pressure.

Review of the maintenance records revealed the brake assemblies were last removed and replaced on December 24, 2010, when the airplane's total time was 4,562.4 hours.

The airplane was last inspected in accordance with a Schedule A inspection of the manufacturer's inspection program on October 3, 2011, when the airplane's total time was about 4,674 hours, about 37 hours before the accident. The inspection included checks of the nose and main landing gear tires for correct inflation and wear; both brakes for wear, cracks, hydraulic leakage, and condition; both thrust reversers assemblies; and normal thrust reverser system and emergency stow system test. The logbook entry specified 55 items that the owner did not want to have inspected or corrected. A ferry permit was issued on October 4, 2011, to fly the airplane to a different location, and over the course of several (4) months, several individuals or FAA-certified repair stations corrected the outstanding discrepancies. The list of discrepancies and corrective action entries are contained in the NTSB public docket.

The Pilot's Operating Manual indicated that the maximum deploy cycle time after actuation of

the thrust reverser lever was 1.6 seconds at 100 knots calibrated airspeed (KCAS), while the maximum stow cycle time after actuation of the reverser lever is 5 seconds at 130 KCAS.

METEOROLOGICAL INFORMATION

A surface observation weather report taken at PDK at 0953 (about 13 minutes before the accident) indicated the wind was variable at 3 knots and the visibility was 8 statute miles, with clear skies. The temperature and dew point were 25 and 15 degrees C, respectively, and the altimeter setting was 30.11 inches of mercury.

Preflight weather briefing documents available to the flight crewmembers at the initiation of the flight revealed they were provided with aviation surface analysis reports for the destination airport and nearby airports. The weather briefing documents also indicate that the flight crewmembers were provided with terminal forecasts, notices to airmen (NOTAMS), and flight data center NOTAMS for the accident airport. The NOTAMs section of the weather briefing documents for PDK indicated that the landing distance available for runway 20L was 4,801 feet.

AIRPORT INFORMATION

PDK, a tower-controlled, public-use airport owned by DeKalb County, had four runways designated 2L/20R, 2R/20L, 9/27, and 16/34. (At the time of the accident, the runway was designated 20L but has since been redesignated as runway 21L due to changes to the earth's magnetic variation.) Runway 20L, a concrete runway with diamond ground grooves, was 5,001 feet long and 100 feet wide (excluding the 1,000-foot displaced threshold) with a positive gradient of about 0.2%. Because the airport boundary fence was located 800 feet from the departure end of the runway or within 1,000 feet from the end of the runway (considered a runway safety area), the published landing distance available was 4,801 feet. The runway condition was reported to be good when inspected on August 31, 2010. Runway 20L was resurfaced about 3 years earlier. (Runway 20R was 3,746 feet; runway 20L was more suitable for the Beech 400A to land due to the runway length.)

A two-light precision approach path indicator was located on the right side of runway 20L, about 986 feet from the displaced runway threshold, providing a 3-degree glidepath. A VOR/DME navigation aid was also located about 508 feet south of the south edge of runway 20L and about 2,031 feet down the runway as measured from the runway 20L displaced threshold, resulting in 2,970 feet of runway remaining from abeam the VOR/DME navigation aid to the departure end of runway 20L.

The PDK airport director reported that security cameras at PDK did not capture the accident sequence.

Airport personnel submit a capital improvement plan (CIP) to the Georgia Department of Transportation (DOT) once a year. The CIP submitted to the Georgia DOT in 2011 specified funding to install 360 feet of engineered materials arrestor system (EMAS) lead-in beyond the departure end of runway 20L and 120 feet by 240 feet of EMAS starting at the end of the EMAS lead-in. The PDK airport director reported that EMAS would be installed at the departure end of runway 20L most likely in 2015. The assistant airport director reported that because the airplane veered left at the departure end of the runway, he believed had EMAS been installed, it may not have helped because it is possible that only one main landing gear would have gone into the EMAS.

An airport perimeter fence was damaged as a result of the accident. No other airport facilities were damaged.

FLIGHT RECORDERS

The accident airplane was not equipped, nor was it required to be equipped, with a flight data recorder. The airplane was equipped with a Fairchild Model A-100 CVR and a Honeywell KGP 860 GA EGPWS. The CVR was downloaded at the NTSB recorder laboratory in Washington, DC, while the EPGWS was downloaded at the manufacturer's facility.

There was no damage to the CVR, and the audio information was extracted normally and without difficulty. The recording consisted of four separate channels: the captain and first officer audio panels, the auxiliary audio panel, and the CAM. The captain's, first officer's, and auxiliary audio panel contained excellent quality audio information, while the CAM contained good quality audio information. The recording began at 0934:54, which coincided with the start of the transcription, and continued recording until 1006:13, which was the end of the recording at the sound of impact. A transcript of the entire 31 minute, 19-second recording is contained in the NTSB public docket.

The EGPWS, which exhibited some damage to the housing, was downloaded with NTSB oversight at the manufacturer's facility without difficulty; the downloaded data was provided to the NTSB vehicle recorder laboratory for evaluation.

WRECKAGE AND IMPACT INFORMATION

Inspection of the dry runway revealed skid marks attributed to the airplane's left main landing gear tire were traced to the aiming point marking located 1,000 feet before the departure end of runway 20L. (The aiming point marking consists of two broad white stripes on each side of the runway centerline and serves as a visual aiming point for landing pilots.) Previous rubber transfer deposits on that section of the runway precluded positive determination of a mark from the right main landing gear tire at that point. The mark from the left main landing gear tire and later from the right main landing gear tire continued in a gentle arc to the left from the aiming point marking to the forward edge of the left touchdown zone marker. At that point, about 575 feet before the departure end of the runway, the marks from both main landing gear tires showed a sudden change in direction to the right, and both continued with a slight veer to the left to the threshold markings on the left side of the runway centerline. The mark from the left main landing gear tire was alternating light and dark in color, and the skid mark from the left main landing gear tire was more pronounced than the skid mark from the right main landing gear tire until about the last 50 feet of the runway. The marks from the left and right main landing gear tires suddenly arced to the left at the left threshold marking and continued in the grass, where marks from all landing gear tires were noted. The marks from all landing gear tires continued in the grass for about 200 to 300 feet, at which point a gouge attributed to the left main landing gear and a scrape from the lower surface of the left wing were noted. The absence of marks from that point on was attributed to a steep angular drop in terrain elevation that parallels the left edge of runway 20L. The airplane touched down on an airport service road, veered to the left, and came to rest upright with a portion of the fuselage extended past the airport perimeter fence poles located adjacent to Dresden Drive, about 800 feet from the departure end of runway 20L.

Examination of the airplane revealed the nose and left main landing gears were separated but found close to the resting position of the airplane, while the right main landing gear was

separated but lodged between the aft wing root and fuselage. The fuselage was partially fractured at the front pressure bulkhead and at fuselage station 8190. No fire was noted on any portion of the airframe. Both wing flaps appeared to be retracted, although inspection of the cockpit revealed the flap selector was in the 30 degrees extend position. Both thrust reversers appeared to be stowed, which agreed with the as-found position of each reverser lever in the cockpit, and both thrust levers were in the cutoff position. The speed brake switch was in the retracted position, and the antiskid switch was in the on position. The main cabin door and emergency exit doors were inspected and exhibited no evidence of preimpact failure or malfunction.

Inspection of the primary flight control system for roll, pitch, and yaw revealed no evidence of preimpact failure or malfunction. The as-found position of the leading edge of the horizontal stabilizer was above the takeoff position indicator. Measurement of the jack screw revealed it was positioned to minus 3.6 degrees leading-edge angle, which equates to 2.3 degrees from full nose-down trim. Each roll trim tab and the rudder trim tab were noted to be faired (neutral).

Damage to the inboard edge of the left flap was consistent with contact by the adjacent wing structure, and damage to the right flap at the inboard flap track was consistent with over travel in the up direction. Inspection and postaccident testing of flap system components consisting of both follow-up switches and both flap position transducers revealed no evidence of preimpact failure or malfunction, although out-of-tolerance issues attributed to in-service wear were identified during the testing.

Because both main landing gears had separated from the airplane during the accident sequence, operational testing of the left and right brake assemblies could not be performed on the airplane. Further, although the left and right brake wear pin indicators were inspected without hydraulic power as specified in the maintenance manual, both measurements were consistent with an in-service unit. Postaccident inspection of the power brake relay, antiskid control box, and both wheel speed transducers revealed no evidence of preimpact failure or malfunction; minor discrepancies were noted, none of which would have negligible effects on braking operations.

Inspection of the left and right thrust reversers revealed the actuators for both were in the stowed and locked position, which correlated to the PIC's comment during a postaccident interview indicating that he did not deploy them during the landing roll.

Inspection and testing of the TCAS processor revealed heavy impact damage, although the initialization and calibration were normal. The unit passed the pilot-initiated test, and the unit acquired and tracked targets normally on an exemplar display that included altitude information with its associated intruder; however, the analog display output was inoperative, which is a required test by the acceptance test procedure. This was attributed to impact damage to a connection at the mother board, which rendered the analog display inoperative. The error log was downloaded, and the last error code occurred about 2 minutes from the processor losing power in the accident sequence and was attributed to a barometric altitude input error, which occurs if the unit does not receive valid barometric altitude information during flight. The previous error log entry occurred about 255 hours earlier, also attributed to a barometric altitude input error. No evidence of preimpact failure or malfunction of the TCAS processor was noted.

MEDICAL AND PATHOLOGICAL INFORMATION

Postaccident toxicology testing of PIC and SIC specimens was neither requested by the NTSB or FAA nor was it performed for the purpose of the investigation. (Toxicology testing is not required for a Part 91 flight.)

TESTS AND RESEARCH

Landing Speed and Distance

The PIC stated during a postaccident interview that a written weight and balance form and manifest for the accident flight were not prepared. The PIC also stated that to the best of his recollection, the estimated takeoff weight was 16,078 pounds, the estimated fuel burn for the accident flight was 800 pounds, and the estimated landing weight was 15,278 pounds. (Calculations by NTSB personnel with the available weight information indicate that the airplane was within normal landing limits.) The PIC added that before the flight, the calculated landing distance was determined to be 3,440 feet, and the Vref speed for the calculated weight was 120 knots; the SIC reported during an interview that the calculated Vref speed for a flaps 30 landing was 109 knots, and as a standard, they added 10 knots to that value to determine the approach speed.

The calculated Vref speed for a flaps 30 landing at the landing weight reported by the PIC was 115 knots. The Landing Distances and Speeds chart found in the Airplane Flight Manual (AFM) indicates that based on the pressure altitude (793 feet) and the PIC reported landing weight, the 100% unfactored landing distance for a dry runway and flaps 30 degree extension is 3,505 feet.

An airplane manufacturer's representative extrapolated landing roll distances at various approach speeds expressed as KCAS for variables including flaps retracted and flaps 30 degree extension. The provided charts included factors such as antiskid on, maximum braking at touchdown, and thrust required to maintain a 3-degree approach angle to 50 feet, then retard thrust to idle at 50 feet. For the purposes of the calculations, the wind was considered calm; the temperature and dew point were 25 and 15 degrees C, respectively; and the altimeter setting was 30.11 inches of mercury. Additionally, the calculations were predicated on speed brakes retracted and thrust reversers stowed (as reported by the flight crewmembers during postaccident interviews). Calculations indicate that at the observed touchdown point of 2,970 feet from the departure end of the runway, any speed greater than 142 KCAS with flaps retracted would have resulted in the remaining runway distance being inadequate for the airplane to stop.

The airframe manufacturer's representative correlated the as-found position of the pitch trim jackscrew, with the expected position at the airplane's landing weight, and calculated Vref speed for that weight (115 knots equivalent airspeed) and for flap settings 0 and 30 degrees. The calculations indicate that the as-found setting of the pitch trim more closely matched the calculated value for flaps 0 setting at the groundspeed value last recorded by the EGPWS (194 knots) than it did for the calculated Vref speed for the airplane's landing weight (115 knots).

ADDITIONAL INFORMATION

EGPWS and TCAS

Since manufacture, the airplane was modified, in part, by installation of an EGPWS and a TCAS. The installation of the EGPWS was completed on March 10, 2005, and the installation of the TCAS I was completed on July 25, 2008. The TCAS I traffic advisory voice message

"traffic traffic" calls attention to a possible collision threat and is intended to help the pilot visually identify the other aircraft. The TCAS I is considered a back-up system to the "see-and-avoid" concept and the ATC radar environment; a note in the AFM Supplement (FMS) indicates that "The pilot should not maneuver the aircraft based on the traffic display only."

AFM FMS 206 associated with the installed EGPWS indicates that in the event the aural "pull up" warning occurs, these procedures should be followed:

1. Level the wings, simultaneously adding maximum power.

2. Smoothly pitch up at a rate of 2 to 3 degrees per second towards an initial target pitch attitude of 15 degrees nose up.

3. Adjust the pitch attitude to ensure terrain clearance, while respecting stall warning. If flaps are extended, retract flaps to the up position.

4. Continue climb at best angle of climb speed (Vx) until terrain clearance is assured.

According to the Honeywell EGPWS Pilot's Guide, for the warning "pull up" in visual conditions during the day, the pilot should evaluate the aircraft's flightpath and take corrective action as necessary to recover safe terrain clearance.

Approach, Runway Overruns, and Go-Arounds

FAA Advisory Circular (AC) 91-79, "Runway Overrun Prevention," indicates its purpose is to provide ways for pilots and operators of turbine-powered airplanes to identify, understand, and mitigate risks associated with runway overruns during the landing phase of flight. The AC gives operators detailed information to use to develop company standard operating procedures to mitigate those risks. The AC references a study of FAA and NTSB data associated with runway overruns indicating the following hazards may increase the risk of a runway overrun: nonstabilized approach, excess airspeed, landing beyond the intended touchdown point, and failure to assess required landing distance to account for slippery or contaminated runway conditions or any changed conditions existing at the time of landing.

AC 91-79 lists five variables of a stabilized approach, which is one of the most critical elements of a safe approach and landing operation, including landing configuration, stabilize on profile, descent rate, indicated airspeed, and engine speed. Regarding stabilize on profile, the airplane should be stabilized on profile before descending through the 500-feet-above-the-touchdown-zone elevation window in VMC, and the descent rate should be between 500 and 700 feet per minute (fpm) but should not be allowed to exceed 1,000 fpm at any time during the approach. Regarding indicated airspeed, it should not be more than Vref + 5 knots and any appropriate adjustment for wind or other factors. The AC also indicates that as it applies to stabilized approaches, the airplane must be in the proper landing configuration, on the correct track, on the correct lateral track, on the correct vertical track, and the airspeed within the acceptable range specified in the AFM or Pilot Operating Handbook, as applicable. The AC further indicates that if a pilot determines that a stabilized approach cannot be flown or if an ATC clearance results in the pilot's inability to fly a stabilized approach from the final approach fix to the airport, the approach should not be accepted, and a go-around should be initiated. Bracketing corrections for airspeed +- 5 KIAS variance from the planned approach speed are acceptable; however, frequent or sustained overshoots are not normal bracketing corrections and are not acceptable. Table 2 of the AC provides rules of thumb for landing distance calculations and indicates that for every 10 knots of excessive airspeed, add 300 feet of landing

distance for a dry runway and add 2,500 feet per each 10 knots of excessive airspeed to account for floating during an extended flare.

The FAA's Airplane Flying Handbook, FAA-H-8083-3A, chapter 8, "Approaches and Landings," states the following: "Whenever landing conditions are not satisfactory, a go around is warranted. There are many factors that can contribute to unsatisfactory landing conditions. Situations such as air traffic control requirements, unexpected appearance of hazards on the runway, overtaking another airplane, wind shear, wake turbulence, mechanical failure and/or an unstabilized approach are all examples of reasons to discontinue a landing approach and make another approach under more favorable conditions....The go-around is not strictly an emergency procedure. It is a normal maneuver that may at times be used in an emergency situation....Although the need to discontinue a landing may arise at any point in the landing process, the most critical go-around will be one started when very close to the ground. Therefore, the earlier a condition that warrants a go-around is recognized, the safer the go around/rejected landing will be."

On April 27, 2008, the NTSB issued Safety Recommendation A-08-18, which asked the FAA to "require 14 Code of Federal Regulations Part 121, 135, and Part 91 subpart K operators to have a written policy emphasizing that either pilot can make a go-around callout and that the response to the callout is an immediate missed approach." On March 1, 2010, the FAA issued Safety Alert for Operators (SAFO) 10005, "Go-Around Callout and Immediate Response," recommending that operators (Parts 121, 125, 135, and 91 subpart K) publish or reinforce existing written policy emphasizing that either the pilot flying or the pilot monitoring may make a go-around callout and emphasizing that the flying pilot's immediate response to a go-around callout by the nonflying pilot is execution of a missed approach. However, the FAA reported that a survey conducted had found that not all operators had adopted the action recommended in SAFO 10005. The FAA indicated that it plans to ensure both compliance and oversight in the SAFO by changing FAA Order 8900.1, "Flight Standards Information Management System." The FAA noted that it is in the process of updating AC 120-71, "Standard Operating Procedures for Flight Deck Crewmembers," to include changes addressing go-around callouts and initiation of immediate action by the pilot flying if a go-around is called by either pilot. Pending completion of these actions, on November 6, 2012, the NTSB classified Safety Recommendation A-08-018 "Open—Acceptable Response."

Crew Resource Management

FAA AC 120-51E, "Crew Resource Management," states, "These guidelines were originally intended for Title 14 of the Code of Federal Regulations (14 CFR) part 121 certificate holders who are required by regulation to provide CRM training for pilots and flight attendants, and dispatch resource management (DRM) training for aircraft dispatchers. Fractional ownership program managers, required by 14 CFR part 91, subpart K to provide CRM training to pilots and flight attendants, and those 14 CFR part 135 operators electing to train in accordance with part 121 requirements, should also use these guidelines. Certificate holders and individuals operating under other operating rules, such as parts 91 (apart from subpart K), 125, and part 135 operators not electing to train in accordance with part 121, and others, should find these guidelines useful in addressing human performance issues." Paragraph 1 of the AC indicates, "CRM training focuses on situation awareness, communication skills, teamwork, task allocation, and decisionmaking within a comprehensive framework of standard operating procedures (SOP)." The background section of the AC specifies that investigations into the

causes of air carrier accidents have shown that human error is a contributing factor in 60 to 80% of all air carrier accidents and incidents. The AC indicates that many problems encountered by flight crews had little to do with the technical aspect of operating in a multiperson cockpit; rather, problems are associated with poor group decision-making, ineffective communication, inadequate leadership, and poor task or resource management. Paragraph 16(a) of the AC indicates, "...to ensure the highest levels of safety, each flight crewmember must carefully monitor the aircraft's flight path and systems and actively cross-check the actions of other crewmembers. Effective monitoring and cross-checking can be the last line of defense that prevents an accident because detecting an error or unsafe situation may break the chain of events leading to an accident. This monitoring function is always essential, and particularly so during approach and landing...."

History of Flight

Approach	Collision avoidance alert Miscellaneous/other (Defining event)
Landing-landing roll	Runway excursion Collision with terr/obj (non-CFIT)

Pilot Information

Certificate:	Airline Transport; Commercial	**Age:**	66
Airplane Rating(s):	Multi-engine Land; Single-engine Land	**Seat Occupied:**	Right
Other Aircraft Rating(s):	None	**Restraint Used:**	Seatbelt, Shoulder harness
Instrument Rating(s):	Airplane	**Second Pilot Present:**	Yes
Instructor Rating(s):	None	**Toxicology Performed:**	No
Medical Certification:	Class 1 With Waivers/Limitations	**Last FAA Medical Exam:**	09/14/2011
Occupational Pilot:	Yes	**Last Flight Review or Equivalent:**	09/11/2011
Flight Time:	10800 hours (Total, all aircraft), 1500 hours (Total, this make and model), 6000 hours (Pilot In Command, all aircraft), 100 hours (Last 90 days, all aircraft), 25 hours (Last 30 days, all aircraft)		

Co-Pilot Information

Certificate:	Airline Transport; Commercial	**Age:**	68
Airplane Rating(s):	Multi-engine Land; Single-engine Land	**Seat Occupied:**	Left
Other Aircraft Rating(s):	None	**Restraint Used:**	Seatbelt, Shoulder harness
Instrument Rating(s):	Airplane	**Second Pilot Present:**	Yes
Instructor Rating(s):	None	**Toxicology Performed:**	No
Medical Certification:	Class 2 With Waivers/Limitations	**Last FAA Medical Exam:**	04/13/2012
Occupational Pilot:	Yes	**Last Flight Review or Equivalent:**	02/01/2012
Flight Time:	3500 hours (Total, all aircraft), 150 hours (Total, this make and model), 1800 hours (Pilot In Command, all aircraft), 25 hours (Last 90 days, all aircraft), 10 hours (Last 30 days, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	BEECH	**Registration:**	N826JH
Model/Series:	400A	**Aircraft Category:**	Airplane
Year of Manufacture:		**Amateur Built:**	No
Airworthiness Certificate:	Transport	**Serial Number:**	RK-70
Landing Gear Type:	Retractable - Tricycle	**Seats:**	8
Date/Type of Last Inspection:	10/03/2011, Continuous Airworthiness	**Certified Max Gross Wt.:**	16100 lbs
Time Since Last Inspection:	37 Hours	**Engines:**	2 Turbo Jet
Airframe Total Time:	4674 Hours as of last inspection	**Engine Manufacturer:**	P&W CANADA
ELT:	Installed, activated, did not aid in locating accident	**Engine Model/Series:**	JT15D-5
Registered Owner:	N79TE LLC	**Rated Power:**	2900 lbs
Operator:	N79TE LLC	**Operating Certificate(s) Held:**	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual Conditions	**Condition of Light:**	Day
Observation Facility, Elevation:	PDK, 1003 ft msl	**Distance from Accident Site:**	
Observation Time:	0953 EDT	**Direction from Accident Site:**	
Lowest Cloud Condition:	Clear	**Visibility**	8 Miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	3 knots /	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	Variable	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	30.11 inches Hg	**Temperature/Dew Point:**	25°C / 15°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Gadsden, AL (GAD)	**Type of Flight Plan Filed:**	IFR
Destination:	Atlanta, GA (PDK)	**Type of Clearance:**	IFR
Departure Time:	0943 EDT	**Type of Airspace:**	

Airport Information

Airport:	Dekalb-Peachtree Airport (PDK)	**Runway Surface Type:**	Concrete
Airport Elevation:	1003 ft	**Runway Surface Condition:**	Dry
Runway Used:	20L	**IFR Approach:**	Visual
Runway Length/Width:	5001 ft / 100 ft	**VFR Approach/Landing:**	Full Stop

Wreckage and Impact Information

Crew Injuries:	2 Serious	**Aircraft Damage:**	Substantial
Passenger Injuries:	2 Minor	**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	2 Serious, 2 Minor	**Latitude, Longitude:**	32.873611, -84.303056 (est)

Administrative Information

Investigator In Charge (IIC):	Timothy W Monville	**Report Date:**	02/19/2014
Additional Participating Persons:	Russell Standifur; FAA FSDO; College Park, GA Ricky D Flores; FAA/FSDO; College Park, GA Mark C Ricker; FAA/FSDO; College Park, GA Michael J Gibbons; Hawker Beechcraft Corporation; Wichita, KS		
Publish Date:	02/19/2014		
Investigation Docket:	http://dms.ntsb.gov/pubdms/search/dockList.cfm?mKey=84013		