



Aviation Investigation Final Report

Location:	DELAND, Florida	Accident Number:	MIA00FA041
Date & Time:	December 3, 1999, 10:23 Local	Registration:	N3038N
Aircraft:	Piper PA-44-180	Aircraft Damage:	Destroyed
Defining Event:		Injuries:	2 Fatal
Flight Conducted Under:	Part 91: General aviation - Instructional		

Analysis

After the Seminole airplane departed, requests to perform instrument approaches to the DeLand airport were denied; the controller responded to the request, '...delands saturated right now unable any approaches at deland...'. The flight was vectored then cleared for a VOR approach to a runway 16 at Daytona Beach then vectored and cleared for a VOR approach to runway 23 at the DeLand airport. After the Cadet airplane departed, the flight proceeded to the DeLand airport and remained in the traffic pattern for runway 05; individuals heard the flight announce while in the traffic pattern. While inside the final approach fix inbound, radar service of the Seminole flight was terminated. Two individuals heard a voice announce on the DeLand CTAF, 'VOR 23.' The witnesses did not hear the distance, intentions, airport ID, or aircraft ID. The Seminole flight continued on the VOR approach; the last radar target of the Seminole was approximately .6 nautical mile from the approach end of runway 23. Several individuals heard the Cadet flight announce on the DeLand CTAF that the flight was departing runway 05. One witness reported that the Cadet used almost the full length of the runway, became airborne, then banked to the left and disappeared behind trees. The airplanes collided in-flight near the departure end of runway 05; the wreckage of both airplanes came to rest within approximately 1/2 nautical mile from the departure end of runway 05. An impact signature from one of the propeller blades from the left engine of the Seminole was noted on top of the engine of the Cadet; the impact signature was within approximately 25 degrees from being perpendicular. Several individuals reported frequency congestion of the DeLand CTAF from other airports that utilize the same frequency. Prior to the accident, ERAU personnel had informally inquired about having the frequency changed due to that very reason; the frequency was not changed before the accident. Advisory circulars and the AIM does not address when to terminate a practice instrument approach to an uncontrolled airport.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The inadequate visual lookout by the pilot-in-command (PIC)/certified flight instructor (CFI) of both aircraft. Contributing factors in the accident were: 1) the frequency congestion of the CTAF 2) the poor in-flight planning decision by the PIC/CFI of the Seminole for his continuing a practice instrument approach to within approximately .6 nautical mile from the approach end of the runway with opposing airplanes departing on the upwind leg, and 3) the absence of guidance in the Aeronautical Information Manual and Advisory Circulars as to how or when to terminate a practice instrument approach to an airport that does not have an operating control tower.

Findings

Occurrence #1: MIDAIR COLLISION

Phase of Operation: APPROACH - FAF/OUTER MARKER TO THRESHOLD (IFR)

Findings

1. (F) AIRPORT FACILITIES, UNICOM - CONGESTED
2. (F) IN-FLIGHT PLANNING/DECISION - POOR - PILOT IN COMMAND(CFI)
3. (F) INFORMATION UNAVAILABLE - FAA(OTHER/ORGANIZATION)
4. (C) VISUAL LOOKOUT - INADEQUATE - PILOT IN COMMAND(CFI)
5. (C) VISUAL LOOKOUT - INADEQUATE - PILOT OF OTHER AIRCRAFT

Factual Information

HISTORY OF FLIGHT

On December 3, 1999, about 1023 eastern standard time, a Piper PA-44-180 (Seminole) airplane, N3038N, registered to and operated by Phoenix East Aviation, Inc., and a Piper PA-28-161 (Cadet) airplane, N153ER, registered to and operated by Embry-Riddle Aeronautical University, collided in-flight near the departure end of runway 5 at the DeLand Municipal-Sidney H Taylor Field Airport, DeLand, Florida. Visual meteorological conditions prevailed at the time and a local instrument flight rules (IFR) flight plan was filed for the 14 CFR Part 91 instructional flight of the Seminole airplane. No flight plan was filed for the 14 CFR Part 91 instructional flight of the Cadet airplane; none was required. Both airplanes were destroyed and the certified flight instructor (CFI) and commercial pilot-rated student of the Seminole airplane were fatally injured. The CFI and private pilot-rated student of the Cadet airplane also were fatally injured. The Seminole flight originated about 0939 from the Daytona Beach International Airport, Daytona Beach, Florida. The Cadet flight originated about 0921, also from the Daytona Beach International Airport, Daytona Beach, Florida.

According to a transcription of communications from Daytona Beach Air Traffic Control Tower (DAB ATCT), a flightcrew member in the Cadet contacted clearance delivery and requested a visual flight rules (VFR) clearance to Leesburg. The flight was cleared to taxi to runway 7R at 0911:48, and was cleared for takeoff at 0920:52. After takeoff, air traffic control (ATC) communications were transferred to Daytona Beach departure control then to the Daytona Beach South-Arrival Radar position. The flight remained in contact with that facility from 0924:45, to 0934:11, when the controller advised the flight to proceed on course, squawk the VFR transponder code, and provided the frequency of the next ATC facility. That transmission was acknowledged; there were no further recorded transmissions from the flightcrew with the DAB ATCT.

The transcription of communications from DAB ATCT indicates that a flightcrew member in the Seminole airplane contacted clearance delivery and requested, "a local IFR clearance ah we would like to shoot ah VOR 23 approach deland to be followed by ndb approach runway thirty deland and uh then we'll break off and come back for an ILS later." The controller cleared the flight to the DeLand airport via radar vectors; the clearance was read back by a flightcrew member. The flight was cleared to taxi to runway 7L at 0918:50, and was cleared for takeoff at 0938:48. After takeoff, ATC communications were transferred to the Daytona Beach North-Arrival Radar position. While in contact with that facility, at 0942:10, a flightcrew member asked the controller, "ah three zero three eight november is it possible we can have the full approach sir uh to fly over the vor", to which the controller responded, "...unable vor uh vor deland approach." A flightcrew member advised the controller "three eight November a mile north of Ormond is fine sir." The controller responded, "...not for you sir

unable vor two three approaches fly tower assigned heading now." The controller advised the flight the heading to fly, and "...unable vor two three at deland." A flightcrew member responded that they would like to perform if possible a non directional beacon (NDB) instrument approach to runway 30 at DeLand. The controller advised, "okay three eight november delands saturated right now unable any approaches at deland let me rephrase that unable any approaches at deland." A flightcrew member responded that they would like to execute a very high frequency omni-directional range station (VOR) approach to runway 16, and a NDB approach to a runway at the New Smyrna Beach Municipal Airport. A flightcrew member questioned whether they could execute the full VOR approach. The flight was vectored then cleared for the VOR approach to runway 16 at the Daytona Beach International Airport, and told to expect to break off the approach four miles north of Daytona. At 0959:28, the controller questioned the flight if they wanted to execute an instrument landing system (ILS) approach after the VOR approach, and also if they had another request. A flightcrew member responded with the registration number of the airplane and the controller stated, "...after this I ah vor 16 would you like an approach at deland now" to which a flightcrew member responded, "ah yes we'll take the deland after this one sir." The controller questioned what kind of approach they would like to execute at DeLand and a flightcrew member responded, "we'd like ah the vor two three if possible." The controller advised the flight to expect that and a flightcrew member questioned if they would be able to execute the full approach to which controller advised the flight to stand by. The controller advised the flight to expect the full approach and the VOR approach would be broken off in about another 1 1/2 miles. At 1001:23, the controller canceled the approach clearance and gave heading and altitude to fly, which was acknowledged. At 1003:53, the controller who was handling the Seminole flight briefed the relieving controller. The handling controller advised the relieving controller in part that the flightcrew was expecting the full VOR approach to runway 23.

At 1006:07, the relieving controller advised the Seminole flight to proceed direct to the Ormond Beach VORTAC and to join the 212-degree radial. A flightcrew member advised the controller that the flight was "proceeding for establishment..." and descending to 1,600 feet. The controller cleared the flight to descend to 1,600 feet and advised the flight to change to another frequency. At 1012:06, a flightcrew member advised the controller on the new frequency that the flight was descending to 1,600 feet. At 1012:30, the controller cleared the flight for the VOR approach to runway 23 at the DeLand Municipal Airport. At 1015:11, the controller advised the flight to use caution due to constant parachute jumping in progress. A flightcrew member responded "...roger", and at 1017:32, the controller questioned if the flight was going to perform a full stop landing to which a flightcrew member responded, "negative sir we uh we gonna breakoff and do some airwork and then come back with an ils full stop we'll advise you." The controller advised the flight to report canceling on the frequency, which was acknowledged. At 1018:02, a flightcrew member advised the controller that the flight was canceling at this time and the controller responded, "november three zero eight november radar service terminated squawk one two zero zero frequency change is approved." This transmission was acknowledged; there were no further recorded transmissions from the flightcrew with DAB ATCT.

Witnesses reported seeing the Cadet airplane in the traffic pattern to runway 5 at DeLand Municipal-Sidney H Taylor Field Airport (KDED) for two patterns; they also reported hearing radio calls from a flightcrew member of the airplane while in the traffic pattern on the KDED common traffic advisory frequency/UNICOM (CTAF). Two individuals who were flying reported hearing a radio call from a flightcrew member of an unidentified airplane report, "VOR 23" on the KDED CTAF frequency; one individual reported he did not recall hearing the identification of the airplane, or hear the person announce the distance or intentions. Several individuals reported hearing a flightcrew member of the Cadet airplane report on the KDED CTAF frequency that the flight was departing runway 5. One witness reported that the Cadet airplane used almost the full length of the runway, became airborne, then banked to the left and disappeared behind trees. A witness who was located near the accident site, reported seeing an airplane flying north and another airplane flying west. She reported seeing the collision and observed that one of the airplanes descended straight down and the other airplane turned to the northwest. Copies of the witness statements are an attachment to this report.

PERSONNEL INFORMATION

The CFI of the Seminole airplane was employed as a flight instructor by Phoenix East Aviation, Inc., from June through August 1999, and from September 1, 1999, through the date of the accident with the title, Director of Corporate Flight Training. He was the holder of an airline transport pilot certificate with ratings airplane single and multiengine land. He was also the holder of a flight instructor certificate with ratings airplane single and multiengine, and instrument airplane; it was scheduled to expire December 31, 2000. He was issued a first class medical certificate on June 21, 1999, with the limitation that he possess lenses to correct for near and intermediate vision. A review of his located pilot logbooks revealed he had logged a total time of approximately 7,357 hours, of which 6,399 hours were as pilot-in-command and 4,897 hours were as a flight instructor; the last logged flight was November 3, 1997, which consisted of an instrument competency check. The student of the Seminole airplane was the holder of a commercial pilot certificate with ratings airplane single and multi-engine land, instrument airplane. He was issued a first class medical certificate on October 21, 1999, with no limitations. He had logged a total time of 5,513 hours, of which 2,996 hours were logged as second-in-command. He did not log any flight time as pilot-in-command between December 6, 1996, and the last entry in his logbook dated October 21, 1999. The student was receiving instruction towards the issuance of an airline transport pilot certificate.

The CFI of the Cadet airplane was employed as a flight instructor by Embry-Riddle Aeronautical University from September 8, 1998, through the date of the accident as a full-time flight instructor. He was the holder of a commercial pilot certificate with ratings airplane single engine land and sea, multiengine land, and instrument airplane. He was also the holder of a flight instructor certificate with ratings airplane single and multiengine land, instrument airplane; it was scheduled to expire March 31, 2001. He had logged a total of about 827 hours total time, of which about 397 hours were as a CFI, and 781 hours were as pilot-in-command. The student of the Cadet airplane was the holder of a private pilot certificate with ratings

airplane single engine land, instrument airplane. She was issued a first class medical certificate on October 6, 1998, with no limitations. She logged a total time of approximately 168 hours, of which 102 hours were as pilot-in-command. The student was receiving instruction to accomplish procedures that were not performed on a previous "stage check" and also to perform maneuvers that were listed as unsatisfactory or marginal on three previous flights near the middle on November.

AIRCRAFT INFORMATION

The Seminole airplane was inspected last in accordance with a 100-hour inspection on November 23, 1999; the airplane had accumulated approximately 44 hours since the inspection at the time of the accident. The airplane was equipped in part with a DME transceiver and two navigation and communication transceivers. The VOR check was accomplished last on November 26, 1999; (required every 30 days to operate civil aircraft under IFR conditions). The pitot static system was inspected last on July 22, 1999. Copies of the VOR receiver check sheet, and pitot static system test maintenance entry are an attachment to this report.

The Cadet airplane was inspected last in accordance with a phase 2 progressive inspection on September 17, 1999; the airplane had accumulated approximately 60 hours since the inspection. The airplane was equipped in part with one communication transceiver.

METEOROLOGICAL INFORMATION

A METAR weather observation taken at the Daytona Beach Municipal Airport at 0953, indicates that the wind was calm, and the visibility was 10 miles. A broken ceiling existed at 4,800 feet, the temperature and dew point were approximately 63 degrees and 52 degrees Fahrenheit, respectively. The altimeter setting was 30.08 inHg. The Daytona Beach Municipal Airport is located approximately 056 degrees and 14 nautical miles from the accident site.

COMMUNICATIONS

Transcriptions of communications from Daytona Beach Air Traffic Control Tower containing contacts with the flightcrew members of the Seminole and Cadet airplanes are an attachment to this report. There were no reported communication difficulties with either airplane during the communications with the Daytona Beach ATCT.

AIRPORT INFORMATION

The Common Traffic Advisory Frequency (CTAF) at the DeLand Municipal-Sidney H Taylor Field Airport is 122.8. The CTAF is not recorded at the DeLand Municipal Airport, or at nearby airports that utilize the same CTAF. There is no air traffic control tower at the airport. The private radio station license issued to the City of DeLand for UNICOM frequency 122.8 was renewed in February 1996, by the Federal Communications Commission (FCC) after

submission of the renewal application by the city.

The initial approach fix (IAF) for the VOR or GPS approach to runway 23 at DeLand is the Ormond Beach VORTAC (OMN), frequency 112.6. The final approach fix (FAF) for the approach is the DONGS intersection which is located in part 11 nautical miles distance measuring equipment (DME) from the OMN VORTAC on the 212-degree radial. The minimum descent altitude (MDA) for the accident airplane category for a straight in approach is 640 feet mean sea level (561 feet above ground level), and the published missed approach point (MAP) is depicted as being 5.6 nautical miles from the FAF. The frequency for Daytona Beach Approach Control is 125.35.

According to a written statement by a pilot and airplane owner who is also an air traffic controller, he was flying his airplane on the day of the accident and stated that, "As a Tower controller, I am experienced in determining aircraft positions through radio communication. After 17 years in the business, I have never witnessed frequency congestion as bad as it was on December 3. Both 122.7 and 122.8 [frequencies] were so unmanageable and absolutely chaotic that it is very understandable how no one on either frequency could understand what was going on." He also stated that he heard radio calls from pilots at 7 different airports on the DeLand CTAF. A copy of his statement is an attachment to this report. Another witness located on the DeLand Municipal Airport associated with a skydive operation reported that on the day and time of the accident, she was not listening to the portable VHF radio that they have tuned to the DeLand CTAF. She further reported that in the past, she has heard radio calls from pilots on the DeLand CTAF from five different airports. A copy of the NTSB Record of Conversation is an attachment to this report.

According to the Embry-Riddle Aeronautical University (ERAU) Aviation Safety Program Manager (ASPM), on October 5, 1999, ERAU began operating 10 airplanes at the DeLand airport under a program titled Center for Aviation Training at Embry-Riddle (CATER). After beginning operations at DeLand and before the accident, personnel from the CATER program began "a dialog" with the city engineer of the DeLand City Council regarding existing frequency congestion and bleed over of the DeLand "UNICOM" frequency from other airports that utilize the same frequency. The CATER personnel and the ERAU ASPM individual also discussed the issue of existing frequency congestion and bleed over. It was decided to approach personnel from the city of DeLand who is the license holder of the UNICOM frequency and to request a frequency change. A copy of the ERAU memorandum related to this subject is an attachment to this report.

According to personnel from the City of DeLand, "a very casual comment was made at the end of October 1999, asking if sometime in the future, DeLand might consider a frequency change. Being of a very informal nature, an application was not filed." A copy of the letter is an attachment to this report.

WRECKAGE AND IMPACT INFORMATION

The main wreckage of the Seminole airplane which consisted of the fuselage and right wing with partially attached engine, and the partially attached vertical stabilizer was located in a marsh area at 29 degrees 04.305 minutes North latitude and 081 degrees 16.559 minutes West longitude (see photo 2). The left wing of the Seminole was separated, and the engine was separated from the wing. The main wreckage when plotted was located approximately 029 degrees and .27 nautical mile from the approach end of runway 23. The main wreckage of the Cadet airplane that consisted of the fuselage with a section of the left wing attached, the engine and propeller assembly, the separated section of the left wing and the separated right wing was located in a wooded area at 29 degrees 04.504 minutes North latitude and 081 degrees 16.435 minutes West longitude (see photo 1). That location when plotted was located approximately 027 degrees and .49 nautical mile from the departure end of runway 05. The wreckage of the Cadet was oriented on a magnetic heading of approximately 085 degrees; the inboard segment of one of the propeller blades from the Seminole was located immediately adjacent to the main wreckage of the Cadet. A search was conducted for wreckage that had separated from both airplanes. The located wreckage was plotted by latitude and longitude then recovered (a chart that lists the located wreckage by coordinates is an attachment to this report).

The wreckage of the Seminole airplane was recovered for further examination. Examination of the wreckage revealed the left wing structure between the fuselage and engine nacelle was fragmented; some sections were located. The spar web of the forward spar of the left wing was displaced aft in the spar box area. The left aileron and balance cables exhibited evidence of overload failure. Examination of the right wing revealed chordwise crushing the center of which was located approximately 44 inches inboard from the end rib; a 2-inch semi-circular indentation was noted in that location with tree bark embedded in the leading edge skin in that area. The leading edge of the right wing was crushed aft approximately 21 inches, 89 inches inboard of the end rib; this location was just outboard of the engine nacelle. Accordion aft crushing was also noted on the leading edge of the right wing between the engine nacelle and the fuselage. Additionally, the outboard section of the leading edge of the right wing was rotated down approximately 60 degrees. The nose section was destroyed from the instrument panel forward. The cabin roof was separated at the instrument panel; the roof was torn and accordion crushed aft beginning at the center of the cabin door area. The cabin floor was structurally separated approximately 12 inches aft of the rudder bar assembly and remained partially connected by flight control cables and wiring harness. The pilot's seat was structurally separated; the co-pilot's seat remained attached to the seat rails. The oleo strut of the right main landing gear was bent aft and was fractured approximately 8.5 inches up from the yoke; a compression wrinkle was noted on the aft side of the oleo. The vertical stabilizer remained only partially connected to the airframe by trim and control cables. The forward spar and the leading edge of the left stabilator was rotated aft approximately 90 degrees. Stabilator and rudder flight control cable continuity was confirmed from the cockpit to the control surface. Examination of the audio panel revealed that the "auto", "Comm 1" and "Comm 2" switches were in the "off" positions; the audio panel was separated from the instrument panel. The aircraft's radios and DME transceiver were removed for further examination (see TESTS AND RESEARCH section of this report).

Examination of the separated left engine of the Seminole airplane revealed the propeller remained secured to the crankshaft; one propeller blade was fractured and separated from the hub (see photo 3); two segments of the fractured propeller blade were located and recovered. Examination of the fractured propeller blade revealed spanwise lines on the leading edge of the blade approximately 5 inches inboard from the tip (see TESTS AND RESEARCH section of this report). The propeller blade that remained secured inside the hub exhibited slight aft bending. Impact damage to the engine was noted; the carburetor was later recovered but not examined. Crankshaft, camshaft, and valve train continuity was confirmed. Examination of the right engine which was partially attached to the airframe revealed the propeller was separated from the engine; the crankshaft was fractured aft of the crankshaft flange. Impact damage to the engine was noted. Crankshaft, camshaft, and valve train continuity was confirmed. Examination of the separated right propeller revealed one blade was twisted towards low pitch and the other blade was bent aft about 90 degrees with gouges on the leading edge near the blade tip. No evidence of preimpact failure or malfunction was noted to either engine or propeller. A copy of the report from the engine manufacturer is an attachment to this report.

The wreckage of the Cadet airplane was also recovered for further examination. An approximate 89-inch segment of left wing with attached flap and landing gear remained partially attached to the fuselage; the aft spar of the left wing was separated from the fuselage. The leading edge of the left wing was crushed aft approximately 6 inches, 27 inches outboard from the wing root. The forward spar of the left wing in line with the pitot mast was rotated aft 90-degrees. A semi-circular indentation was noted on the upper surface of the left aileron. Additionally, the leading edge stall strip of the left wing that was separated but located, exhibited "S" type bending with rubber transfer on the strip. Overload failure was noted on the left aileron and balance control cables. The right wing was separated at the wing root area; 28 inches of inboard wing skin and structure was separated from the leading edge aft to the main spar. The leading edge of the right wing was crushed aft approximately 11 inches, near the center of the fuel tank area. The forward spar of the right wing was fractured at the main landing gear attach area and was separated from structure inboard of that location. Two semi-circular indentations with tree bark were noted on the remaining segment of the leading edge of the right wing. The right aileron and balance cables exhibited evidence of overload failure. The instrument panel and forward cockpit floor forward of the pilot and copilot's seats were structurally separated. Rudder and stabilator control cable continuity was confirmed. The leading edge of the vertical stabilizer was displaced to the left with crushing on the right side. The main spar of the vertical stabilizer was bent aft approximately 45 degrees. The horizontal stabilator remained attached to the empennage; the outboard portion of the left stabilator was crushed inboard, up, and aft; compression wrinkles were noted in the upper skin. The aircraft's radio was removed for further examination, (see TESTS AND RESEARCH section of this report). Examination of the engine revealed crankshaft, camshaft, and valve train continuity. No evidence of preimpact failure or malfunction was noted to the engine or its components. Both propeller blades were fractured; the separated segment of one of the fractured propeller blades was recovered and measured approximately 10.5 inches. A

copy of the report from the engine manufacturer is an attachment to this report.

MEDICAL AND PATHOLOGICAL INFORMATION

Postmortem examination of the CFI of the Seminole airplane was performed by Thomas R. Parsons, M.D., Associate Medical Examiner of 7th and 24th Districts Medical Examiner's Office. The cause of death of the CFI was listed as multiple blunt force injuries. Due to religious concerns, an external examination only was performed on the student by Thomas R. Parsons, M.D. The cause of death of the student was listed as multiple blunt force injuries. Toxicological analysis were performed by the FAA Accident and Research Laboratory (CAMI), located in Oklahoma City, Oklahoma of specimens of the CFI and student. The results of analysis by CAMI of specimens of the CFI and student were negative for cyanide, ethanol, and tested drugs. Carbon monoxide testing was not performed on specimens of the CFI; no carbon monoxide was detected in a specimen of the student.

Postmortem examinations of the CFI and student of the Cadet airplane were also performed by Thomas R. Parsons, M.D., Associate Medical Examiner of 7th and 24th Districts Medical Examiner's Office. The cause of death of both was listed as multiple blunt force injuries. Toxicological analysis of specimens of the CFI and student were performed by CAMI. The results of analysis of specimens of the CFI and student were negative for carbon monoxide, cyanide, and ethanol. No tested drugs were found in specimens of the CFI. Theophylline (0.661 ug/ml and 20.559 ug/ml) was detected in blood and urine of the student. Ephedrine, and pseudoephedrine were also detected in specimen of the student.

TESTS AND RESEARCH SECTION

Examination of the radios from the Seminole airplane with Federal Aviation Administration (FAA) oversight revealed they were inoperative. The frequency of one of the communication radios was set to frequency 122.8, and the frequency of the second communication radio was 125.57. The frequency of one of the navigation receivers was set to 112.60 and the frequency of the second navigation receivers was set between 111 and 112 megahertz (mHz) and .60 kilohertz (kHz). A copy of the report is an attachment to this report. Examination of the DME transceiver with FAA oversight revealed the unit was inoperative; it does not retain any data.

Examination of the radio from the Cadet airplane with FAA oversight revealed that the communication frequency in use was 122.8. A copy of the statement from the FAA is an attachment to this report.

A Recorded Radar Study was prepared by the NTSB Office of Research and Engineering located in Washington, DC, and is an attachment to this report. The radar study indicates that secondary radar data of the Seminole airplane was observed from 0939:57, to the last secondary radar target at 1018:08, when radar service was terminated and the transponder code was noted to change to 1200. The airplane was calculated to be located 210 degrees

and 1.23 nautical miles from the DONGS intersection at that time. The Seminole descended to approximately 600 feet mean sea level (msl), leveled off momentarily, descended to approximately 500 feet msl, then climbed to approximately 600 feet msl, where the last radar target was noted approximately .6 nautical mile from the approach end of runway 23. The report indicated the Seminole descended, "straight down to airport after receiving the radar service termination communication from the controller." The report indicates that after the Cadet airplane departed initially, the flight proceeded to the DeLand Airport and entered the traffic pattern; several traffic patterns associated with the airplane were noted. The report also indicates that just prior to the accident, the CADET airplane departed runway 05 and turned to the northwest.

Examination of the fractured propeller blade segment from the left propeller of the Piper Seminole and the engine of the Cadet airplane revealed matching of the impact signatures on the leading edge of the propeller blade segment and the engine crankcase near the No. 4 cylinder. Cylinder cooling fin impressions were noted on the leading edge of the blade. Additionally, an impact contour on the leading edge of the blade matched the impact contour of the camshaft (see photos 12 and 13). The propeller blade contact on the engine was oriented approximately 25 degrees from being perpendicular to the longitudinal axis of the engine/airframe.

Review of the Aeronautical Information Manual (AIM), Advisory Circular (AC) 90-42F, titled "Traffic Advisory Practices At Airports Without Operating Control Towers" dated May 21, 1990, (AC) 90-48C, titled "Pilot's Role in Collision Avoidance" dated March 18, 1983, and (AC) 90-66A, titled "Recommended Standard Traffic Patterns And Practices For Aeronautical Operations At Airports Without Operating Control Towers" dated August 26, 1993, revealed no specific guidance how and when to terminate practice instrument approaches to airports that do not have a control tower. Excerpts from the AIM and the AC's are attachments to this report.

ADDITIONAL INFORMATION

Additional parties to the investigation are Grant M. Brophy and Donald B. Hunt, Embry-Riddle Aeronautical University, Daytona Beach, Florida; Paul Lehman, The New Piper Aircraft, Inc., Vero Beach, Florida; Edward G. Rogalski, Textron Lycoming, Belleview, Florida; Al Tatum and Robert L. Jones S-Tec Corporation, Mineral Wells, Texas; and Phil Goettel, Honeywell, New Century, Kansas.

The wreckage of the Seminole airplane with the exception of the aircraft's radios and the distance measuring equipment (DME) transceiver was released to Kevin Twiss, claims representative of Phoenix Aviations Managers, Inc., on December 7, 1999. The wreckage of the Cadet airplane with the exception of the aircraft's radio was released to Faith A. Collins, President of Sample International Aviation, Inc., on December 7, 1999. The radios and DME transceiver from the Seminole airplane were released to Kevin Twiss on March 29, 2001. The radio from the Cadet airplane was released to Faith Collins on March 29, 2001.

Pilot Information

Certificate:	Airline transport; Flight instructor	Age:	51, Male
Airplane Rating(s):	Single-engine land; Multi-engine land	Seat Occupied:	Right
Other Aircraft Rating(s):	None	Restraint Used:	
Instrument Rating(s):	Airplane	Second Pilot Present:	Yes
Instructor Rating(s):	Airplane multi-engine; Airplane single-engine; Instrument airplane	Toxicology Performed:	Yes
Medical Certification:	Class 1 Valid Medical-w/ waivers/lim	Last FAA Medical Exam:	June 21, 1999
Occupational Pilot:	Yes	Last Flight Review or Equivalent:	
Flight Time:	7357 hours (Total, all aircraft), 6399 hours (Pilot In Command, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Piper	Registration:	N3038N
Model/Series:	PA-44-180 PA-44-180	Aircraft Category:	Airplane
Year of Manufacture:		Amateur Built:	
Airworthiness Certificate:	Normal	Serial Number:	44-7995229
Landing Gear Type:	Retractable - Tricycle	Seats:	4
Date/Type of Last Inspection:	November 23, 1999 100 hour	Certified Max Gross Wt.:	3800 lbs
Time Since Last Inspection:	44 Hrs	Engines:	2 Reciprocating
Airframe Total Time:	13979 Hrs	Engine Manufacturer:	Lycoming
ELT:	Installed, activated, did not aid in locating accident	Engine Model/Series:	O-360-E1A6D
Registered Owner:	PHOENIX EAST AVIATION	Rated Power:	180 Horsepower
Operator:		Operating Certificate(s) Held:	On-demand air taxi (135)
Operator Does Business As:		Operator Designator Code:	

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	Condition of Light:	Day
Observation Facility, Elevation:	DAB ,34 ft msl	Distance from Accident Site:	14 Nautical Miles
Observation Time:	09:53 Local	Direction from Accident Site:	56°
Lowest Cloud Condition:	Unknown	Visibility	10 miles
Lowest Ceiling:	Broken / 4800 ft AGL	Visibility (RVR):	
Wind Speed/Gusts:	/ None	Turbulence Type Forecast/Actual:	/
Wind Direction:	0°	Turbulence Severity Forecast/Actual:	/
Altimeter Setting:	30 inches Hg	Temperature/Dew Point:	18°C / 11°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	DAYTONA BEACH (DAB)	Type of Flight Plan Filed:	IFR
Destination:		Type of Clearance:	None
Departure Time:	09:39 Local	Type of Airspace:	Class G

Airport Information

Airport:	DELAND MUNICIPAL-SIDNEY H DED	Runway Surface Type:	
Airport Elevation:	80 ft msl	Runway Surface Condition:	
Runway Used:	0	IFR Approach:	Practice;VOR/DME
Runway Length/Width:		VFR Approach/Landing:	

Wreckage and Impact Information

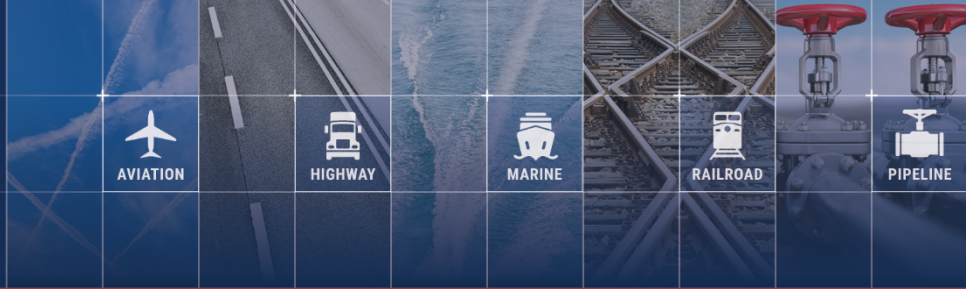
Crew Injuries:	2 Fatal	Aircraft Damage:	Destroyed
Passenger Injuries:		Aircraft Fire:	None
Ground Injuries:	N/A	Aircraft Explosion:	None
Total Injuries:	2 Fatal	Latitude, Longitude:	29.060323,-81.229309(est)

Administrative Information

Investigator In Charge (IIC):	MONVILLE, TIMOTHY
Additional Participating Persons:	DALE NODORFT; ORLANDO , FL ALAN C NEMCIK; ORLANDO , FL GUILLAUME BAUDET; DAYTONA BEACH , FL RICHARD L HOWE; DAYTONA BEACH , FL
Original Publish Date:	May 16, 2001
Last Revision Date:	
Investigation Class:	Class
Note:	
Investigation Docket:	https://data.nts.gov/Docket?ProjectID=47870

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Aviation Investigation Final Report

Location:	DELAND, Florida	Accident Number:	MIA00FA041
Date & Time:	December 3, 1999, 10:23 Local	Registration:	N153ER
Aircraft:	Piper PA-28-161	Aircraft Damage:	Destroyed
Defining Event:		Injuries:	2 Fatal
Flight Conducted Under:	Part 91: General aviation - Instructional		

Analysis

After the Cadet airplane departed, the flight proceeded to the DeLand airport and remained in the traffic pattern for runway 05; individuals heard announcements while in the pattern. After the Seminole airplane departed, requests to perform instrument approaches to the DeLand airport were denied; the controller responded to the request, '...delands saturated right now unable any approaches at deland....' The flight was vectored then cleared for a VOR approach to a runway 16 at Daytona Beach then vectored and cleared for a VOR approach to runway 23 at the DeLand airport. While inside the final approach fix inbound, radar service of the Seminole flight was terminated. Two individuals heard a voice announce on the DeLand CTAF, 'VOR 23.' The witnesses did not hear the distance, intentions, airport ID, or aircraft ID. The Seminole flight continued on the VOR approach; the last radar target of the Seminole was approximately .6 nautical mile from the approach end of runway 23. Several individuals heard the Cadet flight announce on the DeLand CTAF that the flight was departing runway 05. One witness reported that the Cadet used almost the full length of the runway, became airborne, then banked to the left and disappeared behind trees. The airplanes collided in-flight near the departure end of runway 05; the wreckage of both airplanes came to rest within approximately 1/2 nautical mile from the departure end of runway 05. An impact signature from one of the propeller blades from the left engine of the Seminole was noted on top of the engine of the Cadet; the impact signature was within approximately 25 degrees from being perpendicular. Several individuals reported frequency congestion of the DeLand CTAF from other airports that utilize the same frequency. Prior to the accident, ERAU personnel had informally inquired about having the frequency changed due to that very reason; the frequency was not changed before the accident. Advisory circulars and the AIM does not address when to terminate a practice instrument approach to an uncontrolled airport.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The inadequate visual lookout by the pilot-in-command (PIC)/certified flight instructor (CFI) of both aircraft. Contributing factors in the accident were: 1) the frequency congestion of the CTAF 2) the poor in-flight planning decision by the PIC/CFI of the Seminole for his continuing a practice instrument approach to within approximately .6 nautical mile from the approach end of the runway with opposing airplanes departing on the upwind leg, and 3) the absence of guidance in the Aeronautical Information Manual and Advisory Circulars as to how or when to terminate a practice instrument approach to an airport that does not have an operating control tower.

Findings

Occurrence #1: MIDAIR COLLISION

Phase of Operation: TAKEOFF - INITIAL CLIMB

Findings

1. (F) AIRPORT FACILITIES, UNICOM - CONGESTED
2. (C) VISUAL LOOKOUT - INADEQUATE - PILOT IN COMMAND (CFI)
3. (C) VISUAL LOOKOUT - INADEQUATE - PILOT OF OTHER AIRCRAFT
4. (F) IN-FLIGHT PLANNING/DECISION - POOR - PILOT OF OTHER AIRCRAFT
5. (F) INFORMATION UNAVAILABLE - FAA (OTHER/ORGANIZATION)

Factual Information

Same as narrative MIA00FA041A.

Pilot Information

Certificate:	Commercial; Flight instructor	Age:	22, Male
Airplane Rating(s):	Single-engine land; Single-engine sea; Multi-engine land	Seat Occupied:	Right
Other Aircraft Rating(s):	None	Restraint Used:	
Instrument Rating(s):	Airplane	Second Pilot Present:	Yes
Instructor Rating(s):	Airplane multi-engine; Airplane single-engine; Instrument airplane	Toxicology Performed:	Yes
Medical Certification:	Class 1 Valid Medical--no waivers/lim.	Last FAA Medical Exam:	July 22, 1999
Occupational Pilot:	Yes	Last Flight Review or Equivalent:	
Flight Time:	827 hours (Total, all aircraft), 781 hours (Pilot In Command, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Piper	Registration:	N153ER
Model/Series:	PA-28-161 PA-28-161	Aircraft Category:	Airplane
Year of Manufacture:		Amateur Built:	
Airworthiness Certificate:	Normal	Serial Number:	2841178
Landing Gear Type:	Tricycle	Seats:	4
Date/Type of Last Inspection:	September 17, 1999 Continuous airworthiness	Certified Max Gross Wt.:	2325 lbs
Time Since Last Inspection:	61 Hrs	Engines:	1 Reciprocating
Airframe Total Time:	10411 Hrs	Engine Manufacturer:	Lycoming
ELT:	Installed, activated, did not aid in locating accident	Engine Model/Series:	O-320-D3G
Registered Owner:	EMBRY-RIDDLE AERONAUTICAL UNIV	Rated Power:	160 Horsepower
Operator:		Operating Certificate(s) Held:	
Operator Does Business As:		Operator Designator Code:	

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	Condition of Light:	Day
Observation Facility, Elevation:	DAB ,34 ft msl	Distance from Accident Site:	14 Nautical Miles
Observation Time:	09:53 Local	Direction from Accident Site:	56°
Lowest Cloud Condition:	Unknown	Visibility	10 miles
Lowest Ceiling:	Broken / 4800 ft AGL	Visibility (RVR):	
Wind Speed/Gusts:	/ None	Turbulence Type Forecast/Actual:	/
Wind Direction:	0°	Turbulence Severity Forecast/Actual:	/
Altimeter Setting:	30 inches Hg	Temperature/Dew Point:	18°C / 11°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	DAYTONA BEACH (DAB)	Type of Flight Plan Filed:	None
Destination:		Type of Clearance:	None
Departure Time:	09:21 Local	Type of Airspace:	Class G

Airport Information

Airport:	DELAND MUNICIPAL-SIDNEY H DED	Runway Surface Type:	
Airport Elevation:	80 ft msl	Runway Surface Condition:	
Runway Used:	0	IFR Approach:	Practice;VOR/DME
Runway Length/Width:		VFR Approach/Landing:	

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Passenger Injuries:		Aircraft Fire:	None
Ground Injuries:	N/A	Aircraft Explosion:	None
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