



National Transportation Safety Board Aviation Accident Factual Report

Location:	Buckeye, AZ	Accident Number:	LAX06FA099
Date & Time:	02/01/2006, 1504 MST	Registration:	N1563A
Aircraft:	Beechcraft F33A	Aircraft Damage:	Destroyed
Defining Event:		Injuries:	1 Fatal

Flight Conducted Under: Part 91: General Aviation - Instructional

1.1 HISTORY OF FLIGHT

On February 1, 2006, at 1504 mountain standard time, a Beechcraft F33A, N1563A, entered an increasingly steep descent and impacted terrain near Buckeye, Arizona. Airline Training Center Arizona (ATCA), Goodyear, Arizona, operated the airplane under the provisions of 14 CFR Part 91. The student pilot, the sole occupant, was fatally injured, and the airplane was destroyed. Visual meteorological conditions prevailed, and a company flight plan had been filed. The solo instructional flight originated at Phoenix Goodyear Airport, Goodyear, about 1420.

The student pilot was flying her third solo flight of the flight-training syllabus. The ATCA solo flight order authorized the student to depart from Phoenix Goodyear airport, fly to Buckeye Airport, perform at least one landing, taxi back, takeoff, then proceed to a practice area south of the Phoenix Goodyear Airport, perform steep turns, slow flight, and stalls, and finally return to Phoenix Goodyear Airport. The student was reported as overdue at 1615. Five aircraft were launched to search for the overdue airplane at 1640. The Maricopa County Sheriff Department helicopter located the wreckage on February 2 at 0040 in flat desert terrain 12.5 miles south-southeast of the Buckeye Airport.

Radar data depicted the accident airplane departing Buckeye airport to the south in a steady climb; about 120 knots ground speed. Approximately 5 miles south of Buckeye airport the airplane track turns to the east-southeast and continues to climb to 4,500 feet, then immediately starts a descent from 4,500 feet. Radar recorded the start of the descent at 1503:54. Between 1504:14 and 1504:24, a United States Air Force F-16C crosses in front of the accident airplane traveling from south-to-north, at 358 knots ground speed, and between 4,600 and 4,500 feet. The minimum lateral separation between the airplanes was about 0.3 miles, and vertical separation was about 400 feet. Radar continued to track the accident airplane in an increasingly rapid and steep descent in the east-southeast direction. The last radar return was at 1504:44, and was in the vicinity of the accident site. The F-16 continued its track northbound on a gradual descent into Luke Air Force Base.

1.5 PERSONNEL INFORMATION

A review of Federal Aviation Administration (FAA) airman records revealed that the pilot held a student pilot certificate. The certificate was endorsed on January 12, 2006, by a CFI for solo flight in a F33A. The pilot held a third-class medical certificate dated March 1, 2005, with no limitations or restrictions.

An examination of the student pilot's logbook revealed that she had flown 32 times in the last 54 days, accumulating 48.4 hours of flight time; 42.6 hours of that time was documented as dual instruction. She had logged 5.8 solo hours. She had flown each of the previous 2 days prior to the accident. The ATCA training records document that she flew 16 days out of the available 21 flying days for the month of January.

Statements from colleagues of the student pilot indicate that she went to bed around 2130 on January 31 and rose at 0700 the morning of February 1. She had eaten a light breakfast of juice, toast, and jam. She had been scheduled for a cross-country flight, but at 1000 was informed that her instructor had cancelled the flight, and that she would fly a solo flight at 1400 instead. It could not be determined if she had eaten anything between breakfast and her solo flight.

1.6 AIRCRAFT INFORMATION

The Beechcraft F33A is a single engine, 4-passenger, low-wing airplane with retractable landing gear. The airplane was powered by a Teledyne Continental IO-520-BB(65), 6-cylinder, reciprocating engine. A review of the airplane's maintenance logbook revealed that the plane had 18,602.6 hours of total time, the engine had approximately 1,601 hours of total time, and the airplane had completed a progressive-six inspection on January 31, 2006. The progressive-six inspection checklist, included in the maintenance records, documents routine engine maintenance, and a detailed inspection of the landing gear.

The airplane had a Ryan TCAD 9900BX (traffic/collision alerting device) system installed. The system computes relative altitude, range, and bearing of nearby transponder-equipped aircraft. Aircraft with non-mode C transponders can provide range and bearing information. The Model 9900BX does not detect aircraft without operating transponders.

1.7 METEOROLOGICAL INFORMATION

Weather METAR data recorded at the Goodyear airport (KGYR) on February 1, 2006, at 1457, documented winds were variable at 5 knots; 20 statute mile surface visibility; and few clouds at 25,000 feet.

The position of the sun was calculated using a computer Sun & Moon Information program based on the following position, date, and time information; 33 degrees 16 minutes north latitude by 112 degrees 35 minutes west longitude, February 1, 2006, 1500, and altitude of

4,500 feet msl. The calculated magnetic bearing to the sun was 204.2 degrees, and its altitude was 31.3 degrees above the horizon. A sun line was plotted against the radar track of the airplane. The plot illustrates that the sun would have been directly off the right wing of the F33A; 31 degrees above the horizon at the time the F-16C crossed in front of the student's airplane.

The sun line plot is included in the official docket of this investigation.

1.9 COMMUNICATIONS

The Beech F33A was operating in class E airspace and was not in contact with any ATC services. The radar data shows that the F33A was squawking 1200 code.

The F-16C, call sign Stalk-1, squawking 4255, was in communications with Luke Radar Approach Control (RAPCON) during its transit from the south to Luke AFB. The 56th OSS provided a transcript of the Luke RAPCON communications recording that involved Stalk-1 on frequency 125.45 MHz (primary) and 263.125 MHz (secondary), from 1500:17 to 1505:43. At 1502:51, RAPCON informed Stalk-1 of two targets: one at 1 o'clock and 5 miles same direction, altitude indicated 3,400 feet; and the other target was at 11 o'clock, 7 miles opposite direction, 3,900 feet (this target was the student pilot's airplane). Stalk-1 replied that he would descend to 4,500 feet. At 1503:52, RAPCON identified traffic for Stalk-1 at 11 o'clock, 2 miles, eastbound, altitude indicated 4,500 feet. At 1503:58, Stalk 1 responded that he had the traffic in sight.

The entire transcript is included in the official docket of this investigation.

1.11 FLIGHT RECORDERS

F16 Head-Up Display (HUD) Tape

The National Transportation Safety Board investigator viewed the HUD tape of the F-16C that crossed the path of the accident airplane. The accident aircraft never comes into view on the recording. All times are UTC in reference to the times recorded on the HUD tape. At 2203:46, the altitude was 4,810 feet, speed was 325 knots, and heading was 008 degrees; the altitude readout showed a shallow descent. At 2204:00, the video displayed 4,750 feet, 317 knots, heading 010; a voice states that Stalk-1 has traffic 11 o'clock, 2 miles, eastbound at 4,500 feet. The pilot reports that he has traffic in sight. At 2204:10, the video displayed 4,680 feet, 312 knots, heading 012; a voice states the Stalk-1 has traffic at 1 o'clock, same direction, 2 miles, 2,800 feet. The pilot reports traffic in sight and rocked his wings twice. At 2204:27, the tape reads a descent in altitude and the pilot is setting up for his approach into Luke AFB.

1.12 WRECKAGE AND IMPACT INFORMATION

The wreckage was located in flat desert terrain in a shallow dry streambed 33 degrees 16.106

minutes north latitude and 112 degrees 35.443 minutes west longitude, at an elevation of 1,003 feet mean sea level (msl). The initial point of impact was identified by pieces of green glass lens fragments at the tip of an 8-inch-wide strip of disturbed earth. The main line of debris was distributed on a bearing of 148 degrees magnetic for about 150 feet. A second line of minor debris, mostly fragments from the right wing, ran along a bearing of 098 degrees.

The impression on the ground consisted of a narrow strip of disturbed earth running for 17 feet and gradually widening from 8 inches to about 1 foot. It then opened up to a circular pit 10 feet in diameter and 4 feet deep. At the approximate center of the pit the propeller was found with fragments of wing fuel bladder, engine magneto, and nose gear. On the southeastern edge, outside the pit, was the Continental IO-520 engine, which had been separated from the airframe. Thirty-three feet down the 148-bearing line from the engine was the main fuselage, tail, and landing gear. Continuing down the 148-bearing line for another 90 feet, sections of the left wing were distributed. Extending 55 feet along a 098-bearing line from the center of the pit were skin sections and fragments of the right wing.

The wreckage was recovered, taken to a facility in Phoenix, and examined by safety investigators from Beechcraft, Teledyne Continental Motors, Airline Training Center Arizona, and the United States Air Force, under the supervision of the Safety Board investigator-in-charge (IIC).

The left and right aileron cable connections on each bell crank were separated at the bell crank connection. The aileron cables were traced to the cockpit; one side exhibited a broomstrawed end consistent with overload, the other end was detached from the sprocket chain. About 12 inches of the left aileron cable and the sprocket at the firewall were not located. A short length of aileron sprocket chain was located in the firewall area that was still attached to the engine. The elevator cable was traced from the elevator bell crank to the cockpit; the arm of the bell crank was broken off. The cable exhibited a broomstrawed end on the counter balance side. Continuity was established between the rudder push-pull tubes in the cockpit and the rudder bell crank in the tail. The elevator trim actuators were fully retracted and determined to be inaccurate as a result of the crash. The flap actuator was in the fully retracted position and the landing gear actuator was in the up and locked position. Fuel caps were secure in the fuel tank ports. Continuity of the fuel system could not be accomplished due to the level of wing and airframe destruction.

The horizontal and vertical stabilizers were present. Leading edge crushing and aft buckling affected all three stabilizer surfaces in accordion fashion. The left elevator was split chordwise at midspan and the trim tab was bent down. A 2-foot 5-inch outboard section of the right elevator was bent aft about 20 degrees. The right elevator balance weight and rudder balance weight were located within the main wreckage; the left elevator balance weight was not located. The rudder hinges were separated from the vertical stabilizer and were buckled at midspan.

The aft fuselage exhibited extreme twisting, buckling, and ripping of the skin making it almost unrecognizable. The right aft passenger seat was present.

The right wing spar was in approximately seven major pieces. It and associated skin panels exhibited crushing, buckling, twisting, and skin ripping. The wing leading edge was separated from the wing spar and was crushed aft accordion style. The right flap and aileron were present, both detached from the wing, and both were ballooned. The main landing gear mount was present. The right wing tip was crushed at a 50-degree angle with respect to the chord line.

The left wing was ripped, buckled, and twisted into several spanwise elements. A 9-foot section of the main wing spar had a single lengthwise corkscrew twist. Three feet seven inches of the upper main wing spar was still attached to the main cockpit carry through spar. The leading edge of the wing was crushed aft accordion style. The main landing gear mount was present. The flap and aileron were separated from the wing and were ballooned out.

The cockpit was completely destroyed. The wing carry through spar was present with the wing attach bolts fastened. The engine control quadrant was separated from the instrument panel and the engine control cables were separated from the engine. The propeller condition handle was in, the mixture handle was extended 1 inch, and the throttle handle was extended 4 inches and bent 90 degrees at the interface to the panel. The Fuel Flow and Manifold Pressure instrument face had what appeared to be needle slap marks at the 4-gallon/hour mark and the 10 inHg mark. The engine manufacturer confirmed that these readings are consistent with an engine at idle power. The dual control column assembly and rudder bell crank push-pull tubes were completely destroyed. The fuel valve was located and the handle was positioned between folds of metal flooring. By passing air through the valve it was determined that the valve was positioned to the right fuel tank. The front and right rear seats were separated from the cockpit seat rails. The ignition switch was missing its back half and could be spun in its fitting.

The engine was located separate from the main fuselage. The engine data plate contained the following information: Teledyne Continental IO-520-BB(65), serial number 830057R. The exhaust pipe and muffler were collapsed flat consistent with heated ductile deformation. The engine was washed with water to clean off the dirt and debris and placed on a workbench for further examination. There was a 6-inch by 6-inch square hole in the front top of the engine case over the number 5 and 6 piston connecting rods. The hole was deformed inward and fracture faces were bright gray and granular. The induction system was shattered into several pieces, the throttle body was separated from the engine, and the throttle plate was closed and immovable. The crankshaft end was separated behind the propeller flange and the separation surface exhibited a 45-degree angled face. All cylinders exhibited cooling fin damage with the most damage on the number 5 cylinder intake valve cover. The engine could not be rotated by hand, but mechanical continuity was established by internal visual inspection using a borescope. The spark plugs, Champion RHB-32E's, were gray in color indicating normal wear according to the Champion Aviation Check- A-Plug chart, and exhibited no mechanical damage to the electrodes. The fuel pump was removed; the drive coupling was in two pieces at the spline shaft with the fracture surface exhibiting a 45-degree angle, the pump was rotated by hand and no binding was felt. The vacuum pump drive coupling was separated in two pieces radially; the rotor was fractured into five wedge pieces, and the vanes were all about the same length. The left magneto was destroyed; the right magneto had mechanical damage and could not be rotated by hand.

The propeller was examined and each of the three blades labeled either A, B, or C. Blade A was loose in the hub, exhibited leading edge and face polishing, was curved forward, and had chordwise scratches. Blade B was out of its hub location, exhibited leading edge and face polishing, chordwise scratches, and was torsionally twisted about the spanwise axis. Blade C was loose in its hub, 4 inches of the blade tip was curled forward, and the blade was bent aft about 20 degrees at the root.

1.13 MEDICAL AND PATHOLOGICAL INFORMATION

The Maricopa County Medical Examiner completed the autopsy. The Civil Aeromedical Institute (CAMI), Forensic Toxicology Research Team, Oklahoma City, Oklahoma, performed the toxicological analysis from tissue samples obtained during the autopsy. The results of analysis of the specimens were negative for ethanol, legal, and illegal drugs. Due to the lack of suitable tissue samples, tests for carbon monoxide and cyanide were not performed.

The Safety Board medical officer examined medical records from the FAA and Lufthansa. The student responded "no" to all medical history questions on the FAA Application for Airman Medical and Student Pilot Certificate, including specifically "Dizziness or fainting spell," "Unconsciousness for any reason," and "Visits to Health Professional Within Last 3 years." The student pilot's family did not note any significant medical history in the pilot, and specifically denied that she had any tendency to fainting spells. The Lufthansa medical records appear to have consisted entirely of their standard screening examinations for new pilots. The records included EKG, EEG, specialized eye evaluations, audiometry, blood tests, drug screen, and pulmonary function tests; all appearing (and clearly interpreted as) normal. There was only very limited material available for the autopsy, so it was not possible for the autopsy to have excluded any number of potential incapacitating conditions, including, but not limited to, stroke, heart attack, brain tumor, aneurysm, or pulmonary embolus.

1.16 TESTS AND RESEARCH

1.16.1 Radar & Aircraft Performance Study

The study calculates various performance parameters using the long range radar data from the United States Air Force 84th Radar Evaluation Squadron (RADES). There were two other airplanes in the vicinity of the Beech F33A when the accident occurred, an F-16C military jet, and a third plane squawking beacon code 1200. The time range of the data was from 2201:12 to 2205:4 UTC (1501:12 to 1505:40 local time).

A review of the data shows that the Beech F33A was climbing on an easterly heading and the F-16C was descending in altitude on a northerly heading. The Beech F33A and the F-16C closed the distance between each other, with the Beech F33A at 4,400 feet and the F-16 at 4,700 feet, at a lateral distance of 1.9 nautical miles. The next position calculated that the lateral separation had decreased to approximately 0.8 nautical miles and at the same time, the Beech began to decrease its altitude, entering an approximate rate of descent of 500 feet per minute. The closest the two aircraft came to each other was estimated to be 1,850 feet laterally and 400

feet vertically. Then 24 seconds later, the descent rate of the Beech had accelerated to just over 2,500 feet per minute. The wreckage was located about 0.25 nautical miles from the location of the last radar return.

The entire Performance Study is contained in the official docket of this investigation.

1.16.2 Vortex Wake Turbulence Study

Lockheed Martin produced a F-16C wing tip vortices analysis at the request of the US Air Force Safety Center to address the possibility of F-16C wing and wake vortices/turbulence effecting the flight path of the Beech F33A. Data used in this study were the radar depiction of the flight path of both aircraft, the recording of the F-16C head-up display (HUD), and the flight configuration of the F-16C. Based on the information provided and available from the recorded data, the wing tip vortices generated by the F-16C at time 1504:22 (local) would have dropped approximately 12.5 feet at time 1504:25. Even if the F-16C was pulling 2.0 g's and the time was adjusted plus or minus 0.5 seconds, the lowest the wing tip vortices would drop is approximately 36.5 feet.

The entire Lockheed Martin F-16C Wing Tip Vortices Analysis is contained in the official docket of this investigation.

1.16.3 Ryan 9900BX Traffic/Collision Alerting Device (TCAD)

The Beech F33A was equipped with a Ryan 9900BX Traffic/Collision Alerting Device (TCAD). This device creates an audio alert and displays a visual message when another aircraft is detected inside a series of set parameters that establish a volume of space surrounding the airplane with the TCAD. A representative of Ryan International evaluated the flight profiles of the three airplanes, the Beech F33A, the F-16C, and the unknown aircraft squawking 1200, based on the radar track data, and estimated the type and the number of warnings the student pilot in the Beech F33 would have received from the TCAD system.

The TCAD display would have pointed out the first (non-Traffic Alert (TA)) aircraft squawking 1200 (arrow ahead and right), until the F-16C replaced it (arrow ahead and right) about 30 seconds before the closest point of approach. An audible announcement of the F-16C traffic would have sounded at that time and the F-16C would have been approximately 3 nautical miles away. One of two possible traffic messages would have sounded, "Traffic, 2-o'clock, same altitude, three miles," or "Traffic, 2-o'clock, high, three miles" depending on the altitude separation at the moment of the TA. The system would have continued to show the traffic on the visual display as it passed in front of the Beech F33A.

The entire TCAD assessment is contained in the official docket of this investigation.

1.18 ADDITIONAL INFORMATION

1.18.1 Barograph

Per ATCA procedure, the student pilot carried a recording barograph instrument in the cockpit during the flight. Only fragments of the barograph instrument were recovered in the wreckage. The barograph barrel and recording paper was recovered; however, the time period on the graph record that surrounded the time of the accident was missing/destroyed. A copy of the barograph recording is included in the official docket of this investigation.

1.18.2 Flight Profile Simulation

The ATCA Safety Officer reported that he performed a flight test simulating the conditions of the student pilot's flight based on the radar information available. He flew a Beech 33, same type of aircraft as the accident aircraft, with a second pilot present, and the gross weight within 100 pounds of the accident airplane. He leveled the airplane at 4,400 feet msl and trimmed it for 130 kias. Once stabilized in this configuration, he pulled the power back to idle and released the controls. The airplane entered an increasingly nose low attitude and rapidly increased its rate of descent. He reported that the aircraft descent profile was consistent with the one depicted by the accident airplane's radar track. He aborted the descent at 175 kias, 2,500 feet msl, in an approximately 20-degree nose low attitude.

1.18.3 Wreckage Release

The Safety Board IIC released the wreckage on February 4, 2006.

Student Pilot Information

Certificate:	Student	Age:	22, Female
Airplane Rating(s):	None	Seat Occupied:	Left
Other Aircraft Rating(s):	None	Restraint Used:	Seatbelt, Shoulder harness
Instrument Rating(s):	None	Second Pilot Present:	No
Instructor Rating(s):	None	Toxicology Performed:	Yes
Medical Certification:	Class 3	Last FAA Medical Exam:	03/01/2005
Occupational Pilot:		Last Flight Review or Equivalent:	
Flight Time:	48 hours (Total, all aircraft), 48 hours (Total, this make and model), 6 hours (Pilot In Command, all aircraft), 48 hours (Last 90 days, all aircraft), 28 hours (Last 30 days, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Beechcraft	Registration:	N1563A
Model/Series:	F33A	Aircraft Category:	Airplane
Year of Manufacture:		Amateur Built:	No
Airworthiness Certificate:	Normal; Utility	Serial Number:	CE-1320
Landing Gear Type:	Retractable - Tricycle	Seats:	4
Date/Type of Last Inspection:	01/01/2006, Continuous Airworthiness	Certified Max Gross Wt.:	3400 lbs
Time Since Last Inspection:	5 Hours	Engines:	1 Reciprocating
Airframe Total Time:	18602 Hours as of last inspection	Engine Manufacturer:	Teledyne Continental
ELT:	Installed, not activated	Engine Model/Series:	IO-520
Registered Owner:	Airline Training Center Arizona	Rated Power:	285 hp
Operator:	Airline Training Center Arizona	Operating Certificate(s) Held:	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual Conditions	Condition of Light:	Day
Observation Facility, Elevation:	KGYR, 968 ft msl	Distance from Accident Site:	16 Nautical Miles
Observation Time:	1447 MST	Direction from Accident Site:	40°
Lowest Cloud Condition:	Few / 25000 ft agl	Visibility	10 Miles
Lowest Ceiling:	None	Visibility (RVR):	
Wind Speed/Gusts:	5 knots /	Turbulence Type Forecast/Actual:	/
Wind Direction:	Variable	Turbulence Severity Forecast/Actual:	/
Altimeter Setting:	29.96 inches Hg	Temperature/Dew Point:	21° C / 3° C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Buckeye, AZ (KBXK)	Type of Flight Plan Filed:	Company VFR
Destination:	PhoenixGoodyear, AZ (KGYR)	Type of Clearance:	None
Departure Time:	1450 MST	Type of Airspace:	

Airport Information

Airport:	Phoenix Goodyear (KGYR)	Runway Surface Type:	
Airport Elevation:	968 ft	Runway Surface Condition:	
Runway Used:	NA	IFR Approach:	None
Runway Length/Width:		VFR Approach/Landing:	None

Wreckage and Impact Information

Crew Injuries:	1 Fatal	Aircraft Damage:	Destroyed
Passenger Injuries:	N/A	Aircraft Fire:	None
Ground Injuries:	N/A	Aircraft Explosion:	None
Total Injuries:	1 Fatal	Latitude, Longitude:	33.268333, -112.590833

Administrative Information

Investigator In Charge (IIC):	Van S McKenny
Additional Participating Persons:	Jack T Ogle; Federal Aviation Administration; Scottsdale, AZ Jon Lyford; Avidyne Tom Vernon; ATCA; Phoenix, AZ Greg Schmidt; TCM; Mobile, AL Paul Yoos; Raytheon Aircraft Co; Wichita, KS Joachim Fleger; Lufthansa; Frankfurt, Terry Hoffart; USAF; Kirtland AFB, NM William C Brodegard; Ryan International Corporation; Coumbus, OH
Investigation Docket:	NTSB accident and incident dockets serve as permanent archival information for the NTSB's investigations. Dockets released prior to June 1, 2009 are publicly available from the NTSB's Record Management Division at pubinq@ntsb.gov , or at 800-877-6799. Dockets released after this date are available at http://dms.nts.gov/pubdms/ .