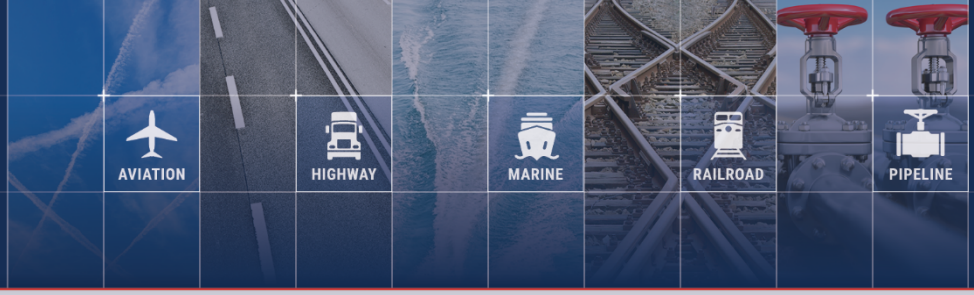

Aviation Investigation Factual Report

Location:	New River, Arizona	**Accident Number:**	LAX02FA166
Date & Time:	May 16, 2002, 21:54 Local	**Registration:**	N328CG
Aircraft:	Socata TB-21	**Aircraft Damage:**	Destroyed
Defining Event:		**Injuries:**	2 Fatal
Flight Conducted Under:	Part 91: General aviation - Other work use		

Factual Information

HISTORY OF FLIGHT

On May 16, 2002, about 2154 mountain standard time, a Socata TB-21, N328CG, descended into mountainous terrain in the Tonto National Forest, about 7 nautical miles (nm) northeast of New River, Arizona. The airplane's registered owner was Avex, Inc., and the airplane was operated by The New Avex, Inc., Camarillo, California. The pilot was employed as an airplane salesman for The New Avex, Inc. The airplane was destroyed, and the pilot and a prospective buyer were fatally injured during the sales demonstration flight. The pilot-salesman held a commercial pilot certificate and the prospective purchaser held a student pilot certificate. The dark nighttime flight was performed under the provisions of 14 CFR Part 91. Visual meteorological conditions prevailed, and no flight plan was filed.

An associate of the accident pilot, who was also employed by Avex as an airplane salesman, reported to the National Transportation Safety Board investigator that he had spoken with the accident pilot via cell phone at 2114. At that time, the accident pilot indicated to him that he had finished dinner at the Sedona Airport and that he planned to immediately depart and fly to Deer Valley with the prospective airplane purchaser. The associate further reported that he believes the earliest that the accident pilot would have become airborne is 2122.

Based upon Federal Aviation Administration (FAA) recorded radar data, the Safety Board investigator estimated that the accident airplane departed Sedona at or before 2132.

The wife of the prospective airplane purchaser reported that about 2015 she had spoken with her husband by telephone regarding his plans. The wife indicated that her husband was at Sedona and planned to fly home following dinner. He anticipated returning to Deer Valley by 2200.

No witnesses reported observing the accident. The airplane wreckage was discovered the following morning by a helicopter crew that observed smoke emanating from the accident site area.

PERSONNEL INFORMATION

Pilot-in-Command/Salesman

The Safety Board investigator reviewed FAA-maintained airman and medical records, the pilot's personal flight record logbook, and pilot history data received from his employer. In pertinent part, the review indicates that the pilot commenced flight training in 1971, and he was issued a Canadian private pilot license (airplane single engine land) the following year.

Subsequently, he was issued airplane single engine sea, airplane multiengine land, and an instrument airplane rating (all foreign based). The pilot also held the following United States FAA-issued certificates/ratings: commercial pilot, airplane single engine land (received in 1990), and instrument airplane (received in 1991).

A review of the pilot's flight record logbook indicates that no flights were listed between October 1995 and March 2002. However, an entry dated May 16, 1996, indicates that the pilot satisfactorily completed a biennial flight review and instrument competency check on that date.

On an application for the pilot's second-class aviation medical certificate dated March 14, 2002, the pilot reported that he had last applied for a medical certificate in 1994.

The pilot was hired by The New Avex, Inc., in April 2002, as an airplane salesman. The pilot's resume indicates that he had flown a variety of different airplane models, including the Cessna 150, 172, 185, 340, and 402. He also listed having flown the Beech F33A, V35, A36, B36TC, Travel Air, Baron 55/58, and the C90. Additionally, the pilot indicated having received 8 hours of dual instruction in the TBM-700.

In summary, the pilot's resume indicated that his total flight time was 2,326.0 hours, which included 875 multiengine hours, 33 hours flying turboprop airplanes, and 1,675 hours in retractable gear airplanes. The pilot had no listed flight time in the Socata TB-20/21 airplane.

The pilot resumed listing flights in his logbook on April 11, 2002. On that date he commenced receiving flight instruction by Avex personnel in the Socata TB-21, the accident airplane. The pilot satisfactorily passed a biennial flight review in a Beech B36 on April 16, 2002, and he passed an instrument competency check flight in the accident airplane on April 29, 2002.

By the accident date and time, the pilot's total flying experience in TB-21 was approximately 14 hours. All of this experience was obtained flying the accident airplane within 90 days of the accident. Additionally, Avex personnel had provided the pilot with all of the dual flight instruction in the airplane.

Based upon the cumulative data contained in reviewed documents, the Safety Board investigator estimates that the pilot's total flight time by the accident date was about 2,350 hours. The hours shown in the "Flight Time Matrix" boxes in this factual report are flight time estimates.

Prospective Purchaser/Passenger.

The prospective purchaser held a combined student pilot and aviation medical certificate. On his May 31, 2000, application for the certificate, the pilot indicated having a total of 300 hours of flight time. No flights were listed as having been flown during the preceding 6 months.

An attorney representing the passenger's family provided the Safety Board investigator with a copy of the pilot's flight record logbook and the backside of his aviation medical certificate. The backside of the certificate showed certified flight instructors' flying endorsements. The student pilot had received endorsements for solo flight in a Cessna 152 and 172, and in a Piper PA-28-181, in addition to a solo cross-country endorsement.

The logbook indicated that the student pilot had commenced receiving flight instruction in 1989. By October 2000, which was the date of the last logbook entry, the pilot's total flight time was indicated as being 113.7 hours. He had logged 71.6 hours of dual instruction and 42.1 hours of solo pilot time.

According to the FAA coordinator, in the year 2000 the pilot had taken flying lessons at Westwind Aviation, a Phoenix-based flight school. Personnel at Westwind reported that about 1 week prior to the accident the pilot had informed them that he intended to resume taking flying lessons. However, by the accident date no lessons had been provided to the student. The FAA coordinator reported to the Safety Board investigator that he was unable to find evidence that the pilot had resumed taking flying lessons.

AIRCRAFT INFORMATION

A review of the airplane's maintenance records revealed that the airplane's last recorded maintenance was performed on the accident date, May 16, 2002. The Camarillo based operator changed the engine's oil and oil filter, and returned the airplane to service. The engine and airplane's total time was recorded as being 191.6 hours. The Safety Board investigator estimates that, thereafter, the accident pilot flew the airplane for at least 3 hours prior to the accident.

The turbocharged and autopilot equipped airplane was also equipped with a Honeywell (Bendix/King) KLN 94 global positioning satellite (GPS) navigation receiver, and a Honeywell (Bendix/King) KMD 550 multifunction (color) display. This equipment provided the pilot with the capability to fly direct (point-to-point) routes. The equipment incorporated a moving map display that included topographical (terrain elevation) information.

The KLN 94 and the KMD 550 Pilot's Guides (operating instruction booklets) were found in the wreckage. In pertinent part, according to information printed in the KMD 550 Pilot's Guide, the pilot has the ability to select a map display by pressing the MAP Function Select Key to toggle between depicting topographic features, in the TOPO ON mode, or no topographic features in the TOPO OFF mode. With TOPO ON, classes of data are displayed as a specific color. A color key can also be displayed on the map display when in the TOPO ON mode. With TOPO OFF, all cartographic data is automatically removed and the Jeppesen Nav Data is presented on a black background.

The following statement is printed in the Pilot's Guide: "CAUTION NEVER USE THE TOPOGRAPHIC ELEVATION DISPLAYED ON THIS EQUIPMENT AS YOUR SOLE REFERENCE

FOR TERRAIN AVOIDANCE."

METEOROLOGICAL INFORMATION

The closest aviation weather observation station to the accident site was located at the Phoenix Deer Valley Airport, about 17 nm south (180 degrees, magnetic) from the accident site. At 2153, the Deer Valley Airport, elevation 1,478 feet mean sea level (msl), reported its weather, as follows: wind from 240 degrees at 8 knots; 10 miles visibility; temperature/dew point 20/5 degrees Celsius, respectively. The barometric pressure was 29.93 inches of mercury.

According to the United States Naval Observatory, on the accident date 19 percent of the moon's visible disk was illuminated. In New River, moon set occurred at 2344 (about 110 minutes after the accident).

COMMUNICATION

The FAA reported that it reviewed facility records along the flight route between Sedona and Deer Valley. No evidence was found of communications or services rendered to the accident airplane/pilot.

WRECKAGE AND IMPACT INFORMATION

The Safety Board investigator's on scene examination of the accident site and airplane wreckage revealed evidence of an initial point of impact (IPI) on upsloping rocky mountainous terrain. The GPS coordinates for the IPI are 33 degrees 57.667 minutes north latitude by 112 degrees 00.774 minutes west longitude, and the GPS elevation is about 3,980 feet msl. The IPI area was approximately 25 feet below the top of a mountain (mesa).

The IPI was noted by the presence of broken tree limbs and oil residue on the face of a boulder. Also in this area were fragments from the airplane including its pitot tube, red navigation light lens fragments, and the tip from one propeller blade. The ground scar in this area was dimensionally similar to the size and shape of the airplane's structure.

The remainder of the airplane's fragmented and partially burnt structure was observed scattered along a magnetic track of about 177 degrees. The cockpit was located several yards south of the IPI. Farther south, the left and right ailerons were found along with portions of bottom fuselage skin panels. The empennage was located south of this location. The propeller assembly and the engine, devoid of its airframe attachment mounts, were found near the south end of the wreckage distribution path at the following GPS coordinates: 33 degrees 57.563 minutes north latitude by 112 degrees 00.794 minutes west longitude. These components were about 640 feet south of the IPI, at a GPS elevation of 4,000 feet msl. (See the wreckage diagram for additional information.)

Airframe Examination.

The instrument panel was found fragmented. The cluster of navigation instruments in the center console was found separated from the remainder of the instrument panel.

Push-pull control tubes were found broken in impact damaged areas of the empennage. Breaks in cables exhibited a broomstraw appearance.

The airspeed indicator needle indicated 122 knots. The altimeter indicated 30.03 inches of mercury. The course bug was set at 174 degrees, the heading bug was set at 181 degrees, and the heading was 187 degrees.

The fuel selector was set to the left main fuel tank. The magneto switch was in the "both" position. The vacuum pump was not found.

A navigation Americas database card for the Bendix/King KLN 94 was located in the wreckage. The database card was labeled showing a September 6, 2001, effective date, and an October 30, 2001, expiration date.

Propeller Assembly Examination.

The propeller assembly was found broken from the crankshaft. The fracture surface exhibited signatures consistent with twisting/bending (torsional) overload. The propeller blades exhibited torsional twisting, chordwise striations, and "S" bending. Two of the three blade tips were missing. The blades were gouged.

Engine and Accessory Examination.

The engine case showed no evidence of preimpact rupture. No evidence of preimpact oil leaks was noted. Several spark plugs were removed by the Lycoming Engine participant and were examined under the Safety Board investigator's supervision. The Lycoming engine participant reported that they displayed coloration consistent with normal operation.

The magnetos drive gears were rotated by hand. The impulse coupler was found intact. The magnetos produced spark at their twelve leads during manual rotation of the drive gear.

The turbocharger was found impact damaged. In part, the Lycoming engine participant reported that the exhaust gas path coloration in the exhaust system was consistent with normal operation. The exhaust system remained free of oil residue. The compressor impeller shroud exhibited circumferential scoring consistent with contact with the compressor turbine. (See the Lycoming Engine participant's report for additional details of the engine examination.)

MEDICAL AND PATHOLOGICAL INFORMATION

Commercial Pilot Medical Data.

The pilot held a second-class aviation medical certificate that was issued on March 19, 2002. The certificate bore the limitation that the pilot possess glasses that correct for near vision.

During the pilot's medical examination by a senior aviation medical examiner, the pilot acknowledged that he had recently begun taking Ziac, an antihypertensive medication. According to the doctor's follow-up letter to the FAA, "…in light of his (the pilot's) benign history and negative evaluation…" he issued the requested aviation medical certificate.

Passenger (Student Pilot) Medical Data.

The passenger held a third-class aviation medical certificate that was issued on May 31, 2000. No limitations were listed on the certificate.

Autopsy and Toxicology Data.

On May 18, 2002, autopsies were performed on the pilot and the passenger/student pilot by the Maricopa County's Office of the Medical Examiner, 120 South Sixth Avenue, Phoenix, Arizona.

The FAA's Civil Aeromedical Institute (CAMI), Toxicology and Accident Research Laboratory, performed toxicology tests from specimens of the salesman/pilot. The laboratory manager reported detecting ethanol in various muscle and kidney specimens, at concentrations between 3 and 43 mg/dL.

Regarding these findings, the manager made the following statement: "The ethanol found in this case may potentially be from postmortem ethanol formation and not from the ingestion of ethanol." There was evidence of putrefaction. The manager also noted that chloroquine was detected in specimens from the pilot's kidney, and it was present in the pilot's liver.

Toxicology tests were also performed at CAMI from specimens of the passenger/student pilot. No evidence of carbon monoxide, cyanide, or volatiles was detected. There was no evidence of ethanol. The laboratory manager reported that evidence of putrefaction was found.

TESTS AND RESEARCH

Avionics Examination.

Under the direction of the Safety Board investigator, the airplane's impact-damaged Honeywell KLN 94 GPS receiver, serial number 2772, and the impact-damaged KMD multifunction display, serial number 1409, were examined at their manufacturing plant.

According to the FAA, no information could be recovered from either of the components. The

GPS receiver was found too impact-damaged, and the multifunction display had no memory capability.

Flight Route Information.

The point-to-point distance between the Sedona and Deer Valley Airports is about 71 nm. The direct magnetic course between these airports is 180 degrees.

Recorded Radar Information.

A review of FAA recorded radar was performed to locate an aircraft target that manifested a flight profile consistent with the following: (1) a flight route between Sedona and Deer Valley, Arizona; (2) a performance profile that approximated the cruise/climb capabilities of the accident model of airplane; and (3) a southerly flight track that commenced near Sedona between 2114 and 2200, and terminated in the vicinity of the accident site.

Upon reviewing the FAA's recorded radar data, only one target was found meeting the aforementioned criteria. In summary, the radar data showed that at 2134:23, a target/aircraft appeared about 3 nm south-southwest of the Sedona Airport. The aircraft was at 6,700 feet, as indicated by its Mode C altitude encoding transponder, and it was climbing. (Sedona Airport's field elevation is 4,827 feet msl.)

The radar data indicated that the aircraft climbed in a southerly direction until reaching 10,800 feet at 2138:59. Thereafter, the aircraft continued to proceed along a course directly toward a location consistent with that of the Deer Valley Airport.

The aircraft commenced descending about 1 minute later. The descent continued along an average 179-degree magnetic track until radar contact was lost at 2153:25, when the aircraft's transponder indicated 3,800 feet. At this time, the southbound aircraft was approximately 0.25 nm north of the accident site. Also, the aircraft's position was about 360 feet east of the point-to-point course between the Sedona and Deer Valley Airports.

The radar data indicated that during the last 3 minutes of recorded flight, the aircraft's average rate of descent was 1,000 feet per minute. Also, its average ground speed was 168 knots, and its average magnetic course was 176 degrees.

Aerial Flight Track Examination and Terrain Conspicuity.

During daylight hours, the Safety Board investigator performed an aerial examination over the accident site vicinity via helicopter. In pertinent part, the examination commenced about 2 miles north of the accident site while at 4,500 feet msl. The investigator descended in a southerly direction until reaching 4,000 feet msl and was above the upsloping portion of the mesa where the initial point of impact ground scar was observed. During the descent, the helicopter maintained a course directly toward and parallel with the impact ground

scar/wreckage distribution line. The following observations were made by the Safety Board investigator:

1. The uphill slope on the mesa's north face was clearly visible;
2. No evidence of roads or man-made structures was noted from 2 miles north of the accident site to the site of the wreckage on the mesa;
3. The greater Phoenix area was observable south of the mesa when the descent was initiated;
4. The greater Phoenix area totally disappeared from view when within approximately 1/2-mile of the impact site.

ADDITIONAL INFORMATION

The airplane wreckage was released to its owner's insurance representative on June 11, 2002. No records were retained.

Pilot Information

Certificate:	Commercial; Foreign	**Age:**	50,Male
Airplane Rating(s):	Single-engine land	**Seat Occupied:**	Unknown
Other Aircraft Rating(s):	None	**Restraint Used:**	
Instrument Rating(s):	Airplane	**Second Pilot Present:**	Yes
Instructor Rating(s):	None	**Toxicology Performed:**	Yes
Medical Certification:	Class 2 Valid Medical--w/ waivers/lim	**Last FAA Medical Exam:**	March 19, 2002
Occupational Pilot:	UNK	**Last Flight Review or Equivalent:**	April 16, 2002
Flight Time:	2350 hours (Total, all aircraft), 14 hours (Total, this make and model), 2080 hours (Pilot In Command, all aircraft), 17 hours (Last 90 days, all aircraft), 14 hours (Last 30 days, all aircraft), 3 hours (Last 24 hours, all aircraft)		

Student pilot Information

Certificate:	Student	**Age:**	36,Male
Airplane Rating(s):	None	**Seat Occupied:**	Unknown
Other Aircraft Rating(s):	None	**Restraint Used:**	
Instrument Rating(s):	None	**Second Pilot Present:**	Yes
Instructor Rating(s):	None	**Toxicology Performed:**	Yes
Medical Certification:	Class 3 Without waivers/limitations	**Last FAA Medical Exam:**	May 31, 2000
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	
Flight Time:	114 hours (Total, all aircraft), 0 hours (Total, this make and model), 42 hours (Pilot In Command, all aircraft), 0 hours (Last 90 days, all aircraft), 0 hours (Last 30 days, all aircraft), 0 hours (Last 24 hours, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Socata	**Registration:**	N328CG
Model/Series:	TB-21	**Aircraft Category:**	Airplane
Year of Manufacture:		**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	2025
Landing Gear Type:	Retractable - Tricycle	**Seats:**	5
Date/Type of Last Inspection:	April 5, 2002 Annual	**Certified Max Gross Wt.:**	3083 lbs
Time Since Last Inspection:	50 Hrs	**Engines:**	1 Reciprocating
Airframe Total Time:	145 Hrs as of last inspection	**Engine Manufacturer:**	Lycoming
ELT:	Installed, activated, did not aid in locating accident	**Engine Model/Series:**	TIO-540-AB1AD
Registered Owner:	Avex, Inc.	**Rated Power:**	250 Horsepower
Operator:	The New Avex, Inc.	**Operating Certificate(s) Held:**	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Night
Observation Facility, Elevation:	DVT,1478 ft msl	**Distance from Accident Site:**	17 Nautical Miles
Observation Time:	21:53 Local	**Direction from Accident Site:**	180°
Lowest Cloud Condition:	Clear	**Visibility**	10 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	8 knots / None	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	240°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	29.93 inches Hg	**Temperature/Dew Point:**	20°C / 5°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Sedona, AZ (SEZ)	**Type of Flight Plan Filed:**	None
Destination:	Phoenix, AZ (DVT)	**Type of Clearance:**	None
Departure Time:	21:32 Local	**Type of Airspace:**	Class G

Wreckage and Impact Information

Crew Injuries:	1 Fatal	**Aircraft Damage:**	Destroyed
Passenger Injuries:	1 Fatal	**Aircraft Fire:**	On-ground
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	2 Fatal	**Latitude, Longitude:**	33.961112,-112.012779

Administrative Information

Investigator In Charge (IIC):	Pollack, Wayne
Additional Participating Persons:	Steven D'Urso; Federal Aviation Administration; Scottsdale, AZ Mark Platt; Textron Lycoming Engines; Williamsport, PA Wayne Miller; EADS Socata; Pembroke Pines, FL
Report Date:	February 24, 2005
Last Revision Date:	
Investigation Class:	Class
Note:	
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=54734