National Transportation Safety Board
Aviation Accident Final Report

Location:	Kelso, CA	**Accident Number:**	LAX04FA031
Date & Time:	10/29/2003, 1222 PST	**Registration:**	N444AM
Aircraft:	Cessna 421B	**Aircraft Damage:**	Destroyed
Defining Event:		**Injuries:**	5 Fatal
Flight Conducted Under:	Part 91: General Aviation - Personal		

Analysis

The aircraft broke up in-flight during a high speed descent after encountering clouds and reduced visibilities aloft. The weather conditions included multiple cloud layers at 9,000, 12,000 and 16,000 feet, and reduced visibility aloft from smoke and haze from wilderness wild fires that were occurring over large portions of Southern California. The aircraft departed the airport toward a VORTAC to the west, approximately 30 nautical miles (nm) away. The first radar contact was at 1159, and the aircraft's Mode C transponder reported an altitude of 3,500 feet mean sea level (msl). By the time the aircraft reached the VORTAC, the altitude had increased to 4,900 feet msl. The aircraft continued to climb, passing through the VFR flight plan filed altitude of 8,500 feet msl, until it reached an altitude of 12,900 feet msl. The last 6 minutes of radar data reported the aircraft at various altitudes, starting at 11,000 feet msl and climbing to a maximum altitude of 12,700 feet msl. During the last 3 minutes of flight, radar data showed the aircraft made numerous left and right climbing and descending turns, eventually reversing course. The next to last radar return at 1221:24 indicated an altitude of 11,900 feet msl. Nineteen seconds later, the last radar return reported an altitude of 7,700 feet msl. The computed vertical speed between the last two radar returns was 13,263 feet per minute. The wreckage was distributed over a 0.2-nm distance, with the main wreckage approximately 0.5 miles northwest of the last radar return. The northern end of the debris path began with pieces of the left elevator, followed by sections of the right stabilizer and elevator, and more sections from both horizontal empennage surfaces. Pieces of the vertical stabilizer, rudder, and both ailerons were also found along the debris path. The southern 100 feet of the debris path contained the fuselage and both sets of wings, engines, and propellers. The aircraft impacted the ground inverted. The wings separated just outboard of the nacelles at the initial point of impact. Examination of the wreckage showed that all structural failures were the result of overload.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The pilot's continued VFR flight into instrument conditions between cloud layers and with reduced visibility due to smoke that resulted in an in-flight loss of control from spatial

disorientation, and the structural overload of the airframe during the subsequent high speed descent.

Findings

Occurrence #1: IN FLIGHT ENCOUNTER WITH WEATHER
Phase of Operation: CRUISE

Findings
1. (F) WEATHER CONDITION - HAZE/SMOKE
2. (F) WEATHER CONDITION - CLOUDS
3. (C) VFR FLIGHT INTO IMC - CONTINUED - PILOT IN COMMAND

Occurrence #2: LOSS OF CONTROL - IN FLIGHT
Phase of Operation: CRUISE

Findings
4. (C) AIRCRAFT CONTROL - NOT MAINTAINED - PILOT IN COMMAND
5. (C) SPATIAL DISORIENTATION - PILOT IN COMMAND

Occurrence #3: AIRFRAME/COMPONENT/SYSTEM FAILURE/MALFUNCTION
Phase of Operation: DESCENT - UNCONTROLLED

Findings
6. (C) DESIGN STRESS LIMITS OF AIRCRAFT - EXCEEDED - PILOT IN COMMAND
7. (C) WING - OVERLOAD
8. (C) FLIGHT CONTROL,ELEVATOR - OVERLOAD

Occurrence #4: IN FLIGHT COLLISION WITH TERRAIN/WATER
Phase of Operation: DESCENT - UNCONTROLLED

Findings
9. TERRAIN CONDITION - GROUND

Factual Information

HISTORY OF FLIGHT

On October 29, 2003, at 1222 Pacific standard time (PST), a Cessna 421B, N444AM, experienced a loss of control and a subsequent in-flight breakup near Kelso, California. The owner/pilot was operating the airplane under the provisions of 14 CFR Part 91 of the Federal Aviation Regulations. The airline transport pilot and four passengers sustained fatal injuries; the airplane was destroyed. The personal cross-country flight departed Laughlin/Bullhead International Airport (IFP), Bullhead, Arizona, about 1155 PST, and was en route to Van Nuys, California. Day visual meteorological conditions prevailed, and a visual flight rules (VFR) flight plan had been filed. The primary wreckage was located at 35 degrees 01.310 minutes north latitude and 115 degrees 35.021 minutes west longitude.

The evening prior to the accident, the pilot contacted Hawthorne Flight Service Station (FSS) to obtain a FORECAST briefing for a noon departure the following day from IFP to Van Nuys. The briefer indicated the main concern would be layers of smoke due to fires as the flight crossed the San Gabriel Mountains, which are northeast of the Los Angeles basin, between Los Angeles and the Mojave Desert.

The morning of the accident, the pilot telephoned Hawthorne FSS for a weather briefing. The briefer advised the pilot of the following, in summary: an AIRMET for mountain obscuration along the coast; an "on-shore flow" pushing forest fire smoke inland; current Barstow-Daggett weather including clouds FEW015 and visibility 1.5 miles; current Van Nuys weather including clouds FEW200 and visibility 1 mile in haze/smoke; "most of the greater LA area has low visibility 1 to 4 miles," and an area forecast for the mountains and desert; clear or scattered cirrus clouds, and occasional visibilities 3 to 5 miles because of smoke and haze.

After receiving the weather brief, the pilot filed a VFR flight plan, departing IFP at noon, with an arrival time at Van Nuys around 1320. Initially the pilot reported, "We have slant Romeo equipment on board." After some discussion about the equipment on board the aircraft, they decided the flight plan should indicate slant India equipment.

The flight departed IFP at 1155 PST. The pilot asked IFP tower personnel to activate the VFR flight plan to Van Nuys.

Plotted Radar information obtained from Los Angeles Air Route Traffic Control Center (ARTCC) and Air Force Rescue Coordination Center (AFRCC) showed the total flight duration was 22 minutes 19 seconds. The aircraft departed IFP to the west, toward Goffs VORTAC, approximately 30 nautical miles (nm0 away. The first radar contact was at 11:59, and the aircraft's Mode C transponder reported an altitude of 3,500 feet mean sea level (msl). By the time the aircraft reached Goffs VORTAC, the altitude had increased to 4,900 feet msl. The aircraft continued to climb, passing through the filed altitude of 8,500 feet msl, until it reached a maximum altitude of 12,900 feet msl.

The last 6 minutes of radar data showed the aircraft at various altitudes, starting at 11,000 feet msl and climbing to maximum altitude of 12,700 feet msl. During the last 3 minutes of flight, radar data showed the aircraft made numerous left and right climbing and descending turns, eventually reversing course. The next to last radar return at 1221:24 indicated an altitude of 11,900 feet msl. The last radar return, 19 seconds later, showed an altitude of 7,700 feet msl. The computed vertical speed between the last two radar returns was 13,263 feet per minute

(FPM).

PERSONNEL INFORMATION

A review of Federal Aviation Administration (FAA) airman records revealed the 89-year-old pilot held an airline transport pilot certificate with airplane single and multiengine land ratings. He also held the type rating for a DC-3.

The pilot obtained his student pilot's license on September 24, 1935. He obtained his private pilot's license on July 9, 1936; his commercial pilot's license on January 15, 1941; his instrument rating on April 14, 1941; and his airline transport pilot certificate on May 3, 1943.

The pilot held a third-class medical certificate that was issued on March 25, 2003. It had no limitations or waivers.

An examination of the pilot's logbook indicated an estimated total flight time of 11,371 hours. He logged 12 hours in the last 90 days and 3 hours in the last 30 days. Pilot logbook records from October 12, 1984, to October 12, 2003, indicated an estimated 1,237 hours in the accident airplane.

FAA records indicated that pilot purchased the airplane in February 1979.

The company insuring the accident airplane required the accident pilot to pass a physical examination given by an FAA approved Medical Examiner. He also had to successfully complete an Instrument Proficiency Check in the same make and model of airplane. Both of these requirements were to be completed within the past 12 months prior to the operation of the airplane.

The pilot's logbook indicated his last instrument proficiency check was completed on December 31, 1996. The pilot's last valid biannual flight review endorsement was completed on March 3, 2000.

The pilot's logbook contained endorsements indicating the pilot had successfully completed biennial flight reviews as required by FAR 61.56 on March 27, 2001, April 30, 2002, and April 11,2003. However, the CFI, who endorsed the logbooks, did not hold the instructor rating for multiengine airplanes.

AIRCRAFT INFORMATION

The airplane was a Cessna 421B, serial number 421B0367. A review of the airplane's logbooks revealed a total airframe time of 3,114.2 hours at the last annual inspection. The annual inspection was completed on December 20, 2002. The Hobbs hour meter read 3,114.2 at the last inspection. The Hobbs hour meter was destroyed and unreadable at the accident scene.

The airplane had a Teledyne Continental Motors GTSIO-520-H engine, serial number 218493R, installed on the left side. Total time on the engine at the last 100-hour annual inspection was 3,114.2 hours.

A Teledyne Continental Motors GTSIO-520-H engine, serial number 218446R, was installed on the right side. Total time on the engine at the last 100-hour annual inspection was 3,114.2 hours.

Fueling records at IFP established that the airplane was last fueled on October 28, 2003, with the addition of 53.7 gallons of 100LL-octane aviation fuel. Examination of the maintenance and flight department records revealed no unresolved maintenance discrepancies against the

airplane prior to departure.

METEOROLOGICAL CONDITIONS

A staff meteorologist for the National Transporation Safety Board prepared a factual report, which included weather for the departure area, route of flight, and destination. The weather conditions over the accident site included multiple cloud layers at 9,000, 12,000 and 16,000 feet, and reduced visibility aloft from smoke and haze from wilderness wild fires that were occurring over large portions of southern California.

The closest official weather observation station was Needles, California (EED), located 56 nm east of the accident site. Visual meteorological conditions were recorded for several hours before and after the time of the accident.

Weather observations from McCarran International Airport (LAS), Las Vegas, Nevada, located 79 nautical miles northeast of the accident site, reported reduced visibility due to smoke and haze around the time of the accident.

There were numerous pilot reports (PIREPs) describing limited visibility aloft due to smoke from the wilderness fires that were occurring in California.

COMMUNICATIONS

The airplane was not in contact with any known facility at the time of the accident. The last known radio communication from the accident airplane was to the Bullhead local control tower. After takeoff the pilot requested that the controller contact Prescott flight service and open his flight plan. The controller told the pilot that the flight plan was opened with his takeoff time of 1955z (1155 local). At 1201:28, the pilot stated, "..now it's thirty six hundred, thirty seven hundred and visibility is unlimited." The controller asked him if he was on top of the smoke layer. At 1201:38, which was the last transmission from the pilot, he stated, "we're underneath."

WRECKAGE AND IMPACT INFORMATION

Investigators from the Safety Board and Teledyne Continental Motors began the on-site examination the day following the accident. A representative from the Cessna Aircraft Company joined the on-site examination on October 31, 2003.

Investigators further examined the wreckage at Aircraft Recovery Service, Littlerock, California, on November 19-20, 2003.

Accident Site

The accident site was 50.7 nm southwest of IFP, and 3.5 nm east of Kelso. The wreckage came to rest in the Mojave National Preserve. The first impact point and the main wreckage was located on a small butte or ridge that ran east to west, with the debris path on a north to south heading. The elevation in the area gradually decreased from east to west. The terrain was sparse desert flora with cactus and other low-growing vegetation. The ground consisted of a combination of desert pavement and soft sand and rocks.

The wreckage was distributed over a 0.2 nm distance on a median magnetic bearing of 185 degrees. The main wreckage was approximately 0.5 miles northwest of the last radar return, at an elevation of 2,905 feet msl; 50.7 nm southwest of IFP. The debris field between the farthest point (the left elevator) and the fuselage consisted of the stabilizers, the elevators, sections of

the rudder, and three pieces of the right stabilizer spar. All control surfaces and their associated mass balance weights were accounted for in the debris field.

The elevation at the main wreckage was at 2,905 feet msl on a measured magnetic heading of 195 degrees. The in-flight breakup left a debris path that was oriented roughly on a 185-degree heading and was approximately 1,030 feet in length. The northern end of the debris path began with pieces of the left elevator, followed by sections of the right stabilizer and elevator, and more sections from both horizontal empennage surfaces. Pieces of the vertical stabilizer and rudder and both ailerons were also found along the debris path. The southern 100 feet of the debris path contained the fuselage, and both sets of wings, engines, and propellers. The aircraft impacted the ground inverted, slightly nose up, and wings level. The wings separated just outboard of the nacelles at the initial impact point, and the fuselage slid 40 feet to the south of the initial ground impact.

Fuselage

A substantial amount of the fuselage structure was destroyed during the impact sequence and post impact fire. The red beacon mounted on the belly of the airplane appeared undamaged. The cabin area was crushed in the vertical axis. The nose section separated at the forward pressure bulkhead, and exhibited very little or no forward crushing, with no fire damage present. With the exception of the nose section, the fuselage was lying upside down. The center wing/carry-thru section, to the engine nacelles, remained attached to the fuselage. The radome separated from the fuselage, mostly intact.

The airplane manufacturer examined the landing gear. The left main landing gear remained attached to the wing, but was 180 degrees out of the retracted position. The right main landing gear separated from the wing and was found 32 feet from the main wreckage on a 149-degree bearing. The nose landing gear remained with the nose section of the fuselage and was partially out of the wheel well.

Wings

The outboard section of both wings separated near the nacelle. The wings were found upside down, 55 to 65 feet from the main wreckage. The right wing was exposed to and damaged by the post impact fire. The left wing did not exhibit any fire/heat signatures. The separation points of the wing structure and attachment fittings exhibited deformation consistent with positive and negative bending. Visual examination of fracture surfaces revealed characteristics of overload separation.

The ailerons separated from the wings and were found along the debris path. Aileron cable continuity was confirmed through the fuselage, specifically from the cockpit controls, through the wings, and to wing/aileron juncture.

Left Aileron

The left aileron was found primarily in two major pieces; one piece was located 106 feet from the main wreckage. The other piece was located 169 feet from the main wreckage. A small section of the left aileron remained attached to the inboard wing hinge. Investigators accessed the aileron bellcrank in the wing. The airplane manufacturer noted a mark on the bellcrank with a corresponding mark on the up travel stop bracket. The travel stop bracket retains the travel stop bolt for the system. According to the manufacturer the bellcrank contacted the travel stop bracket. The up stop bracket was bent forward approximately 45 degrees. The

aileron cables remained attached to the bellcrank and ended near the wing separation point in a manner consistent with overload. The aileron trim tab actuator remained with the wing. The chain/cable assembly was off of the actuator sprocket and inside the wing.

Right Aileron

The right aileron was found as a complete unit, although it exhibited impact damage. Both aileron hinge points were present. The right aileron cables remained attached to the bellcrank. The cables ended near the wing separation point in a manner consistent with overload. The bellcrank was not damaged. No evidence of over-travel or flutter was observed on either travel stop.

Flaps

The left flap chain remained wrapped around the flap motor sprocket. The position of the chain indicated a flaps retracted setting. Flap cable continuity was established from the motor outboard.

According to the airplane manufacturer, the wing flaps were in a fully retracted (zero degree) position.

Empennage

The empennage was severely damaged during the accident sequence and during the post impact fire. The emergency locator transmitter (ELT) was destroyed during the impact sequence.

The rudder separated from the vertical stabilizer and was recovered in multiple pieces. The upper most section separated just below the top rudder hinge. The top fairing and counter weight remained secure to the upper section. The top hinge separated form the vertical stabilizer rear spar. The hinge bolt was intact and safetied with a cotter pin and castellated nut. The mid section separated just below the middle rudder hinge. The middle hinge separated from the vertical stabilizer rear spar, pulling the bracket from the rear spar. The hinge bolt remained intact and safetied with a cotter pin and castellated nut. The lower section further separated into multiple pieces. The bottom hinge bolt hole was torn out.

The rudder trim tab separated from the rudder and found in multiple pieces. The piano wire hinge was partially attached to one section of the rudder trim tab surface. The rudder control horn separated from the bottom of the torque tube. The control horn remained connected to the rudder cables inside the tailcone.

The rudder assembly was laid out at the crash site. A black transfer mark observed on the right side of the rudder surface extended from the lower edge of the rudder forward of the torque tube, in an upward and aft direction to the trailing edge of the rudder just above the trim tab. The deformation of the rudder, associated with the transfer mark, was consistent with white scuff marks along a portion of the right horizontal stabilizer deice boots.

Stabilizers

The horizontal stabilizer separated into multiple sections. The left side was mostly in one piece, although it incurred substantial damage. The horizontal skins exhibited numerous diagonal wrinkles. The left side of the center mounting area of the horizontal stabilizer showed downward bending and torsional twisting. The left elevator separated into multiple sections. The counterweight remained attached to the outboard section of the elevator.

The right side of the horizontal stabilizer separated into multiple sections, which were strewn throughout the debris path. The outboard 2/3 were mostly in one piece, minus the rear spar. A majority of the leading edge was flattened, including the area with the white scuffmarks as mentioned above. The rear spar separated from the horizontal stabilizer into two sections. Both pieces of the aft spar displayed torsional twisting. The majority of the mating horizontal skin separated from the spar along the rivet line. The right elevator and trim tab separated into multiple pieces. The counterweight remained attached to the outboard section of the elevator. The elevator trim tab actuator separated from the horizontal stabilizer, along with a portion of its corresponding horizontal stabilizer structure.

Cabin

The cockpit and cabin were crushed during impact and thermally consumed by the post impact fire. The instrumentation was mostly consumed in the post impact fire.

Partial seat frames were observed. Two seat belt buckles, which were buckled and melted shut, were recovered. No belt material was present.

Fuel System

The airplane was equipped with four fuel tanks; two on each wing, a tip tank, and a main fuel tank. Both tip tanks separated from the aircraft and were compromised. At least three of the fuel tanks were breached in a manner consistent with having been subjected to hydraulic forces.

Electrical System

The electrical system was destroyed during the accident sequence and subjected to thermal damage during the post impact fire.

Power Plants

Both engines separated from the aircraft during the impact and were found downhill from the main wreckage. Both engine cases were compromised. Most of the accessories were separated.

The left engine's crankcase was broken and displaced inward above cylinders number 1 and number 2. The entire magneto housing and all of the engine accessories had been broken off of the crankcase during the impact. The propeller shaft was fractured in the area of the oil seal. Visual inspection of the crankcase interior revealed that the crankshaft was intact and all six connecting rods were intact and connected to their respective pistons and the crankshaft journals were also intact. The factory representative reported no evidence of any preimpact failure to the engine.

The right engine's crankcase was compromised and was shattered. Cylinders number 4 and number 6 were broken off and the piston's separated from their respective connecting rods. The number 2 cylinder head was broken off and the piston was intact. All six connecting rods were still attached to their respective crankshaft journals and were intact. All accessories were broken off of the back of the engine. The propeller shaft was fractured in the area of the oil seal. The factory representative reported no evidence of any preimpact failure to the engine.

The propellers separated from their respective engines and were located near their respective engines. The right propeller assembly contained all three blades. The right propeller blades exhibited no signs of deformation (s-bending or torsional twisting). Two propeller blades remained attached to the left propeller assembly, one propeller blade separated at the hub.

The left propeller blades exhibited no signs of deformation.

MEDICAL AND PATHOLOGICAL INFORMATION

The San Bernardino County Coroner, San Bernardino, California, completed an autopsy. The FAA Toxicology and Accident Research Laboratory were unable to perform toxicological screening of the pilot.

ADDITIONAL INFORMATION

The Safety Board investigator released the wreckage to the owner's representative.

Pilot Information

Certificate:	Airline Transport	**Age:**	89, Male
Airplane Rating(s):	Multi-engine Land; Single-engine Land	**Seat Occupied:**	Left
Other Aircraft Rating(s):	None	**Restraint Used:**	
Instrument Rating(s):	Airplane	**Second Pilot Present:**	No
Instructor Rating(s):	None	**Toxicology Performed:**	No
Medical Certification:	Class 3 Without Waivers/Limitations	**Last FAA Medical Exam:**	03/01/2003
Occupational Pilot:		**Last Flight Review or Equivalent:**	03/01/2000
Flight Time:	11371 hours (Total, all aircraft), 1237 hours (Total, this make and model), 12 hours (Last 90 days, all aircraft), 3 hours (Last 30 days, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Cessna	**Registration:**	N444AM
Model/Series:	421B	**Aircraft Category:**	Airplane
Year of Manufacture:		**Amateur Built:**	No
Airworthiness Certificate:	Normal	**Serial Number:**	421B0367
Landing Gear Type:	Retractable - Tricycle	**Seats:**	8
Date/Type of Last Inspection:	12/01/2002, Annual	**Certified Max Gross Wt.:**	7450 lbs
Time Since Last Inspection:		**Engines:**	2 Reciprocating
Airframe Total Time:	3114 Hours as of last inspection	**Engine Manufacturer:**	Continental
ELT:	Installed, not activated	**Engine Model/Series:**	GTSIO-520-H
Registered Owner:	Robert S. Brown	**Rated Power:**	375 hp
Operator:	Robert S. Brown	**Operating Certificate(s) Held:**	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual Conditions	**Condition of Light:**	Day
Observation Facility, Elevation:	EED, 983 ft msl	**Distance from Accident Site:**	56 Nautical Miles
Observation Time:	1156 PST	**Direction from Accident Site:**	90°
Lowest Cloud Condition:	Clear	**Visibility**	10 Miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	9 knots /	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	200°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	29.7 inches Hg	**Temperature/Dew Point:**	24°C / 9°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	BULLHEAD CITY, AZ (IFP)	**Type of Flight Plan Filed:**	VFR
Destination:	VAN NUYS, CA (VNY)	**Type of Clearance:**	None
Departure Time:	1155 PST	**Type of Airspace:**	

Wreckage and Impact Information

Crew Injuries:	1 Fatal	**Aircraft Damage:**	Destroyed
Passenger Injuries:	4 Fatal	**Aircraft Fire:**	On-Ground
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	5 Fatal	**Latitude, Longitude:**	35.021944, -115.583611

Administrative Information

Investigator In Charge (IIC):	Patrick H Jones	**Report Date:**	04/25/2006
Additional Participating Persons:	Martin F Kay; Federal Aviation Administration; Las Vegas, NV Todd Sigler; Cessna Aircraft Company; Wichita, KS Michael Grimes; Teledyne Continental Motors; Mobile, AL		
Publish Date:			
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.ntsb.gov/pubdms/.		