

		NTSB ID: LAX07FA258		Aircraft Registration Number: N1098F	
		Occurrence Date: 08/30/2007		Most Critical Injury: Fatal	
		Occurrence Type: Accident		Investigated By: NTSB	
Location/Time					
Nearest City/Place Cameron Park	State CA	Zip Code 95682	Local Time 1235	Time Zone PDT	
Airport Proximity: On Airport/Airstrip		Distance From Landing Facility:			
Aircraft Information Summary					
Aircraft Manufacturer Raytheon Aircraft Company		Model/Series A36		Type of Aircraft Airplane	
Revenue Sightseeing Flight: No			Air Medical Transport Flight: No		
Narrative					
Brief narrative statement of facts, conditions and circumstances pertinent to the accident/incident:					
HISTORY OF FLIGHT					
<p>On August 30, 2007, at 1235 Pacific daylight time, a Raytheon A36, N1098F, descended into terrain during the takeoff initial climb from Cameron Air Park, Cameron Park, California. The airplane was operated by the commercial pilot under the provisions of 14 Code of Federal Regulations Part 91. The pilot and one passenger were seriously injured, two passengers were fatally injured, and the airplane was substantially damaged. Visual meteorological conditions prevailed, and a flight plan had not been filed.</p>					
<p>A television news crew was filming airplane operations at the Cameron Park Airport and captured the accident on video. A Federal Aviation Administration (FAA) inspector and the National Transportation Safety Board investigator-in-charge (IIC) viewed the video of the event. The video depicted the airplane on its takeoff roll, accelerating almost 2/3 down runway 31 before getting airborne. Once airborne, the airplane climbed to approximately 40 feet and the wings began to wobble and it settled back down towards the ground. The airplane settled into the rising terrain off the end of the runway, slid on the ground, and abruptly flipped over on to its back.</p>					
<p>The pilot stated to the Safety Board IIC that he was very familiar with this airplane and had flown it often. He topped the airplane off with fuel, had mentally performed a weight and balance, and had done a takeoff over a 50-foot obstacle calculation for a 100-degree Fahrenheit (F) day at this airport in the past. He stated that the engine run-up was normal, and the outside air temperature (OAT) was 35 Celsius (C) (95 F). The takeoff roll was a little longer than normal and the acceleration felt normal except for a momentary shudder about 1/3 the way down the runway. During the initial climb the airplane was accelerating. At some point the airplane stopped climbing, the airspeed indicated 84 knots, and the rate of climb had dropped off. He lowered the nose and felt a gust of wind from the left side, at which point the wings started to wobble. He cut the power just as the airplane was settling in to the rising terrain/runway overrun.</p>					
<p>The pilot and passenger in the cockpit sustained serious injuries. The two passengers in seats that were positioned forward in the cabin and faced aft were fatally injured.</p>					
PERSONNEL INFORMATION					
<p>The pilot, age 64, held a commercial pilot certificate issued on December 10, 1989, with single engine land, single engine sea, multiengine land, multiengine sea, helicopter, gyroplane, and airplane instrument ratings. The pilot also held a flight instructor certificate issued on May 20, 2007, with instructor ratings in single and multiengine airplane, instrument airplane, rotorcraft helicopter and gyroplane. The pilot held a third-class airman medical issued in June 2006, with the limitation that he must wear corrective lenses for near and distant vision. The pilot reported a total flight time of 2,000 hours, of which 1,700 hours were pilot-in-command, and 1,000 hours as</p>					
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## Narrative (Continued)

an instructor. He had flown 16 hours in the accident airplane make and model within the last 30 days.

## AIRCRAFT INFORMATION

The four seat, low-wing, retractable-gear airplane, serial number E-3059, was manufactured in 1996.

The airplane's original production configuration was equipped with six seats, however, the two furthest aft seats were removed from this airplane. It was powered by a Teledyne-Continental Motors IO-550-B, 300 brake horsepower engine, and equipped with a McCauley model D3A32C409-C propeller. A review of the airframe maintenance logbook records showed that an annual inspection was completed October 9, 2006, at an airframe total time (AFTT) of 1031.5 hours. At this time a turbonormalizing system was installed on the engine in accordance with Engine Technologies, Inc, supplemental type certificate (STC) number SE5222NM. The engine maintenance logbook records showed the annual inspection had been complied with on October 9, 2006, at AFTT 1031.5 hours, and Engine Time Since Overhaul (ETSO) of 679.1 hours. The Hobbs meter read 1,108.3 at the accident site.

The pilot operating handbook (POH) contained a section titled; Airplane Flight Manual Supplement - 550, Aircraft With Turbonormalizer Systems installed after August 1, 2000. Page 5 of the supplement stated "Your aircraft has been approved for increased maximum takeoff weights and landing weights in accordance with the following chart. All operations above the original maximum weight listed in the Aircraft Flight Manual are to be NORMAL CATEGORY operations." The tables that followed contained flight load factor limits for the A36 in the 'normal category' as 3.8 positive g's, 1.5 negative g's, flaps up, and 2.7 positive g's, 0 negative g's, flaps down. Page 6 contained the increased weight and balance envelope load for the A36 as 4,000 lbs (NORMAL CATEGORY ONLY above 3,650 lbs), between stations +85.5 in to +87.7 in. Page 26 of the supplement stated "However, when operating at the increased weights authorized when operations are conducted in the NORMAL CATEGORY expect:

- |    |                                      |                |
|----|--------------------------------------|----------------|
| A. | Increased Takeoff Distance of up to: | 30%            |
| B. | Decreased Rate-of-Climb of up to:    | 13%            |
| C. | Increased Stall Speed of up to:      | 7%             |
| D. | Increased Landing Distance of up to: | 15%            |
| E. | Increased Takeoff & Approach Speeds: | Increase 2 kts |
| F. | Increase Vx and Vy speeds:           | Increase 2 kts |

The most recent airplane weight and balance sheet was dated October 9, 2006, and copies were located in the maintenance records and in the POH. The empty weight of the airplane was stated to be 2,630 pounds. Using the following weights; removal of rear seats (32 lbs), full fuel load (431 lbs), pilot (162 lbs), right front seat (204 lbs), 3 rd seat occupant (195 lbs), 4th seat occupant (234 lbs), and baggage/cargo (271 lbs), the total takeoff weight was approximately 4,095 lbs at a CG of +86.15 in.

Utilizing the above information, pressure altitude of 1,293 feet, and OAT of 35C; the takeoff performance charts provided in the POH were used to calculate the takeoff ground roll and distance to clear a 50-foot obstacle. The ground roll plus 30 percent was 2,210 feet. The takeoff distance to clear a 50-foot obstacle plus 30 percent was 4,030 feet, and takeoff speed plus 2 knots was 86 knots.

Utilizing topographical information from Google Earth, the horizontal distance between the point the airplane lifted from the runway and the location of the highest terrain directly ahead was approximately 2,128 feet. The elevation difference between these two points is 80 feet. Total distance from the start of the takeoff roll to the highest terrain directly ahead is about 4,860 feet.

## METEOROLOGICAL INFORMATION

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Cameron Airpark does not have a weather recording system. The exact wind conditions at the time of the accident are not known. The pilot reported that his OAT gauge read 35 degrees C (95 degrees F) just prior to takeoff, and the EDM 800 (engine analyzer) recorded OAT between 95 and 97 F (~36C) during takeoff.

The closest airfield with an aviation meteorological recording system is Sacramento Mather Airport, Sacramento, California, 17 miles southwest of Cameron Park. Mather Airport has an AWOS-3 (aviation weather observation system) that recorded an atmospheric pressure of 29.89 inches of mercury (inHg) at 1245.

The calculated density altitude for Cameron Airpark at the time of the accident was 4,125 feet msl.

The video shows the windsock at the southeast end of the runway limp as the airplane accelerated past it, but immediately after the accident at the northwest end of the runway bush branches can be observed waving in a moderate breeze. The video also depicts the airplane crabbing to the northwest immediately after takeoff, while the airplane's shadow stayed positioned on the runway.

## AERODROME INFORMATION

Cameron Air Park is located in a slight geographical bowl, with rising terrain at both ends of the runway. Field elevation is 1,293 feet msl. The single runway is marked 31 and 13, and is 4,051 feet long. Trees and buildings ring the airport.

## WRECKAGE AND IMPACT INFORMATION

The wreckage was examined on-scene by the Safety Board IIC, with technical assistance provided by representatives from the FAA, Hawker-Beechcraft, and Teledyne-Continental Motors. The wreckage was located about 719 feet north of the end of runway 31, on the runway extended centerline, at an elevation of 1,330 feet msl. The terrain slopes up gradually to the north and is covered with dry grass, shrubs, and a few boulders. The initial point of contact with terrain was about 500 feet from the end of the runway at an elevation of 1,314 feet msl. The total distance from the initial point of impact to the main wreckage was 365 feet. At the 246-foot point a large boulder had been dislodged from the earth and traveled 60 feet to come to rest next to the wreckage.

The main wreckage was inverted, generally facing the direction it came from, and was oriented on a bearing of 130 degrees. The forward portion of the cockpit occupiable space had been compromised by a large dent on the bottom of the fuselage that went from the nose wheel through the center of the cabin to the aft wing spar, deforming the air conditioning condenser. The cabin contained four seats; the forward facing pilot and copilot seats, and two aft facing passenger seats. The forward windscreen was shattered and generally not present except for where it attaches to the airframe. The firewall had been pushed back into the cockpit and the engine was detached from the engine mount and lay next to the nose cowling. The left wing was attached to the fuselage at the forward and aft attach fittings, the right wing remained attached at the forward attach fitting. Fifty-three gallons of bluish fluid was extracted from the wing fuel bladders during the recovery of the wreckage.

Examination of the cockpit revealed that the landing gear handle was down, the flap handle was up, and the auxiliary fuel boost pump switch was "off." The throttle, mixture, and propeller levers were in the full forward position. The fuel selector was removed from the wreckage, and by passing air through the valve it was determined that the fuel selector was configured to the left tank position. Fluid drained from the fuel selector housing revealed a bluish liquid, the odor consistent with avgas; no contamination was identified. The JPI EDM 800 engine monitor was removed from the instrument panel for further examination. Control continuity from the rudder, elevator, and ailerons were established to the cockpit control column bell crank. The left and right

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elevator trim actuators measured 1.25 inches and 1.375 inches respectively; both corresponded to zero degrees of tab (neutral). The left and right flap actuator measured 2.125 inches and 1.75 inches respectively; which corresponded to zero degrees of flap (retracted position).

The engine was completely separated from the firewall engine mount, and lay 3 feet downhill from the cockpit area of the wreckage. A hole was present in the oil pan. The oil cap was observed to be secured to the oil filler tube. The 3-bladed Hartzel propeller was attached to the crankshaft flange. The propeller exhibited aft blade tip curling/bending on all blades, no leading edge damage or chordwise scratches observed. The engine was transported to a recovery yard where a detailed examination was accomplished. No mechanical anomalies were identified.

The baggage and cargo recovered from the wreckage consisted of a portable icemaker, four pieces of individual luggage, a case of soda, and a medium sized cooler. The items were collected and found to weigh, in total, 271 pounds.

## MEDICAL AND PATHOLOGICAL INFORMATION

The El Dorado Pathology Medical Group performed the autopsy of the male passenger fatality. The autopsy significant findings include "Cervical Neck Fracture" and "Right Parietal Subarachnoid Hemorrhage."

The Sacramento County Coroner performed the autopsy of the female passenger fatality. The autopsy significant findings include "Hemorrhagic shock due to pelvic fractures."

## TESTS AND RESEARCH

## EDM-800 - Engine Analyzer

The airplane was instrumented with a JPI EDM-800 Engine Analyzer. This instrument was removed and taken to the JP Instruments facility to be downloaded. The EDM-800 recorded the engine performance parameters for the time between engine start and the accident. The following parameters were recorded; exhaust gas temperature, cylinder head temperature, oil temperature, outside air temperature (OAT), battery voltage, fuel flow, engine rpm, manifold pressure (MAP), and percent horsepower. The data revealed consistent engine operation throughout the takeoff power application. RPM was maintained between 2,669 - 2,672 rpm; manifold pressure (MAP) was maintained between 29.5 - 30.1 inHg; fuel flow between 33.1 - 33.8 gallons per hour; the recorded OAT was 93 degrees F at engine start and 95-97 degrees F during takeoff. Horsepower produced was between 91 and 94 percent.

## Video Study

A video study was performed to determine the ground speed of the airplane at the time of rotation and when it crossed the end of the runway. Utilizing topographical data points on the runway, the location of the video camera, and the time stamp imbedded into the video, an accurate calculation of the airplane's ground speed was determined to be 84 plus or minus 4 knots at rotation, and 80 plus or minus 4 knots over the end of the runway. The takeoff distance, from the start of the ground roll to the point the main wheels left the runway, was 2,732 feet.

The video study factual report is located in the docket of this accident investigation.

## Wind Effects Indicated in the Accident Video

A few video frames captured the approach end (southeast end) windssock as the airplane accelerated down the runway. The windssock appears to be stationary and completely draped down, indicating very little or no wind at that location.

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The accident video showed the airplane enter a left crab immediately after takeoff, while the airplane and airplane shadow appeared to remain centered over the runway. In order for the airplane to be in a slight crab and remain over the runway, there would have to be a crosswind force being exerted on the airplane. Using the video imagery, comparing the runway direction and airplane nose alignment, it was estimated that the crab angle was approximately 7 degrees. Using the ground speed calculated in the video study of 80 knots, a 7-degree crab would correspond to a 10-knot crosswind component. This implies that immediately after takeoff the airplane was subjected to a wind from the left.

The left side of the departure end of runway 31 has low or down sloping terrain populated with single story residence structures. As the departure end of runway 31 gives way to up sloping terrain, the far left side also abruptly becomes populated with a grove of tall trees. These buildings and trees are in a position to affect winds coming across the runway from the west.

## Performance Study

The Data Analysis Numerical Toolbox & Editor (DANTE) software computer program was used to model and calculate the probable performance of the Raytheon A36 under the aircraft load (4,100 lbs) and environmental conditions that existed at the time of the accident. The following aerodynamic data was provided by Hawker-Beechcraft for the A36; wing area = 181 sq ft, wing aspect ratio = 6.2, c/4 sweep = 0 deg, wing taper ratio = 0.49, and drag coefficient  $CD0 = 0.0435$ . Environmental conditions used for the calculation was a density altitude of 4,100 feet. Power parameter provided by the engine was set to 277.5 hp, the average power level recorded by the EDM 800 (92.5 percent of maximum rated power-300 hp). The DANTE calculation resulted in a positive rate of climb of 911 feet per minute (fpm) at 80 knots calibrated airspeed (CAS).

The elevation difference between the point the airplane lifted from the runway (1,270 feet msl) and the highest point of terrain directly ahead (1,350 ft msl) is approximately 80 feet. The distance between these two points is approximately 2,128 feet. At 80 knots it would take the airplane approximately 15 seconds to travel 2,128 feet. At 911 fpm rate of climb the airplane would have climbed approximately 228 feet after 15 seconds, clearing the terrain high point by 148 feet.

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<b>Landing Facility/Approach Information</b>					
Airport Name	Airport ID:	Airport Elevation	Runway Used	Runway Length	Runway Width
Cameron Air park	KO61	1293 Ft. MSL	31	4051	50
Runway Surface Type: Asphalt					
Runway Surface Condition: Dry					
Approach/Arrival Flown: NONE					
VFR Approach/Landing: None					
<b>Aircraft Information</b>					
Aircraft Manufacturer		Model/Series		Serial Number	
Raytheon Aircraft Company		A36		3059	
Airworthiness Certificate(s): Normal					
Landing Gear Type: Retractable - Tricycle					
Amateur Built Acft? No	Number of Seats: 4	Certified Max Gross Wt.	4000 LBS	Number of Engines: 1	
Engine Type:	Engine Manufacturer:	Model/Series:	Rated Power:		
Reciprocating	Teledyne Continental	IO-550	300 HP		
- Aircraft Inspection Information					
Type of Last Inspection	Date of Last Inspection	Time Since Last Inspection	Airframe Total Time		
Annual	10/2006	77 Hours	1108 Hours		
- Emergency Locator Transmitter (ELT) Information					
ELT Installed?/Type Yes /	ELT Operated? Yes	ELT Aided in Locating Accident Site? No			
<b>Owner/Operator Information</b>					
Registered Aircraft Owner		Street Address			
Aerometals		2202 W Charleston Blvd Ste 7			
		City	State	Zip Code	
		Las Vegas	NV	89102	
Operator of Aircraft		Street Address			
Ben R. Martin		On File			
		City	State	Zip Code	
		Folsom	CA	95630	
Operator Does Business As:			Operator Designator Code:		
- Type of U.S. Certificate(s) Held: None					
Air Carrier Operating Certificate(s):					
Operating Certificate:			Operator Certificate:		
Regulation Flight Conducted Under: Part 91: General Aviation					
Type of Flight Operation Conducted: Personal					

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**First Pilot Information**

Name On File	City On File	State On File	Date of Birth On File	Age 64
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Sex: M	Seat Occupied: Left	Occupational Pilot?	Certificate Number: On File
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Certificate(s): Flight Instructor; Commercial

Airplane Rating(s): Multi-engine Land; Multi-engine Sea; Single-engine Land; Single-engine Sea

Rotorcraft/Glider/LTA: Helicopter

Instrument Rating(s): Airplane

Instructor Rating(s): Airplane Multi-engine; Airplane Single-engine; Helicopter; Instrument Airplane

Current Biennial Flight Review?

Medical Cert.: Class 3	Medical Cert. Status:	Date of Last Medical Exam: 06/2006
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- Flight Time Matrix	All A/C	This Make and Model	Airplane Single Engine	Airplane Multi-Engine	Night	Instrument		Rotorcraft	Glider	Lighter Than Air
						Actual	Simulated			
Total Time	2000									
Pilot In Command(PIC)	1700									
Instructor	1000									
Instruction Received										
Last 90 Days	26	20								
Last 30 Days	21	16								
Last 24 Hours										

Seatbelt Used? Yes	Shoulder Harness Used? No	Toxicology Performed? No	Second Pilot? No
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**Flight Plan/Itinerary**

Type of Flight Plan Filed: VFR

Departure Point Same as Accident/Incident Location	State	Airport Identifier KO61	Departure Time 1235	Time Zone PDT
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Destination Ensenada	State	Airport Identifier	
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Type of Clearance: None

Type of Airspace:

**Weather Information**

Source of Wx Information:

Automated Report

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<b>Weather Information</b>					
WOF ID	Observation Time	Time Zone	WOF Elevation	WOF Distance From Accident Site	Direction From Accident Site
KMHR	1245	PDT	Ft. MSL	17 NM	225 Deg. Mag.
Sky/Lowest Cloud Condition: Scattered			10000 Ft. AGL	Condition of Light: Day	
Lowest Ceiling: None		Ft. AGL	Visibility: 10	SM	Altimeter: 29.89 "Hg
Temperature: 38 °C	Dew Point: 13 °C	Weather Conditions at Accident Site: Visual Conditions			
Wind Direction: 180		Wind Speed: 8	Wind Gusts:		
Visibility (RVR):	Ft.	Visibility (RVV)	SM		
Precip and/or Obscuration: No Obscuration; No Precipitation					

<b>Accident Information</b>		
Aircraft Damage: Substantial	Aircraft Fire: None	Aircraft Explosion: None

- Injury Summary Matrix	Fatal	Serious	Minor	None	TOTAL
First Pilot		1			1
Second Pilot					
Student Pilot					
Flight Instructor					
Check Pilot					
Flight Engineer					
Cabin Attendants					
Other Crew					
Passengers	2	1			3
- TOTAL ABOARD -	2	2			4
Other Ground					
- GRAND TOTAL -	2	2			4

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Administrative Information

Investigator-In-Charge (IIC)

Van S. McKenny

Additional Persons Participating in This Accident/Incident Investigation:

Ken Meyer  
Federal Aviation Administration  
Sacramento, CA

Russell Schrock  
Hawker-Beechcraft  
Wichita, KS

Brian Weber  
Hawker-Beechcraft  
Wichita, KS

Chris Lang  
Teledyne Continental Motors, Inc  
Mobile, AL

George Braly  
Tornado Alley Turbo, Inc  
Ada, OK