Aviation Investigation Final Report

Location:	Marana, Arizona	**Accident Number:**	LAX05LA135
Date & Time:	April 13, 2005, 06:45 Local	**Registration:**	N210EW
Aircraft:	Cameron Balloons A-210	**Aircraft Damage:**	Substantial
Defining Event:		**Injuries:**	1 Fatal, 3 Serious, 7 Minor
Flight Conducted Under:	Part 91: General aviation - Other work use		

Analysis

The balloon collided with boulders located atop a hill, fatally injuring a passenger. After a normal departure on the for-hire sightseeing flight, the pilot transferred control authority to a crewmember who held a private pilot certificate. The purpose of the control transfer was to help the crewmember obtain more practice hours and log pilot-in-command time. He was additionally receiving instruction from the commercial pilot. As the balloon approached rising terrain the crewmember continued the ascent up to about 1,000 feet above ground level (agl). The pilot said the balloon began a gradual descent and the crewmember reacted by manipulating all the burners to produce maximum lift. The balloon's basket impacted a boulder on the peak of the hill and bounced upward. The balloon again collided with another boulder and subsequently became airborne, clearing the peak of the hill. After maneuvering the balloon over power lines, the pilot landed. A passenger reported that the balloon continued to gain altitude continuously as it proceeded toward the mountain. In the cumulative 2 minutes prior to impact, the passenger noted that the balloon did not appear to increase in altitude, and he assumed that the pilot was going to attempt to maneuver around the approaching peak. He stated that during the flight's duration only one burner was operating at a given time, with the exception of just seconds before the impact when the pilot instructed the other crewmember to "turn on both burners." The passenger said that the two burners appeared to be operating. He added that the balloon's altitude never appeared to reach higher than the top of the hill, and the flight path consisted of a continuous accent up the mountain. Safety Board investigators reviewed an atmospheric sounding of the area around the time of the accident. The data did not support any thermals and no clear air turbulence was identified at the accident altitudes. The wind profile indicated calm surface winds, defined as below 10 knots. No defined mountain wave pattern was identified. A post accident examination of the balloon found no anomalies or discrepancies with the envelope, basket, or burners. Regulations restrict private pilots from being pilot-in-command during commercial operations with fare-paying passengers; however, a private pilot can be the pilot-in-command if a

commercial pilot is providing instruction.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: the failure of the flying pilot to attain a proper climb rate and maintain an adequate clearance from rising terrain. Also causal was the commercial pilot's inadequate supervision of the flight and his delayed remedial action.

Findings

Occurrence #1: IN FLIGHT COLLISION WITH TERRAIN/WATER
Phase of Operation: CLIMB

Findings
1. TERRAIN CONDITION - RISING
2. (C) PROPER CLIMB RATE - NOT ATTAINED - COPILOT/SECOND PILOT
3. (C) CLEARANCE - NOT MAINTAINED - COPILOT/SECOND PILOT
4. (C) REMEDIAL ACTION - DELAYED - PILOT IN COMMAND
5. (C) SUPERVISION - INADEQUATE - PILOT IN COMMAND

Factual Information

HISTORY OF FLIGHT

On April 13, 2005, about 0645 mountain standard time, a Cameron Balloons A-210, N210EW, collided with boulders located atop the foothills in Marana, Arizona. Thunderbird Adventures was operating the balloon under the provisions of 14 CFR Part 91. The commercial pilot, a second crewmember, and five passengers sustained minor injuries; three passengers sustained serious injuries; one passenger was fatally injured. The balloon sustained substantial damage. The local area sightseeing flight departed Marana about 0615. Visual meteorological conditions prevailed, and a flight plan had not been filed.

During a telephone conversation with a National Transportation Safety Board investigator, the pilot reported that after making a normal departure, he maneuvered the balloon in a level attitude toward a series of hills to the west. He had followed this flight path many times prior. As he approached the hills on a heading of 300 degrees, he noted that the balloon appeared to be encountering a downdraft. He manipulated all the burners to produce maximum lift in an effort to counteract the downward force, which he attributed to be a result of either a rotor wave or downdraft. The balloon's basket impacted a boulder on the peak of the hill and bounced upward. The balloon again collided with another boulder and subsequently became airborne, clearing the peak of the hill. After maneuvering the balloon over power lines, the pilot landed; the balloon incurred substantial damage to the basket.

A Safety Board investigator interviewed the crewmember, a private pilot, who was aboard the balloon during the accident. He stated that a normal flight the operator provides to passengers consists of a departure from Marana, followed by an ascent over the foothills located to the west of the town. After clearing the terrain, the pilot gives a tour of the valley, and pending wind conditions, decides where to land. The accident flight departed from the Coyote Moon Health Resort and Spa about 0615, in light wind conditions. After lifting off, the balloon ascended about 300 feet per minute, until reaching about 600 feet above ground level (agl), where the pilot configured the balloon in a level attitude. The crewmember added that due to the residential neighborhood below, they always fly at a minimum altitude of 500 feet agl, until reaching the unpopulated foothills, about a mile to the west.

The crewmember further stated that as the balloon continued toward the hills, just south of Rattlesnake Pass, everything seemed normal. As the balloon came in closer proximity to the hilly terrain, he noted that the burners were configured for maximum lift, but the balloon did not climb. The balloon impacted a rock on top of a hill, which offset the basket from the envelope. The basket collided with an addition rock causing injuries to himself and the occupants inside the basket. The balloon floated to the west side of the hill and the pilot landed.

In a written statement the pilot reported that after departing the resort, the balloon ascended to about 500 feet agl. He transferred control authority to the crewmember about 5 minutes into the flight. About 1/2 mile before reaching the rising terrain, the crewmember continued the ascent up to about 1,000 feet agl. The speed increased to about 15 knots and the balloon was100 feet higher than the peak of the upcoming hill. The balloon leveled off and began a gradual decent. The pilot took authority and activated both burners. The balloon continued in the decent with no reaction to the burners. The basket impacted the rising terrain twice.

A passenger reported that after departure, as the balloon continued to gain altitude, he kept his attention fixated on the scenery below. An estimated 2 1/2 minutes prior to the balloon impacting the side of a hill, he recalled a woman passenger asking the pilot what altitude the balloon was flying at. After consulting the handheld global positioning system (GPS) onboard, the pilot reported a cruising altitude of 2,500 feet. Another 30 seconds passed and an additional passenger again queried the pilot as to the altitude the balloon was operating, at which time he confirmed the balloon was still at 2,500 feet. Seconds before the balloon impacted, the pilot instructed the other crewmember to "turn on both burners."

In the cumulative 2 minutes prior to impact, the passenger noted that the balloon did not appear to increase in altitude, and he assumed that the pilot was going to attempt to maneuver around the approaching peak. He stated that during the flight's duration only one burner was operating at a given time, with the exception of just seconds before the impact (just after the pilot directed the crewmember to turn on both burners) he noted that the two burners appeared to be operating. He added that the balloon's altitude never appeared to reach higher than the top of the hill, as the flight path consisted of a continuous accent up the mountain.

During a telephone interview with a Safety Board investigator, a resident of Marana, who is also a pilot, stated that she witnesses the operator conduct sightseeing flights almost every morning. The operator regularly maneuvers over her house at an altitude of 50 feet agl, before reaching the foothills to the west where it ascends over the mountain if enough altitude is gained, or continues though a pass in the hills. On numerous occasions she has observed the balloon landing on fields below the hill (including her property), which she thought was a result of the balloon not obtaining enough altitude prior to reaching the rising terrain. The morning of the accident, she again saw the balloon cross over her house about 50 feet agl, and ran outside to communicate to the pilot that he is flying too low. She thought the low operations were an invasion of her privacy, as the balloon was at such an altitude that the occupants could look through her windows. She added that several months prior to the accident, she contacted the Federal Aviation Administration to file a complaint against the operator, at which point no action was taken.

The global positioning system (GPS) coordinates for the first impact point were: 32 degrees 21.948 minutes north latitude by 111 degrees 08.735 west longitude, and an estimated 2,465-foot mean sea level (msl)

AIRCRAFT INFORMATION

The balloon was a Cameron Balloons A-210, serial number 3134. The manufacturer reported the envelope was built in 1994. The pilot reported that the balloon had a total time of 234 hours at the time of the accident. The last annual inspection was preformed 68 hours prior to the accident, on August 26, 2004.

A representative from Cameron Balloons US, stated that the manufacturer of the accident balloon was not his company, but rather Cameron Balloons LTD, which is their sister company in the United Kingdom. An external inspection revealed that the balloon's components were also manufactured by different companies. The basket was manufactured by Ultra Magic; Thunder and Colt manufactured the burners, the tanks were a mix of ones manufactured by Thunder and Colt, as well as Ultra Magic. He stated that the combination of such components all being from different manufacturers is quite common and did not believe that it was a safety issue.

METEOROLOGICAL INFORMATION

At 0655, the aviation routine weather report (METAR) at Tucson International Airport, located 25 miles southeast of the accident site, was reporting winds from 140 degrees at 9 knots. The pilot stated that during the accident, the wind was from 120 degrees at 10 knots, gusting to 15 knots, with a downdraft present.

Safety Board investigators reviewed the 1200Z sounding that was launched within the hour and within 25 miles of the accident site, at an elevation of 2618 feet. The sounding identified a surface based temperature inversion from the surface to 1,057 feet agl (3,675 feet msl) and resulted in a stable atmosphere with a Lifted Index (LI) of 16.0. The sounding did not support any thermals and no clear air turbulence was identified to 18,000 feet. The wind profile indicated calm surface winds, with winds defined from the south-southeast at 10 knots or less through 6,500 feet msl. Winds veered from the south-southeast through the southwest with wind speeds increasing to 25 knots at 18,000 feet. No defined mountain wave pattern was identified.

TESTS AND RESEARCH

Under the auspices of an FAA inspector, a representative from Cameron Balloons examined the wreckage. He stated that a functional test of the burners and tanks revealed no evidence of preimpact malfunction or failure with the balloon. The burners produced normal power and the flame size and shape, as well as sound, appeared normal. The fuel quantity within the tanks were of adequate capacity and the pilot reported that he had not filled the tanks after the flight. The envelope had normal porosity and he thought the entire balloon appeared to be in good condition. He noted no anomalies or discrepancies with the envelope, basket, or burners.

ADDITIONAL INFORMATION

14 CFR 91 section 91.119 (a) requires a pilot to fly at an altitude that will allow for a power unit failure and/or emergency landing without undo hazards to persons or property.

Regulations restrict private pilots from being pilot-in-command during commercial operations with fare-paying passengers; however, a private pilot can be the pilot-in-command in those circumstances if a commercial pilot is providing instruction.

Pilot Information

Certificate:	Commercial	**Age:**	31,Male
Airplane Rating(s):	None	**Seat Occupied:**	
Other Aircraft Rating(s):	Balloon	**Restraint Used:**	
Instrument Rating(s):	None	**Second Pilot Present:**	Yes
Instructor Rating(s):	None	**Toxicology Performed:**	No
Medical Certification:	None	**Last FAA Medical Exam:**	
Occupational Pilot:	Yes	**Last Flight Review or Equivalent:**	May 1, 2004
Flight Time:	2036 hours (Total, all aircraft), 285 hours (Total, this make and model), 1976 hours (Pilot In Command, all aircraft), 55 hours (Last 90 days, all aircraft), 18 hours (Last 30 days, all aircraft), 2 hours (Last 24 hours, all aircraft)		

Co-pilot Information

Certificate:	Private	**Age:**	33,Male
Airplane Rating(s):	None	**Seat Occupied:**	
Other Aircraft Rating(s):	Balloon	**Restraint Used:**	
Instrument Rating(s):	None	**Second Pilot Present:**	Yes
Instructor Rating(s):	None	**Toxicology Performed:**	No
Medical Certification:	None	**Last FAA Medical Exam:**	
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	May 1, 2004
Flight Time:	43 hours (Total, all aircraft), 29 hours (Pilot In Command, all aircraft), 30 hours (Last 90 days, all aircraft), 16 hours (Last 30 days, all aircraft), 2 hours (Last 24 hours, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Cameron Balloons	**Registration:**	N210EW
Model/Series:	A-210	**Aircraft Category:**	Balloon
Year of Manufacture:		**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	3134
Landing Gear Type:	None	**Seats:**	0
Date/Type of Last Inspection:	August 1, 2004 Annual	**Certified Max Gross Wt.:**	3965 lbs
Time Since Last Inspection:	68 Hrs	**Engines:**	0
Airframe Total Time:	234 Hrs as of last inspection	**Engine Manufacturer:**	
ELT:	Not installed	**Engine Model/Series:**	
Registered Owner:	Jeffrey and Julie Gilles	**Rated Power:**	
Operator:	Jeffrey Gilles	**Operating Certificate(s) Held:**	None
Operator Does Business As:	Thunderbird Adventures	**Operator Designator Code:**	

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	TUS,2643 ft msl	**Distance from Accident Site:**	25 Nautical Miles
Observation Time:	06:55 Local	**Direction from Accident Site:**	135°
Lowest Cloud Condition:	Clear	**Visibility**	10 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	9 knots /	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	140°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	29.94 inches Hg	**Temperature/Dew Point:**	14°C / -6°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Marana, CA	**Type of Flight Plan Filed:**	None
Destination:		**Type of Clearance:**	None
Departure Time:	06:15 Local	**Type of Airspace:**	Class G

Wreckage and Impact Information

Crew Injuries:	2 Minor	**Aircraft Damage:**	Substantial
Passenger Injuries:	1 Fatal, 3 Serious, 5 Minor	**Aircraft Fire:**	On-ground
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	1 Fatal, 3 Serious, 7 Minor	**Latitude, Longitude:**	32.333332,-111.058334

Administrative Information

Investigator In Charge (IIC):	Keliher, Zoe
Additional Participating Persons:	Jim Woods; Federal Aviation Administration; Scottsdale, AZ
Original Publish Date:	August 29, 2006
Last Revision Date:	
Investigation Class:	Class
Note:	
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=61299