National Transportation Safety Board
Aviation Accident Final Report

Location:	MARANA, AZ	**Accident Number:**	LAX02FA110A
Date & Time:	03/15/2002, 1000 MST	**Registration:**	23253
Aircraft:	Pilatus UV-20A	**Aircraft Damage:**	Destroyed
Defining Event:		**Injuries:**	1 Fatal
Flight Conducted Under:	Armed Forces		

Analysis

A US Army Pilatus UV-20A collided in midair with a Cessna 182C during parachute jumping operations. The collision occurred about 4,800 feet mean sea level (msl) (2,800 feet above ground level (agl)) on the northeast side of runway 12 abeam the approach end. Both aircraft had made multiple flights taking jumpers aloft prior to the accident. The Pilatus departed runway 12 about 5 minutes prior to the Cessna's departure on the same runway. The drop zone was on the airport west of the intersections of runways 12 and 03. The Pilatus departed to the south and began a climb to the jump altitude of 5,500 feet msl, which was 3,500 feet agl. The pilot began the jump run on the southwest side of the runway paralleling it on a heading of about 300 degrees and when he was 1 to 2 minutes from the drop zone broadcast the intent to drop jumpers. The first jumper stated that it normally took him between 1 minute and 1 minute 15 seconds to reach the ground. As he neared the ground he observed everyone running toward the crash site. The Cessna pilot had four jumpers on board and said that his usual practice is to plan his climb so that the jump altitude (5,000 to 5,500 feet msl) is reached about the same time that the aircraft arrives over the jump zone. He departed runway 12 and made a wide sweeping right turn around the airport to set up for the jump. As the Pilatus neared the jump zone the Cessna was greater than 1,000 feet lower and west of the Pilatus climbing on a northerly heading. The Cessna pilot planned to make a right turn to parallel the left side of runway 12, and then turn right toward the drop zone. The jumpers in the Cessna looked out of the right side, and watched the Golden Knights exit their airplane. The jumpers said that their altimeters read 2,500 feet agl. The Cessna pilot turned to a heading of 120 degrees along the left side of the approach end of runway 12. He heard the Pilatus pilot say on Common Traffic Advisory Frequency that the Pilatus was downwind for runway 12. Based on witness observations, at this point the Pilatus was in a descending turn heading generally opposite to the downwind heading on the northeast side of the runway. Everyone in the Cessna heard a loud bang, the Cessna pilot felt something hit him in the head, and the airplane pitched down and lost several hundred feet of altitude. He noticed a blur of yellow and white out of his left window. The lead jumper decided that they should exit, and they all jumped. The Cessna pilot decided that the airplane was controllable, and landed safely. Both civilian and military witnesses on the ground heard the Pilatus pilot call downwind for runway 12. About 10 seconds later they heard intense transmissions over the loud speaker, and looked up

and observed the Pilatus in a nearly vertical, nose down slow spiral. There was an open gash in the top of the Cessna's cabin on the left side near the wing root. The green lens and its gold attachment fitting from the Pilatus were on the floor behind the pilot's seat.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: the failure of both pilots to maintain an adequate visual lookout. The failure of the Pilatus pilot to report his proper position was a factor.

Findings

Occurrence #1: MIDAIR COLLISION
Phase of Operation: MANEUVERING

Findings
1. (C) VISUAL LOOKOUT - INADEQUATE - PILOTS OF BOTH AIRCRAFT
2. (F) TRAFFIC ADVISORY - INACCURATE - PILOT IN COMMAND

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

Findings
3. (C) AIRCRAFT CONTROL - NOT POSSIBLE - PILOT IN COMMAND

Occurrence #3: IN FLIGHT COLLISION WITH TERRAIN/WATER
Phase of Operation: DESCENT - UNCONTROLLED

Findings
4. TERRAIN CONDITION - GROUND

Factual Information

HISTORY OF FLIGHT

On March 15, 2002, at 1000 mountain standard time, a United States Army Pilatus UV-20A, 79-23253, collided with a Cessna 182C, N8813T, over the Marana Northwest Regional Air Park, Marana, Arizona. The Pilatus was operating under the provisions of Army Flight Regulation AR95-1, and the Cessna was operating under the provisions of 14 CFR Part 91. The pilot of the Pilatus sustained fatal injuries, and the airplane was destroyed. The commercial pilot and four passengers in the Cessna were not injured; however, the airplane sustained substantial damage. Both airplanes were conducting skydiving operations. The Pilatus had just completed a drop of five members of the US Army Golden Knights Proficiency and Accuracy team. The Pilatus departed runway 12 at Marana about 10 minutes prior to the accident, and the Cessna departed on runway 12 at Marana about 5 minutes prior to the accident. Both airplanes were going to return to Marana for another jump flight. Visual meteorological conditions prevailed, and no flight plan had been filed for either airplane. The approximate global positioning system (GPS) coordinates of the primary wreckage were 32 degrees 25.64 minutes north latitude and 111 degrees 13.01 minutes west longitude.

The drop zone was west of the intersections of runways 12 and 03.

This was the fifth flight of the day for the Pilatus pilot. The Golden Knights were making practice jumps in two lifts. One lift had five jumpers, and the other lift had four jumpers. One lift would repack their parachutes while the other lift was jumping. As soon as the airplane returned, the team on the ground would board and repeat the cycle. Five jumpers were on board for the accident flight.

Witnesses reported that after departure from runway 12, the Pilatus pilot would depart to the south and begin the climb to the jump altitude of 5,500 feet mean sea level (msl), which was 3,500 feet above ground level (agl). The pilot contacted the Drop Zone Safety Officer to verify that the drop zone was clear and the pilot could begin the jump run. The pilot began the jump run and broadcast the intent to drop jumpers when he was 1 to 2 minutes from the drop zone. The jumpers selected a flight path to the jump zone that was over a taxiway that had a bearing of 300 degrees. The first jumper exited over the drop zone. Jumpers remaining on board the airplane had the pilot adjust the flight path to the left 5 degrees and then again for another 10 degrees before the last jumper exited the airplane.

The first jumper stated that it normally took him between 1 minute and 1 minute 15 seconds to reach the ground. Maximum drop time would be about 1 minute 30 seconds. As he neared the ground he observed everyone running.

The Cessna pilot had four jumpers on board whom he had taken up for a jump earlier that morning. He said that jump pilots try to plan their climb so that they reach the jump altitude about the same time that they reach the jump zone. He was going to climb to 5,000 to 5,500 feet msl (3,000 to 3,500 feet agl) for this jump. He departed runway 12 and made a sweeping right turn around the airport to set up for the jump. He planned to make a right turn to parallel the left side of runway 12, and then turn right toward the drop zone.

The jumpers in the Cessna looked out of the right side, and watched the Golden Knights exit their airplane. The jumpers said that their altimeters read 2,500 feet agl.

The Cessna pilot turned to a heading of 120 degrees along the left side of the approach end of runway 12. He heard the Pilatus pilot say on UNICOM that the Pilatus was downwind for runway 12.

The Cessna pilot was a few seconds away from beginning his right turn to the jump run when everyone in the Cessna heard a loud bang. The airplane was at 4,800 feet msl. He felt something hit him in the head, and the airplane pitched down and lost several hundred feet of altitude. He noticed a blur of yellow and white out of his left window.

One of the jumpers noted that she usually could only see blue sky out of the windshield; now she could see ground. The pilot did a control check while the jumpers looked at him for clearance. The lead jumper decided that they should exit the airplane. All of the jumpers verified that they were 2,000 feet above the ground and could safely jump; all of them exited the airplane. The pilot, who was wearing a parachute, determined that the right aileron was working; however, the airplane was banking and yawing to the right. He decided that the airplane was controllable, and landed safely.

A loud speaker at the drop zone broadcast the UNICOM frequency. Both civilian and military witnesses on the ground heard the Pilatus pilot call downwind for runway 12. About 10 seconds later they heard intense transmissions over the loud speaker and at first didn't realize anything was wrong. Several witnesses looked up and observed the Pilatus in a nearly vertical, nose down slow spiral.

PERSONNEL INFORMATION

Pilatus Pilot

A review of Federal Aviation Administration (FAA) airman records revealed that the pilot held an airline transport pilot certificate with a rating for airplane multiengine land. He held a commercial pilot certificate for airplane single engine land, helicopter, and instrument helicopter.

The Army reported that the pilot had military ratings for airplane single engine land, multiengine land, and helicopters. He was instrument rated in airplanes and helicopters. He was an instructor in both airplanes and helicopters including instrument instructor. They reported a total time of 6,187 hours with 31 hours in make and model. He had 133 hours in the last 90 days, and 113 hours in the last 30 days.

The pilot held a second-class medical certificate issued on July 12, 2001, with no limitations or waivers.

Cessna Pilot

The pilot held a commercial pilot certificate with an airplane single engine land rating. The pilot held a second-class medical certificate issued on June 28, 2001. It had the limitations that the pilot must wear corrective lenses. The pilot reported a total flight time of 520 hours with 80 hours in this make and model. He logged 80 hours in the last 90 days, and 40 hours in the last 30 days.

AIRCRAFT INFORMATION

Pilatus

Pilatus manufactured the airplane, serial number 79-23253. The Army designation was UV-

20A, while the civil designation was PC-6/B2-H2. The Army reported an airframe total time of 6,267.5 hours. The last inspection was a 100-hour inspection on February 26, 2002. The engine was a Pratt & Whitney PT-6-27, serial number 42382. Total time on the engine at the 100-hour inspection was 3,139 hours.

Cessna

The airplane was a Cessna 182C, serial number 52713. The operator reported a total airframe time of 9,029 hours. An annual inspection was completed on March 11, 2002, and it had accumulated 15 hours since that inspection. The engine was a Teledyne Continental Motors O-470, serial number 211437-71R. Total time on the engine at the annual inspection was 1,064 hours.

METEOROLOGICAL CONDITIONS

A routine aviation weather report (METAR) for Tucson International was issued at 0955. It stated: skies clear; visibility 10 miles; winds variable at 5 knots; temperature 53 degrees Fahrenheit; dew point 5 degrees Fahrenheit; altimeter 29.98 inches of mercury.

COMMUNICATIONS

Both airplanes were broadcasting and monitoring on the UNICOM frequency of 123.0. The Pilatus was also in contact with the Drop Zone Safety Officer on frequency 123.5.

WRECKAGE AND IMPACT INFORMATION

Investigators from the National Transportation Safety Board, Cessna, the Army, and the FAA inspected the wreckage at the accident scene. Safety Board software determined that the airplane came to rest 1.14 miles from the airport on a bearing of 352 degrees. The Pilatus was gold at the wing tip; the rest of the wings were white on top and black on the bottom. The fuselage and empennage were white with broad gold and narrow black accent stripes. The Cessna was not painted; it was bare gray aluminum.

Pilatus

The Pilatus came to rest in a brushy, dry river bed of soft sand. The principal impact crater was 22 inches deep and about 3 feet in diameter. The propeller separated aft of the mounting flange. The fracture surface was angular to the longitudinal axis of the crankshaft, irregular, and grainy.

The engine, wings, fuselage, and empennage formed the main wreckage. The fuselage heading was 272 degrees. A main tire separated and was 246 feet away; the right front door separated and was 114 feet away. Other pieces that separated, but were within 40 feet of the main wreckage, included the second main tire, two flap segments, a midsection piece of the right side lower fuselage, and a section of engine cowling.

The right wing exhibited aft crush damage. The outboard bottom section contained scrape marks that were about 45 degrees to the longitudinal axis.

Cessna

The Cessna pilot landed the airplane successfully. There was an open gash in the top of the cabin on the left side near the wing root. A green lens and its gold attachment fitting were on the floor behind the pilot's seat. The gold color of the fitting was similar to the gold color of the Pilatus. The attachment fitting for the Pilatus' right wing was not with its wreckage; however,

the associated wiring and light assembly were at the Pilatus' wreckage.

The top of the left wing immediately forward of the left flap and left aileron sustained mechanical damage and exhibited scrape marks. The left flap was wavy. The inboard half of the left aileron separated at the inboard and middle hinges. The aileron buckled and bent at the outboard edge of the middle hinge. The inboard half of the aileron hung down about 20 degrees.

The Cessna's rudder and vertical stabilizer were not damaged.

MEDICAL AND PATHOLOGICAL INFORMATION

An Armed Forces pathologist completed an autopsy and toxicology of the Pilatus pilot.

TESTS AND RESEARCH

The Cessna exhibited scratch marks and yellow paint transfer marks on the top of the cabin and left wing root that were 55 degrees to its longitudinal axis. It was flying at 80 mph when the collision occurred. The Pilatus exhibited scrape marks on the outboard bottom right wing that were 45 degrees to its longitudinal axis.

The Aeronautical Information Manual (AIM) noted that the FAA was responsible for insuring the safe and efficient use of the National Airspace System (NAS) of the United States for both military and civil aviation. They designed the AIM to provide the aviation community with basic flight information and air traffic control procedures for use in the NAS.

Chapter 3 of the AIM described other airspace areas such as parachute operations in the vicinity of an airport without an operating control tower. It noted that there was no substitute for alertness while in the vicinity of an airport. It was essential that pilots conducting parachute operations be alert, look for other traffic, and exchange traffic information as recommended in paragraph 4-1-9. It noted that pilots should make appropriate broadcasts on the designated Common Traffic Advisory Frequency (CTAF), and monitor the CTAF until all parachute activity had terminated or the aircraft had left the area. Prior to commencing a jump operation, the pilot should have broadcast the aircraft's altitude and position in relation to the airport, the approximate relative time when the jump would have commenced and terminated, and listened to the position reports of other aircraft in the area.

Chapter 4 of the AIM discussed air traffic control. It recommended traffic advisory procedures to use at airports without operating control towers. One section discussed UNICOM communications procedures, and indicated that the practices listed in this section helped reduce frequency congestion, facilitated a better understanding of a pilot's intentions, helped locate the airplane in the traffic pattern, and enhanced safety of flight. It recommended that the pilot report on downwind, base, and final approach.

The Pilot/Controller Glossary defined the downwind leg as a flight path parallel to the landing runway in the direction opposite to landing. The downwind leg normally extended between the crosswind leg and the base leg.

Another section of Chapter 4 discussed traffic patterns. It instructed pilots to enter the pattern in level flight, abeam the midpoint of the runway, at pattern altitude (1,000 feet agl unless established otherwise). It said to maintain pattern altitude until abeam the approach end of the landing runway on the downwind leg. Marana's elevation was 2,031 feet.

ADDITIONAL INFORMATION

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

Pilot Information

Certificate:	Airline Transport; Commercial; Military	**Age:**	45, Male
Airplane Rating(s):	Multi-engine Land; Single-engine Land	**Seat Occupied:**	Front
Other Aircraft Rating(s):	Helicopter	**Restraint Used:**	Seatbelt, Shoulder harness
Instrument Rating(s):	Airplane; Helicopter	**Second Pilot Present:**	No
Instructor Rating(s):	Airplane Multi-engine; Airplane Single-engine; Helicopter; Instrument Airplane; Instrument Helicopter	**Toxicology Performed:**	
Medical Certification:	Class 2	**Last FAA Medical Exam:**	07/01/2001
Occupational Pilot:		**Last Flight Review or Equivalent:**	
Flight Time:	6187 hours (Total, all aircraft), 31 hours (Total, this make and model), 3697 hours (Pilot In Command, all aircraft), 133 hours (Last 90 days, all aircraft), 113 hours (Last 30 days, all aircraft), 3 hours (Last 24 hours, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Pilatus	**Registration:**	23253
Model/Series:	UV-20A	**Aircraft Category:**	Airplane
Year of Manufacture:		**Amateur Built:**	No
Airworthiness Certificate:		**Serial Number:**	79-23253
Landing Gear Type:	Tailwheel	**Seats:**	2
Date/Type of Last Inspection:	02/01/2002, Continuous Airworthiness	**Certified Max Gross Wt.:**	6100 lbs
Time Since Last Inspection:		**Engines:**	1 Turbo Prop
Airframe Total Time:	6267 Hours as of last inspection	**Engine Manufacturer:**	Pratt & Whitney
ELT:	Not installed	**Engine Model/Series:**	PT 6-27
Registered Owner:	UNITED STATES ARMY	**Rated Power:**	520 hp
Operator:	UNITED STATES ARMY	**Operating Certificate(s) Held:**	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual Conditions	**Condition of Light:**	Day
Observation Facility, Elevation:	TUS, 2643 ft msl	**Distance from Accident Site:**	25 Nautical Miles
Observation Time:	0955 MST	**Direction from Accident Site:**	130°
Lowest Cloud Condition:	Clear	**Visibility**	10 Miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	Light and Variable /	**Turbulence Type Forecast/Actual:**	/
Wind Direction:		**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	29.98 inches Hg	**Temperature/Dew Point:**	12°C / -15°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	MARANA, AZ (AVQ)	**Type of Flight Plan Filed:**	None
Destination:		**Type of Clearance:**	None
Departure Time:	0950 MST	**Type of Airspace:**	Class E

Airport Information

Airport:	Marana Northwest Regional (AVQ)	**Runway Surface Type:**	
Airport Elevation:		**Runway Surface Condition:**	
Runway Used:	NA	**IFR Approach:**	None
Runway Length/Width:		**VFR Approach/Landing:**	Traffic Pattern

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:**	32.427500, -111.216944

Administrative Information

Investigator In Charge (IIC):	HOWARD D PLAGENS	**Report Date:**	10/03/2006
Additional Participating Persons:	Joe Remington; Federal Aviation Administration; Scottsdale, AZ Wes Hedman; United States Army; Ft. Rucker, AL Joe Hutterer; Cessna Aircraft Company; Wichita, KS		
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/.		