



National Transportation Safety Board Aviation Accident Final Report

Location:	NORTH LAS VEGAS, NV	Accident Number:	LAX95FA043
Date & Time:	12/03/1994, 1230 PST	Registration:	N58FD
Aircraft:	SIAI-MARCHETTI SF260C	Aircraft Damage:	Destroyed
Defining Event:		Injuries:	2 Fatal

Flight Conducted Under: Part 91: General Aviation - Other Work Use

Analysis

THE PURPOSE OF THE FLIGHT WAS TO ENTERTAIN A NON-PILOT MEMBER OF THE GENERAL PUBLIC BY PERMITTING HIM TO FLY HANDS-ON A HIGH PERFORMANCE MILITARY FIGHTER-LIKE LIGHT AIRPLANE DURING A SIMULATED DOG FIGHT. THE OPERATOR HAD EQUIPPED THE AIRPLANE WITH A VIDEO RECORDER FROM WHICH BOTH COCKPIT AUDIO AND VIDEO DATA WAS PRESERVED. THE PASSENGER WAS CALLED A 'GUEST FIGHTER PILOT,' AND HE WAS HANDLING THE FLIGHT CONTROLS DURING A SIMULATED AIR COMBAT MANEUVER INITIATED AROUND 5,500 FEET MEAN SEA LEVEL (MSL). THE PILOT-IN-COMMAND (PIC) ISSUED REPEATED VERBAL WARNINGS TO THE PASSENGER TO 'STAY OUT OF THE BUFFET.' HOWEVER, DURING A LEFT CLIMBING TURN THE PASSENGER STALLED THE AIRPLANE AND IT BEGAN SPINNING. AS THE AIRPLANE DESCENDED IN THE SPIN, THE PIC TOLD THE PASSENGER THREE TIMES 'I'VE GOT THE AIRPLANE.' THE AIRPLANE IMPACTED 3,600 TO 3,700-FOOT MSL TERRAIN IN A NOSE LOW AND WINGS LEVEL ATTITUDE DURING THE INITIATION OF THE PULLUP RECOVERY. THE PIC WAS AN EX-MILITARY FIGHTER PILOT AND HIS CIVILIAN FLYING EXPERIENCE IN THE AIRPLANE WITH PASSENGERS WAS LIMITED, HAVING ONLY ACQUIRED EMPLOYMENT WITH THE OPERATOR 1.5 MONTHS EARLIER. THE PIC DID NOT HOLD A CFI CERTIFICATE.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: the pilot's failure to maintain control of the airplane by inadvertently allowing the flying passenger to enter a stall/spin. Factors in the accident were the passenger's interference with the pilot's attempted recovery from the spin, and the pilot's lack of experience in small general aviation airplanes.

Findings

Occurrence #1: LOSS OF CONTROL - IN FLIGHT
Phase of Operation: MANEUVERING

Findings

1. LIGHT CONDITION - DAYLIGHT
2. (C) AIRCRAFT CONTROL - NOT MAINTAINED - PILOT IN COMMAND
3. (C) STALL/SPIN - INADVERTENT - PASSENGER
4. (F) LACK OF TOTAL EXPERIENCE IN TYPE OF AIRCRAFT - PILOT IN COMMAND
5. (F) CONTROL INTERFERENCE - INADVERTENT - PASSENGER
6. (F) RELINQUISHING OF CONTROL - NOT PERFORMED - PASSENGER

Occurrence #2: IN FLIGHT COLLISION WITH TERRAIN/WATER
Phase of Operation: DESCENT - UNCONTROLLED

Factual Information

HISTORY OF FLIGHT

On December 3, 1994, around 1230 Pacific standard time, a Siai- Marchetti SF260C, N58FD, operated by Desert Aces, Ltd., departed from controlled flight while engaged in a simulated air combat training maneuver with another of the operator's airplanes. The first airplane (N406FD) landed without incident. The second (accident) airplane crashed into open desert terrain about 14 nautical miles northwest of the North Las Vegas Air Terminal, Nevada. The airplane was destroyed by impact forces and postimpact ground fire. The airline transport pilot and passenger were fatally injured. Visual meteorological conditions prevailed during the work-related flight. The flight originated from North Las Vegas on the day of the accident between 1200 and 1210.

According to information provided by Desert Aces, its primary business was entertainment in the form of simulated air combat flight operations. Its mission was "to allow the general public the opportunity to experience an air combat training mission in the safest, most professional and realistic environment possible."

Prior to the accident flight, the passenger had made one flight as a "guest fighter pilot" in the Marchetti airplane. The first flight was concluded without mishap, and the passenger boarded the airplane for the second and final flight.

The flight was performed in concert with another of the operator's Marchetti airplanes. Both airplanes departed together from the North Las Vegas Air Terminal, and the airplanes proceeded to the practice area. Upon arrival, the pilots commenced practicing a series of basic simulated air combat fighter maneuvers.

After completing the second of three maneuvers, the pilot in the second airplane directed his passenger to attempt to turn their airplane toward the higher elevation first airplane. This action was attempted in an effort at engaging him in the third and final "dog fight."

According to the pilot in the first airplane, at the time his estimated altitude was 6,500 feet mean sea level (msl). The estimated altitude of the second airplane was 6,000 feet msl. The pilot in the first airplane reported to the National Transportation Safety Board that he observed the second airplane depart from controlled flight. The second airplane entered a left spin, and it descended for an estimated 9 seconds while making more than 4 complete revolutions until finally impacting the underlying desert terrain. Within seconds thereafter, a plumb of smoke was noted rising from the crash site.

A ground-based witness reported observing the descending accident airplane make five counterclockwise circles, each lasting about 1 second, and then the airplane impacted the ground. The witness heard the sound of an explosion, and the airplane burst into flames.

PERSONNEL INFORMATION

Pilot.

The pilot held a Federal Aviation Administration (FAA) airline transport pilot certificate for multiengine land airplanes, and a Boeing B-737 type rating. He had commercial pilot privileges for single-engine land airplanes. He also held a flight engineer certificate for turbojet powered airplanes. The pilot did not hold an FAA certified flight instructor certificate.

Based upon a review of the pilot's personal flight record logbook and his resume dated August 1, 1994, the pilot received his initial flight training from the U.S. Air Force. He had about 2,318 hours of military flying time, of which over 2,106 hours were flown in the F-16.

The resume indicated that the pilot's total flight time was about 2,540 hours. The pilot's total civilian flight time was approximately 222 hours. The resume also indicated that the civilian flight time had been obtained flying DC-10, B-737, BE-76, Citabria, and Marchetti airplanes.

The pilot's logbook indicated he received a checkout in a Citabria on September 11, 1993. Between September of 1993, and May of 1994, the pilot flew the Citabria for about 23 hours. On July 7, 1994, the pilot first flew a Marchetti. The pilot completed being checked out in the Marchetti (by Desert Aces personnel) on October 14, 1994. By that date, he had received about 5.2 hours of dual instruction in the airplane. According to the operator, the checkout flights in the Marchetti included performance of about three spins. On one flight during the checkout, the accident pilot demonstrated his ability to enter and recover from one spin.

As a newly hired employee for the operator, the pilot completed a "Pilot Experience Form," which was dated October 13, 1994. In the form, the pilot informed the operator that his total logged military pilot-in-command flight hours were 1,905 of which 1,733 were in turbojet airplanes. The pilot also reported having flown for a total of 35 hours as pilot-in-command in civilian airplanes.

The operator reported that during the 2 week-long period which preceded the accident flight, the pilot had exclusively flown its customers in Marchetti airplanes, and the pilot had performed simulated aerial combat maneuvers. The Safety Board estimated that by the accident date, the pilot's total pilot-in-command flying experience in the Marchetti was between 10 and 30 hours.

Passenger.

The operator reported that the passenger had flown one previous flight in the Marchetti. The flight was made during the 24-hour period which preceded the accident flight, and included simulated aerial combat maneuvers. The passenger did not hold any FAA airman certificates.

AIRPLANE INFORMATION

Maintenance.

A review of the airplane's logbooks revealed the airplane had received its last annual inspection on February 18, 1994, at an indicated tachometer time of 1,459.5 hours. The airplane had received its last 100-hour inspection on November 4, 1994, at an indicated tachometer time of 1,653.30 hours. The FAA participant reviewed the airplane's maintenance records. He reported observing no obvious maintenance discrepancies.

Spin Characteristics.

The operator reported that the airplane was equipped with complete dual flight controls, and it was certificated for performance of intentional spins. The airplane's handling qualities were similar to other high performance light airplanes. The airplane did not exhibit any unusual spin entry or recovery characteristics.

The operator reported that movement of the flight controls in a pro-spin direction is necessary to enter a spin. Maintaining pro-spin control pressures is necessary to sustain a spin. When the flight controls are appropriately positioned to terminate a spin, the airplane promptly stops

spinning. A spin can also be terminated by releasing all control pressures. However, this method is less efficient. The operator further reported that the altitude loss in a spin was generally between 600 and 800 feet per spin rotation.

WRECKAGE AND IMPACT INFORMATION

The geographic coordinates for the crash site were approximately 36 degrees 22.42 minutes north latitude, by 115 degrees 23.65 minutes west longitude. The estimated elevation was between 3,600 and 3,700 feet msl.

From an examination of the accident site, airplane wreckage, and from witness statements, the airplane was found to have collided with terrain while in approximately a wings level and shallow nose-down pitch attitude. An imprint which outlined the airplane's overall size and structure was observed in the ground at the initial point of impact (IPI) crater. The airplane imprint was oriented toward the southwest (236 degrees, magnetic). The distance between the IPI and the main wreckage was estimated at 75 feet. The engine was found about 97 feet and 236 degrees from the IPI. The farthest component found separated from the airplane was a video camera mount component, and it was about 174 feet southwest from the IPI.

Airframe and Propeller Blade Examination.

All flight control surfaces were found with the airplane. The elevator and rudder assemblies were found hinged to their respective tail fittings. At least one hinge from each aileron was found intact. The entire cockpit was observed destroyed by fire. The wing and stabilizer spars appeared straight. The vertical stabilizer was found perpendicular to the horizontal stabilizers, and was bent in a forward direction. The engine was found separated from the firewall.

No evidence of preimpact separations were observed with any of the flight control surfaces or their attachment linkages. The cockpit seat frames, the outboard portion of the wings, and the empennage structure were observed compressed in a vertical direction.

One propeller blade was found attached to the engine. The cambered side of the blade was observed scratched in a chordwise direction, and the blade tip was curled in an aft direction. The second propeller blade was found separated from the engine and was located several feet from the IPI. The blade exhibited torsional deformation and was bent into an "S" shape. The blade's leading edge was found gouged in several locations, with one gouge approximately 1/2-inch deep. The blade's face bore scratches in a chordwise direction over its span. The shank portion of the blade was found bent.

Engine and Accessories Examination.

Under the direction of the Safety Board, the Lycoming Engine participant removed all six top spark plugs and two bottom spark plugs. The participant reported that they all exhibited normal wear and appeared dry.

Both magnetos were rotated by hand. Electrical spark was observed from cut ignition leads at both magnetos.

The engine's crankshaft was rotated and the accessory gears turned. No metal contamination was observed in the exposed oil pump gear.

At the conclusion of the engine examination, the Lycoming Engine participant reported that no evidence of any preimpact mechanical failures was observed to any rotating or reciprocating component.

FIRE

No evidence was found preimpact fire. The postimpact fire was confined to the main wreckage. Left and right sides of the airframe appeared symmetrically destroyed. The cockpit and cabin were destroyed by fire. The outboard portion of both wings and the engine did not burn.

MEDICAL AND PATHOLOGICAL INFORMATION

Pilot Data.

On December 15, 1994, the pilot's wife was interviewed by the Safety Board. In summary, she made the following statements:

In general, the pilot was healthy, and he had not been sick during the past 9.5 years. He did not smoke. He did not take over the counter medications.

The night before the accident flight the pilot went to bed at 9 p.m. He usually went to bed between 9 and 10 p.m. He awoke the next morning around 7 a.m.

The pilot lost his voice the night before the accident flight. During that evening, he tried to save his remaining voice by whispering. He sounded like he had a "slight case of laryngitis." His "voice was a little raspy."

The pilot's wife stated that their family had possession of a vial which was labeled Trimox 500 MG, amoxicillin trihydrate. The vial contained 36 capsules of the antibiotic. The wife stated that she felt as if she starting to get a cold, so she took two capsules from the vial. The wife also stated that she believed the pilot took one capsule, either the night before the accident flight or the morning of the accident. Before leaving for work, the pilot's voice sounded better, but it was still raspy.

Subsequently, a count was made of the number of capsules which remained in the amoxicillin vial. Thirty-three capsules were found.

An autopsy was performed on the pilot by the Clark County Coroner's office. Results of the FAA, Civil Aeromedical Institute's toxicology tests on the pilot were negative for ethanol, carbon monoxide, and all screened drugs.

Passenger Data.

Regarding toxicology tests on the passenger, the FAA reported it found no evidence of ethanol or drugs except that verapamil and its metabolite norverapamil, were detected in both lung and liver fluid.

The 1995 edition of the "Physicians' Desk Reference" (PDR) listed verapamil, in part, as a prescription drug which may be used for cardiovascular conditions, and it functions as a calcium channel blocker. The PDR listed several warnings for use of verapamil, which included the following statement: "Occasionally, the pharmacologic action of verapamil may produce a decrease in blood pressure below normal levels which may result in dizziness or symptomatic hypotension."

Standard Operating Procedures (SOP).

The operator required its employees to follow the directives contained in its SOP. In the chapter entitled "Safety and Standardization" at Section 3003.4, the following statement appears: "No Pilot will self medicate prior to flying."

SURVIVAL ASPECTS

Bail Out Procedure and Parachutes.

To facilitate bailing out, the airplane was equipped with a means of opening and jettisoning the canopy. Components from the shattered canopy were found near the main wreckage. The airplane's overhead centerpost canopy manual release handle was found in the closed (locked) position. The locking pawl was found bent away from the frame. The latch open/close handle was functionally examined, and it turned to both positions. Hardware (control rods) associated with the right side canopy emergency release lever were found seated.

The seat belt buckles from both occupants were found in the locked position. Belt webbing material from both seats belts was observed stretched.

Both of the occupants were found ejected from the airplane and wearing unopened parachutes. Both of the "D" ring assemblies in the parachutes were found stowed. The FAA coordinator reported that the parachutes bore repack dates of October and November, 1994.

TESTS AND RESEARCH

It was the operator's policy to video tape passenger's simulated air combat flights. At the conclusion of the flights, the passengers were presented with the video tape which memorialized their experience and performance as a guest fighter pilot. A video recorder/camera was located inside each of the Marchetti airplanes. During performance of simulated air combat maneuvers, the same radio frequencies were used in both airplanes.

A few seconds prior to the second airplane departing from controlled flight, the first airplane was, according to its pilot, turning in a counterclockwise direction at an elevation about 500 feet higher than the second airplane. The second airplane was also turning in a counterclockwise direction. Its pilot was attempting to position his airplane in order to engage the first airplane in another simulated dog fight.

From the perspective of the first airplane, the second airplane was partially visible outside the left portion of its canopy. The first airplane's wide angle camera lens happened to be recording events located partially outside and in the distance beyond the left side of the airplane. The video camera recorded the second airplane's departure from controlled flight.

The video tape from the recorder which was in the second (accident) airplane, was recovered from several locations adjacent to the main impact wreckage area. The tape was found ejected from the burned wreckage. It was partially fragmented and without an intact cassette holder. The tape was cleaned, recassembled, and viewed by the Safety Board.

In part, the video tape showed that within about 1/2 minute before the airplane departed from controlled flight, the pilot told his passenger four times to "stay out of the buffet." During this time, the airplane remained in a left turn, and its pitch attitude increased until the airplane's nose was above the horizon. The airplane's left bank angle increased and a left spin started. While the airplane descended and made at least four complete left turn spins, the pilot repeated three times "I got the airplane." (See the attached exhibit for an abbreviated transcript and flight path description.)

ADDITIONAL INFORMATION

Flight Program.

Desert Aces provided literature to its guest fighter pilots, which presented an overview of the simulated air combat flying and training program the passengers would receive. According to information contained in Chapter 2 of the Desert Aces "GUEST FIGHTER PILOT MANUAL," the instructor pilot performs the takeoffs and landings. "The guest pilots fly the rest of the flight, except when a demonstration, or safety of flight maneuver, is required. But most of the time, our instructors will talk you through the maneuvers."

In Chapter 4, the manual states: "Air combat maneuvers will subject you to gravitational forces of up to six times the normal. This does put a strain on the spinal and cardiovascular systems. Therefore, if you have a history of spinal, heart or blood vessel problems it is suggested that you discuss this with a personal physician prior to flying."

In Chapter 10, the manual provides a definition for the term "Hard Deck." In part, the manual states: "The 'Hard Deck' is 2000 feet above the ground level. No aircraft shall maneuver below the hard deck. Although the absolute hard deck is 2000 feet AGL, pilots should set the hard deck higher in an effort to have the additional safety margin. . . . All efforts should be taken to give the Guest Pilot at least 2500 feet of maneuvering airspace."

Wreckage Release.

On December 4, 1994, while on scene at the accident site, the entire airplane wreckage was verbally released to the operator's representative. No airplane parts or records were retained.

Pilot Information

Certificate:	Airline Transport; Flight Engineer; Military	Age:	35, Male
Airplane Rating(s):	Multi-engine Land; Single-engine Land	Seat Occupied:	Right
Other Aircraft Rating(s):	None	Restraint Used:	Seatbelt, Shoulder harness
Instrument Rating(s):	Airplane	Second Pilot Present:	No
Instructor Rating(s):	None	Toxicology Performed:	Yes
Medical Certification:	Class 1 Valid Medical--no waivers/lim.	Last FAA Medical Exam:	04/15/1994
Occupational Pilot:		Last Flight Review or Equivalent:	
Flight Time:	2540 hours (Total, all aircraft), 25 hours (Total, this make and model), 2365 hours (Pilot In Command, all aircraft), 4 hours (Last 24 hours, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	SIAI-MARCHETTI	Registration:	N58FD
Model/Series:	SF260C SF260C	Aircraft Category:	Airplane
Year of Manufacture:		Amateur Built:	No
Airworthiness Certificate:	Aerobatic	Serial Number:	716
Landing Gear Type:	Retractable - Tricycle	Seats:	2
Date/Type of Last Inspection:	11/04/1994, 100 Hour	Certified Max Gross Wt.:	2430 lbs
Time Since Last Inspection:		Engines:	1 Reciprocating
Airframe Total Time:		Engine Manufacturer:	LYCOMING
ELT:	Installed, not activated	Engine Model/Series:	O-540-E4A5
Registered Owner:	DESERT ACES, LTD.	Rated Power:	260 hp
Operator:	DESERT ACES, LTD.	Operating Certificate(s) Held:	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual Conditions	Condition of Light:	Day
Observation Facility, Elevation:	, 0 ft msl	Distance from Accident Site:	0 Nautical Miles
Observation Time:	0000	Direction from Accident Site:	0°
Lowest Cloud Condition:	Scattered / 18000 ft agl	Visibility	50 Miles
Lowest Ceiling:	Overcast / 25000 ft agl	Visibility (RVR):	0 ft
Wind Speed/Gusts:	Light and Variable /	Turbulence Type Forecast/Actual:	/
Wind Direction:		Turbulence Severity Forecast/Actual:	/
Altimeter Setting:	29 inches Hg	Temperature/Dew Point:	13° C / -4° C
Precipitation and Obscuration:			
Departure Point:	(VGT)	Type of Flight Plan Filed:	None
Destination:		Type of Clearance:	None
Departure Time:	1210 PST	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:	

Administrative Information

Investigator In Charge (IIC): WAYNE POLLACK **Report Date:** 11/08/1995

Additional Participating Persons: WILLIAM F SMITH; LAS VEGAS, NV
CHARLES LITTLE; CHINO HILLS, CA

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.nts.gov/pubdms/>.

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The Independent Safety Board Act, as codified at 49 U.S.C. Section 1154(b), precludes the admission into evidence or use of any part of an NTSB report related to an incident or accident in a civil action for damages resulting from a matter mentioned in the report. A factual report that may be admissible under 49 U.S.C. § 1154(b) is available [here](#).