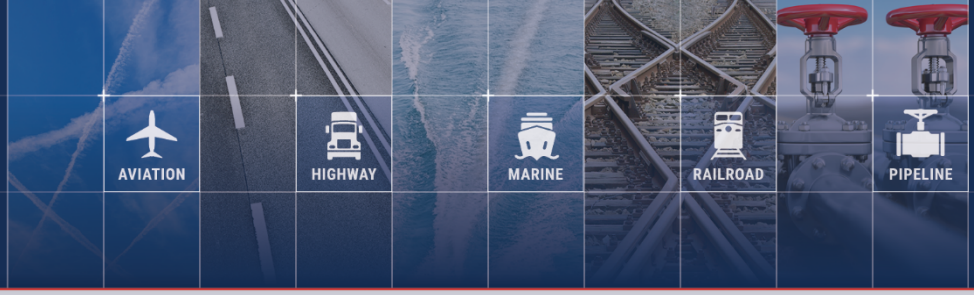

Aviation Investigation Final Report

Location:	MANASSAS, Virginia	**Accident Number:**	IAD98FA061
Date & Time:	May 19, 1998, 10:56 Local	**Registration:**	N292SU
Aircraft:	Sukhoi SU-29	**Aircraft Damage:**	Destroyed
Defining Event:		**Injuries:**	1 Fatal
Flight Conducted Under:	Part 91: General aviation		

Analysis

The flight was a scheduled aerobatic demonstration for an airshow. The accident flight was witnessed by several thousand spectators, and recorded on videotape. The airplane was observed entering a skidding turn at the top of a climb. After reversing direction in the turn, the airplane dived toward the ground. The airplane struck the ground before completing the pull out at the bottom. The witnesses said the airplane was 'perilously low ...[and] needed another 300 feet, minimum, on top of what he had.' A review of one videotape revealed the airplane's height above the ground prior to its final descent could not be estimated. However, the maneuvers observed were consistent with the witness accounts. Engine noise was smooth and uninterrupted until ground contact.

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 adequate altitude/clearance during an aerobatic maneuver.

Findings

Occurrence #1: ABRUPT MANEUVER
Phase of Operation: MANEUVERING - TURN TO REVERSE DIRECTION

Findings
1. AEROBATICS - PERFORMED - PILOT IN COMMAND
2. (C) ALTITUDE/CLEARANCE - INADEQUATE - PILOT IN COMMAND

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

Factual Information

HISTORY OF FLIGHT

On May 19, 1998, at 1056 eastern daylight time, a Sukhoi SU-29, N292SU, was destroyed during collision with terrain on the Manassas Regional Airport (HEF), Manassas, Virginia. The certificated commercial pilot was fatally injured. Visual meteorological conditions prevailed for the aerobatic demonstration flight that originated at Manassas, Virginia at 1049. No flight plan was filed for the flight conducted under 14 CFR Part 91.

The flight was a scheduled aerobatic demonstration for the Drug Abuse Resistance Education (D.A.R.E.) Airshow at HEF. The accident flight was witnessed by several thousand spectators, and recorded on videotape. Several of the witnesses interviewed were military pilots, Civil Air Patrol members, law enforcement officers, and commercial rated pilots with aerobatic endorsements.

One witness was an aerobatic pilot who had been an associate of the accident pilot for approximately 10 years. In an interview, he stated:

"[The pilot] made several passes, rolling and vertical. Then he made a pass at the North end and pulled vertical. At the top of the maneuver, at a minimum airspeed, approximately 500 feet above ground level (AGL), he initiated full deflection of right rudder. What that does is skid the airplane around the turn so that the airplane comes out 180 degrees from the entry. This is a flat turn - no aileron - it just skids it around. All the airspeed has diminished so he has to get the nose down very quickly, which he did. As he picked up airspeed I noticed an initial pull for recovery. He pulled back on the stick. At that point, I saw a slight bobble of the wings, which means the aircraft had stalled. That aircraft can stall very quickly."

"From the point of the wing bobble, he initiated a recovery to prevent a secondary stall. The airplane began to round-out at the bottom where it began to mush. At that point, I started running towards the aircraft. When he kicked rudder in at the top of the maneuver, I knew he wasn't going to make it. He needed another 300 feet, minimum, on top of what he had."

"[The pilot] had done the maneuver previously in the performance. I commented that the maneuver was done way too low to the ground and he did not have enough room to recover. The Sukhoi is not an airplane you want to point at the ground at low altitude and slow airspeed. I was surprised he did the maneuver again because I thought the first one would have scared him."

"The engine was putting out 100 percent power and the prop was putting out 100 percent power. The engine was running perfect. It was developing power right up until it hit the

ground. He had good control authority and good elevator authority."

In a written statement, the narrator of the D.A.R.E. Show, a commercial rated aerobatic pilot, described the maneuver prior to ground contact. He said:

"Twice during the demonstration the pilot executed a change-of-direction maneuver...using his rather substantial rudder and full power, pivoting the aircraft on its yaw axis until he affected a one hundred eighty degree change of direction. Recovery was accomplished by rolling to a wings-parallel-to-the-ground position and diving to regenerate lift."

"...The third time he performed a variant of the above described maneuver, he appeared to be perilously low, perhaps three or four hundred feet AGL, prompting me to utter something like 'Watch out, Buddy.' on the public address system...but the pilot's angle of recovery had already been compromised by his lack of sufficient altitude."

A review of one videotape revealed the airplane's height above the ground prior to its final descent could not be estimated. However, the maneuvers observed were consistent with the witness accounts. Engine noise was smooth and uninterrupted until ground contact.

The accident occurred during the hours of daylight approximately 38 degrees, 43 minutes north latitude, and 77 degrees, 30 minutes west longitude.

PERSONNEL INFORMATION

The pilot held a commercial pilot certificate with a rating for airplane single engine land. He held a private pilot certificate with ratings for airplane single engine sea and rotorcraft-helicopter. The pilot was issued a statement of aerobatic competency July 22, 1997, and it did not expire until July 31, 1998.

The pilot's most recent Federal Aviation Administration (FAA) second class medical certificate was issued April 22, 1998. The pilot reported 1,710 hours of flight experience on that date.

Excerpts of the pilot's logbooks were recovered. Examination of these pages revealed the pilot had approximately 475 hours of experience in the SU-29.

AIRCRAFT INFORMATION

The pilot purchased the airplane new on November 27, 1992. The most recent annual inspection was performed January 4, 1998, at 365.5 aircraft hours.

The maintenance logbooks were examined at the scene by an FAA Airworthiness Inspector. In a written report, the Inspector stated:

"The aircraft had undergone a condition inspection in April, 1998. All pertinent records and

reference documents were available. The records revealed meticulous attention to detail by the owner. The aircraft was relatively new and low time."

METEOROLOGICAL INFORMATION

The weather reported at HEF at the time of the accident was clear skies with 10 miles visibility. The temperature was 84 degrees and the dewpoint was 55. The winds were from 280 degrees at 7 knots.

AERODROME INFORMATION

The Manassas Regional Airport was tower controlled with parallel runways oriented 160 and 340 degrees. The runways were asphalt covered and 5,700 feet and 3,700 feet in length respectively. There were 3 helipads on the airport as well. The airport terminal, several hangers, and a large parking apron were on the east side of the runways. The control tower, several more hangers and more parking areas were on the west side.

WRECKAGE AND IMPACT INFORMATION

The wreckage was examined at the site on May 19, 1998. All major components were accounted for at the scene. Control continuity was established from the cockpit controls to all flight control surfaces. Overload fractures were observed in the elevator and right aileron control tubes. Rescue personnel cut rudder, elevator, and trim control cables. Continuity was established from the cuts and breaks to their respective control surfaces.

The radial engine was separated from the accessory case, which remained attached to the airframe. The propeller blades were separated outboard of their hubs, and the splintered ends were bent opposite the direction of rotation. The spinner displayed torsional damage. The propeller hub could be rotated by hand.

MEDICAL AND PATHOLOGICAL INFORMATION

An autopsy was performed by Dr. Frances P. Field of the Office of the Chief Medical Examiner, Fairfax, Virginia, on May 20, 1998.

The toxicological testing report, from the FAA Toxicology Accident Research Laboratory, Oklahoma City, Oklahoma, revealed Psuedoephedrine detected in blood and urine. Ephedrine was detected in urine.

ADDITIONAL INFORMATION

The pilot competed in International Aerobatics Club Intermediate Class competition and had either won or placed in several events. The pilot had performed in airshow events for several years.

The airplane wreckage was released on May 21, 1998, to a representative of the owners insurance company.

Pilot Information

Certificate:	Commercial; Private	**Age:**	50,Male
Airplane Rating(s):	Single-engine land; Single-engine sea	**Seat Occupied:**	Rear
Other Aircraft Rating(s):	Helicopter	**Restraint Used:**	
Instrument Rating(s):	None	**Second Pilot Present:**	No
Instructor Rating(s):	None	**Toxicology Performed:**	Yes
Medical Certification:	Class 2 Valid Medical--w/ waivers/lim	**Last FAA Medical Exam:**	April 22, 1998
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	
Flight Time:	1710 hours (Total, all aircraft), 475 hours (Total, this make and model)		

Aircraft and Owner/Operator Information

Aircraft Make:	Sukhoi	**Registration:**	N292SU
Model/Series:	SU-29 SU-29	**Aircraft Category:**	Airplane
Year of Manufacture:		**Amateur Built:**	
Airworthiness Certificate:	Experimental (Special)	**Serial Number:**	73-02
Landing Gear Type:	Tailwheel	**Seats:**	2
Date/Type of Last Inspection:	January 4, 1998 Annual	**Certified Max Gross Wt.:**	2655 lbs
Time Since Last Inspection:		**Engines:**	1 Reciprocating
Airframe Total Time:	365 Hrs	**Engine Manufacturer:**	Vendeneyev
ELT:	Installed, activated, did not aid in locating accident	**Engine Model/Series:**	M14P
Registered Owner:	MILES J. MERRITT	**Rated Power:**	360 Horsepower
Operator:		**Operating Certificate(s) Held:**	None
Operator Does Business As:		**Operator Designator Code:**	

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	HEF ,193 ft msl	**Distance from Accident Site:**	
Observation Time:	10:54 Local	**Direction from Accident Site:**	
Lowest Cloud Condition:	Clear	**Visibility**	10 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	7 knots /	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	280°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	30 inches Hg	**Temperature/Dew Point:**	29°C / 13°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	(HEF)	**Type of Flight Plan Filed:**	None
Destination:		**Type of Clearance:**	VFR
Departure Time:	10:49 Local	**Type of Airspace:**	Class D

Airport Information

Airport:	MANASSAS REGIONAL AIRPORT HEF	**Runway Surface Type:**	Asphalt
Airport Elevation:	193 ft msl	**Runway Surface Condition:**	Dry
Runway Used:	0	**IFR Approach:**	None
Runway Length/Width:		**VFR Approach/Landing:**	None

Wreckage and Impact Information

Crew Injuries:	1 Fatal	**Aircraft Damage:**	Destroyed
Passenger Injuries:		**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	1 Fatal	**Latitude, Longitude:**	

Administrative Information

Investigator In Charge (IIC):	Rayner, Brian
Additional Participating Persons:	LYLE K STREETER; WASHINGTON , DC
Original Publish Date:	March 31, 2000
Last Revision Date:	
Investigation Class:	Class
Note:	
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=46522