Aviation Investigation Final Report

Location:	WAUKEGAN, Illinois	**Accident Number:**	CHI96FA005
Date & Time:	October 8, 1995, 12:17 Local	**Registration:**	N61AC
Aircraft:	BLATTER-PITTS S2S	**Aircraft Damage:**	Destroyed
Defining Event:		**Injuries:**	1 Fatal
Flight Conducted Under:	Part 91: General aviation		

Analysis

The airshow pilot was performing a series of shoulder rolls 250 to 300 feet above the ground. The airplane completed a fifth rolling maneuver when it began a descent towards the runway. The airplane collided with the runway and slid off onto the clearway area next to the runway. The on-scene investigation revealed no control system, engine, or propeller failure. The pilot had received his low altitude aerobatic waiver about 1 month before the accident. An airshow promoter/witness said the pilot kept losing altitude during the maneuvers he was performing. The airplane's builder and advanced aerobatic competititor told the pilot's manager that the pilot was not ready to fly the airshow circuit. The airplane's center of gravity was about 3/4-inch aft of the rear limit.

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 airplane control during the aerobatic maneuver. Factors associated with the accident were: an improper weight and balance with a center of gravity aft of the rear limit, the pilot's overconfidence in his personal ability, and his lack of total experience in the aerobatic maneuver being performed.

Findings

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

Findings
1. AEROBATICS - PERFORMED - PILOT IN COMMAND
2. (F) OVERCONFIDENCE IN PERSONAL ABILITY - PILOT IN COMMAND
3. (C) AIRCRAFT CONTROL - NOT MAINTAINED - PILOT IN COMMAND
4. (F) LACK OF TOTAL EXPERIENCE IN TYPE OPERATION - PILOT IN COMMAND
5. (F) AIRCRAFT WEIGHT AND BALANCE - IMPROPER - PILOT IN COMMAND

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

Factual Information

HISTORY OF FLIGHT

On October 8, 1995, at 1217 central daylight time, a Blatter-Pitts S2S, N61AC, piloted by a commercially certificated pilot, was destroyed during a collision with the ground and subsequent fire while demonstrating aerobatic maneuvers at an airshow. Visual meteorological conditions prevailed at the time of the accident. The 14 CFR Part 91 demonstration flight was not operating on a flight plan. The pilot was fatally injured. The flight departed Waukegan, Illinois, exact time unknown.

Witnesses reported the airplane had made a series of rolling maneuvers before colliding with the runway. They said the airplane leveled out before its collision with the runway. According to these witnesses, the airplane caught fire shortly after colliding with the runway.

One witness provided a video tape recording which showed the airplane completing a fifth roll type maneuver before beginning its descent. This video tape was taken looking from the west to the east. It showed the right side of the airplane as it headed southwest. The video showed the airplane with an approximate 25 degree pitch down attitude at the conclusion of the last roll maneuver. As the airplane neared the runway, its pitch attitude leveled with about a 5 degree right bank.

When the airplane collided with the runway the landing gear moved aft and outward until the airplane's fuselage bottom struck the runway surface. As the airplane slid along the runway's surface smoke began to emanate from the engine and front cockpit compartments.

A second video tape showed a rear view of the airplane. It showed the airplane at the completion of its roll type maneuver pitched down about 30 degrees. This video showed the airplane in an approximate 15 degree right bank at the completion of the maneuver. As N61AC neared the runway its pitch attitude and bank angle decreased. Just before colliding with the runway, N61AC's right wing entered an approximate 5 degree bank.

PERSONNEL INFORMATION

The pilot's logbook was not complete. No entries beyond March 27, 1995, were found. The pilot did keep a record on the pages of a desk blotter calendar. The information on these sheets gave a name of an airplane and related flight time.

The logbook showed one aerobatic dual instructional flight on January 27, 1988. This flight was in the Pitts S2A airplane. There were logbook entries for the Pitts S1D airplane without an indication of whether the flight was dual or solo. There were no entries for the logbook's

remarks section for these flights. According to the logbook, the pilot had competed in basic aerobatic competitions on June 20, 1992, and August 11 through 15, 1992. The logbook showed the pilot won second place in both events. There were no other logbook entries showing aerobatic competitions won by the pilot. The pilot's father listed other aerobatic competitions won by the pilot: 1) A second place in sportsman aerobatics competition during 1993. 2) A first place in sportsmen class during 1994. 3) A first time in sportsman aerobatics during 1993. None of these were shown in the logbook.

The pilot's desk blotter calendar notes two airshows he had participated in. The first was during September 9 and 10, 1995, followed by one on September 16 and 17, 1995. There were no other records showing the pilot participating in any other airshows. A logbook entry showing when the pilot obtained his low altitude waiver is not shown.

AIRCRAFT INFORMATION

N61AC was a homebuilt version of the Pitts S2S. It was completed on May 17, 1984, and received its special airworthiness certificate on May 23, 1984. The airplane's front cockpit had an auxiliary fuel tank in it. The airplane received an airframe inspection in accordance with 14 CFR Part 43, Appendix D, on August 1, 1995. The airframe logbook showed its total airframe time on this date was 656.0 hours.

WRECKAGE AND IMPACT INFORMATION

N61AC collided onto runway 23's approach end on an approximate heading of 255 degrees magnetic. Its first contact scar was located 527 feet northeast of the approach threshold. The general wreckage path had a heading of 255 degrees magnetic. After sliding about 200 feet along the ground, the wreckage trail changed to a 265 degrees magnetic heading. The airplane's final heading was 010 degrees' magnetic.

Pieces of N61AC's landing gear wheel pants, cowl, and engine were found along the wreckage trail. About 45 feet southwest of the initial runway contact point, an oil spray residue started that continued throughout the wreckage trail. Sections of the grass surface along the wreckage trail were burnt.

N61AC's engine was bent down about 10 degrees. Its cowling was destroyed by the post-crash fire. The fuselage, from the cockpit forward, had been involved in the post-crash fire. Most of its fabric and aluminum covering had been destroyed. The top and bottom right wings had been destroyed by fire.

The airplane's left top wing was fire damaged from the center section to its midspan location. The right horizontal stabilizer and elevator fabric had been destroyed by fire. The vertical stabilizer and rudder fabric had been melted as had been the fuselage's left side aft section fabric. The fabric on the fuselage's right aft side was destroyed by fire.

The right side and forward section of N61AC's rear cockpit had been burnt during the post-crash fire. The right center portion of the pilot's seat was crushed downward onto the bottom of the fuselage. The seatback was collapsed aft at the middle and broken away from the mounting junction with the seat bottom.

One propeller blade was curled from the tip inward about 9 inches. The second propeller blade curled from the hub outward to about midspan. The remainder of the blade had been melted by the post-crash fire.

A fuel tank located in the front cockpit had separated from its four mounting points on the top longerons. The fuel tank was found near the bottom of the front cockpit. The right rear corner of the fuel tank was crushed inward. At the center of the crush area was an approximate 3 inch diameter hole. The top edge of the rear cockpit's right rudder pedal was in the center of the hole. The edges of the hole were melted. The fuel tank had been involved in the post-crash fire.

Flight control continuity was established for all three axis. The elevator push-pull rod had fractured at its attach point under the seat. The fracture surfaces had a granular appearance and with shear lips on their edges. The elevator trim tab was found in the full "nose down" position. The trim tab handle was located on the left side of the cockpit. It was found fully forward and jammed into the fuselage longerons and vertical bracing. Once the handle was unjammed, the trim tab system functioned.

Engine and propeller controls had continuity between the control mechanisms in the cockpit and engine. The fuel distribution block and injector lines were free of debris. The distribution block's diaphragm was not damaged. The fuel servo had separated at the mounting flange and was partially destroyed by the post-crash fire. The engine driven fuel pump examination revealed no debris and a slight odor of a substance similar to aviation fuel.

Examination of the spark plugs revealed them to be free of debris and with electrodes to be gray to light gray in color. The magnetos were externally and internally fire damaged. They would not produce spark when rotated. The engine was rotated by the propeller and the accessory case gears were observed to rotate.

MEDICAL AND PATHOLOGICAL INFORMATION

The autopsy of the pilot was conducted by the Lake County, Illinois, Coroner's Office on October 8, 1995. The toxicology analysis was performed by the FAA's Civil Medical Institute in Oklahoma City, Oklahoma. The report was negative for the drugs and chemicals.

ADDITIONAL INFORMATION

According to the pilot's manager, the airplane's auxillary fuel tank did not have much fuel in it. He said it may have been empty because the pilot usually runs that tank dry on cross country

flights. He said the main fuel tank was probably full. The airplane was refueled just before the airshow.

N61AC's weight and balance data showed an empty weight of 1,144 pounds. There were no logbook entries that showed any weight and balance data. According to the weight and balance data, the airplane aerobatic envelope shows a maximum weight of 1,500 pounds. The aft limit of this envelope is 97.12 inches aft of the datum. Calculations for the accident flight were made. The calculations used a full main fuel tank, the pilot's weight (found on his FAA medical certificate), and N61AC's empty weight of 1,144 pounds. According to the weight and balance forms, the airplane was 25 pounds over its maximum aerobatic weight at takeoff. The Center of gravity was at 97.86 inches aft of the datum. The weight and balance data and calculations are appended to this report.

FAA Forms 8710.7, Statement of Aerobatic Competency, dated May 18, 1993, August 1, 1994, and September 5, 1995, showed the pilot obtained progressively lower altitude waivers to do aerobatics. The forms showed his low altitude waiver began at 800 feet above ground level (agl) on May 18, 1993. The last low altitude waiver showed he had been approved to do aerobatics to within 250 feet agl on September 5, 1995. The two most recent forms showed airshow and practice sessions that were not found in his logbook or desk blotter records.

The accident pilot's airshow manager stated the pilot had been demonstrating a "shoulder roll" maneuver. He described the maneuver as a slow motion snap roll. An airshow promoter/witness (witness) stated the maneuvers were performed very aggressively. He said he would have graded them fair too poor because the pilot kept losing altitude consistently during the maneuvers.

The witness said a skilled pilot could perform 3 shoulder rolls at 500 feet above the ground with a safety margin. He said the pilot lost control at the conclusion of the 5th shoulder roll. He said the pilot appeared to be "...pushing forward a lot..." during the flight. He said he noticed this until the last maneuver before ground impact. The witness said an aft center of gravity would adversely affect the maneuver the accident pilot was doing. According to this witness, the designer of the airplane had concerns about the center of gravity during aerobatics when a heavy pilot was flying the airplane from the rear seat.

The person who built N61AC said he had flown the airplane between 400 and 600 hours. He said he flies aerobatic competition in the advanced category. The builder said he told the pilot's manager that the pilot was not ready to fly the airshow circuit. He said the pilot's skill level was like that of a fair sportsman category aerobatic pilot.

The wreckage was released to the Manager of the Waukegan Regional Airport, Waukegan, Illinois, on October 10, 1995.

Pilot Information

Certificate:	Commercial	**Age:**	28,Male
Airplane Rating(s):	Single-engine land; Single-engine sea; Multi-engine land	**Seat Occupied:**	Rear
Other Aircraft Rating(s):	None	**Restraint Used:**	
Instrument Rating(s):	None	**Second Pilot Present:**	No
Instructor Rating(s):	Airplane multi-engine; Airplane single-engine; Instrument airplane	**Toxicology Performed:**	Yes
Medical Certification:	Class 1 Valid Medical--w/ waivers/lim	**Last FAA Medical Exam:**	August 29, 1995
Occupational Pilot:	Yes	**Last Flight Review or Equivalent:**	
Flight Time:	5457 hours (Total, all aircraft), 33 hours (Total, this make and model), 94 hours (Last 90 days, all aircraft), 34 hours (Last 30 days, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	BLATTER-PITTS	**Registration:**	N61AC
Model/Series:	S2S S2S	**Aircraft Category:**	Airplane
Year of Manufacture:		**Amateur Built:**	Yes
Airworthiness Certificate:	Experimental (Special)	**Serial Number:**	001
Landing Gear Type:	Tailwheel	**Seats:**	1
Date/Type of Last Inspection:	August 1, 1995 Annual	**Certified Max Gross Wt.:**	1500 lbs
Time Since Last Inspection:		**Engines:**	1 Reciprocating
Airframe Total Time:	656 Hrs	**Engine Manufacturer:**	Lycoming
ELT:	Installed, not activated	**Engine Model/Series:**	IO-540-D4A5
Registered Owner:	J.S. RUX	**Rated Power:**	260 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:	UGN ,720 ft msl	**Distance from Accident Site:**	1 Nautical Miles
Observation Time:	12:20 Local	**Direction from Accident Site:**	70°
Lowest Cloud Condition:	Unknown	**Visibility**	25 miles
Lowest Ceiling:	Overcast / 2900 ft AGL	**Visibility (RVR):**	
Wind Speed/Gusts:	8 knots /	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	230°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	30 inches Hg	**Temperature/Dew Point:**	
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	(UGN)	**Type of Flight Plan Filed:**	None
Destination:		**Type of Clearance:**	
Departure Time:	00:00 Local	**Type of Airspace:**	Class D

Airport Information

Airport:	WAUKEGAN REGIONAL UGN	**Runway Surface Type:**	
Airport Elevation:	720 ft msl	**Runway Surface Condition:**	Dry
Runway Used:	23	**IFR Approach:**	
Runway Length/Width:		**VFR Approach/Landing:**	

Wreckage and Impact Information

Crew Injuries:	1 Fatal	**Aircraft Damage:**	Destroyed
Passenger Injuries:		**Aircraft Fire:**	On-ground
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	1 Fatal	**Latitude, Longitude:**	42.399436,-87.850929(est)

Administrative Information

Investigator In Charge (IIC):	Gattolin, Frank
Additional Participating Persons:	WILLIAM LAW; W. CHICAGO , IL
Original Publish Date:	July 11, 1996
Last Revision Date:	
Investigation Class:	Class
Note:	
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=10056