Aviation Investigation Final Report

Location:	MCKINNEY, Texas	**Accident Number:**	FTW97FA274
Date & Time:	July 19, 1997, 19:25 Local	**Registration:**	N1678N
Aircraft:	HILLAM RANS S-9	**Aircraft Damage:**	Destroyed
Defining Event:		**Injuries:**	1 Fatal
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

The pilot of a homebuilt airplane lost control of the airplane while attempting to sequence his airplane to land behind a departing ultralight vehicle following a loss of engine power. The airplane completed a high speed low pass over runway 17 followed by a 'sharp pull up' with a pronounced nose high attitude. Witnesses reported hearing the engine lose power and observing that the propeller had stopped. Another witness observed that an ultralight vehicle was on takeoff roll as the Rans was gliding northbound 'as if he was trying to sequence himself behind the ultralight on the runway.' Witnesses were 'expecting a downwind landing' to either the taxiway, or the grassy area east of the runway, but instead, the airplane continued gliding northbound on a close left downwind. As soon as the ultralight was past him, 'the Rans appeared to try to turn to get into the wind by making a 180 degree left turn in behind the ultralight;' however, 'he was so close to the runway that he had to make a very tight [steep] turn.' The airplane 'rotated 1/4 to 3/8 of a complete spin' prior to impacting the ground in a near vertical attitude. The reason for the loss of engine power could not be determined.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: loss of engine power for undetermined reason(s), and failure of the pilot to maintain adequate airspeed, while maneuvering for a forced landing, which resulted in a stall and collision with the terrain.

Findings

Occurrence #1: LOSS OF ENGINE POWER
Phase of Operation: MANEUVERING

Findings
1. (C) REASON FOR OCCURRENCE UNDETERMINED

Occurrence #2: FORCED LANDING
Phase of Operation: MANEUVERING - TURN TO LANDING AREA (EMERGENCY)

Occurrence #3: LOSS OF CONTROL - IN FLIGHT
Phase of Operation: MANEUVERING - TURN TO LANDING AREA (EMERGENCY)

Findings
2. (C) AIRSPEED - NOT MAINTAINED - PILOT IN COMMAND
3. (C) STALL - INADVERTENT - PILOT IN COMMAND

Occurrence #4: IN FLIGHT COLLISION WITH TERRAIN/WATER
Phase of Operation: DESCENT - UNCONTROLLED

Factual Information

HISTORY OF FLIGHT

On July 19, 1997, at 1925 central daylight time, a Hillam Rans S-9 experimental airplane, N1678N, was destroyed following a loss of control while attempting to return to the airport after experiencing a loss of engine power during initial takeoff climb near McKinney, Texas. The student pilot, sole occupant of the homebuilt airplane, was fatally injured. The airplane was owned and operated by the pilot under Title 14 CFR Part 91. Visual meteorological conditions prevailed for the personal flight. The airplane departed from the Aero Country Airpark approximately 5 minutes prior to the accident.

Witnesses at the airpark reported that the airplane executed a high speed low pass over runway 17 at an estimated altitude of 4 feet above the runway. About 3/4 down the 2,950 foot runway, the pilot initiated a "sharp pull up" establishing a pronounced nose high attitude. Witnesses further reported hearing that the engine suddenly lost power and they observed that the 3-bladed propeller had stopped at an estimated altitude between 350 to 400 feet AGL.

Witnesses further stated that the pilot established a glide as he turned to a northerly heading towards the runway. Witnesses further stated that an ultralight vehicle that had been holding short of the active while the low pass was completed by the Rans, proceeded to taxi into position for takeoff.

Another witness observed that the ultralight vehicle was on his takeoff roll as the Rans was gliding northbound "as if he was trying to sequence himself behind the ultralight on the runway." Witnesses at the airport continued to watch the airplane "expecting a downwind landing" to either the runway, the taxiway, or the grassy area east of the runway, but instead, the airplane continued gliding northbound on a close left downwind down to an estimated altitude of 50 to 100 feet AGL.

Witnesses reported that "as soon as the ultralight was past him, the Rans appeared to try to turn to get into the wind by making a 180 degree left turn in behind the ultralight." The witness added that "he was so close to the runway that it had to be a very tight turn." The witness further stated that while executing the left turn "the wing dropped and the nose turned and dropped simultaneously." At that point the witnesses observed the airplane "rotate 1/4 to 3/8 of a complete spin" prior to the airplane impacting into the trees in a near vertical attitude.

PERSONNEL INFORMATION

The pilot was reported to have started to fly around 1992. He purchased an ultralight vehicle and "taught himself to fly." According to a friend, the pilot had accumulated approximately 300

flight hours since 1992. His second airplane was another experimental airplane which be bought used from the original builder. The accident airplane was his third airplane he owned and like his previous airplane, was also purchased from the original builder in Idaho.

Personnel at the airport reported to the investigator-in-charge (IIC) that the pilot had previously owned one ultralight vehicle and another home built airplane prior to purchasing the accident airplane about a year earlier. The pilot had performed several modifications to "improve aircraft performance" and was currently in the process of "experimenting" with the carburetor and fuel system to increase the power output of the installed Rotax 670 engine.

The pilot held a student pilot certificate number DD1286339 with a third class medical certificate issued on August 24, 1994. The pilot's logbook was not located. The student pilot, who was employed as an automotive technician specializing in fuel injected fuel systems, had recently replaced the original exhaust system with a high performance exhaust system. Prior to the accident flight, the pilot replaced the stock carburetor with a mechanical fuel injection system.

AIRCRAFT INFORMATION

The single seat, tailwheel equipped, fabric covered, midwing airplane was built by Scott Hillam of Idaho Falls, Idaho, as a Rans S-9 "Chaos," and assigned serial number 019117. According to a friend of the pilot, the S-9 is sold as an FAA approved 51% kit, normally requiring 300 to 500 hours to complete.

The 710 pounds gross weight airplane was powered by an 85 horsepower Bombardier Rotax 2-stroke engine model 670, serial number A181872. The engine was driving a 3-bladed composite propeller manufactured by Warp Drive under model T6337. According to a representative of the engine manufacturer, the model 670 engine is not listed as under the UL (ultralight) series of engines intended to be used in ultralights vehicles and light airplanes. According to the manufacturers specifications for the airplane, the aircraft was designed for either a Rotax 503 (47 HP) or a Rotax 582 (65 HP). A representative of the engine manufacturer, who was afforded party status by the IIC, further stated that the Rotax 670 engine was designed for snowmobile or personal watercraft applications only. The manufacturer declined to participate in the investigation.

An FAA special airworthiness certificate in the experimental category for amateur built airplanes was issued to the airplane on July 27, 1996, upon completion of 70.1 hours of flight on the airframe.

The airplane was equipped with and electrical system which included a battery and a starter. The single seat airplane was also equipped with an altimeter, an airspeed indicator and a rate of climb indicator. The altimeter was found set at 29.06 inches of mercury.

The ashes of the airplane's logbook were found in the wreckage.

WRECKAGE AND IMPACT INFORMATION

The airplane impacted amidst trees on a 30 feet wide tree line running north and south paralleling the runway. The airplane impacted the trees on a measured magnetic heading of 243 degrees in a slight left turn. The airframe came to rest on a measured heading of 164 degrees. A corn field bordered the point of impact on the east side and a mowed grass area bordered the west side. The edge of the north-south runway was approximately 150 feet west of the tree line where the airplane impacted.

The tubular steel structure for both wings remained attached to the airframe and were disconnected by the investigation team to facilitate the removal of the wreckage from the wooded area. The liquid cooled engine sustained severe impact and fire damage; however, it remained attached to the airframe. Most of the engine accessories and the fuel system components were destroyed by the post-impact fire. The fire damage sustained by the engine and the fuel system components precluded a conclusive determination of the reason for the loss of engine power.

The 3-blade ground controllable pitch propeller system was found separated from the engine at the reduction gearbox. The three propeller blades remained attached to the hub. The composite blades were partly consumed by fire. The chromed propeller spinner sustained crushing damage and did not exhibit any signs of rotational scoring or damage.

All flight control surfaces remained attached and continuity was confirmed to all the flight controls at the accident site prior to the removal of the wings. The trim tab on the elevator was found in the full up (nose down) position. The airplane was not equipped with wing flaps.

The pilot was reported to operate the airplane with automotive fuel; however, the quantity of fuel aboard the airplane at the time of the accident could not be confirmed. The two wing fuel cells, with a total capacity of 18 gallons, were compromised during the accident sequence.

The airplane was equipped with a 4-point restraint system. The seat belt and shoulder harnesses were found attached to their respective airframe mounts. The burned remains of the latches to the seat belts and shoulder harnesses were found in the latched position.

MEDICAL AND PATHOLOGICAL INFORMATION

An autopsy and toxicological tests were ordered and completed. The autopsy was performed by William B. Rohr, M.D., County Medical Examiner for Collin County, in McKinney, Texas, on July 21, 1997. Toxicological tests were negative.

FIRE

A post-impact fire destroyed the airplane. According to witnesses at the airport, an explosion

was heard within 15 to 20 seconds after the airplane impacted into the trees. The fire was fueled by the automotive gasoline contained in the two 9 gallon fiberglass tanks located in the wings.

SURVIVAL ASPECTS

The pilot was not wearing a flight helmet nor gloves. The seat belt and shoulder harnesses remained attached and buckled. The airplane was not equipped with an ELT.

ADDITIONAL DATA

The remains of the airplane and engine was recovered to the pilot's hangar with the assistance of friends and other tenants at the airport. The wreckage was released to the owner's representative upon completion of the engine examination.

Pilot Information

Certificate:	Student	**Age:**	53,Male
Airplane Rating(s):	None	**Seat Occupied:**	Center
Other Aircraft Rating(s):	None	**Restraint Used:**	
Instrument Rating(s):	None	**Second Pilot Present:**	No
Instructor Rating(s):	None	**Toxicology Performed:**	Yes
Medical Certification:	Class 3 Expired	**Last FAA Medical Exam:**	August 24, 1994
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	
Flight Time:	300 hours (Total, all aircraft), 59 hours (Total, this make and model)		

Aircraft and Owner/Operator Information

Aircraft Make:	HILLAM	**Registration:**	N1678N
Model/Series:	RANS S-9 RANS S-9	**Aircraft Category:**	Airplane
Year of Manufacture:		**Amateur Built:**	Yes
Airworthiness Certificate:	Experimental (Special)	**Serial Number:**	0193117
Landing Gear Type:	Tailwheel	**Seats:**	1
Date/Type of Last Inspection:	July 27, 1996 Annual	**Certified Max Gross Wt.:**	710 lbs
Time Since Last Inspection:	59 Hrs	**Engines:**	1 Reciprocating
Airframe Total Time:	130 Hrs	**Engine Manufacturer:**	Bombardier
ELT:	Not installed	**Engine Model/Series:**	ROTAX 670
Registered Owner:	MIKE A. MCDUFF	**Rated Power:**	85 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:	TKI ,926 ft msl	**Distance from Accident Site:**	10 Nautical Miles
Observation Time:	18:48 Local	**Direction from Accident Site:**	100°
Lowest Cloud Condition:	Scattered / 25000 ft AGL	**Visibility**	7 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	6 knots /	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	140°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	29 inches Hg	**Temperature/Dew Point:**	32°C / 21°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	(TX05)	**Type of Flight Plan Filed:**	None
Destination:		**Type of Clearance:**	None
Departure Time:	19:20 Local	**Type of Airspace:**	Class G

Airport Information

Airport:	AERO COUNTRY AIRPARK TX05	**Runway Surface Type:**	Asphalt
Airport Elevation:	792 ft msl	**Runway Surface Condition:**	Dry
Runway Used:	17	**IFR Approach:**	None
Runway Length/Width:	2950 ft / 40 ft	**VFR Approach/Landing:**	Forced 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:**	33.170917,-96.700958(est)

Administrative Information

Investigator In Charge (IIC):	Casanova, Hector
Additional Participating Persons:	LARRY K ELLIS; DALLAS , TX
Original Publish Date:	May 29, 1998
Last Revision Date:	
Investigation Class:	Class
Note:	
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=20045