



# Aviation Investigation Final Report

<b>Location:</b>	Kingsville, Texas	<b>Accident Number:</b>	CEN18FA147
<b>Date &amp; Time:</b>	April 25, 2018, 12:25 Local	<b>Registration:</b>	N12377
<b>Aircraft:</b>	North American SNJ 5	<b>Aircraft Damage:</b>	Destroyed
<b>Defining Event:</b>	Aerodynamic stall/spin	<b>Injuries:</b>	2 Fatal
<b>Flight Conducted Under:</b>	Part 91: General aviation - Personal		

## Analysis

The private pilot, who was the owner of the vintage military trainer airplane, and a pilot-rated passenger were conducting a right turn just after takeoff, while still over the runway surface. Witnesses reported that the airplane's bank angle exceeded 90° and the highest altitude achieved was 200-300 ft. above ground level. The airplane then descended nose low and impacted the ground less than 1 minute after takeoff. Radar data indicated that the airplane's average airspeed during the final portion of the flight was 87 mph and the bank angle reached about 56°, which would have resulted in a load factor of about 1.8g. Airplane performance data indicated that the accelerated stall speed at this load factor was about 95 mph, thus it is likely that, during the turn, the airplane exceeded its critical angle of attack and entered an accelerated stall at an altitude too low for the pilot to recover. Postaccident examination of the airplane did not reveal any anomalies that could be attributed to a preimpact mechanical deficiency.

The airplane was equipped with tandem seating and dual flight controls; the owner was seated in the front seat and the passenger was seated in the rear seat. The removable rear cockpit control stick was found outside of the airplane, and it could not be determined if the stick was installed at the time of the accident. No conclusive determination could be made as to which occupant was manipulating the controls during the accident sequence.

The private pilot was using decongestant and allergy medications. Toxicological testing identified diphenhydramine, a sedating antihistamine, at levels that were likely impairing; however, the extent to which this contributed to the accident could not be determined.

## 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 airspeed during a steep turn after takeoff, resulting in an exceedance of the airplane's critical angle of attack and a subsequent accelerated stall at an altitude too low for recovery.

### Findings

<b>Aircraft</b>	Lateral/bank control - Incorrect use/operation
<b>Aircraft</b>	Airspeed - Not attained/maintained
<b>Aircraft</b>	Angle of attack - Capability exceeded
<b>Personnel issues</b>	Aircraft control - Pilot
<b>Aircraft</b>	Altitude - Not attained/maintained

## Factual Information

### History of Flight

<b>Maneuvering</b>	Aerodynamic stall/spin (Defining event)
<b>Uncontrolled descent</b>	Collision with terr/obj (non-CFIT)

On April 25, 2018, about 1225 central daylight time, a North American SNJ 5 airplane, N12377, was destroyed when it impacted terrain shortly after takeoff from Kingsville Naval Air Station (NQI), Kingsville, Texas. The private pilot and pilot-rated passenger were fatally injured. The airplane was registered to and was being operated by the pilot under the provisions of Title 14 *Code of Federal Regulations* Part 91. Day visual meteorological conditions prevailed in the area, and no flight plan was filed for the personal flight, which was originating at the time of the accident with an intended destination of San Marcos Regional Airport (HYI), San Marcos, Texas.

Air traffic control tower personnel reported that the airplane took off on runway 13R and had requested a right teardrop turn for a departure toward the north. Several witnesses reported seeing the airplane in a steep right bank; some witnesses reporting that the bank angle exceeded 90° and the maximum altitude achieved was 200-300 ft above ground level. The airplane descended nose low and the right bank angle decreased before the airplane impacted the ground between runway 17R/35L and taxiway B just south of the intersection of taxiways B and E (Figure 1.).

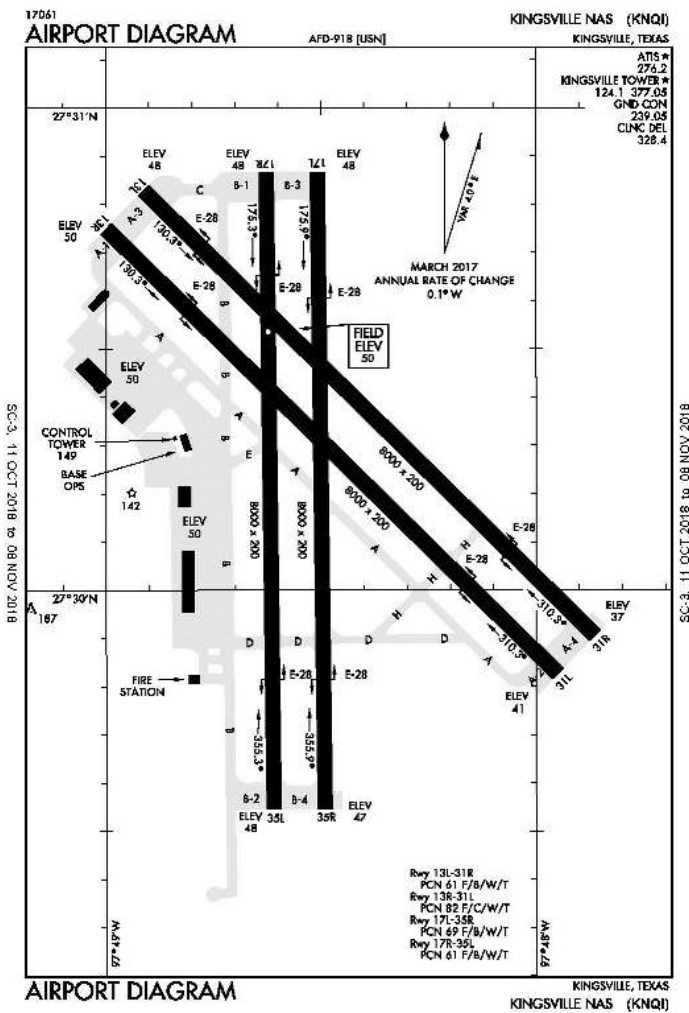


Figure 1. Airport diagram showing the layout of Kingsville NAS

Review of radar data showed that the airplane began its takeoff roll from runway 13R at 1224:01. The accident flight was captured in 11 radar returns, with the final return at 1224:52. No altitude data was recorded. The airplane's ground track continued along the runway centerline from the takeoff position for about 2,000 ft before making a slight left turn followed by a right turn. The right turn continued to the end of the data and the final recorded position was about 100 ft east of the initial impact point. Based on the final 3 recorded radar returns, the turn radius was estimated to be about 450 ft and the calculated average groundspeed was 87 mph. Based on this information, the calculated bank angle was about 56° during the final portion of the flight. For a level, 56°-banking turn, the calculated flight load factor was 1.8g. Based on the velocity versus load factor (V-N) diagram for the accident airplane, a load factor of 1.8g equated to an accelerated stall speed about 95 mph. The airplane's ground track is depicted in Figure 2.



Figure 2. Overhead view of the airplane's ground track

## Pilot Information

<b>Certificate:</b>	Private	<b>Age:</b>	64, Male
<b>Airplane Rating(s):</b>	Single-engine land	<b>Seat Occupied:</b>	Front
<b>Other Aircraft Rating(s):</b>	None	<b>Restraint Used:</b>	4-point
<b>Instrument Rating(s):</b>	None	<b>Second Pilot Present:</b>	Yes
<b>Instructor Rating(s):</b>	None	<b>Toxicology Performed:</b>	Yes
<b>Medical Certification:</b>	Class 3 With waivers/limitations	<b>Last FAA Medical Exam:</b>	April 17, 2018
<b>Occupational Pilot:</b>	No	<b>Last Flight Review or Equivalent:</b>	
<b>Flight Time:</b>	3000 hours (Total, all aircraft)		

## Pilot-rated passenger Information

<b>Certificate:</b>	Airline transport; Commercial	<b>Age:</b>	50, Male
<b>Airplane Rating(s):</b>	Single-engine land; Multi-engine land	<b>Seat Occupied:</b>	Rear
<b>Other Aircraft Rating(s):</b>	None	<b>Restraint Used:</b>	4-point
<b>Instrument Rating(s):</b>	Airplane	<b>Second Pilot Present:</b>	Yes
<b>Instructor Rating(s):</b>	None	<b>Toxicology Performed:</b>	Yes
<b>Medical Certification:</b>	Class 1 Without waivers/limitations	<b>Last FAA Medical Exam:</b>	July 18, 2017
<b>Occupational Pilot:</b>	Yes	<b>Last Flight Review or Equivalent:</b>	
<b>Flight Time:</b>	5000 hours (Total, all aircraft)		

The pilot, age 64, held a private pilot certificate with an airplane single-engine land rating. His most recent Federal Aviation Administration (FAA) third-class medical certificate was issued on April 17, 2018, with a limitation for corrective lenses. On the application for that medical certificate, the pilot reported 3,000 total hours of flight experience, with 40 hours in the previous 6 months. The pilot's flight logbook was not available for review.

The passenger, age 50, held an airline transport pilot certificate with airplane multiengine land and airplane single-engine land ratings. The single-engine rating was limited to commercial pilot privileges. Military records indicated that he had accumulated at least 2,400 hours of flight experience before his discharge from the military. No civilian flight records were reviewed; however, the pilot reported 5,000 total hours of flight experience on the application for his most recent FAA first-class medical certificate, dated July 20, 2017. The medical certificate listed no limitations.



## Aircraft and Owner/Operator Information

<b>Aircraft Make:</b>	North American	<b>Registration:</b>	N12377
<b>Model/Series:</b>	SNJ 5	<b>Aircraft Category:</b>	Airplane
<b>Year of Manufacture:</b>		<b>Amateur Built:</b>	
<b>Airworthiness Certificate:</b>	Normal	<b>Serial Number:</b>	85086
<b>Landing Gear Type:</b>	Retractable - Tailwheel	<b>Seats:</b>	2
<b>Date/Type of Last Inspection:</b>	November 20, 2017 Annual	<b>Certified Max Gross Wt.:</b>	5300 lbs
<b>Time Since Last Inspection:</b>		<b>Engines:</b>	1 Reciprocating
<b>Airframe Total Time:</b>	7718 Hrs as of last inspection	<b>Engine Manufacturer:</b>	Pratt & Whitney
<b>ELT:</b>		<b>Engine Model/Series:</b>	R-1340-AN-1
<b>Registered Owner:</b>	On file	<b>Rated Power:</b>	600 Horsepower
<b>Operator:</b>	On file	<b>Operating Certificate(s) Held:</b>	None

The airplane, serial number 85086, was a single-engine monoplane used to train military pilots during World War II and into the 1970s. It was equipped with retractable conventional (tailwheel) landing gear and tandem seating for two occupants. The airplane was powered by a 600-horsepower Pratt & Whitney R-1340-AN-1 radial reciprocating engine, which drove a 2-blade, constant-speed Hamilton Standard 12D40-6101-12 propeller.

Maintenance records indicated that the most recent annual inspection was completed on November 20, 2017, at an airframe total time of 7,717.7 hours. According to the entry, the engine had accumulated 414.7 hours since its most recent overhaul.

Registration information indicated that the pilot had owned the airplane since 2007.

## Meteorological Information and Flight Plan

<b>Conditions at Accident Site:</b>	Visual (VMC)	<b>Condition of Light:</b>	Day
<b>Observation Facility, Elevation:</b>	NQI,50 ft msl	<b>Distance from Accident Site:</b>	0 Nautical Miles
<b>Observation Time:</b>	12:32 Local	<b>Direction from Accident Site:</b>	0°
<b>Lowest Cloud Condition:</b>	Few / 3000 ft AGL	<b>Visibility</b>	10 miles
<b>Lowest Ceiling:</b>	None	<b>Visibility (RVR):</b>	
<b>Wind Speed/Gusts:</b>	16 knots / 23 knots	<b>Turbulence Type Forecast/Actual:</b>	/
<b>Wind Direction:</b>	120°	<b>Turbulence Severity Forecast/Actual:</b>	/
<b>Altimeter Setting:</b>	30.01 inches Hg	<b>Temperature/Dew Point:</b>	31°C / 13°C
<b>Precipitation and Obscuration:</b>	No Obscuration; No Precipitation		
<b>Departure Point:</b>	Kingsville, TX (NQI )	<b>Type of Flight Plan Filed:</b>	None
<b>Destination:</b>	Austin, TX (HYI )	<b>Type of Clearance:</b>	VFR
<b>Departure Time:</b>	12:24 Local	<b>Type of Airspace:</b>	Class D

At 1232, the weather conditions recorded at NQI included wind from 120° at 16 knots gusting to 23 knots, 10 miles visibility, few clouds at 3,000 ft above ground level (agl), temperature 31°C, dew point 13°C, and an altimeter setting of 30.01 inches of mercury.

## Airport Information

<b>Airport:</b>	KINGSVILLE NAS NQI	<b>Runway Surface Type:</b>	Concrete
<b>Airport Elevation:</b>	50 ft msl	<b>Runway Surface Condition:</b>	Dry
<b>Runway Used:</b>	13R	<b>IFR Approach:</b>	None
<b>Runway Length/Width:</b>	8000 ft / 200 ft	<b>VFR Approach/Landing:</b>	None

## Wreckage and Impact Information

<b>Crew Injuries:</b>	1 Fatal	<b>Aircraft Damage:</b>	Destroyed
<b>Passenger Injuries:</b>	1 Fatal	<b>Aircraft Fire:</b>	On-ground
<b>Ground Injuries:</b>	N/A	<b>Aircraft Explosion:</b>	On-ground
<b>Total Injuries:</b>	2 Fatal	<b>Latitude, Longitude:</b>	27.503889,-97.812225



The initial impact point was in a grass area about 1,200 ft right of the runway 13R centerline and about 3,500 ft from its approach end. Most of the wreckage came to rest on the ramp near taxiway E. The debris path was oriented in a westerly direction with the first impact mark about 20 ft from the east edge of the paved ramp area.

The engine separated from the fuselage and the supercharger section of the engine separated from the cylinder section. The propeller remained attached to the engine with one blade intact, displaying evidence of chordwise scratching on the cambered side and twisting of the outboard portion of the blade toward low pitch. The other blade was missing the outboard 2 ft, which came to rest near the ground scar. There was a propeller slash in the dirt and the broken section of the blade displayed leading edge gouging, chordwise scratching, and bending.

Both wings separated upon impact. The right wing came to rest at the east edge of taxiway B. The fuselage came to rest on its right side about 30 ft west of the right wing. The left wing came to rest about 100 ft further west.

The wing was composed of 3 sections; a center section and 2 outboard wing panels. The right wing and a portion of the center section came to rest upright between the initial impact point and the fuselage. The right portion of the wing center section was crushed and twisted and remained attached to the outboard right wing panel. The outboard portion of the wing panel displayed fire damage and upward bending of the portion outboard of the wing joint. The flap remained attached to the outboard portion of the wing. The inboard portion of the right aileron remained attached to the wing.

The left wing separated at the joint and came to rest upright. The aileron was separated, but the inboard portion was found between the fuselage and left wing. The flap remained attached. The left wing was predominately intact. There was aft, angular crushing damage to the wing tip from the tip to about 3 ft inboard. The leading edge inboard of this damage was intact and showed little deformation.

The fuselage was mostly intact. The steel tube fuselage structure at the firewall was bent aft with more significant bending of the right side of the firewall. The firewall crush angle was indicative of about a 30° right-wing-low impact. The left horizontal stabilizer, elevator, vertical stabilizer, and rudder remained attached. The right horizontal stabilizer and elevator remained attached and were bent upward about 90°.

Flight control continuity was established from the forward cockpit rudder pedals aft to the rudder. The left pushrod connecting the forward and aft cockpit rudder pedals were intact but bent about mid-length. The right rudder interconnect pushrod was broken in two; the forward and aft portions remained attached to their respective rudder pedals. Elevator control continuity was established for the complete cable circuit from the elevator forward to the forward control stick bellcrank, then forward around the firewall-mounted pulley and aft to the elevator. Pulling on the rudder and elevator cables resulted in corresponding movement of the respective surfaces. The aileron control bellcrank remained attached and intact on the torque tube with the aileron control cables still attached to the bellcrank. One cable was about 3 ft long, and the other was about 6 inches long to their respective separation points. Both separations were consistent with overload failure. Aileron control cable continuity within the wings was established through several breaks consistent with overload failure.

The forward cockpit control stick casting was fractured from the torque tube and the stick was fractured from its mount. The removable rear cockpit control stick was found lying on the ramp adjacent to the airplane. Examination could not confirm if the stick had been installed in its socket prior to impact.

The right landing gear remained attached to the wing. The left landing gear was broken loose and came to rest between the fuselage and the left wing.

Examination of the airplane did not reveal any evidence of preimpact mechanical failures or anomalies.

## Medical and Pathological Information

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### Pilot

On his medical certificate application, the pilot reported his use of tamsulosin to treat benign prostate hypertrophy and allopurinol for gout. These medications are generally not considered to be impairing. The pilot reported no other medical conditions or medications.

The Nueces County Medical Examiner, Corpus Christi, Texas, performed an autopsy of the pilot. The cause of death was blunt force trauma. The pilot had moderate to severe coronary artery disease with up to 60% narrowing of the right coronary and 70% narrowing of the left coronary artery. No other significant natural disease was identified.

National Medical Services Laboratory (NMS Labs) testing of cavity blood conducted as part of the autopsy was negative for alcohol and carbon monoxide. Testing detected diphenhydramine at 160 ng/ml; pseudoephedrine at 120 ng/ml, and its metabolite, norpseudoephedrine, at 12 ng/ml; and caffeine.

The FAA Bioaeronautical Sciences Research Laboratory, Oklahoma City, Oklahoma, performed toxicology testing on specimens of the pilot. Diphenhydramine was detected in urine and at 156 ng/ml in cavity blood; pseudoephedrine was detected in blood and urine; and tamsulosin was detected in cavity blood and urine.

Pseudoephedrine, caffeine, and tamsulosin are generally not considered to be impairing. Diphenhydramine is a sedating antihistamine used to treat allergy symptoms and as a sleep aid. It is available over the counter under the trade names Benadryl and Unisom. The therapeutic range for diphenhydramine is 25.0 to 112.0 ng/ml. Blood concentrations following a single dose of 50 mg diphenhydramine in 10 healthy adults produced an average peak plasma concentration of 66 ng/ml at 2.3 hours. Further, in a driving simulator study, a single 50 mg dose of diphenhydramine impaired driving ability more than a blood alcohol concentration of 0.100%. Diphenhydramine carries the FDA warning, "may impair mental and/or physical ability required for the performance of potentially hazardous tasks (e.g., driving, operating heavy machinery)." Compared to other antihistamines, diphenhydramine causes marked sedation; this is the rationale for its use as a sleep aid. Altered mood and impaired cognitive and psychomotor performance may also be observed.

Diphenhydramine undergoes postmortem redistribution where, after death, the drug can leach from

storage sites back into blood. Central postmortem blood levels may be about two to three times higher than peripheral levels.

#### Pilot-Rated Passenger

The pilot-rated passenger reported no medications and had no significant medical conditions during his most recent FAA medical examination.

The Nueces County Medical Examiner's autopsy documented the cause of death as multiple crush injuries. The passenger had moderate coronary artery disease with up to 50% narrowing of the right coronary, 40% narrowing of the left coronary, and 30% narrowing of the circumflex coronary arteries. No other significant natural disease was identified.

NMS Labs forensic toxicology testing of femoral blood conducted as part of the autopsy was negative for alcohol, carbon monoxide, and tested-for drugs.

FAA Bioaeronautical Sciences Research Laboratory toxicology testing detected no carbon monoxide in femoral blood, no ethanol in vitreous, and no tested-for-drugs in urine.

## Administrative Information

<b>Investigator In Charge (IIC):</b>	Brannen, John
<b>Additional Participating Persons:</b>	Christopher Wehrmann; FAA - SAT FSDO; San Antonio, TX
<b>Original Publish Date:</b>	March 18, 2019
<b>Last Revision Date:</b>	
<b>Investigation Class:</b>	<a href="#">Class</a>
<b>Note:</b>	The NTSB traveled to the scene of this accident.
<b>Investigation Docket:</b>	<a href="https://data.ntsb.gov/Docket?ProjectID=97106">https://data.ntsb.gov/Docket?ProjectID=97106</a>

The National Transportation Safety Board (NTSB) is an independent federal agency charged by Congress with investigating every civil aviation accident in the United States and significant events in other modes of transportation—railroad, transit, highway, marine, pipeline, and commercial space. We determine the probable causes of the accidents and events we investigate, and issue safety recommendations aimed at preventing future occurrences. In addition, we conduct transportation safety research studies and offer information and other assistance to family members and survivors for each accident or event we investigate. We also serve as the appellate authority for enforcement actions involving aviation and mariner certificates issued by the Federal Aviation Administration (FAA) and US Coast Guard, and we adjudicate appeals of civil penalty actions taken by the FAA.

The NTSB does not assign fault or blame for an accident or incident; rather, as specified by NTSB regulation, “accident/incident investigations are fact-finding proceedings with no formal issues and no adverse parties ... and are not conducted for the purpose of determining the rights or liabilities of any person” (Title 49 *Code of Federal Regulations* section 831.4). Assignment of fault or legal liability is not relevant to the NTSB’s statutory mission to improve transportation safety by investigating accidents and incidents and issuing safety recommendations. In addition, statutory language prohibits the admission into evidence or use of any part of an NTSB report related to an accident in a civil action for damages resulting from a matter mentioned in the report (Title 49 *United States Code* section 1154(b)). A factual report that may be admissible under 49 *United States Code* section 1154(b) is available [here](#).