



# National Transportation Safety Board Aviation Accident Final Report

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<b>Location:</b>	PROVINCETOWN, MA	<b>Accident Number:</b>	NYC93FA140
<b>Date &amp; Time:</b>	08/02/1993, 2234 EDT	<b>Registration:</b>	N2093A
<b>Aircraft:</b>	PIPER PA-28-181	<b>Aircraft Damage:</b>	Destroyed
<b>Defining Event:</b>		<b>Injuries:</b>	2 Fatal
<b>Flight Conducted Under:</b>	Part 91: General Aviation - Personal		

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## Analysis

THE NON-INSTRUMENT RATED PILOT HAD CALLED FSS 6 TIMES, FROM 1152 TO 2201, FOR WEATHER FOR A VFR FLIGHT FROM CAPE COD AND PROVINCETOWN, MA TO POTTSTOWN, PA. DURING THE 1152, 1254, AND 1401 BRIEFINGS HE WAS ADVISED OF A SEVERE THUNDERSTORM WATCH IN EFFECT. DURING THE 2018 BRIEFING HE WAS ADVISED OF 2 SIGMETS AND THAT VFR FLIGHT WAS NOT RECOMMENDED. DURING THE THE 2201 BRIEFING HE WAS AGAIN ADVISED THAT VFR FLIGHT WAS NOT RECOMMENDED DUE TO LOW CEILINGS AND FOG IN THE PROVINCETOWN AREA AND FORECASTED IFR CONDITIONS EN ROUTE. SHORTLY AFTER TAKEOFF FROM PROVINCETOWN, THE AIRPLANE WAS HEARD CIRCLING LOW, AND THEN OBSERVED DESCENDING OUT OF THE CLOUDS. THE RIGHT WING HAD SEPARATED IN FLIGHT. AN AIRLINE PILOT WITNESS ESTIMATED VISIBILITY AT 1 MI. ALTHOUGH A SMALL AREA OF PREEXISTING FATIGUE CRACKING WAS FOUND ON THE LOWER WING SPAR BREAK, EXAMINATION REVEALED THAT THE WING HAD SUSTAINED HIGH LOADS IMMEDIATELY PRIOR TO SEPARATION. DURING HIS LAST PHYSICAL DURING 4/93 THE PILOT REPORTED 5 HRS TOTAL NIGHT FLIGHT TIME. CRASH SITE WAS A TRAILER PARK.

## Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: THE PILOT INITIATING VFR FLIGHT INTO INSTRUMENT METEOROLOGICAL CONDITIONS RESULTING IN SPATIAL DISORIENTATION AND LOSS OF AIRCRAFT CONTROL. DURING HIS ATTEMPT TO REGAIN CONTROL OF THE AIRCRAFT THE PILOT EXCEEDED THE DESIGN STRESS LIMITS RESULTING IN WING OVERLOAD AND SEPARATION. FACTORS WHICH CONTRIBUTED TO THE ACCIDENT WERE: THE PILOT'S DISREGARD OF THE WEATHER BRIEFER'S ADVISORY THAT VFR FLIGHT WAS NOT RECOMMENDED, THE WEATHER CONDITIONS, THE DARK NIGHT, AND THE PILOT'S LACK OF INSTRUMENT TIME AND NIGHT FLYING EXPERIENCE.

## Findings

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Occurrence #1: IN FLIGHT ENCOUNTER WITH WEATHER  
Phase of Operation: CLIMB - TO CRUISE

### Findings

1. (F) PREFLIGHT BRIEFING SERVICE - DISREGARDED - PILOT IN COMMAND
2. (F) WEATHER CONDITION - HAZE/SMOKE
3. (F) WEATHER CONDITION - CLOUDS
4. (F) WEATHER CONDITION - FOG
5. (C) VFR FLIGHT INTO IMC - INITIATED - PILOT IN COMMAND

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Occurrence #2: LOSS OF CONTROL - IN FLIGHT  
Phase of Operation: MANEUVERING

### Findings

6. (F) LIGHT CONDITION - DARK NIGHT
7. (C) AIRCRAFT CONTROL - NOT MAINTAINED - PILOT IN COMMAND
8. (C) SPATIAL DISORIENTATION - PILOT IN COMMAND
9. (F) LACK OF TOTAL INSTRUMENT TIME - PILOT IN COMMAND
10. (F) LACK OF TOTAL EXPERIENCE IN TYPE OPERATION - PILOT IN COMMAND

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Occurrence #3: AIRFRAME/COMPONENT/SYSTEM FAILURE/MALFUNCTION  
Phase of Operation: DESCENT - UNCONTROLLED

### Findings

11. WING,SPAR - FATIGUE
12. (F) WING - OVERLOAD
13. (C) DESIGN STRESS LIMITS OF AIRCRAFT - EXCEEDED - PILOT IN COMMAND
14. WING - SEPARATION

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

## Factual Information

### HISTORY of FLIGHT

On Monday, August 2, 1993, at about 2234 eastern daylight time, a Piper PA-28-181, N2093A, piloted by Mr. Ritchie K. Smith, collided with a recreation vehicle (RV) and a tree while maneuvering shortly after takeoff from the Provincetown Airport, Provincetown, Massachusetts. The airplane was destroyed as was the RV. The pilot and the one passenger were fatally injured. There were no injuries to anyone on the ground. Instrument meteorological conditions prevailed at the time and no flight plan had been filed. The flight was being conducted under 14 CFR 91.

The non-instrument rated pilot called the Bridgeport Automated Flight Service Station (AFSS), Bridgeport, Connecticut, prior to his departure and was advised that VFR was not recommended for his flight. Shortly after takeoff the airplane was heard circling low and the engine was heard revving. One witness heard a bang; saw a wing descend out of the clouds, and the airplane tumbling to the ground.

A person identifying himself as the pilot of, Piper N2093A, telephoned the Bridgeport AFSS, six times on August 2, 1993. The first call was made at 1152 and last call was made at 2201. During each phone call the pilot asked for and was given weather for a Visual Flight Rules (VFR) flight from Cape Code (Marth's Vineyard and Provincetown, Massachusetts), to Pottstown, Pennsylvania (PTW).

During the first two phone calls starting at 1152, and ending at 1254, the pilot was concerned with getting to Provincetown, and then flying VFR later in the evening, around 2000 to PTW. The pilot of N2093A was briefed, and told by the Specialists at the AFSS that there were thunderstorm watches throughout the local area and along his route of flight, and to call back later in the day because the watches were scheduled to be lifted at 2000.

At 1401:01, the pilot of N2093A, made telephone contact with the Bridgeport AFSS, and said, he wanted to make a flight from Provincetown in an hour, "going V-F-R hopefully." At 1403:10, he requests weather for the Philadelphia area, and was told, "there is a severe thunderstorm watch" in effect. The AFSS Specialist suggests that he recheck the weather before leaving Provincetown.

At 2018, the pilot again called the AFSS, and received an updated briefing. After receiving the weather which included; two SIGMETS; for precipitation; and reduced visibility, he asked the AFSS Specialist, when the weather will be through his intended area of flight. At 2020:30, the AFSS Specialist said:

...probably tomorrow morning let's see what we got here I'm not showing much along your route right now it looks what precip is there has been dwindling a little there may be some lingering we still do have some I-F-R conditions around of course V-F-R is not recommended are you I-F-R capable.

The pilot of N2093A answers, "Naw not really," and asks the AFSS Specialist, "...what would you suggest ah hang tight.

At 2022:15, the AFSS Specialist said:

I would say ah wait till morning do it in the morning...I'd wait till mid morning tomorrow

and really wouldn't chance it tonight they're still forecasting a possibility of some thunderstorms popping up out there...it just don't look good for tonight even down in the like New York metro area...they're looking for like four miles visibility in haze right through the early to mid morning hours tomorrow.

At 2024:20, the pilot said, "...you wouldn't say right now that there's a chance that we could get through."

At 2024:32 the AFSS Specialist said:

Not V-F-R no not what I got right now if you go Boston westward or northward you're running into thunderstorms and I-F-R conditions if you stay south of Boston like Marshfield which is slightly south of Boston and all the way down through Hyannis is all I-F-R right now so you're busting through I-F-R you know.

The pilot answers, "right," and the AFSS Specialist said, "...it just ain't worth taking a chance...I'd say tomorrow morning you should be able to get out..." The telephone conversation ended at 2025:38.

At 2133, the pilot of N2093A called the Bridgeport AFSS again, and said, "...I'm sitting right now at Provincetown and the I need to go towards Philadelphia."

The AFSS Specialist told the pilot that the severe thunderstorm watch was "taken down," but there was shower activity along the pilot's intended route of flight, and that radar shows, "...there's still quite a bit of activity down in the Philadelphia area."

At 2135:09, the pilot said:

...I really have to be back in the morning so even if I could get from...Provincetown where I'm at let's say I could get close if you can give me ah destination I can shoot for that I could get close [to my destination airport].

The AFSS Specialist said:

...you could get to Morristown Trenton looks good...just wanted to check the terminal forecasts because there's quite a bit of fog and haze...north Philly's calling for thirty-five hundred scattered...visibility down to four miles in haze and a chance of two miles in rain showers and fog that's valid until four o'clock in the morning.

The telephone conversation ended at 2139:39.

At 2201, the pilot of N2093A, called the Bridgeport AFSS for the last time. Again the pilot is informed about weather conditions in the area of Philadelphia, and is told that the thunderstorm watch is no longer in effect, but that there is some shower activity. At 2203:01, the pilot said, "I want to take off in two minutes," and the AFSS Specialist said, "Okay let me give you the actual weather then."

At 2203:28, the AFSS Specialist said:

...I do have say V-F-R is not recommended because we do have forming fog overnight and out in the Cape area although there's seven miles visibility being reported at Provincetown Hyannis is down to three miles in fog four miles for Providence Groton says three miles in fog with overcast ceilings at seven hundred feet at Groton New Bedford eight hundred overcast...the surface wind at Provincetown two niner zero at six knots.

At 2204:51, the AFSS Specialist said:

...for right now the Provincetown weather is nine hundred scattered now that scattered layer is being observed by the AWOS [automatic weather observing system] weather station there it's not being observed by a person...over at Hyannis they are I-F-R with six hundred broken ceilings and three miles in fog so that scattered layer although it's reported as nine hundred I'm not sure if it's really gonna be scattered layer it might be broken as a ceiling that's why I said V-F-R not recommended.

AFSS Specialist explained to the pilot that unless he can reach his destination prior to midnight, that the fog could cause the Pottstown and Philadelphia areas to become IFR, and that is why the Specialist can not recommend VFR. The telephone conversation ended at 2208:25.

There were several witnesses in the area at the time of the accident that heard and observed the airplane prior to impact. Mr. Louise Salesse was standing on the west side of his camper and said:

...I heard a noise and saw light beams...when all of a sudden, I saw a plane coming out of the fog, coming in my direction...coming out of the fog, I saw red, green and white lights. Then after, I heard the explosion.

Patrick Boyle was at campsite 43/45 said, "...I saw the red and green lights through the clouds (the plane still appeared to be flying at this time)...seconds later the [airplane] headed downward very quickly."

Mr. Kent Davis, an Airline Pilot for, Air Canada, was at his house about 1 mile north of the crash site, and heard the airplane pass over his house. According to Mr. Davis's statement:

...[The airplane] appeared to be in a very high speed dive, (angled). It appeared to be at full throttle. To pass by my location the sound lasted about 1.5 seconds. I would estimate the weather at between 1-300 feet visibility 1 mile.

Mr. Jeff Wright at campsite T-46 said, that after hearing the airplane's engine he looked up and saw, "...what appeared to be a plane with both wings still intact." He said the airplane, "...was spinning out of control."

A camp security guard, Ms. Deborah Gifford, was standing outside the guard shack at the time of the accident. Deborah Gifford told the NTSB, investigator-in-charge, that she previously had aviation experience as a crew chief in the military. Ms. Gifford said in her statement:

Heard plane circling around at [a] low altitude. Then gunning of engine, a few seconds later heard a pop noise. Then [I saw]... something falling and plane was spinning downward with loud race of engine. Saw large piece [right wing] come down after popping sound. Then aircraft went sideways in rotating motion, with engine sound of wee-ee like high RPM sound.

The accident occurred during the hours of darkness at approximately 42 degrees, 02 minutes north, and 70 degrees, 12 minutes west.

#### PERSONNEL INFORMATION

Mr. Ritchie K. Smith was born on January 13, 1955. He held a Private Pilot Certificate, No. 177441329, with airplane single engine land ratings. Mr. Smith was issued a Third Class

Airman Medical Certificate on April 26, 1993, with no limitations or waivers.

Mr. Smith's records showing his total flight hours were not located. It was estimated from information he provided the FAA on his last flight physical that he had a total flight hours of 57, and 5 hours of night flight time.

#### WRECKAGE AND IMPACT INFORMATION

The wreckage was examined at the accident site on August 3-4, 1993. The crash site was located in a trailer park and camp site about 1.7 miles south of the airport. The right wing had separated from the airplane in flight and came to rest in a tree 4 feet 8 inches off the ground. The main wreckage continued in a westerly direction coming to rest 460 feet west of the right wing. Control continuity to the flight controls was established through the cables. An examination of the propeller and engine revealed no discrepancies.

#### MEDICAL AND PATHOLOGICAL INFORMATION

An autopsy was performed on Mr. Ritchie K. Smith, on August 3, 1993, at the Medical Examiner's Office, in Worcester, Massachusetts by Dr. Sidney Callis. The autopsy revealed that the cause of death was, "... multiple severe injuries..."

The toxicological tests were conducted at the Federal Aviation Administration's (FAA), Toxicology and Accident Research Laboratory, Oklahoma City, Oklahoma and revealed, "... no drugs or alcohol were found."

#### TEST AND RESEARCH

The following parts were removed from N2093A and examined at the NTSB Material Laboratory, Washington, DC. The examined parts included; pieces of the right wing including 3 pieces of the main spar and two from the aft attachment, 5 pieces total.

The inboard end of the main spar was found fractured through both the upper and lower spar caps and through portions of the spar web. Both spar caps were transversely fractured at positions near the outboard ends of the fuselage carry-through structure. The upper spar cap was found fractured just past the outboard end of the upper carry-through, and the lower cap was fractured through the most outboard pair of bolts connecting the spar and carry-through. Both spars exhibited upward bending outboard. The upper spar cap and sheet metal fractures were overstress separations with the upper cap fracture typical of upward bending of the wing. Indications of preexisting fatigue cracking was found on the lower spar break.

The lower spar break had a small area of fatigue on the fracture surface near the forward bolt, approximately 0.3 inches wide and had penetrated about 0.2 inches into the spar cap. The fatigue zone was located slightly aft and outboard of the forward bolt hole, but had not penetrated the bore surface. The remainder of the lower spar fracture displayed features of an overstress separation. Closer examination of the fatigue revealed that it had initiated on the lower surface of the spar cap approximately 0.073 inches from the edge of the bolt hole. The fatigue had progressed upward and aft away from the bolt hole. The outboard fracture face, had two distinct fatigue origins in close proximity to each other on the surface of the spar. The fatigue on the outboard fracture face had progressed upward and aft generally avoiding the hole to the fatigue terminus. Beyond the terminus the fracture was typical of an overstress fracture in ductile aluminum alloys.

The lower surface of the spar was partially covered with green and yellow primer paint.

Removal of the paint revealed many areas of randomly oriented surface scratches, as if the surface had been lightly sanded prior to assembly.

Examination of the fastener hardware to connect the wing spar to the fuselage carry through structure, revealed that the washers on the received spar section were in prescribed order. Rotational damage to the under-nut washers indicated that the nuts were tightened on the received lower spar cap.

Both the Maintenance Manual and Piper Service Letter, No. 997, specify the use of MS21042 nuts on all of the main spar wing attachment bolts. A MS21042 nut is described as a self-locking ring base nut with a reduced hexagon and reduced height. The nuts received from N2093A were not marked with a part number or other identification, and did not match the description for the MS21042 nut, in either detail or style.

The fuselage and wing aft attachment fitting were cut from the airplane's structure, and were not damaged. The Piper Maintenance Manual for this airplane shows that the two lugs are connected by an AN5-7A bolt through the holes in each fitting. The examination revealed no evidence that the bolts were in place, however, lug surfaces had been in direct contact with each other with the bolt holes aligned. Visual inspection also showed that the holes were approximately round showing no appreciable deformation.

The examination of the wing spar revealed that the wing had sustained high loads immediately prior to separation, but it was not determined whether an uncracked wing would have survived.

#### ADDITIONAL INFORMATION

The airplane was equipped with a transponder, however, impact damage precluded a determination on the use of the transponder. Radar data was requested from the Boston Air Route Traffic Control Center (ARTCC). No beacon targets were observed in the vicinity of the airport at the reported time of the accident. A non-beacon target was observed starting just south of the airport at 2230:39 and moving first south and then east. The target disappeared at 2233:28, moving in an easterly direction. Due to lack of an assigned beacon code, the target could not positively be identified as the accident airplane.

The radar data was then processed through a program to view both the ground track and rate of turn. The target exhibited turns both left and right. The target went from a left turn of 9 degrees per second (a standard rate of turn is 3 degrees per second, as defined in FAA Advisory Circular 61-27C, Instrument Flying Hand Book), to a right turn of approximately 12 degrees per second, followed immediately by a left turn of 9 degrees per second, and ended in a right turn of 9 degrees per second. Altitude information was not available.

The wreckage was released to the owner's insurance adjuster, Mr. David Malhall, on August 4, 1993. The wing spar was released to the owner's insurance company, on January 5, 1994 and mailed directly to the owner.

## Pilot Information

<b>Certificate:</b>	Private	<b>Age:</b>	38, Male
<b>Airplane Rating(s):</b>	Single-engine Land	<b>Seat Occupied:</b>	Left
<b>Other Aircraft Rating(s):</b>	None	<b>Restraint Used:</b>	Seatbelt, Shoulder harness
<b>Instrument Rating(s):</b>	None	<b>Second Pilot Present:</b>	No
<b>Instructor Rating(s):</b>	None	<b>Toxicology Performed:</b>	Yes
<b>Medical Certification:</b>	Class 3 Valid Medical--no waivers/lim.	<b>Last FAA Medical Exam:</b>	04/26/1993
<b>Occupational Pilot:</b>		<b>Last Flight Review or Equivalent:</b>	
<b>Flight Time:</b>	57 hours (Total, all aircraft)		

## Aircraft and Owner/Operator Information

<b>Aircraft Make:</b>	PIPER	<b>Registration:</b>	N2093A
<b>Model/Series:</b>	PA-28-181 PA-28-181	<b>Aircraft Category:</b>	Airplane
<b>Year of Manufacture:</b>		<b>Amateur Built:</b>	No
<b>Airworthiness Certificate:</b>	Normal	<b>Serial Number:</b>	287990103
<b>Landing Gear Type:</b>	Tricycle	<b>Seats:</b>	4
<b>Date/Type of Last Inspection:</b>	06/17/1993, Annual	<b>Certified Max Gross Wt.:</b>	2550 lbs
<b>Time Since Last Inspection:</b>	35 Hours	<b>Engines:</b>	1 Reciprocating
<b>Airframe Total Time:</b>	11683 Hours	<b>Engine Manufacturer:</b>	LYCOMING
<b>ELT:</b>	Installed, not activated	<b>Engine Model/Series:</b>	O-360-A4M
<b>Registered Owner:</b>	BASCO FLYING SERVICE INC.	<b>Rated Power:</b>	180 hp
<b>Operator:</b>	BASCO FLYING SERVICE INC.	<b>Operating Certificate(s) Held:</b>	None

## Meteorological Information and Flight Plan

Conditions at Accident Site:	Instrument Conditions	Condition of Light:	Night/Dark
Observation Facility, Elevation:	PVC, 5 ft msl	Distance from Accident Site:	2 Nautical Miles
Observation Time:	2235 EDT	Direction from Accident Site:	330°
Lowest Cloud Condition:	Unknown / 0 ft agl	Visibility	3 Miles
Lowest Ceiling:	Broken / 900 ft agl	Visibility (RVR):	0 ft
Wind Speed/Gusts:	/	Turbulence Type Forecast/Actual:	/
Wind Direction:	290°	Turbulence Severity Forecast/Actual:	/
Altimeter Setting:		Temperature/Dew Point:	22° C / 18° C
Precipitation and Obscuration:			
Departure Point:		Type of Flight Plan Filed:	None
Destination:	POTTSTOWN, PA (N46)	Type of Clearance:	
Departure Time:	2230 EDT	Type of Airspace:	

## Airport Information

Airport:	PROVINCETOWN (PVC)	Runway Surface Type:	
Airport Elevation:		Runway Surface Condition:	
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:	1 Fatal	Aircraft Fire:	None
Ground Injuries:	N/A	Aircraft Explosion:	None
Total Injuries:	2 Fatal	Latitude, Longitude:	

## Administrative Information

Investigator In Charge (IIC):	ALAN J YURMAN	Report Date:	06/22/1994
Additional Participating Persons:	BURRELL D ROBERT; BEDFORD, MA BUNKER RICHARD; BOSTON, MA		
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 <a href="mailto:pubinquiry@ntsb.gov">pubinquiry@ntsb.gov</a> , or at 800-877-6799. Dockets released after this date are available at <a href="http://dms.nts.gov/pubdms/">http://dms.nts.gov/pubdms/</a> .		

The National Transportation Safety Board (NTSB), established in 1967, is an independent federal agency mandated by Congress through the Independent Safety Board Act of 1974 to investigate transportation accidents, determine the probable causes of the accidents, issue safety recommendations, study transportation safety issues, and evaluate the safety effectiveness of government agencies involved in transportation. The NTSB makes public its actions and decisions through accident reports, safety studies, special investigation reports, safety recommendations, and statistical reviews.

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](#).