National Transportation Safety Board
Aviation Accident Final Report

Location:	ST. GEORGE, AK	**Accident Number:**	ANC98FA091
Date & Time:	07/07/1998, 1547 AKD	**Registration:**	N501FS
Aircraft:	Swearingen SA-26AT	**Aircraft Damage:**	Destroyed
Defining Event:		**Injuries:**	2 Fatal
Flight Conducted Under:	Part 91: General Aviation - Positioning		

Analysis

The flight departed Anchorage, Alaska, and was en route to Saint George, Alaska, to pick up passengers for a return flight to Anchorage. The pilot-in-command (PIC) was seated in the right seat, and the copilot was seated in the left seat. This was the copilot's third flight in this make and model airplane, and he was not qualified as a crewman in it under 14 CFR Part 135. There was no record of when the copilot last performed a nondirectional beacon (NDB) approach. The NDB indicator in the cockpit was on the left side of the left control column, partially blocked from the view of the PIC. The minimum altitude for the segment of the approach prior to the final approach fix (FAF) was 1,700 feet. The Minimum Descent Altitude (MDA) for the final segment of the approach was 880 feet. The reported ceiling was 100 feet overcast. The Air Route Traffic Control Center radar altitude readout for the airplane revealed that the airplane descended below 600 feet prior to reaching the FAF. The radar ground track revealed the airplane on course prior to the course reversal procedure turn on the published approach. The radar ground track showed that after the course reversal, the airplane continued through the published final approach course, and turned to parallel the inbound track three miles north of course. The radar plot terminates about the location of the 550 feet high cliffs where the airplane was located. Weather at the time of the accident was reported as 100 foot overcast. This location was 5.5 miles (DME) from the airport. A review of radar tapes from the day prior to the accident, show the same airplane and PIC tracking the published course outbound and inbound, and descending below the published approach minima to below 500 feet. This flight successfully landed at the airport. An interview with the copilot from the successful flight revealed that the PIC intentionally descended to 300 feet on the approach until he acquired visual contact with the ocean, then flew to the airport to land. An aircraft flying on the published inbound final approach course at 5.5 DME is over water, approximately three miles from the nearest terrain.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The pilot-in-command's failure to adequately monitor the instrument approach and the co-pilot's failure to intercept and maintain the proper NDB bearing on the approach.

Contributing factors were the pilot-in-command's obstructed view of the NDB indicator and his overconfidence in his personal ability, the terrain (cliffs), low ceiling, and the flight crew's disregard of the minimum descent altitude.

Findings

Occurrence #1: IN FLIGHT COLLISION WITH TERRAIN/WATER
Phase of Operation: APPROACH - IAF TO FAF/OUTER MARKER (IFR)

Findings
1. (F) FLIGHT/NAV INSTRUMENTS,RADIO MAGNETIC INDICATOR - OBSTRUCTED
2. (C) MONITORING - INADEQUATE - PILOT IN COMMAND
3. (F) OVERCONFIDENCE IN PERSONAL ABILITY - PILOT IN COMMAND
4. (F) TERRAIN CONDITION - CLIFF
5. (C) PROPER ALIGNMENT - NOT OBTAINED/MAINTAINED - COPILOT/SECOND PILOT
6. (F) WEATHER CONDITION - LOW CEILING
7. (F) MINIMUM DESCENT ALTITUDE - DISREGARDED - FLIGHTCREW

Factual Information

HISTORY OF FLIGHT

On July 7, 1998, about 1547 Alaska daylight time, a Swearingen SA-26AT Merlin-IIB airplane, N501FS, operated by F. S. Air Service, Inc., of Anchorage, Alaska, was destroyed when it impacted terrain about 5.5 miles west-northwest of the New Saint George Airport, Saint George, Alaska. The two occupants, both flight crewmembers, sustained fatal injuries. The pilot-in-command (PIC) was the president and owner of F. S. Air Service, Inc., and occupied the right pilot seat. The copilot was not qualified as a pilot-in-command of the SA-26AT, and occupied the left pilot seat. The flight was conducted under 14 CFR Part 91 as a positioning flight to pick up three passengers for an on-demand charter flight from Saint George. The flight departed Anchorage International Airport at 1240 under a VFR flight plan, and an IFR clearance was received approximately 100 nautical miles northeast of Saint George. Instrument meteorological conditions prevailed at Saint George at the time of the accident.

The last recorded radio communication from the airplane was at 1527, when the flight was cleared by the Anchorage Air Route Traffic Control Center (ARTCC) to perform the NDB/DME-A instrument approach.

A witness who was awaiting pickup by the accident airplane told the NTSB investigator-in-charge (IIC) that he was waiting at the airport and heard an airplane fly over the airport on a southwesterly course about 1545. He said that the airplane transmitted that it was F. S. Air beginning the approach. No other transmission was overheard. The witness stated that the ceiling was about 300 feet.

About 1600, the flight was reported overdue, and a search was initiated. The wreckage was located about 1630 by fishing boats near the northwest end of the island.

The main wreckage came to rest on a beach, at the bottom of an approximately 550 feet high cliff. The location was 5.5 nautical miles on a magnetic bearing of 285 degrees from the airport. Portions of the wreckage was consumed by a postcrash fire. Lightweight debris from the airplane was located on the top of the cliff.

DAMAGE TO AIRCRAFT

The airplane was destroyed by a combination of impact forces and postcrash fire.

PERSONNEL INFORMATION

Pilot-In-Command

The PIC was seated in the right seat. He held an airline transport pilot certificate with ratings for multiengine airplanes, and a commercial pilot certificate with ratings for single-engine land and sea airplanes, and multiengine seaplanes. He held type ratings in the CASA-212 and Lear Jet. He was authorized to fly as pilot-in-command under 14 CFR Part 135 in SA-26AT, SA-227, LR-35, CASA-212, SC-7, BE-18T, and PA-31 airplanes.

His most recent 14 CFR 135.293, 135.297, and 135.299 checks were completed on June 12, 1998, in a PA-31 airplane. This check was administered by a company check airman, and included an NDB approach.

Records of flight time were not up to date on the PIC. The most recent records available indicated that he had accumulated over 13,000 hours of flight experience, with over 5,000

hours in multiengine airplanes, more than 1,000 hours in instrument conditions, and over 250 in the SA-26AT. Company records indicated that in the previous 30 days, the pilot had flown 56 hours, 46 in the SA-26AT.

On the day prior to the accident (July 6), he had flown the same airplane to Saint George, and flown the NDB A approach in instrument conditions. During the flight on July 6, he was seated in the left seat of the SA-26AT.

Copilot

The copilot held an airline transport pilot certificate, with ratings for multiengine and single-engine land airplanes, and a commercial pilot certificate with ratings for single engine seaplanes. He had accumulated 3,989 total hours of flight experience at the time of the accident, of which about 900 were in multiengine airplanes, and 500 were in actual or simulated instrument conditions. In the previous 30 and 90 days, he had flown 41 and 66 hours for the company, respectively.

He held a first class medical certificate, with the restriction that "Holder shall wear corrective lenses." He possessed a Statement Of Demonstrated Ability (SODA) for defective distant vision of 20/200, which was correctable to 20/20 with lenses.

The copilot had accumulated 3 hours, 2 flights, 1 instrument approach, and 5 landings in the SA-26AT prior to the accident. In the previous 90 days he had performed 10 instrument approaches in company aircraft. No record was available to determine if any of these were non-precision or NDB type approaches. There was no record of the copilot having flown to Saint George previously.

The copilot was a part-time employee of the company. He had received salaried pay and completed monthly flight and duty time records as a pilot for F. S. Air Service, Inc., since April of 1998. On his FAA medical certificate application, FAA Form 8600-8, dated April 16, 1998, he lists his occupation as "Part Time Pilot" and his employer as "F.S. Air."

He completed initial company training as a pilot on April 17, 1998, and successfully completed 135.293 checkrides as a second-in-command on the Lear-35 and SA-227. He had not completed a check as second-in-command for the SA-26AT.

The 135.293 check flight report for the SA-227 on June 5, 1998, indicated that the copilot performed an ILS precision approach. There were no records that he performed an NDB or ADF nonprecision approach on either check flight.

AIRCRAFT INFORMATION

The airplane had accumulated 7,804 hours in service. It was maintained under an Approved Aircraft Inspection Program (AAIP), and 10 hours had been flown since the previous inspection.

The navigation equipment included VOR/DME receivers, an NDB/ADF receiver, a radio altimeter, and a Global Positioning System (GPS). The GPS was not integrated to provide flight guidance information to the pilot's heading indicator, flight director, or autopilot.

Each pilot position had standard flight instruments, Radio Magnetic Indicators (RMIs), and Distance Measuring Equipment (DME) displays. The GPS and radio altimeter display was visible from either pilot position. The fixed card NDB/ADF display was located on the lower left side of the left control column, visible to the left seat pilot, but partially obstructed from the

view of the right seat pilot.

METEOROLOGICAL INFORMATION

The weather reporting for the New Saint George Airport was provided by an Automated Surface Observing System (ASOS). There is no official weather observer on the island. The ASOS information is available from the FAA Flight Service Stations, via aircraft radio, or telephone.

Between 1053 and the time of the accident, 10 observations were recorded. The ceilings for all ten of these observations varied between 100 feet and 300 feet, with visibility ranging from 1/4 mile to 10 miles.

The weather reported at 1453 ADT was a measured ceiling of 100 feet overcast, with 2 1/2 miles visibility in fog, temperature and dew point both at 46 degrees Fahrenheit, and winds from 210 degrees at 11 knots.

The weather reported at 1553 was a ceiling of 1,000 feet broken, 1,400 feet overcast, visibility of 10 miles. The temperature was 47 degrees Fahrenheit, dew point was 46 degrees Fahrenheit, and winds of 200 degrees at 7 knots.

A U. S. Fish and Wildlife biologist who arrived at the top of the cliff about 2000, told the NTSB IIC that the prevailing winds were southwest at 10 miles per hour, which created an updraft along the cliffs.

AIDS TO NAVIGATION

Navigation to the airport is provided by a nondirectional beacon (NDB) and a DME transmitter, located at the south end of the runway. The outbound course to be followed on the NDB/DME-A approach is 245 degrees magnetic after crossing the NDB. After performing a course reversal turn south of the outbound course, the inbound course to be flown is 065 degrees magnetic.

The minimum altitudes specified for the approach segments are 1,700 feet msl until crossing the final approach fix (FAF) inbound to the airport, at which time the minimum descent altitude (MDA) is 880 feet.

Radar service at Saint George island is provided by an FAA ARTCC radar located on Saint Paul island, about 40 miles northwest. The radar plot provided by this FAA radar site depicts the ground track of the flight proceeding outbound established on the specified course, executing a procedure turn to reverse direction, and continuing to the north of the final approach course about three miles. The final ground track for the airplane was 065 degrees, and paralleled the final approach course.

The airplane's altitude from the ARTCC radar was 1,900 feet until beginning the course reversal turn, then a descent to 600 feet occurred.

The last radar altitude received was 600 feet, at position 56 degrees 36 minutes 40 seconds North latitude, 169 degrees 47 minutes 29 seconds West longitude. This position was about one mile from the accident site. Five more position returns, without altitude transmissions from the airplane's encoding altimeter were received. The last position was 56 degrees 36 minutes 41 seconds North latitude, 169 degrees 42 minutes 21 seconds West longitude. The floor of radar coverage from Saint Paul Island in the vicinity of the accident is about 600 feet.

Three hours after the accident, the crew of a Coast Guard C-130 which had searched for the overdue airplane, flew the NDB/DME-A approach in VFR conditions. The aircraft commander of the C-130, told the NTSB IIC that the course guidance appeared normal, and that his airplane's position cross checked on course both visually, and with his on board GPS guidance system.

The FAA conducted a postaccident flight inspection of the NDB/DME-A approach on July 9, 1998. No anomalies were noted on the Flight Inspection Report, FAA Form 8240-19. All items checked were noted as "SAT," and the instrument approach procedure was noted as "SATISFACTORY."

COMMUNICATIONS

At 1200 ADT, the pilot received an abbreviated weather brief from the Kenai, Alaska, FAA Flight Service Station (FSS), and filed a flight plan from Anchorage to Saint George.

At 1356, the pilot of N501FS received the current Saint George weather via aircraft radio from the Dillingham, Alaska FSS.

At 1513, the pilot of N501FS told the ARTCC controller that he had the 1453 Saint George weather observation. At 1514, N501FS was issued an IFR clearance to the New Saint George Airport. At 1527, N501FS was cleared to descend to 3,000 feet until on a published portion of the approach, and cleared for the NDB/DME-A approach to the New Saint George Airport. He was then approved to change to the airport advisory frequency for Saint George.

AERODROME INFORMATION

The New Saint George Airport is located on Saint George Island, one of the two Pribilof Islands located in the Bering Sea, 800 miles southwest of Anchorage. These two islands are 40 miles apart, and about 200 miles from the mainland.

The airport consists of a 5000 feet long by 150 feet wide gravel runway, configured with pilot-operated medium intensity runway lights (MIRL).

The airport sits on the southwest shore of the approximately 10 mile long, triangular shaped island, at 125 feet above sea level (msl). The airport is located at the head of a shallow, wide, bay. The tundra covered terrain slopes gently up from the airport to the northwest, and also to the southeast. The terrain on the island extends up to 1,012 feet msl to the north, and 668 feet msl to the south.

The elevations of the two prominent points on the northwest end of the island nearest the accident site are 658 feet and 671 feet msl. The top of the bluffs at the accident site were about 550 feet msl. An obstruction of 1,012 feet msl at the north end of the island, is depicted on the NDB/DME-A instrument approach procedure chart.

WRECKAGE AND IMPACT INFORMATION

The two NTSB investigators arrived on the island of Saint George on July 9. Due to weather and the remote location of the accident, the NTSB investigators did not arrive at the accident site until July 11.

The accident site was a nearly vertical 550 feet high cliff, located 5.5 nautical miles northwest of the airport. A scar in the cliff face was located about 50 feet below the top. On the bluff above the cliff, several pieces of glass, plexiglass, and the radome were located. Debris was visible

along the cliff face from the visible scar, extending down to the majority of the wreckage which came to rest on a rocky beach.

Dark areas of burnt vegetation were visible along the debris path on the cliff face, and the wreckage located on the beach had black sooting, blistered paint, and heat damage.

Both wings were separated from the fuselage and located on the beach. The main structural attachments at both wing roots were deformed aftward 90 degrees. The leading edges of both wings were crushed aft.

Scrape marks extended along the bottom of the entire empennage, oriented from forward right to aft left.

The center fuselage and cockpit area were consumed by a postcrash fire. Both wings exhibited burning and heavy sooting. All molten metal dripped vertically downward. All soot patterns were upward. There was no indication of sooting or metal deposits in the direction of aft airflow.

The landing gear support structure appeared to be in the retracted position. The trailing edge flaps actuator was found extended 2.0 inches, which corresponds to the "APPROACH" position. These settings were confirmed by the airplane's manufacturer. The elevator and aileron trim tabs were observed in the neutral position.

The first stage compressors and first stage diffusers from each engine had rotational scoring, and the tips of all vanes were uniformly deformed opposite the direction of normal rotation. The engine cases from both engines were broken open, and all internal parts had separated and were strewn about the debris field. All rotating parts had large amounts of rotational damage and metal deformation.

The exhaust components of both engines displayed ductile bending and crushing.

MEDICAL AND PATHOLOGICAL INFORMATION

A postmortem examination was performed on the pilot-in-command by the State of Alaska Medical Examiner, 5700 East Tudor Road, Anchorage, Alaska, on July 13, 1998. The cause of death was noted as "massive deceleration type injuries."

X-ray evaluation of the hands of the pilot seated in the left seat revealed distinct fractures of the left wrist and left thumb, and fractures of the right wrist and four fingers.

X-rays of the right seat pilot's hands revealed multiple fractures of both wrists and all fingers.

Toxicological samples obtained from the pilot-in-command revealed the presence of ethanol, isopropanol, and acetaldehyde. According to the NTSB medical officer, the levels noted were consistent with postmortem production.

FIRE

The center fuselage and cabin were partially consumed by a postcrash fire. The wings had postcrash fire damage. There was no indication of preimpact or in-flight fire.

TESTS AND RESEARCH

A review of maintenance records revealed no discrepancies in the previous 60 days for the pitot-static, radar altimeter, ADF/NDB, VOR/DME, or flight control systems of the airplane.

The minimum procedure altitude on the NDB/DME-A approach prior to reaching the FAF is

1,700 feet. The MDA after the FAF is 880 feet.

A review of the ARTCC radar data for the flight the PIC flew on the day prior to the accident (July 6), showed that the airplane descended to less than 500 feet prior to reaching the FAF on the inbound leg.

One of the witnesses waiting on the ground stated to the IIC that on July 6, the same pilot and airplane flew him out to the island. He said that during the approach to Saint George they descended until they could see the water, then flew in to the island and landed. He estimated the ceiling on July 6 to be about 300 feet overcast.

During an interview with the IIC, the copilot of the flight on July 6 stated that the accident PIC flew the NDB/DME-A approach, and descended to about 300 feet until they gained visual contact with the water. At that point they flew to the island and landed.

ADDITIONAL INFORMATION

The company approved training manual for the SA-26AT, page 62 and 62A, depict the company procedures for performing nonprecision (ADF/NDB) approaches. The procedural text states "On a circling approach the aircraft must not leave MDA until in a position from which a descent to landing can be made at a normal rate of descent...The pilot must also keep the runway environment in sight at all times."

Three radios were removed from the wreckage site for further examination. These were returned to the insurance adjuster representing the underwriter on July 29, 1998.

Pilot Information

Certificate:	Airline Transport; Commercial	**Age:**	58, Male
Airplane Rating(s):	Multi-engine Land; Multi-engine Sea; Single-engine Land; Single-engine Sea	**Seat Occupied:**	Right
Other Aircraft Rating(s):	None	**Restraint Used:**	Seatbelt
Instrument Rating(s):	Airplane	**Second Pilot Present:**	Yes
Instructor Rating(s):	None	**Toxicology Performed:**	Yes
Medical Certification:	Class 1 Valid Medical--w/ waivers/lim.	**Last FAA Medical Exam:**	01/30/1998
Occupational Pilot:		**Last Flight Review or Equivalent:**	
Flight Time:	13000 hours (Total, all aircraft), 250 hours (Total, this make and model), 12500 hours (Pilot In Command, all aircraft), 150 hours (Last 90 days, all aircraft), 56 hours (Last 30 days, all aircraft), 6 hours (Last 24 hours, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Swearingen	**Registration:**	N501FS
Model/Series:	SA-26AT SA-26AT	**Aircraft Category:**	Airplane
Year of Manufacture:		**Amateur Built:**	No
Airworthiness Certificate:	Normal	**Serial Number:**	T26-146
Landing Gear Type:	Retractable - Tricycle	**Seats:**	8
Date/Type of Last Inspection:	07/05/1998, AAIP	**Certified Max Gross Wt.:**	10000 lbs
Time Since Last Inspection:	10 Hours	**Engines:**	2 Turbo Prop
Airframe Total Time:	7799 Hours	**Engine Manufacturer:**	Garrett
ELT:	Installed, not activated	**Engine Model/Series:**	TP-331-1-151G
Registered Owner:	F. S. AIR SERVICE, INC.	**Rated Power:**	665 hp
Operator:	F. S. AIR SERVICE, INC.	**Operating Certificate(s) Held:**	Commuter Air Carrier (135); On-demand Air Taxi (135)
Operator Does Business As:	F.S. AIR	**Operator Designator Code:**	STZA

Meteorological Information and Flight Plan

Conditions at Accident Site:	Instrument Conditions	**Condition of Light:**	Day
Observation Facility, Elevation:	PBV, 125 ft msl	**Distance from Accident Site:**	5 Nautical Miles
Observation Time:	1453 ADT	**Direction from Accident Site:**	105°
Lowest Cloud Condition:	Unknown / 0 ft agl	**Visibility**	2.5 Miles
Lowest Ceiling:	Overcast / 100 ft agl	**Visibility (RVR):**	0 ft
Wind Speed/Gusts:	11 knots /	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	210°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	29 inches Hg	**Temperature/Dew Point:**	8°C / 8°C
Precipitation and Obscuration:			
Departure Point:	ANCHORAGE, AK (ANC)	**Type of Flight Plan Filed:**	VFR/IFR
Destination:	(PBV)	**Type of Clearance:**	IFR
Departure Time:	1240 ADT	**Type of Airspace:**	Airport Advisory Area; Class G

Airport Information

Airport:	NEW ST. GEORGE (PBV)	**Runway Surface Type:**	
Airport Elevation:	125 ft	**Runway Surface Condition:**	
Runway Used:	0	**IFR Approach:**	ADF/NDB
Runway Length/Width:		**VFR Approach/Landing:**	None

Wreckage and Impact Information

Crew Injuries:	2 Fatal	**Aircraft Damage:**	Destroyed
Passenger Injuries:	N/A	**Aircraft Fire:**	On-Ground
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	2 Fatal	**Latitude, Longitude:**	

Administrative Information

Investigator In Charge (IIC):	MATTHEW L THOMAS	**Report Date:**	03/30/2000
Additional Participating Persons:	GARY L ANDERSON(FAA FSDO); ANCHORAGE, AK SYLVIA VILLA (FAA FSDO); ANCHORAGE, AK MICKEY SELHAY(ALLIED SIGNAL); ANCHORAGE, AK MARTIN KANG (FS AIR, INC); ANCHORAGE, AK		
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 pubinq@ntsb.gov, or at 800-877-6799. Dockets released after this date are available at http://dms.ntsb.gov/pubdms/.		