National Transportation Safety Board
Aviation Accident Final Report

Location:	JULIAN, CA	**Accident Number:**	LAX01FA026
Date & Time:	10/26/2000, 1058 PDT	**Registration:**	N4347C
Aircraft:	Cessna 340A	**Aircraft Damage:**	Destroyed
Defining Event:		**Injuries:**	2 Fatal
Flight Conducted Under:	Part 91: General Aviation - Business		

Analysis

During en route cruise flight at an assigned altitude of 11,000 feet (msl) in instrument meteorological conditions, the airplane impacted mountainous terrain at 5,300 feet, in wings-level, descending flight. During the final 12 minutes of the flight (from 1046 to 1058 Pacific daylight time), recorded military search radar height values (primary radar returns) show the aircraft in a steady descent from 11,000 feet to 5,600 feet, where radar contact was lost. During the same time interval, recorded Mode C altitudes received at Los Angeles Air Traffic Control Center (Center) and SoCal Terminal Radar Approach Control (TRACON) indicated the aircraft was level at 11,000 feet. At 1055:49, when the pilot was handed off from SoCal TRACON to Los Angeles Center, the pilot checked in with the Center ". . . level at one one thousand." At 1057:28, the pilot asked the Center controller "what altitude you showing us at" to which the controller responded "not receiving your mode C right now sir." At 1057:37, the pilot transmitted "o k we'd like to climb to vfr on top, our uh altimeter just went down to uh fifty three hundred." The controller approved the pilot's request to climb to VFR conditions on-top and, at 1057:54, the pilot responded "roger we're out." No further transmissions were received from the aircraft. The airplane was equipped with a single instrument static pressure system with two heated static ports. The static system and static system instruments were damaged or destroyed by impact and post-crash fire sufficiently to preclude post-accident testing.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: Total blockage of the instrument static system due to ice.

Findings

Occurrence #1: AIRFRAME/COMPONENT/SYSTEM FAILURE/MALFUNCTION
Phase of Operation: CRUISE

Findings
1. (C) PITOT/STATIC SYSTEM - ICE
2. (C) PITOT/STATIC SYSTEM - BLOCKED(TOTAL)

Occurrence #2: IN FLIGHT COLLISION WITH TERRAIN/WATER
Phase of Operation: CRUISE

Findings
3. TERRAIN CONDITION - MOUNTAINOUS/HILLY

Factual Information

HISTORY OF FLIGHT

On October 26, 2000, at 1058 hours Pacific daylight time, a Cessna 340A, N4347C, was destroyed when the aircraft impacted mountainous terrain near Julian, California. The airline transport certificated pilot and the commercial certificated second pilot were fatally injured. Instrument meteorological conditions prevailed for the business flight conducted under 14 CFR Part 91 by Marko Foam Products, Inc., of Corona, California. The aircraft departed from the John Wayne Airport - Orange County, Santa Ana, California, at 1031, destined for Calexico, California, and was operating on an instrument flight plan.

About 2 minutes prior to the loss of radar contact, while en route in instrument flight conditions between the Oceanside VORTAC and the Julian VORTAC (radio navigational aides), the flight was handed off to the Los Angeles Air Route Traffic Control Center. The pilot checked in with the center at 11,000 feet and, a short time later, asked what altitude the center showed him to be at on radar. The controller replied that he was not receiving the airplane's mode C altitude information. The pilot then asked for clearance to climb to VFR conditions on top. He reported ". . . our uh altimeter just went down to uh fifty three hundred." He reported the airplane was in the tops of the clouds and needed to go up about 1,000 feet. The controller cleared the aircraft to climb and maintain VFR conditions on top and, a short time later, radar contact was lost.

PERSONNEL INFORMATION

The pilot was the Charter chief pilot at Lenair Aviation at John Wayne Airport and had about 20,000 hours of flight experience. His first-class medical certificate was issued October 2, 2000.

The chief flight instructor of Lenair said that his company regularly provided pilot services to the owner of the accident aircraft. Because they were providing pilots only, the flight operation was conducted under 14 CFR Part 91. On the day of the accident, Lenair assigned the pilot to fly the aircraft to Calexico to pickup employees of the owner and return them to Corona, California, and then return the airplane to John Wayne airport.

The chief flight instructor also said that the second pilot was neither an employee of Lenair nor an assigned crewmember. He was aboard the aircraft without Lenair's knowledge or consent. The pilot who was assigned the trip had, unbeknownst to Lenair, apparently offered the second pilot the opportunity to "ride along." The second pilot was not affiliated with the aircraft owner.

AIRCRAFT INFORMATION

The previous flight of the aircraft was on October 24, 2000. The pilot who flew that flight reported the aircraft was equipped and certified for flight in instrument meteorological conditions, there were no mechanical discrepancies on the aircraft, and that the model 400 autopilot functioned normally. The aircraft was originally manufactured and equipped for approved flight into known icing conditions; however, the windshield heated plate had been removed. The pilot who flew the previous flight believed the remainder of the de-ice equipment was functional although he hadn't had occasion to use it.

The owner of the aircraft reported that the aircraft was only washed when he specifically

instructed the washing service to clean it. It was last washed on October 16, 2000, just before he flew the airplane to Colorado Springs, Colorado, and back. He reported that, on that trip, which cruised at 16,500 feet mean sea level (msl), there were no irregularities in any of the instrumentation, in particular, none in the pitot-static instruments.

The last regular maintenance was an annual inspection on January 19, 2000, when the aircraft's total flying time was 3,181.5 hours. The manager of the maintenance facility, which performed the inspection, said the de-ice boot function would have routinely been tested by external visual and tactile examination during ground run-up. According to the shop work order, "several small splits" in the wing de-ice boots were repaired. Airworthiness directive 96-20-07 relating to pressure testing the combustion chamber of the cabin heater was accomplished.

Two maintenance activities were accomplished in the interim following the inspection up to the time of the accident. On May 4, 2000, the right-hand (copilot) attitude indicator was overhauled and replaced, the de-ice boots were "clean[ed] and dressed," and the cockpit seats were reupholstered. On June 30, 2000, the de-ice boot electrical lead on the number 3 blade of the right-hand propeller was replaced and the de-ice ammeter was removed, overhauled, and replaced at aircraft total flight time of 3,233 hours.

According to the aircraft logbooks, new de-ice boots were installed on the horizontal stabilizer on January 23, 1997.

On December 22, 1999, the altimeters and static system were tested and certified in accordance with FAR 91.411 (FAR part 43, appendix E), and the transponder was tested and certified in accordance with FAR 91.413 (FAR part 43, appendix F). The manager of the repair station that performed the pitot/static and transponder tests reported it is normal practice in the course of the static system test to first slightly pressurize the static system (about 200 feet altitude) and open the static system drains to expel any accumulated moisture.

According to production records, provided by Cessna Aircraft, the airplane was manufactured April 5, 1978, with optional equipment installed for flight in known icing conditions. Cessna drawing 5300960, titled "Kit Installation - Known Icing, Model 340," shows this equipment as heated static ports, an electrically heated windshield panel, surface de-ice boots, and propeller de-ice boots. According to the Cessna Pilot's Operating Handbook for the model 340A aircraft, an electrically heated pitot tube was standard equipment.

Also according to the production records, the aircraft did not come from the factory with flight instrumentation installed on the right-hand (copilot's) instrument panel and, according to the Cessna party representative, this means that aircraft would have been delivered with a single static system. The aircraft was equipped with an EA-401A encoding altimeter on the left-hand (pilot's) instrument panel and did have a standby altimeter installed on the right-hand panel. According to the operator, the right-hand panel instrumentation included an attitude indicator (artificial horizon), directional (heading) gyro instrument, airspeed indicator, altimeter, and rate-of-climb indicator. Entries in the aircraft logbook stated that "standby" directional gyro instrument and airspeed indicators were installed on the right panel on February 18, 1982. An attitude gyro instrument was installed on August 22, 1984.

According to the Cessna Pilot's Operating Handbook, there are three switches on the left side of the cockpit which operate the de-icing equipment; one for surface de-ice (boots), another for "Pitot Heat" and a third for "Stall and Vent Heat." The third switch, "Stall and Vent Heat,"

when turned on, supplies electrical power to the static vent heaters, the stall vane heaters, and the wing locker fuel tank vent heater. The "Pitot Heat" switch provides electrical power to the pitot tube heater element only. According to the Cessna Aircraft company party representative, the "Pitot Heat" switch and the "Stall and Vent Heat" switch are adjacent to one another on the switch panel. A supplement to the handbook describes the equipment and provides instructions for preflight functional testing of the heaters.

METEOROLOGICAL CONDITIONS

The chief flight instructor at Lenair Aviation reported that the pilot obtained a weather briefing and filed an instrument flight plan using Lenair's DUATs weather access computer before going to the aircraft.

According to the Factual Report of the Safety Board's Air Traffic Specialist (see Communications, below), at 0941, the pilot contacted San Diego Automated Flight Service Station (San Diego AFSS) and filed an instrument flight rules (IFR) flight plan departing John Wayne/Orange County, California, airport (SNA) "A S A P." The pilot requested a route via Seal Beach (SLI), Oceanside (OCN), and Julian (JLI) VORs (radio navigational aides), direct to the KUMBA intersection, direct to his destination of Calexico, California (CXL). Requested cruising altitude was 11,000 feet (msl) and estimated time of arrival at CXL was 1847. The flight plan indicated the airplane was equipped with an IFR certified GPS receiver and would cruise at a true airspeed of 200 knots. The pilot then requested a weather briefing. The San Diego AFSS specialist advised the pilot of conditions in the area, read weather observations along the requested route of flight, and said there would be "multiple layers of clouds west of the mountains." The specialist advised the pilot that winds at 11,000 feet were forecast to be "from the southwest, two four zero at twenty two knots," and advised that "the freezing level is also at eleven thousand."

COMMUNICATIONS

A Safety Board Air Traffic Control Specialist examined flight plan, weather, and Air Traffic Control (ATC) communications and automation data obtained from the Federal Aviation Administration (FAA) Los Angeles Air Route Traffic Control Center (Los Angeles Center) and Southern California Terminal Radar Approach Control (SoCal TRACON). Recorded radar data was obtained from Los Angeles Center and SoCal TRACON. Additional recorded search (primary) radar data was obtained from U.S. Air Force 84th Radar Evaluation Squadron (RADES). The Safety Board Specialist's factual report is attached.

According to the Specialist's report, the pilot filed an instrument flight rules (IFR) flight plan from John Wayne/Orange County Airport to his destination at Calexico via the Seal Beach, Oceanside, and Julian VOR navigation aides and thence via KUMBA intersection to Calexico, and filed to cruise at 11,000 feet. At 1015, the pilot was issued his clearance "as filed" and at 1031, was cleared for takeoff. After having been assigned two lower altitude restrictions during climb from John Wayne/Orange County, the pilot was cleared to climb and maintain 11,000 feet at 1038. At 1041:50, the aircraft's Mode C altitude return indicated that the aircraft was leveling at 11,000 feet when the aircraft was approximately 10 miles north of the Oceanside VOR and the Air Force RADES search radar height values also showed the aircraft at 11,000 feet. Between 1042 and 1046, both Mode C and RADES height values show the aircraft cruising at approximately 11,000 feet.

Between 1046 and 1056, RADES search radar height values showed the aircraft in a steady

descent from 11,000 feet to 5,600 feet while Mode C altitudes received at Los Angeles Center and SoCal TRACON indicated the aircraft was level at 11,000 feet. At 1055:49, when the pilot was handed off from SoCal TRACON to Los Angeles Center, the pilot checked in with the Center ". . . level at one one thousand." At 1057:28, the pilot asked the Center controller "what altitude you showing us at" to which the controller responded "well *(not) picking it up right now not receiving your mode c right now sir." At 1057:37, the pilot transmitted "o k we'd like to climb to vfr on top, our uh altimeter just went down to uh fifty three hundred." The controller approved the pilot's request to climb to VFR conditions on-top and, at 1057:54, the pilot responded "roger we're out." No further transmissions were received from the aircraft.

At 1048, while the aircraft was near Oceanside, the SoCal TRACON controller advised the pilot of reported icing conditions at 9,000 feet in the vicinity of the Julian VOR. At 1054, the controller advised another aircraft on the frequency that icing had been reported in the area between 8,000 and 10,000 feet.

WRECKAGE AND IMPACT INFORMATION

The accident site was in mountainous terrain across a large ravine on the east side of Oak Ridge (oriented north-south) about 1.25-miles west of the Julian VORTAC navigational aide. The terrain sloped downward about 45 degrees on the east side of the ridge into the ravine and then sloped upward about 45 degrees on the opposite (west-facing) side of the ravine. Both slopes were densely populated with Pine and Cedar trees typically 50 - 75 feet tall. All of the major component parts of the aircraft were identified at the accident site.

There were two areas of wreckage debris; one on the east face, but near the crest, of Oak Ridge at 5,300 feet (msl) and the second about 1,500 feet further east, southeast, and 300 feet lower, on the opposite (west-facing) side of the ravine. The second debris area, where the inboard wings and fuselage were located, was consumed by fire except for the empennage.

The first debris area, near the crest of Oak Ridge, was about 500 feet in diameter and contained widely scattered pieces of debris associated with the right and left wingtips of the aircraft. The tops of several trees were visibly damaged about 75 feet above their bases and several branches of freshly severed treetops were present in the debris field. Among the debris in this area was the right-hand wingtip, severed through the aileron midspan station, and with the majority of the tip fuel tank still attached. Major sections of the left tip fuel tank were also located in this area along with tip tank fairings and transfer fuel pumps. A paved road identified as the "AT&T access road" bisected this debris field. The center of this debris field is at latitude 33 degrees 08.63 minutes north and longitude 116 degrees 36.76 minutes west.

The second debris area, where the inboard wings, engines, and fuselage were located was at latitude 33 degrees 08.47 minutes north and longitude 116 degrees 36. 47 minutes west. The engines and propeller hubs were buried in the slope. The wings, cockpit, and cabin area of the aircraft were destroyed by impact and fire. The empennage, with its associated control surfaces attached, was damaged by impact but was not involved in the fire. There was no sooting or soot-traces on the empennage. The instruments, radios, and switches were destroyed by impact and fire except the pilot's altimeter and attitude gyro, which were located on the hillside near the fuselage but outside the fire area. The "Pitot Heat" and "Stall and Vent Heat" switches were destroyed.

The wreckage was further examined at the facilities of Aircraft Retrieval Service in Compton, California, on November 29, 2000. The airplane was destroyed forward of the rear pressure

bulkhead by impact and fire. The fuselage aft of the pressure bulkhead exhibited a shredded and torn appearance but was not involved in the fire. The horizontal and vertical stabilizer assemblies had impact damage but were intact. The aileron and elevator trim actuators were in the neutral position and the rudder trim actuator was in a position equal to 5 degrees tab-left. Three propeller blades were recovered; two from the right propeller and one from the left propeller. One blade exhibited melting near the tip and all three exhibited chordwise striations and torsional bending. One airspeed indicator dial was found loose in the debris. There was a radial scratch in the perimeter of the dial between 192 and 197 knots.

The left and right static ports with heating elements were present on two torn sections of the aft fuselage skin. Approximately 2 feet of the aluminum static pressure line remained attached to the left port and 8 inches to the right port. Both lines were positioned running upward and forward from the port toward the top, front of the aft fuselage. The outlet fitting on the right port was snug but could be rotated by hand. The outlet fitting on the left port was tight. Approximately 8 inches below each static port was an aluminum doubler riveted to the skin that closely resembled the doubler around the static ports. Nothing was connected to these lower doublers and the center hole in the doubler was filled with a bucked rivet. A section of wire number H34RD18 was identified, clamped to the skin near the left static port, which provided electrical power to the port heaters, and the ground wires were present although both wires were torn out of both heaters.

The rear pressure bulkhead, viewed from the rear, was destroyed by impact and fire at the 12 o'clock position but was intact at the sides and bottom. None of the static system plumbing remained near the 12 o'clock position although the plastic sump bottle was found loose in the wreckage debris with damage to both end fittings. At the 3 o'clock position of the bulkhead was one static pressure bulkhead feed-through fitting. No evidence of a second fitting was observed.

MEDICAL AND PATHOLOGICAL INFORMATION

Autopsies were performed by the San Diego County Medical Examiner, case numbers 00-02003 (Arends) and 00-02004 (Kropa).

Toxicology tissue samples of the pilot were taken during the autopsy for the FAA; however, the sample box was shipped in error to the FAA's San Diego Flight Standards District Office (FSDO) vice the FAA's Civil Aeromedical Institute in Oklahoma City, Oklahoma. Personnel at the San Diego FSDO did not appreciate the error until sufficient time elapsed that the samples were unusable.

The toxicology analysis of the pilot performed by the San Diego County Medical Examiner was negative for alcohol and drugs.

TESTS AND RESEARCH

The ARC Model EA-401A drum-pointer-type altimeter from the left (pilot's) instrument panel, serial number 6323, was examined at Otto's Instrument Service in Ontario, California, on January 9, 2000. According to the technician who assisted with the examination, the altimeter is an electrically powered, servo driven altimeter with an internal altitude encoder. The electrical power input is 28 volts, direct current (28 VDC), and powers the servo motors that move the encoder mechanism, the encoder electronics, and the altitude display on the dial. Positive 28VDC current is provided on one pin of the case electrical connector and chassis ground (negative) is carried on another. Another pin, which is not used in the Cessna 340

installation, is available to operate the altimeter at 14 VDC. The remaining pins on the electrical connector supply encoder output signals to the transponder. The technician pointed out that if electrical power is removed from the instrument, the altitude display stops at its present position, a flag appears over the altitude drum to alert the pilot of the power loss and encoded altitude output ceases. According to the technician, if Air Traffic Control was receiving encoded altitude information from the aircraft it means, among other things, that there had to be power available to the altimeter.

The forward end of the case exhibited compression (impact) damage and the electrical connector and static port opening were pushed inward. The glass was broken on the face of the altimeter, however, the dial was present. The Kollsman rollers were displaced to the side from the center of the display and indicated 29.93 inHg. The altitude drum was displaced from the center of the display window and the numbers 5300 were most near the window. The pointer was at the "8" position (80 feet).

When the case was removed, the chassis of the altimeter exhibited compression damage lengthwise from the dial end to the forward end of the chassis. The aneroid module exhibited impact damage, the aneroid was compressed and bent, and the output gear train to the servo sensors was discontinuous. The servo motor module was damaged, the motors were loose, and the output gear train was discontinuous. The altitude encoder module was visually intact, however, the electrical connector was pulled off the optical reader assembly. The altitude display module (dial) was loose within the chassis and the gear train was deformed and discontinuous at several locations. Functional testing was not possible. No evidence of preimpact failure was observed.

The ARC Model AS-895 autopilot altitude sensor, serial number 3121, was examined at the facilities of Mr. Doug Wilson in Redlands, California, on January 13, 2001. The sensor, from the tailcone of the aircraft, appeared externally undamaged except for a bend in the mounting flange. When connected to test equipment, the electronic signal output was about 100 millivolts when subjected to a static pressure change equal to 1 inch of water. The ARC service manual called for output between 738 and 902 millivolts. When the cover was removed, the aneroid capsule case was found distorted (elliptical) and its attaching bracket was deformed in the direction toward the front of the aircraft. When the aneroid capsule was removed from its case there was no impact damage visually evident and no visual evidence of moisture or corrosion.

ADDITIONAL INFORMATION

The aircraft wreckage was released to Mr. Stephen Lora, Claims Manager, USAIG, on January 18, 2001.

Pilot Information

Certificate:	Airline Transport; Flight Instructor; Commercial	**Age:**	61, Male
Airplane Rating(s):	Multi-engine Land; Single-engine Land	**Seat Occupied:**	Unknown
Other Aircraft Rating(s):	None	**Restraint Used:**	
Instrument Rating(s):	Airplane	**Second Pilot Present:**	Yes
Instructor Rating(s):	Airplane Multi-engine; Airplane Single-engine; Instrument Airplane	**Toxicology Performed:**	No
Medical Certification:	Class 1 Valid Medical--w/ waivers/lim.	**Last FAA Medical Exam:**	10/02/2000
Occupational Pilot:		**Last Flight Review or Equivalent:**	08/09/2000
Flight Time:	20000 hours (Total, all aircraft), 180 hours (Total, this make and model), 150 hours (Last 90 days, all aircraft), 73 hours (Last 30 days, all aircraft)		

Other Flight Crew Information

Certificate:	Commercial	**Age:**	33, Male
Airplane Rating(s):	Multi-engine Land; Single-engine Land	**Seat Occupied:**	Unknown
Other Aircraft Rating(s):	None	**Restraint Used:**	
Instrument Rating(s):	Airplane	**Second Pilot Present:**	Yes
Instructor Rating(s):	None	**Toxicology Performed:**	No
Medical Certification:	Class 2 Valid Medical--w/ waivers/lim.	**Last FAA Medical Exam:**	03/01/2000
Occupational Pilot:		**Last Flight Review or Equivalent:**	03/16/2000
Flight Time:	338 hours (Total, all aircraft), 5 hours (Last 90 days, all aircraft), 1 hours (Last 30 days, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Cessna	**Registration:**	N4347C
Model/Series:	340A 340A	**Aircraft Category:**	Airplane
Year of Manufacture:		**Amateur Built:**	No
Airworthiness Certificate:	Normal	**Serial Number:**	340A0538
Landing Gear Type:	Retractable - Tricycle	**Seats:**	6
Date/Type of Last Inspection:	01/19/2000, Annual	**Certified Max Gross Wt.:**	6390 lbs
Time Since Last Inspection:		**Engines:**	2 Reciprocating
Airframe Total Time:	3182 Hours as of last inspection	**Engine Manufacturer:**	Continental
ELT:	Installed, activated, did not aid in locating accident	**Engine Model/Series:**	TSIO-520-NB
Registered Owner:	MARKO FOAM PRODUCTS, INC.	**Rated Power:**	325 hp
Operator:	MARKO FOAM PRODUCTS, INC.	**Operating Certificate(s) Held:**	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Instrument Conditions	**Condition of Light:**	Day
Observation Facility, Elevation:	RNM, 1393 ft msl	**Distance from Accident Site:**	19 Nautical Miles
Observation Time:	1101 PDT	**Direction from Accident Site:**	233°
Lowest Cloud Condition:	Unknown	**Visibility**	10 Miles
Lowest Ceiling:	Broken / 700 ft agl	**Visibility (RVR):**	0 ft
Wind Speed/Gusts:	3 knots /	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	100°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	29 inches Hg	**Temperature/Dew Point:**	13°C / 11°C
Precipitation and Obscuration:			
Departure Point:	SANTA ANA, CA (SNA)	**Type of Flight Plan Filed:**	IFR
Destination:	CALEXICO, CA (CXO)	**Type of Clearance:**	IFR
Departure Time:	1031 PDT	**Type of Airspace:**	Class E

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):	RICHARD B PARKER	**Report Date:**	05/21/2002
Additional Participating Persons:	DERON N KONG; FAA FLT STNDS DIST OFFICE; SAN DIEGO, CA MICHAEL J GRIMES; TELEDYNE CONTINENTAL MOTORS; MOBILE, AL TODD SIGLER; CESSNA AIRCRAFT COMPANY; WICHITA, KS SAL PIAZZA; LENAIR AVIATION INC.; SANTA ANA, CA		
Publish Date:			
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