National Transportation Safety Board
Aviation Accident Final Report

Location:	Watertown, NY	**Accident Number:**	ERA10LA128
Date & Time:	02/01/2010, 1512 EST	**Registration:**	N121PB
Aircraft:	CESSNA 402C	**Aircraft Damage:**	Substantial
Defining Event:	Sys/Comp malf/fail (non-power)	**Injuries:**	7 None
Flight Conducted Under:	Part 135: Air Taxi & Commuter - Scheduled		

Analysis

The pilot of the scheduled passenger flight was conducting a visual approach to runway 25 at the destination airport in marginal visual meteorological conditions. As the airplane descended to the traffic pattern, the pilot noticed the airspeed decrease from 145 knots to 85 knots. The pilot applied full power but did not observe an increase in airspeed. He elected to continue the approach and, due to weather conditions, joined the traffic pattern for runway 7. It is likely that the pilot felt pressure to complete the flight due to the deteriorating weather conditions, rather than taking time to identify and correct the anomaly or to attempt to cross-reference with other instruments. When the pilot deployed the wing flaps and extended the landing gear, he noted that the airplane felt as though it was traveling faster than its indicated airspeed. The airplane touched down approximately 1,000 feet past the runway threshold and bounced. The pilot attempted to apply brakes, but reported that the braking action was "nil" due to runway contamination. The airplane continued down the runway, departed the paved surface, and came to rest 366 feet past the runway's end. Postaccident testing revealed that the pitot tubes were warm to the touch when the pitot heat switch was turned on. Unregulated air pressure was applied to the right pitot tube and to the left pitot line downstream of the tube. The corresponding airspeed indicators displayed needle movement with no leaks detected. Since no further examination of the pitot-static system was conducted, the cause of the airspeed anomaly 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 decision to continue the approach with a known anomaly with the left airspeed indicator. Contributing to the accident was an undetermined malfunction of the left airspeed indicator and the condition of the runway, resulting in decreased braking capability.

Findings

Aircraft	Indep instrument (clock, etc) - Malfunction (Factor)
Personnel issues	Decision making/judgment - Pilot (Cause)
Environmental issues	Snow/slush/ice covered surface - Effect on equipment (Factor)
Not determined	Not determined - Unknown/Not determined (Factor)

Factual Information

HISTORY OF FLIGHT

On February 1, 2010, about 1512 eastern standard time, a Cessna 402C, N121PB, operating as Cape Air flight 1805, was substantially damaged during a runway overrun at Watertown International Airport (ART), Watertown, New York. The airline transport pilot and the six passengers were not injured. Marginal visual meteorological conditions prevailed, and an instrument flight rules flight plan was filed for the scheduled passenger flight, which was operated under the provisions of Title 14 Code of Federal Regulations Part 135.

The flight departed from Albany International Airport (ALB), Albany, New York, and was destined for ART. According to the pilot, the initial cruise altitude was 6,000 feet above mean sea level (msl), and the flight was subsequently cleared to 7,000 feet msl by air traffic control (ATC) to remain above the cloud layer. As the flight approached ART, ATC issued radar vectors for the instrument landing system approach to runway 7, cleared it to descend to 3,600 feet msl, and then cleared it down to 2,000 feet msl. The airplane descended out of the clouds at 2,600 feet, on a northwest heading, and the pilot sighted the airport about 7 miles northeast of his position. He requested and was cleared for a visual approach to runway 25 at ART.

As the airplane descended to traffic pattern altitude, the pilot noticed that the airspeed had decreased from 140 knots to 85 knots. In response, he pushed the airplane's nose down and applied maximum engine power, but observed no increase in airspeed, and continued towards the airport at 85 knots indicated. He reported that clouds and snow squalls to the south and northeast of the airport obscured his view of the runway, and elected to land on runway 7 by overflying the airport and entering a modified left-hand traffic pattern. He stated that he considered climbing to a higher altitude in order to troubleshoot the airspeed anomaly; however, due to the weather conditions, he decided to land as soon as possible. In a statement to Federal Aviation Administration (FAA) inspectors, the pilot reported that the airplane was responsive to flight control inputs, and did not feel as though it was near its stall speed. He also reported that he did not cross-reference the airspeed indicator located on the right side of the instrument panel. The pilot did not report any anomalies to ATC.

The pilot stated that the airplane was on a "tight" left base leg for runway 7 when he extended the wing flaps to 15 degrees and extended the landing gear, which resulted in a reduction in airspeed. The pilot turned onto the final approach leg for runway 7 between 300 and 400 feet above ground level (agl). After the turn, he observed that the airspeed indicator still registered about 85 knots, but he felt that the groundspeed was much higher than 85 knots. When the airplane was on short final, the pilot extended the wing flaps to at least 20 degrees once the landing was assured.

The airplane touched down about 1,000 feet beyond the threshold of runway 7, and bounced slightly. The nose landing gear made runway contact about mid-field. After nose gear touchdown, the pilot applied the brakes, but observed the braking action to be "nil." The airplane continued to track along the runway, and departed the end of the paved surface onto the snow-covered terrain. After the airplane stopped, the pilot secured the magnetos, master switch, and alternators, and he and the passengers exited via the cockpit and cabin doors. He stated that he was wearing gloves, and while securing the switches he may have inadvertently switched the pitot heat and stall warning vane heat switches off as well. The pilot stated that after the accident, airport personnel told him that was there was approximately 1/2 inch of

snow on the runway at the time of the overrun.

PERSONNEL INFORMATION

FAA records indicated that the pilot held an airline transport certificate with airplane single- and multi-engine land ratings, and several type ratings. His most recent FAA first-class medical certificate was issued in November 2009. The pilot reported that he had 8,223 total hours of flight experience, including 1,374 hours in the accident airplane make and model. He reported 132 hours in the airplane in the 90 days prior to the accident, and 33 hours in the 30 days prior to the accident.

AIRPLANE INFORMATION

FAA records indicated that the airplane was manufactured in 1981, and that it was first registered to the current owner, Hyannis Air Leasing, in 1992. It was equipped with two Teledyne Continental TSIO-520 series 325-hp piston engines, with three-bladed, all-metal propellers. The airplane's most recent inspection was conducted on January 23, 2010, and the airplane had accumulated 35 hours in service since that date. The airplane had accumulated a total time in service (TT) of 27,611 hours at the time of the accident. The left engine had accumulated a TT of 2,456 hours, and the right engine had accumulated a TT of 2,273 hours. According to the pilot, the airplane was not equipped with anti-skid braking or reversible-pitch propellers.

METEOROLOGICAL INFORMATION

The 1512 automated weather observation at ART reported winds from 240 degrees at 10 knots, 3 miles visibility in light snow, scattered clouds at 2,400 feet agl, broken cloud layer at 3,500 feet agl, overcast cloud layer at 4,700 feet agl, temperature -6 degrees C, dew point -7 degrees C, and an altimeter setting of 30.16 inches of mercury. Recorded observations indicated continuous snowfall that started about 2 hours prior to the accident.

AIRPORT INFORMATION

FAA records indicated that ART was a non-towered airport equipped with two runways, designated 07-25 and 10-28. Runway 7-25 was grooved asphalt, and measured 5,000 feet by 150 feet. Airport elevation was listed as 325 feet above mean sea level. Three instrument approach procedures (IAP) were published for runway 7, and no IAPs were published for the other runways.

WRECKAGE AND IMPACT INFORMATION

Two FAA inspectors responded to the scene the morning after the accident. The airplane was still located where it came to rest, 366 feet beyond the departure end of runway 7. The airplane remained upright, and all three landing gear had either collapsed or fracture-separated from the airplane. Both main landing gear tires exhibited flat-spotting. The skin and structure in the proximity of the nose landing gear exhibited substantial crush and tearing damage, and all six propeller blades were bent aft. The two pitot tubes, located on either side of the airplane's nose, remained attached to the fuselage, but were buried in snow. Approximately 600 pounds of fuel remained on board the airplane.

The inspectors reported that many of the cockpit switches remained on, but that the de-ice boots, stall warning vane, leading edge light, and pitot heat switches were in the "OFF" position. These switches were located in close proximity to one another on the left side of the

instrument panel.

The airplane was equipped with two airspeed indicators (ASIs), one on the left instrument panel, and one on the right instrument panel. Each ASI was independently plumbed to a dedicated pitot tube and set of static pressure ports. A single pitot heat switch in the cockpit activated the pitot heat for both pitot tubes. The pitot heat system was field tested, and both tubes were observed to warm to the touch when the system was switched on.

ADDITIONAL INFORMATION

After the inspectors examined the airplane in the field, it was lifted and transported to a hangar for additional examination. Unregulated air pressure was applied to the right pitot tube; the ASI needle moved to its maximum indication, and no system leaks were detected. The same test was attempted with the left pitot tube, but the left ASI did not respond. Examination indicated that a plastic line from the left pitot tube to the left ASI was severed at the point where it passed through airplane structure that was deformed by the impact. Introduction of air pressure into the severed line for the left pitot tube yielded ASI needle movement, and no leaks were detected. No further examination was performed of the pitot system or its components.

According to the pilot's operating handbook (POH), an independent, second pitot system was used when the airplane was equipped with copilot's instruments. This second system allowed for a second presentation of airspeed pitot pressure. Pitot heat for the additional pitot head was controlled by an additional pitot heat switch adjacent to the standard pitot heat switch.

The POH also stated that in the event of an airspeed indicator anomaly, if only the airspeed indicator was affected, it was reasonable to assume that a pitot tube blockage had occurred. If the possibility of pitot source icing was present, activation of the pitot heat switch would clear the blockage. The POH further instructed the pilot to reference the additional copilot's instruments or optional angle-of-attack indicator for airspeed information until a reliable airspeed indication could be obtained. If the airplane was not equipped with these optional systems, the pilot was instructed to fly using attitude and power references. It was not determined if the accident airplane was equipped with an angle-of-attack indicator.

According to information provided by the manufacturer, there were no service bulletins or service information letters regarding the pitot-static system for the accident airplane make and model.

The accident pilot recounted a previous event he had heard about through other company pilots, wherein a similar airspeed anomaly was observed in a newly-painted airplane. He stated that the reason for the anomaly was attributed to paint chips in the pitot-static system. He further noted that the accident airplane was painted prior to the accident. According to the operator, the accident airplane was painted on November 4, 2009. At the time of the accident, the airplane had flown 336 hours since completion of the painting. The operator stated that they had no records of a pitot-static malfunction that had been attributed to foreign objects such as paint chips found within the system.

History of Flight

Approach	Sys/Comp malf/fail (non-power) (Defining event)
Landing-landing roll	Runway excursion

Pilot Information

Certificate:	Airline Transport	**Age:**	46, Male
Airplane Rating(s):	Multi-engine Land; Single-engine Land	**Seat Occupied:**	Left
Other Aircraft Rating(s):	None	**Restraint Used:**	Seatbelt, Shoulder harness
Instrument Rating(s):	Airplane	**Second Pilot Present:**	No
Instructor Rating(s):	None	**Toxicology Performed:**	No
Medical Certification:	Class 1 Without Waivers/Limitations	**Last Medical Exam:**	11/19/2009
Occupational Pilot:	Yes	**Last Flight Review or Equivalent:**	08/27/2009
Flight Time:	8227 hours (Total, all aircraft), 1374 hours (Total, this make and model)		

Aircraft and Owner/Operator Information

Aircraft Manufacturer:	CESSNA	**Registration:**	N121PB
Model/Series:	402C	**Aircraft Category:**	Airplane
Year of Manufacture:		**Amateur Built:**	No
Airworthiness Certificate:	Normal	**Serial Number:**	402C0507
Landing Gear Type:	Retractable - Tricycle	**Seats:**	10
Date/Type of Last Inspection:	01/23/2010, AAIP	**Certified Max Gross Wt.:**	6850 lbs
Time Since Last Inspection:		**Engines:**	2 Reciprocating
Airframe Total Time:	27611 Hours	**Engine Manufacturer:**	CONT MOTOR
ELT:	Installed, not activated	**Engine Model/Series:**	TSIO-520 SER
Registered Owner:	HYANNIS AIR LEASING INC	**Rated Power:**	325 hp
Operator:	HYANNIS AIR LEASING INC	**Air Carrier Operating Certificate:**	Commuter Air Carrier (135)
Operator Does Business As:	Cape Air	**Operator Designator Code:**	HYIA

Meteorological Information and Flight Plan

Observation Facility, Elevation:	ART, 325 ft msl	**Observation Time:**	1512 EST
Distance from Accident Site:	0 Nautical Miles	**Condition of Light:**	Day
Direction from Accident Site:		**Conditions at Accident Site:**	Visual Conditions
Lowest Cloud Condition:	Scattered / 2400 ft agl	**Temperature/Dew Point:**	-6°C / -8°C
Lowest Ceiling:	Broken / 3500 ft agl	**Visibility**	3 Miles
Wind Speed/Gusts, Direction:	10 knots, 240°	**Visibility (RVR):**	
Altimeter Setting:	30.16 inches Hg	**Visibility (RVV):**	
Precipitation and Obscuration:	Light - Snow; Mist		
Departure Point:	Albany, NY (ALB)	**Type of Flight Plan Filed:**	IFR
Destination:	Watertown, NY (ART)	**Type of Clearance:**	IFR
Departure Time:	1358 EST	**Type of Airspace:**	

Airport Information

Airport:	Watertown International (ART)	**Runway Surface Type:**	Asphalt
Airport Elevation:	325 ft	**Runway Surface Condition:**	Snow
Runway Used:	07	**IFR Approach:**	Visual
Runway Length/Width:	5000 ft / 150 ft	**VFR Approach/Landing:**	Traffic Pattern

Wreckage and Impact Information

Crew Injuries:	1 None	**Aircraft Damage:**	Substantial
Passenger Injuries:	6 None	**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	7 None		

Administrative Information

Investigator In Charge (IIC):	Michael C Huhn	**Adopted Date:**	01/18/2012
Additional Participating Persons:	Joe Yacko; FAA/FSDO; Albany, NY		
Publish Date:	01/18/2012		
Investigation Docket:	http://dms.ntsb.gov/pubdms/search/dockList.cfm?mKey=75328		