Aviation Investigation Final Report

Location:	Daytona Beach, Florida	**Accident Number:**	ERA18LA164
Date & Time:	June 9, 2018, 15:00 Local	**Registration:**	N21161
Aircraft:	Piper PA 44	**Aircraft Damage:**	Substantial
Defining Event:	Loss of control in flight	**Injuries:**	2 Minor
Flight Conducted Under:	Part 91: General aviation - Instructional		

Analysis

The flight instructor stated that he and the private pilot-receiving instruction, who had the controls, informally checked the weather before departing for the cross-country instructional flight but that they did not obtain an official weather briefing. The flight was operating on an instrument approach in instrument meteorological conditions, which included thunderstorms, frequent lightning, and low-level wind shear advisories in effect at the destination airport. A tower controller at the destination airport issued the flight a local instrument clearance and provided wind and supplemental weather information, which included wind from 310° at 14 knots, gusting to 20 knots; a low-level windshear advisory, which included wind from 320° at 15 knots and a 15-knot gain 1 mile from the end of the runway. The controller also advised the pilot that the visibility was probably 1 mile in “that precipitation" and that there was “frequent lightning cloud to ground.” During the approach, the airplane began encountering rain, which increased in intensity as the airplane neared the final approach fix (FAF). Shortly after passing the FAF, when the airplane was about 800 ft mean sea level, the controller issued a low-altitude alert. The flight instructor took the controls, added full power, and attempted to climb the airplane; however, it continued descending while about 90 knots throughout the descent and upon impact. The airplane impacted houses and then came to rest inverted in a retention pond.

The flight instructor noted that there were thunderstorms east of the destination airport when the flight began; however, he did not anticipate their potential impact on the flight. While in-flight, both pilots failed to identify the frequent lightning and low-level windshear advisory as a severe weather hazard and continued the approach into an area of thunderstorm activity instead of diverting to an alternate airport.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be:

The pilots' improper in-flight weather evaluation and decision to continue the approach, which resulted in an encounter with a thunderstorm, a loss of airplane control, and collision with terrain. Contributing to the accident was the flight instructor's inadequate preflight weather evaluation.

Findings

Personnel issues	Weather planning - Instructor/check pilot
Personnel issues	Decision making/judgment - Instructor/check pilot
Personnel issues	Decision making/judgment - Pilot
Personnel issues	Aircraft control - Instructor/check pilot
Environmental issues	Thunderstorm - Effect on equipment
Aircraft	Descent/approach/glide path - Attain/maintain not possible

Factual Information

History of Flight

Prior to flight	Preflight or dispatch event
Approach-IFR final approach	Windshear or thunderstorm
Approach-IFR final approach	Loss of control in flight (Defining event)
Approach-IFR final approach	Collision with terr/obj (non-CFIT)

On June 9, 2018, about 1500 eastern daylight time, a Piper PA-44-180 airplane, N21161, was substantially damaged when it was involved in an accident near Daytona Beach International Airport (DAB), Daytona Beach, Florida. The flight instructor and pilot-receiving-instruction sustained minor injuries. The flight was operated as a Title 14 *Code of Federal Regulations* Part 91 local instructional flight.

The flight instructor stated he and the pilot-receiving-instruction, who had the controls, departed DAB about 1400 in visual flight rules conditions. They practiced maneuvers and then landed at Flagler Executive Airport (FIN), Palm Coast, Florida. After departing FIN, a DAB tower controller issued the flight a local instrument clearance and provided wind and supplemental weather information, which included wind from 310° at 14 knots, gusting to 20 knots. The controller also issued a low-level windshear advisory, which included wind from 320° at 15 knots and a 15-knot gain 1 mile from the end of the runway. The controller also advised the pilot that the visibility was probably 1 mile in “that precipitation" and that there was “frequent lightning cloud to ground.” During the approach, the airplane encountered rain, which increased in intensity as the airplane neared the final approach fix (FAF). Shortly after passing the FAF and while the airplane was about 800 ft mean sea level, a DAB tower controller issued a low-altitude alert. The instructor took the flight controls, added full power, and attempted to climb the airplane. It continued descending while about 90 knots throughout the descent and upon impact with houses about 4 miles north of DAB. The airplane then came to rest inverted in a retention pond. Both wings outboard of the engines were separated.

The flight instructor stated they informally checked the weather before departing but did not obtain an official weather briefing before the flight. He further stated that thunderstorms were an everyday occurrence in the afternoon. When they departed FIN the storms were east of DAB, but they moved quicker than they anticipated.

A convective SIGMET advisory was valid at the time of the accident, and it warned of a line of severe thunderstorms about 20 miles wide with cloud tops above 45,000 ft above ground level (agl), hail to 1 inch, and possible wind gusts to 50 knots. A Center Weather Service Unit Center Weather Advisory was valid at the time of the accident, and it warned of an area of scattered developing thunderstorms with cloud tops to 40,000 ft agl and moderate-to-heavy precipitation.

Base reflectivity scans from around the time of the accident indicated very heavy rainfall and possible hail. Two hundred fifty-five lightning flashes occurred around the accident site between 1445 and 1505;

the closest lightning occurred within 1,000 ft of the accident flight. See figure 1 for the base reflectivity scan from 1501.

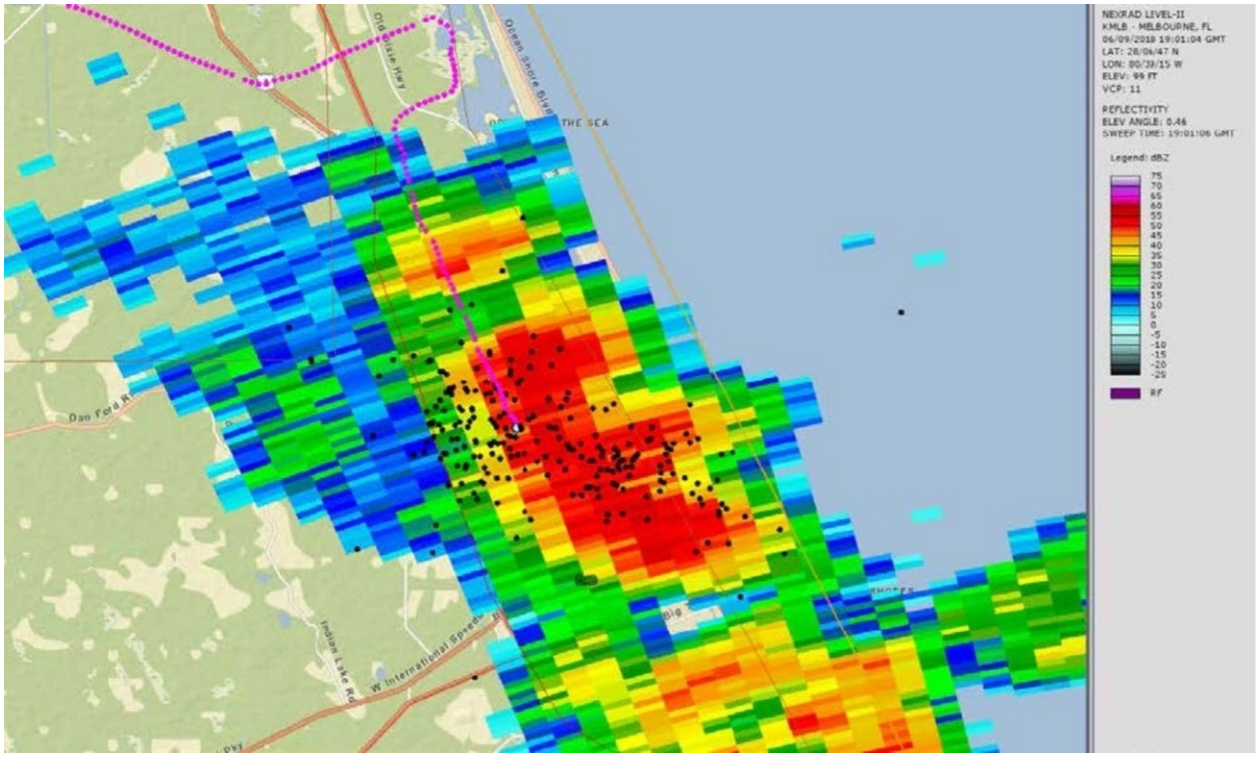

Figure 1. Reflectivity scan at 1501 with the air traffic control flight track data points in pink and the lightning flashes as black dots.

The National Weather Service issued an amended terminal aerodrome forecast (TAF) at 1416, which was valid at the time of the accident and included temporary conditions between 1500 and 1700 ft agl of variable winds at 15 knots, gusting to 25 knots; 2 miles visibility; thunderstorm and heavy rain; and a broken ceiling of cumulonimbus clouds at 2,000 ft agl.

At 1444, the weather conditions reported at DAB, which was 4 miles from the accident site, included wind variable at 6 knots; visibility 9 statute miles; thunderstorms; cumulonimbus clouds at 2,500 ft agl; broken clouds at 4,100, 7,500, and 25,000 ft agl; temperature 28°C; dew point 23°C; and an altimeter setting of 30.09 inches of mercury (inHg).

At 1453, the weather conditions reported at DAB included wind from 300° at 14 knots, gusting to 19 knots; visibility 9 statute miles; thunderstorms; scattered cumulonimbus clouds at 2,500 ft agl; broken ceiling at 4,100 ft agl; broken clouds at 7,500 and 25,000 ft agl; temperature 27°C; dew point 22°C; and an altimeter setting of 30.09 inHg.

Two METARs issued by DAB just before and after the accident included lightning in the area farther than 10 miles and but less than 30 miles from the center of the airport and frequent in-cloud and cloud-to-ground lightning.

The FAA Advisory Circular AC 00-24C, "Thunderstorms," issued February 19, 2013, provides guidance to pilots on thunderstorm hazards and avoidance. The AC states that all thunderstorms “have conditions that are a hazard to aviation.

The following guidance is included for avoiding thunderstorms:

Chapter 10, “DOS AND DON'TS OF THUNDERSTORM AVOIDANCE.,” section A, “Thunderstorm Avoidance,” states, in part, the following:

> *Never regard any thunderstorm lightly, even when radar observers report the echoes are of light intensity. Avoiding thunderstorms is the best policy. Following are some dos and don'ts of thunderstorm avoidance:*
>
> *(1) Don't land or takeoff in the face of an approaching thunderstorm. A sudden gust front of low-level turbulence could cause loss of control.*
>
> *(17) Do regard as extremely hazardous any thunderstorm with top 35,000 ft or higher whether the top is visually sighted or determined by radar….*
>
> *(19) Do divert and wait out the thunderstorms on the ground if unable to navigate around an area of thunderstorms.*

Pilot Information

Certificate:	Commercial; Flight instructor; Private	**Age:**	35,Male
Airplane Rating(s):	Single-engine land; Multi-engine land	**Seat Occupied:**	Right
Other Aircraft Rating(s):	None	**Restraint Used:**	3-point
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 Without waivers/limitations	**Last FAA Medical Exam:**	November 11, 2017
Occupational Pilot:	Yes	**Last Flight Review or Equivalent:**	November 9, 2017
Flight Time:	700 hours (Total, all aircraft), 114.5 hours (Total, this make and model), 611.5 hours (Pilot In Command, all aircraft), 261.7 hours (Last 90 days, all aircraft), 92.4 hours (Last 30 days, all aircraft), 5.5 hours (Last 24 hours, all aircraft)		

Student pilot Information

Certificate:	Private	**Age:**	30,Male
Airplane Rating(s):	Single-engine land; Multi-engine land	**Seat Occupied:**	Left
Other Aircraft Rating(s):		**Restraint Used:**	3-point
Instrument Rating(s):	Airplane	**Second Pilot Present:**	Yes
Instructor Rating(s):	None	**Toxicology Performed:**	No
Medical Certification:	Class 1 Without waivers/limitations	**Last FAA Medical Exam:**	July 11, 2017
Occupational Pilot:	Yes	**Last Flight Review or Equivalent:**	May 17, 2018
Flight Time:	211.1 hours (Total, all aircraft), 32.2 hours (Total, this make and model), 115.9 hours (Pilot In Command, all aircraft), 101.5 hours (Last 90 days, all aircraft), 29.2 hours (Last 30 days, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Piper	**Registration:**	N21161
Model/Series:	PA 44 180	**Aircraft Category:**	Airplane
Year of Manufacture:	1978	**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	44-7995041
Landing Gear Type:	Retractable - Tricycle	**Seats:**	4
Date/Type of Last Inspection:	May 24, 2018 100 hour	**Certified Max Gross Wt.:**	3800 lbs
Time Since Last Inspection:		**Engines:**	2 Reciprocating
Airframe Total Time:	11424 Hrs as of last inspection	**Engine Manufacturer:**	Lycoming
ELT:	C91A installed, activated, did not aid in locating accident	**Engine Model/Series:**	O-360-E1A6D
Registered Owner:		**Rated Power:**	180 Horsepower
Operator:		**Operating Certificate(s) Held:**	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Instrument (IMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	KDAB,41 ft msl	**Distance from Accident Site:**	4 Nautical Miles
Observation Time:	14:53 Local	**Direction from Accident Site:**	154°
Lowest Cloud Condition:	Scattered / 2500 ft AGL	**Visibility**	9 miles
Lowest Ceiling:	Broken / 4100 ft AGL	**Visibility (RVR):**	
Wind Speed/Gusts:	14 knots / 19 knots	**Turbulence Type Forecast/Actual:**	/ None
Wind Direction:	300°	**Turbulence Severity Forecast/Actual:**	/ N/A
Altimeter Setting:	30.09 inches Hg	**Temperature/Dew Point:**	27°C / 22°C
Precipitation and Obscuration:	Moderate - Thunderstorm -		
Departure Point:	Palm Coast, FL (FIN)	**Type of Flight Plan Filed:**	None
Destination:	Daytona Beach, FL (DAB)	**Type of Clearance:**	IFR
Departure Time:	14:45 Local	**Type of Airspace:**	Class C

Airport Information

Airport:	DAYTONA BEACH INTL DAB	**Runway Surface Type:**	Water
Airport Elevation:	34 ft msl	**Runway Surface Condition:**	Water-calm
Runway Used:		**IFR Approach:**	RNAV
Runway Length/Width:		**VFR Approach/Landing:**	None

Wreckage and Impact Information

Crew Injuries:	2 Minor	**Aircraft Damage:**	Substantial
Passenger Injuries:		**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	2 Minor	**Latitude, Longitude:**	29.239166,-81.078887

Administrative Information

Investigator In Charge (IIC):	Hill, Millicent		
Additional Participating Persons:	Michael Corrigan; FAA FSDO; Orlando, FL		
Original Publish Date:	August 24, 2021	**Investigation Class:**	3
Note:	The NTSB did not travel to the scene of this accident.		
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=97432		