

National Transportation Safety Board

Office of Aviation Safety

Washington, DC 20594



ERA23FA270

METEOROLOGY

Specialist's Factual Report

September 8, 2023

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A. ACCIDENT

Location: Ebensburg, Pennsylvania
Date: June 17, 2023
Time: 0506 eastern daylight time
0906 coordinated universal time (UTC)
Airplane: Piper PA-30; Registration: N7628Y

B. METEOROLOGY SPECIALIST

Paul Suffern
Senior Meteorologist
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C. DETAILS OF THE INVESTIGATION

The NTSB's Senior Meteorologist did not travel for this investigation but gathered all data remotely. Data for this investigation were collected from official National Oceanic and Atmospheric Administration (NOAA) National Weather Service (NWS) sources including the Weather Prediction Center (WPC) and the National Center for Environmental Information (NCEI). This Specialist's Factual Report contains the meteorological factors pertinent to the weather surrounding the accident time. All times are eastern daylight time (EDT) and are based upon the 24-hour clock, where local time is -4 hours from UTC. Directions are referenced to true north and distances are in nautical miles. Heights are above mean sea level (msl) unless otherwise noted. Visibility is in statute miles and fractions of statute miles. NWS station identifiers use the standard International Civil Aviation Organization 4-letter station identifiers versus the International Air Transport Association 3-letter identifiers, which deletes the initial country code designator "K" for U.S. airports.

The accident site was located at approximate latitude 40.4311° N, longitude 78.7714° W, and elevation of 2,085 feet (ft).

D. FACTUAL INFORMATION

1.0 Synoptic Situation

The synoptic or large-scale migratory weather systems influencing the area were documented using standard NWS charts issued by the National Center for Environmental Prediction and the WPC, located in College Park, Maryland. These are the base products used in describing synoptic weather features and in the creation of forecasts and warnings for the NWS. Reference to these charts can be found in the Federal Aviation Administration (FAA) "Aviation Weather Handbook", FAA-H-8083-28.¹

1.1 Surface Analysis Chart

The NWS Surface Analysis Chart centered over the mid-Atlantic United States for 0500 EDT is provided as figure 1 with the location of the accident site within the black circle. The chart depicted two low-pressure systems at 1003- and 1001-hectopascals (hPa), respectively, located off the New Jersey Atlantic coast associated with an occluded frontal system. Broad high-pressure systems were located over northern Michigan and southern Wisconsin at 1016-hPa. Further to the north a trough² was located extending east to west from Lake Ontario to northern Lake Michigan.

The station model closest to the accident site depicted an air temperature of 57 degrees Fahrenheit (°F), dew point temperature of 57°F, overcast skies, mist, and a west wind at 5 knots. Mist and overcast were also reported at all other surrounding station models in western Pennsylvania.

¹ [FAA-H-8083-28](#)

² Trough - An elongated area of relatively low atmospheric pressure or heights.

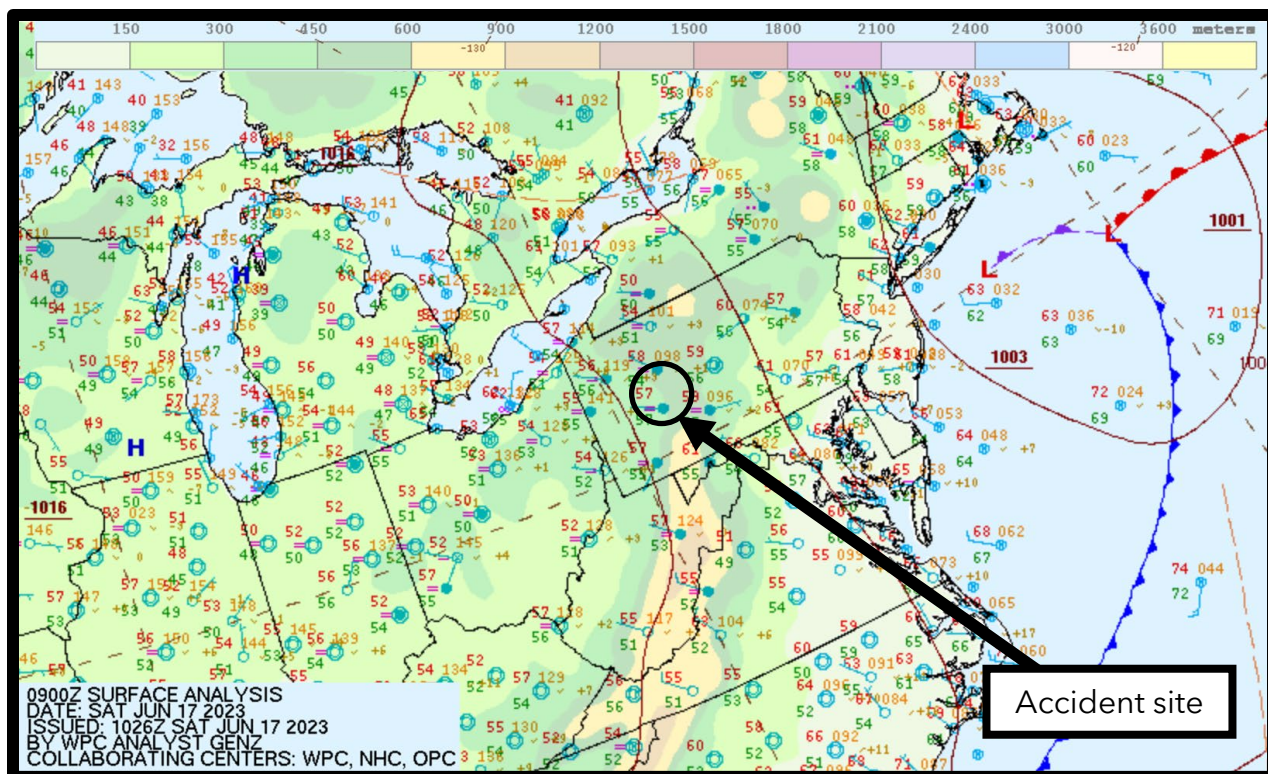


Figure 1. NWS Surface Analysis Chart for 0500 EDT.

1.2 Upper Air Charts

The NWS Storm Prediction Center (SPC) Constant Pressure Charts for 0800 EDT at 925-, 850-, and 700-hPa are presented in figures 2 through 4. The charts depicted a vertically stacked low-pressure center over the northeastern United States. The 925-hPa constant pressure chart depicted a north wind around 15 knots (figure 2) increasing to a 30 knot northwest wind by 700-hPa (figure 4).

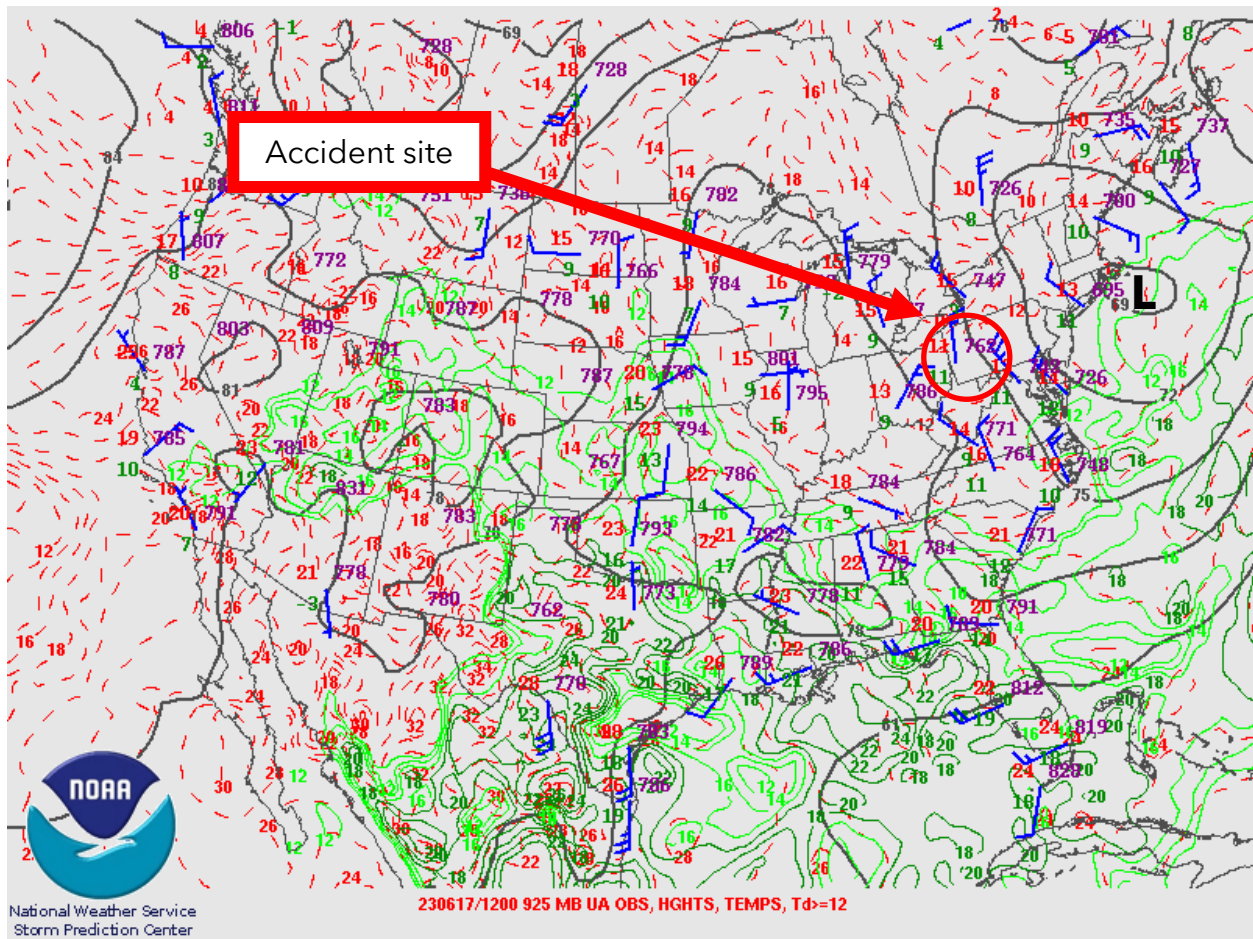


Figure 2. 925-hPa Constant Pressure Chart for 0800 EDT.

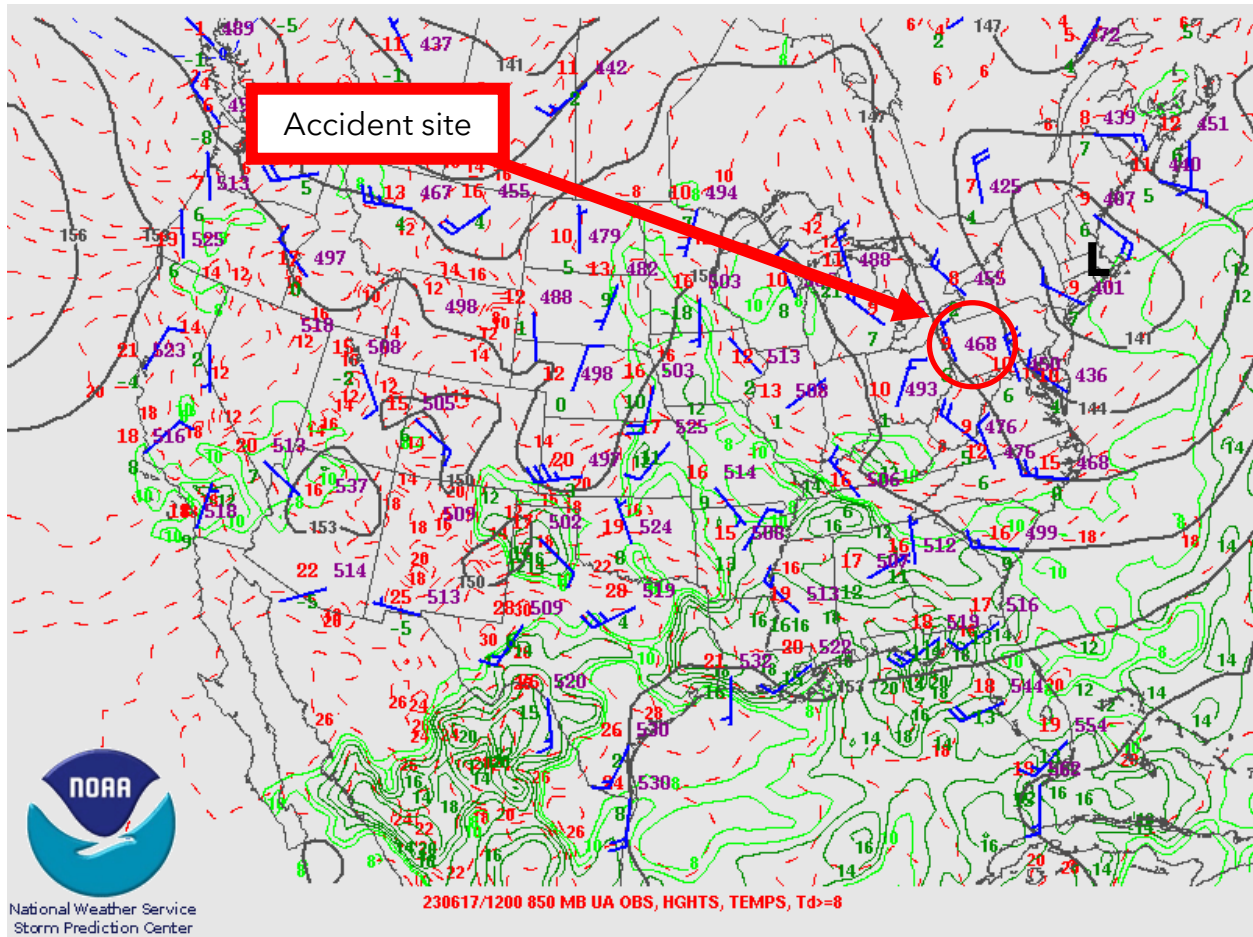


Figure 3. 850-hPa Constant Pressure Chart for 0800 EDT.

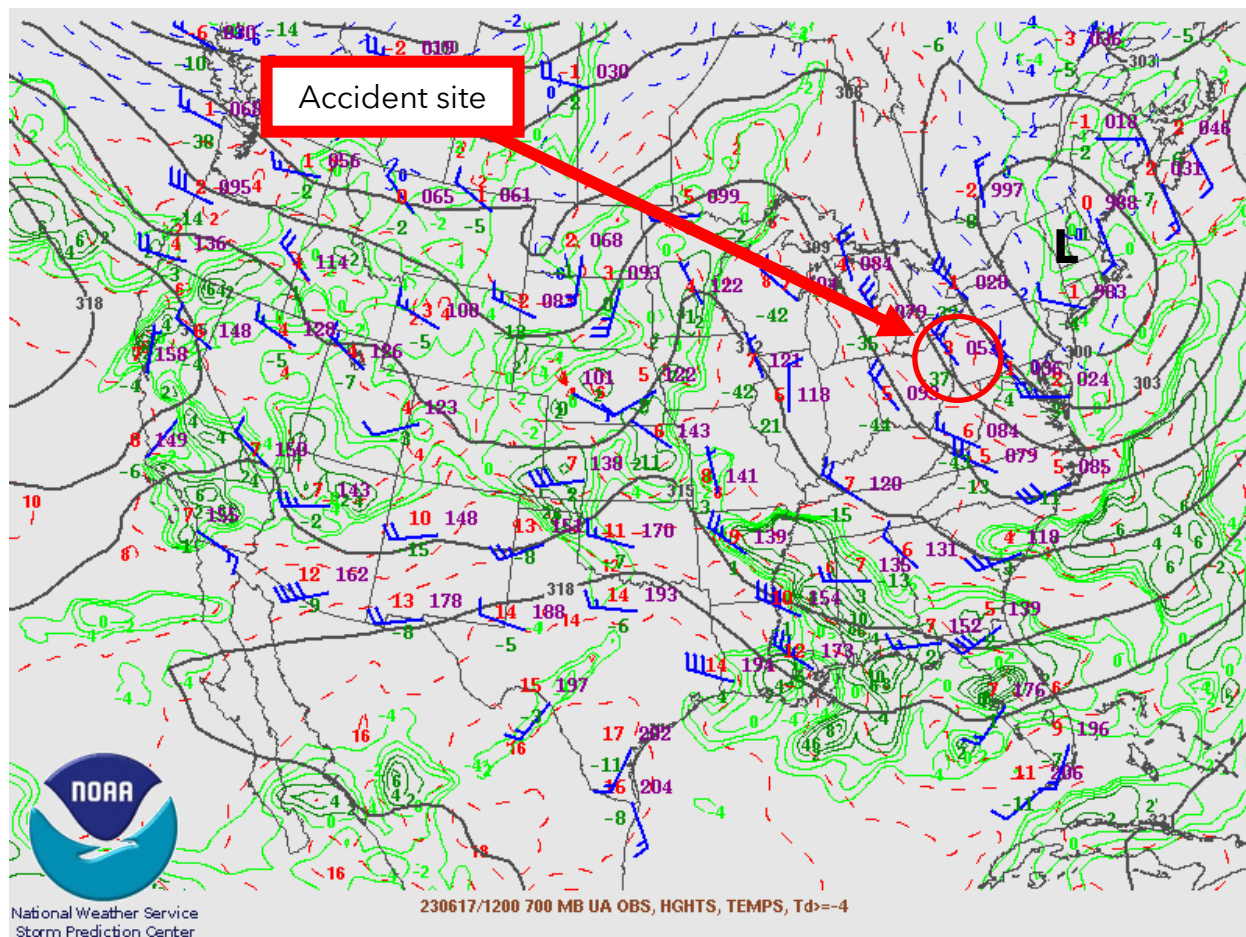


Figure 4. 700-hPa Constant Pressure Chart for 0800 EDT.

2.0 Surface Observations

The area surrounding the accident site was documented using official Aviation Routine Weather Reports (METARs) and Special Reports (SPECIs)³. The following observations were taken from standard code and are provided in plain language. Figure 5 is a local sectional chart with the accident site and the closest weather reporting location marked. A magnetic variation⁴ of 10° west was indicated over the area.

³ Latest criteria for SPECIs can be found in the Federal Meteorological Handbook: [Federal Meteorological Handbook Number 1, Surface Weather Observations and Reports \(icams-portal.gov\)](https://www.federalmeteorologicalhandbook.com/)

⁴ Magnetic variation - The angle (at a particular location) between magnetic north and true north. Latest measurement taken from <https://skyvector.com/>

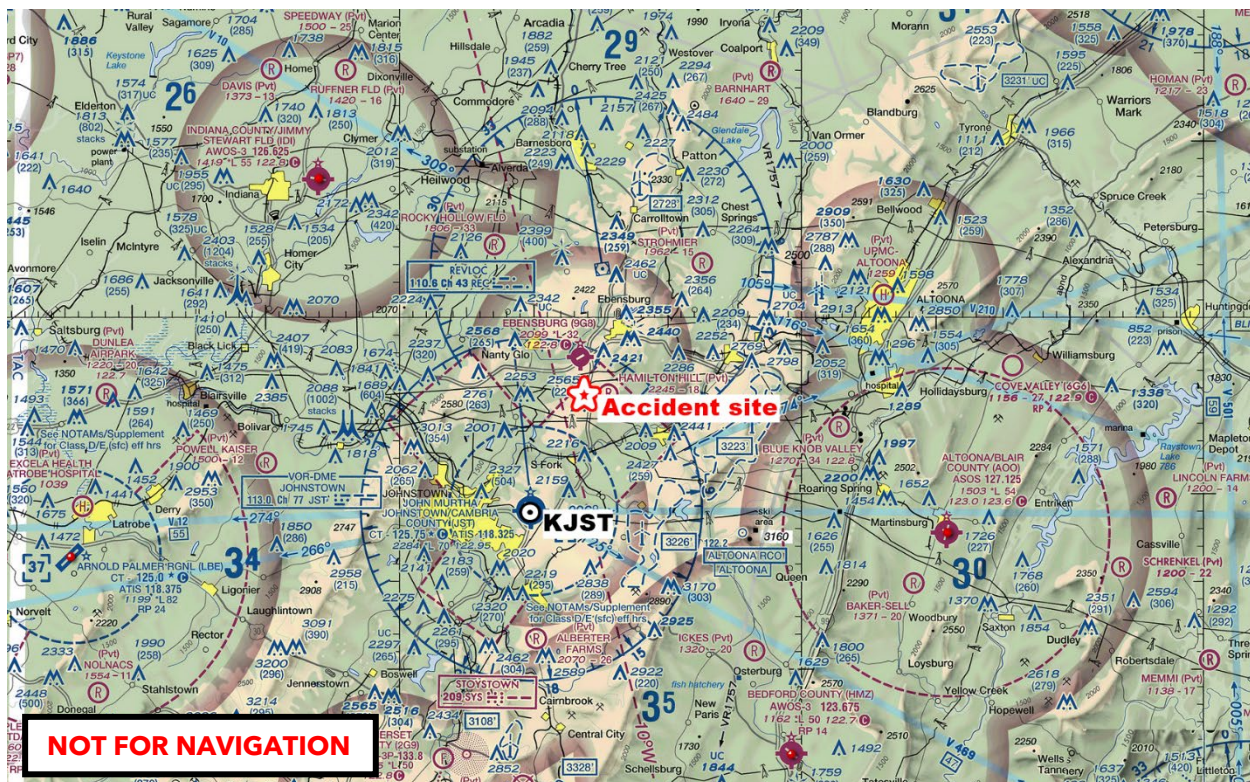


Figure 5. FAA sectional aeronautical chart of the accident area with the location of the accident site and surface observation site noted.

John Murtha Johnstown/Cambria County Airport (KJST) had the closest official weather station to the accident site. KJST had an Automated Surface Observing System (ASOS⁵) and its longline⁶ reports were not augmented. The KJST ASOS was located 8 miles south-southwest of the accident site (figure 5), at an elevation of 2,284 ft, and issued the following observations surrounding the accident time:⁷

⁵ ASOS - Automated Surface Observing System is equipped with meteorological instruments to observe and report wind, visibility, weather phenomena, ceiling, temperature, dewpoint, altimeter, and barometric pressure. ASOS are maintained by the NWS.

⁶ "Longline" refers to the dissemination of weather observations with the intent that they are available in near-real time to national databases and accessible to the general global public from a large number of vendors. This does not include public accessibility to observations from a reporting station's Very High Frequency (VHF; line-of-site) or telephone broadcast, where applicable. Longline dissemination of weather observations is the primary vehicle through which the weather observations are distributed.

⁷ The bold sections of products in this report are intended to highlight the text that directly reference the weather conditions that affected the accident region around the accident time. The local times in this section next to the METARs are provided for quick reference between UTC and local times.

[0345 EDT] SPECI KJST 170745Z AUTO 31012KT 1SM BR VV002 12/12
A2984 RMK AO2 T01220122

[0354 EDT] METAR KJST 170754Z AUTO 31011KT 1 3/4SM BR OVC002
12/12 A2985 RMK AO2 SLP101 T01220122

[0406 EDT] SPECI KJST 170806Z AUTO 30009KT 2 1/2SM BR OVC002
12/12 A2985 RMK AO2 T01220122

[0420 EDT] SPECI KJST 170820Z AUTO 30012KT 1 3/4SM BR OVC002
12/12 A2985 RMK AO2 T01220122

**[0454 EDT] METAR KJST 170854Z AUTO 30009KT 1 1/2SM BR
OVC002 12/12 A2985 RMK AO2 SLP104 T01220122 55000**

ACCIDENT TIME 0506 EDT

**[0510 EDT] SPECI KJST 170910Z AUTO 30010KT 1/2SM FG VV002
12/12 A2986 RMK AO2 T01220122**

[0526 EDT] SPECI KJST 170926Z AUTO 31010KT 1/4SM FG VV002
12/12 A2987 RMK AO2 T01220122

The bold type observations decoded in plain language were as follows:

KJST weather at 0454 EDT, automated, wind from 300° at 9 knots, visibility 1 1/2 miles, mist, overcast ceiling at 200 ft above ground level (agl), temperature of 12° Celsius (C), dew point temperature of 12°C, and an altimeter setting of 29.85 inches of mercury (inHg). Remarks, automated station with a precipitation discriminator, sea level pressure 1010.4 hPa, temperature 12.2°C, dew point temperature 12.2°C, 3-hourly pressure tendency fallen then risen 0.0-hPa.

KJST weather at 0510 EDT, automated, wind from 300° at 10 knots, visibility 1/2 mile, fog, vertical visibility at 200 ft agl, temperature of 12°C, dew point temperature of 12°C, and an altimeter setting of 29.86 inHg. Remarks, automated station with a precipitation discriminator, temperature 12.2°C, dew point temperature 12.2°C.

The observations from the KJST ASOS around the accident time identified LIFR⁸ conditions.

⁸ The NWS and the FAA Aeronautical Information Manual (AIM) section 7-1-7 defines the following general flight categories:

- Low Instrument Flight Rules (LIFR*) - ceiling below 500 ft above ground level (agl) and/or visibility less than 1 statute mile.

3.0 Upper Air Sounding

A High-Resolution Rapid Refresh (HRRR)⁹ model sounding was created¹⁰ for the approximate accident site coordinates for 0500 EDT. The HRRR sounding was plotted on a standard Skew-T Log P diagram¹¹ from the surface to 700-hPa (or approximately 10,000 ft) using the RAOB¹² software package and is included as figure 6. The sounding depicted an elevation of 2,119 ft over the grid point with a near surface temperature of 12.6°C, a dew point temperature of 12.2°C, and a relative humidity of 97%. The sounding depicted the lifted condensation level (LCL)¹³ at 170 ft agl, the level of free convection (LFC)¹⁴ at 222 ft agl, and the convective condensation level (CCL)¹⁵ at 6,287 ft msl. The freezing level was located at 10,275 ft. The precipitable water value at 0.74 inches.

-
- Instrument Flight Rules (IFR) - ceiling between 500 to below 1,000 feet agl and/or visibility 1 to less than 3 miles.
 - Marginal Visual Flight Rules (MVFR**) - ceiling from 1,000 to 3,000 ft agl and/or visibility 3 to 5 miles.
 - Visual Flight Rules (VFR) - ceiling greater 3,000 ft agl and visibility greater than 5 miles.

* By definition, IFR is a ceiling less than 1,000 ft agl and/or visibility less than 3 miles while LIFR is a sub-category of IFR.

**By definition, VFR is a ceiling greater than or equal to 3,000 ft agl and visibility greater than 5 miles while MVFR is a sub-category of VFR.

⁹ The HRRR is a NOAA real-time three-kilometer resolution, hourly-updated, cloud-resolving, convection-allowing atmospheric model, initialized by three-kilometer grids with three-kilometer radar assimilation. Radar data is assimilated in the HRRR every 15 minutes over a one-hour period.

¹⁰ HRRR sounding was created using NOAA Air Resource Laboratory: [READY Archived Meteorology \(noaa.gov\)](https://ready.noaa.gov/).

¹¹ Skew T log P diagram - is a standard meteorological plot using temperature and the logarithmic of pressure as coordinates, used to display winds, temperature, dew point, and various indices used to define the vertical structure of the atmosphere.

¹² RAOB - (The complete Rawinsonde Observation program) is an interactive sounding analysis program developed by Esonde Research Services, The Villages, Florida.

¹³ LCL - The height at which a parcel of moist air becomes saturated when it is lifted dry adiabatically.

¹⁴ LFC - The level at which a parcel of saturated air becomes warmer than the surrounding air and begins to rise freely. This occurs most readily in a conditionally unstable atmosphere.

¹⁵ CCL - The level in the atmosphere to which an air parcel, if heated from below, will rise dry adiabatically, without becoming colder than its environment just before the parcel becomes saturated.

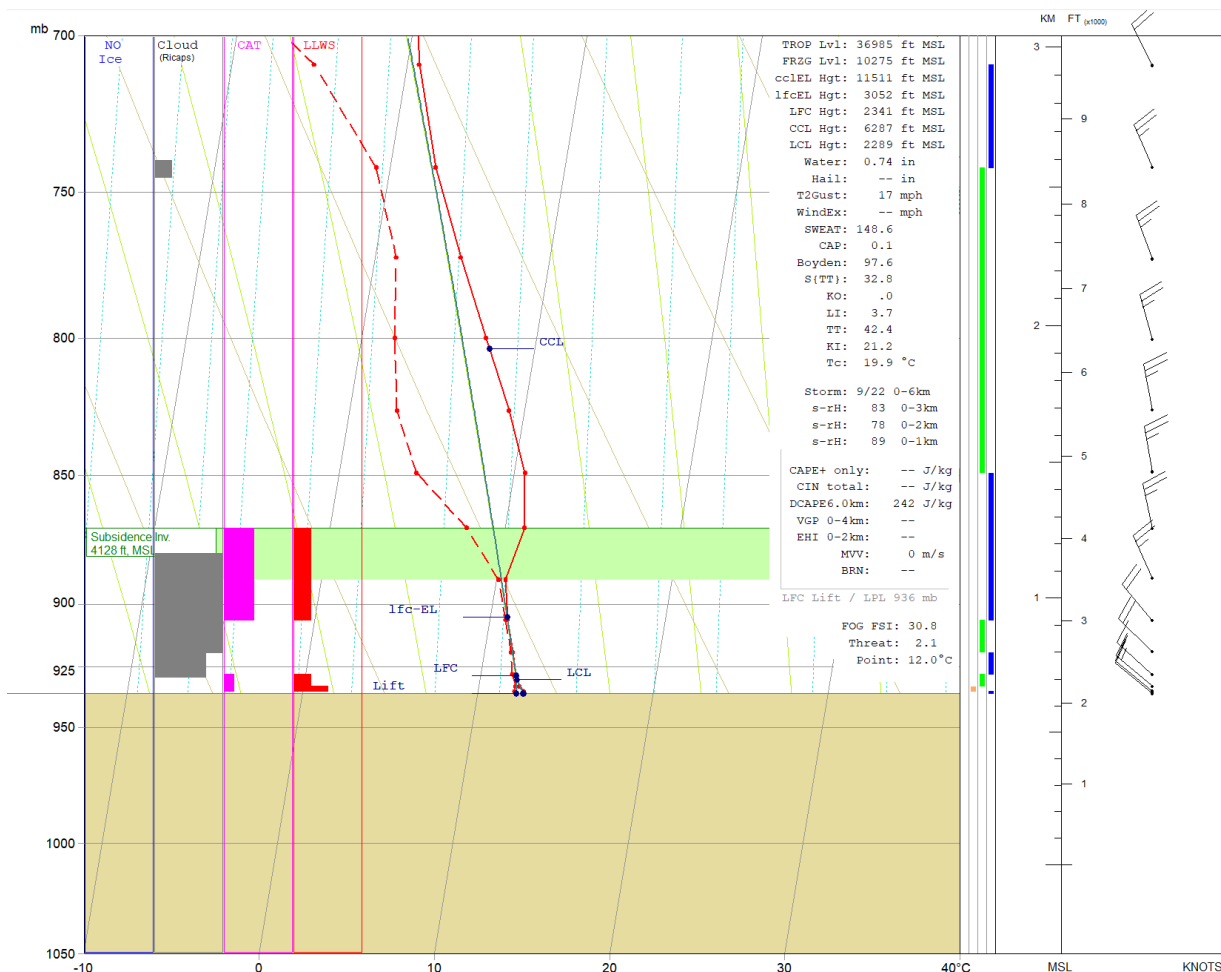


Figure 6. 0500 EDT HRRR sounding.

The 0500 EDT HRRR sounding indicated alternating conditionally unstable and stable environment from the surface through 10,000 ft. RAOB indicated a cloud layer between 200 ft agl (~2,300 ft msl) and 1,900 ft agl (~4,000 ft msl). No icing was indicated below 10,000 ft. The top of a subsidence inversion¹⁶ was noted at 4,128 ft.

The 0500 EDT HRRR sounding wind profile indicated a near-surface wind from the northwest at 10 knots with the wind backing¹⁷ with height and becoming north-northwesterly through 10,000 ft. The wind speed increased to 20 knots by 1,000 ft agl and to 25 knots by 2,000 ft agl. RAOB indicated the possibility of light low-level wind shear (LLWS) and light clear air turbulence (CAT) between the surface and 2,000 ft agl.

¹⁶ Inversion - A departure from the usual decrease of the value of an atmospheric property with increasing altitude; also, the layer through which this departure occurs (the "inversion layer"), or the lowest altitude at which the departure is found (the "base of the inversion").

¹⁷ Backing winds - Winds which shift in a counterclockwise direction with time at a given location (e.g. from southerly to southeasterly), or change direction in a counterclockwise sense with height (e.g. westerly at the surface but becoming more southerly aloft). The opposite of veering winds.

4.0 Satellite Data

Geostationary Operational Environmental Satellite number 16 (GOES-16) visible and infrared data were obtained from an archive at the Space Science Engineering Center at the University of Wisconsin-Madison in Madison, Wisconsin, and processed using the Man-computer Interactive Data Access System software. Visible and infrared imagery (GOES-16 bands 2 and 13) at wavelengths of 0.64 microns (μm) and 10.3 μm , respectively, were retrieved for the period from 0200 EDT through 0900 EDT and reviewed, and the closest images to the time of the accident were documented. Given the sun angle, the visible imagery (band 2) did not provide useful information at the accident time.

Figure 7 presents the GOES-16 infrared image at 0506 EDT at 6X magnification with the accident site highlighted with a red square and cloud cover indicated above the accident site. The lower brightness temperatures (red colors; higher cloud tops) were located east and west of the accident site at the accident time. The brightness temperature of 281 Kelvin over the accident site would have been near 6,000 ft based on the vertical temperature profile provided by the 0500 EDT HRRR sounding. It should be noted these figures have not been corrected for any parallax error. The Nighttime Microphysics Red, Green, Blue (RGB) imagery¹⁸ indicated the cloud cover above the accident site was a combination of low- and very low-level water clouds with the cloud cover moving southward with time (attachment 1).

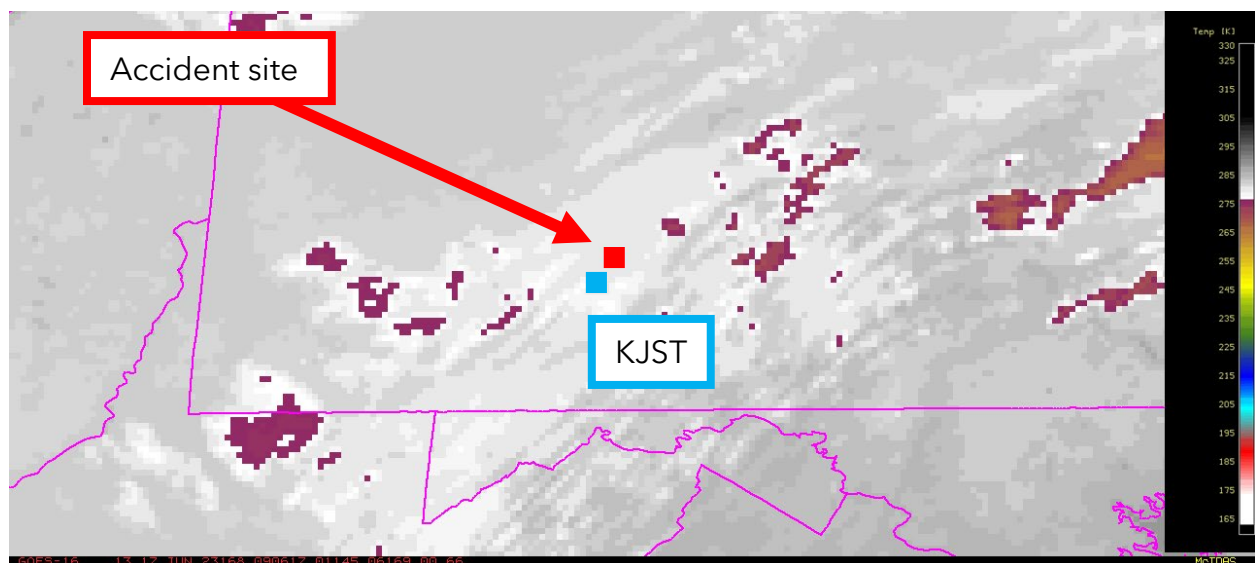


Figure 7. GOES-16 infrared image at 0506 EDT.

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https://weather.msfc.nasa.gov/sport/training/quickGuides/rgb/QuickGuide_NtMicro_GOESR_NASA_SPoRT_20191206.pdf

5.0 National Radar Imagery

A regional view of the NWS National Reflectivity Mosaic is included as figure 8 for 0505 EDT with the approximate location of the accident site marked by a red circle. The image depicted no meteorological echoes above the accident site.

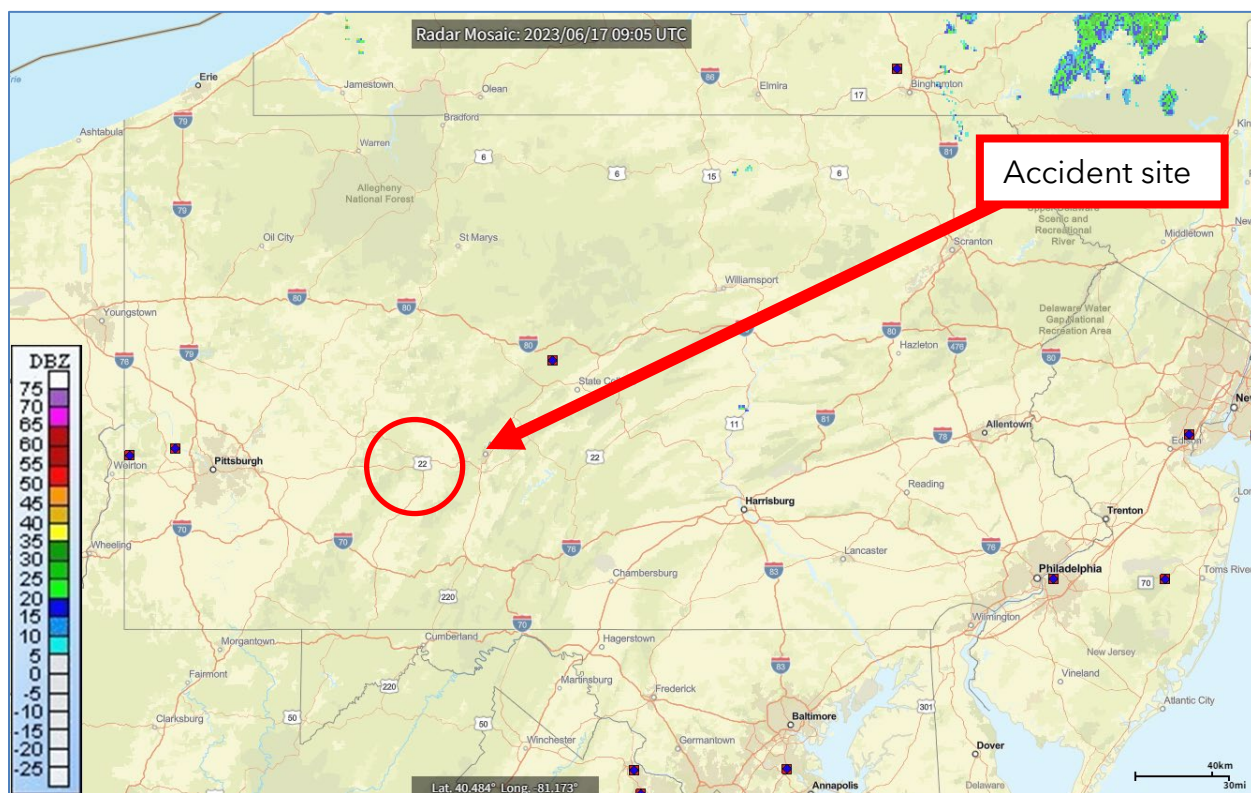


Figure 8. National Reflectivity Mosaic for 0505 EDT.

6.0 Pilot Reports

There were no longline-disseminated pilot reports¹⁹ (PIREPs) distributed into the national airspace system (NAS) within two hours before and after the accident time and within 100 miles of the accident site at altitudes below 18,000 ft.

7.0 Significant Meteorological Information

There were no convective or non-convective Significant Meteorological Information (SIGMET) advisories valid for the accident site at the accident time.

¹⁹ Only PIREPs with the World Meteorological Organization headers UBPA**, UBMD**, UBOH**, and UBWV** were considered. These do not include pilot reports only broadcast via radio.

8.0 Center Weather Service Advisories

The Cleveland (ZOB) Air Route Traffic Control Center (ARTCC) Center Weather Service Unit (CWSU) was responsible for the accident region. There was no Center Weather Advisory (CWA) valid for the accident site at the accident time.

9.0 Airmen's Meteorological Information

The NWS Aviation Weather Center (AWC) had text Airmen's Meteorological Information (AIRMET) advisory Sierra valid for the accident site at the accident time for below 8,000 ft. The text AIRMET Sierra was issued at 0445 EDT and forecast IFR conditions due to mist and mountain obscuration conditions due to clouds, precipitation, and mist:

WAUS41 KPCI 170845

WA1S

-BOSS WA 170845

AIRMET SIERRA UPDT 2 FOR IFR AND MTN OBSCN VALID UNTIL 171500

.

AIRMET IFR...NY LO PA OH LE WV MD VA

FROM 40NW SYR TO 60SW HNK TO 30ESE PSB TO 40WNW CSN TO 60SSE EKN

TO PSK TO HNV TO HNN TO CVG TO FWA TO DXO TO 20NNW CLE TO 30SW

BUF TO 20ESE YYZ TO 40NW SYR

CIG BLW 010/VIS BLW 3SM BR. CONDS ENDG 12-15Z.

.

AIRMET IFR...ME NH VT MA RI CT NY LO NJ PA MD DE VA AND CSTL WTRS

FROM 70NW PQI TO 40NNE PQI TO 20SE PQI TO 50SE HUL TO 200SE ACK

TO 150SE SIE TO 30SE JFK TO 50NW ETX TO 50NW SYR TO 30ESE YOW TO

80NE MPV TO 70NW PQI

CIG BLW 010/VIS BLW 3SM PCPN/BR. CONDS CONTG BYD 15Z THRU 21Z.

.

AIRMET MTN OBSCN...ME NH VT MA NY PA WV MD VA

FROM 70NW PQI TO MLT TO 20SW CON TO 40SSE ALB TO 30WNW EMI TO

40ESE HNV TO 50WSW HNV TO HNV TO HNN TO 30SSW BUF TO SYR TO

20NNE MSS TO 70NNE MPV TO 70NW PQI

MTNS OBSC BY CLDS/PCPN/BR. CONDS CONTG BYD 15Z THRU 21Z.

....

10.0 Graphical Forecasts for Aviation

The Graphical Forecasts for Aviation (GFA) products issued by the AWC before the accident flight and valid at 0500 EDT are shown in attachment 2. The GFA surface forecasts applicable to the accident site that were valid before the accident flight's departure for 0500 EDT indicated VFR to IFR conditions with a west to northwest wind of 5 knots and gusts to 15 knots. In addition, Graphical AIRMET²⁰ (G-AIRMET) Sierra for IFR conditions was valid for the accident site at 0500 EDT. The GFA cloud forecast applicable to the accident site that was valid at 0500 EDT indicated overcast cloud cover was expected with G-AIRMET Sierra for mountain obscuration overlaid. The only human-generated information reflected in the two GFA products were the G-AIRMETs.

11.0 Terminal Aerodrome Forecast

The closest site with an NWS Terminal Aerodrome Forecast²¹ (TAF) was from KJST. The KJST TAF valid at the accident time was an amended forecast issued at 0504 EDT and was valid for a 21-hour period beginning at 0500 EDT. The 0504 EDT TAF for KJST was as follows:

TAFJST
TAF AMD
KJST 170904Z 1709/1806 **30007KT 1 1/2SM BR OVC002**
FM171300 30009KT P6SM BKN004
FM171500 30014G22KT P6SM SCT050
FM180000 30007KT P6SM SKC=

Between 0500 and 0900 EDT the KJST forecast expected a wind from 300° at 7 knots, 1 1/2 miles visibility, mist, and an overcast ceiling at 200 ft agl.

²⁰ Graphical AIRMETs (G-AIRMETs), found on the Aviation Weather Center webpage at <http://aviationweather.gov>, are graphical forecasts of en-route weather hazards valid at discrete times no more than 3 hours apart for a period of up to 12 hours into the future (for example, 00, 03, 06, 09, and 12 hours). G-AIRMETs are snap shots at discrete time intervals as defined above. The text AIRMET is the result of the production of the G-AIRMET but provided in a time smear for a 6hr valid period.

²¹ According to NWS Instruction 10-813: "An NWS TAF consists of the expected meteorological conditions significant to aviation at an airport for a specified time period. For the U.S., this is the area within five (5) statute miles (SM) of the center of an airport's runway complex."
www.nws.noaa.gov/directives/sym/pd01008013curr.pdf

Another amended KJST TAF was issued at 0436 EDT and was valid for a 21-hour period beginning at 0500 EDT. The 0436 EDT TAF for KJST was as follows:

FTUS41 KCTP 170836 AAC
TAFJST
TAF AMD
KJST 170836Z 1709/1806 **30007KT 1 1/2SM BR VV002**
FM171300 30009KT P6SM BKN004
FM171400 30014G22KT P6SM SCT050
FM180000 30007KT P6SM SKC=

Between 0500 and 0900 EDT the KJST forecast expected a wind from 300° at 7 knots, 1 1/2 miles visibility, mist, and vertical visibility at 200 ft agl. The KJST TAF issued at 0327 EDT forecast similar conditions through 0900 EDT.

12.0 National Weather Service Area Forecast Discussion

The NWS weather forecast office in State College, Pennsylvania, (WFO CTP) was responsible for the public forecast in the region of the accident site. WFO CTP issued the following Area Forecast Discussion (AFD) at 0457 EDT, the AFD issued closest to the accident time with an aviation section:

FXUS61 KCTP 170857
AFDCTP

Area Forecast Discussion
National Weather Service State College PA
457 AM EDT Sat Jun 17 2023

.SYNOPSIS...

A much drier and somewhat cooler northerly flow in the wake of surface and upper level low pressure over the New England states will bring us morning clouds then increasing afternoon sunshine today.

Aside from isolated showers over the Endless Mountains and Pocono region of North Central and Northeastern Pennsylvania today, expect rain-free conditions throughout the weekend.

Sunday will feature slightly warmer temperatures with continued comfortable humidity.

&&

.NEAR TERM /UNTIL 6 PM THIS EVENING/...

Weak ridging aloft and the subsiding, thermally indirect, right exit region of a speed max diving SE from Lake Ontario and the Finger Lakes region of upstate New York will negate anything more than a few isolated showers NE of the KIPT area.

Elsewhere, weak cold Advection from near the SFC up through 925 mb will help to form variable amounts of shall/non-precipitating stratus and stratocu this morning.

Deepening vertical mixing up to around 6KFT AGL later this morning and this afternoon will tap very dry air above the base of the subsidence inversion and transport it to the sfc, accompanied by wind gusts at least in the upper teens to low 20s (KTS). Considering that the mid-upper level jet core will extend from near KBFD to KSEG and KABE this afternoon, some gusts in the mid to upper 20s are possible across the NE half of PA.

High temps this afternoon will rebound about 5-6 deg F higher than Friday - and range from the upper 60s to low 70s over the higher terrain of the north and west to between 75 and 80F over the Central Mtns and Lower Susq Valley.

&&

.SHORT TERM /6 PM THIS EVENING THROUGH SUNDAY NIGHT/...
Sky cover will decrease to SKC to SCT tonight with wind diminishing to under 6 kts from the West to NW in most places.

Min temps at sunrise Sunday will be on the chilly side and in the mid to upper 40s over the Northern and Western Mtns and generally between 50 and 55F elsewhere. A few pockets of min temps in the low 40s are possible in the perennial cold rural valleys of Central and NW PA.

Sunday will be mostly sunny with max temps another 3 to 5 deg F higher than today, which will turn out to be right around normal over the Northern and Western Mountains and 1-3 deg F above normal elsewhere.

&&

.LONG TERM /MONDAY THROUGH FRIDAY/...
Temperatures begin to warm up next week as ridging develops over the area. The first half of the week looks to be mainly dry except for the potential for some rain across the southern half of the area on Monday and Tuesday in association with an area of low pressure that will be off to our south.

High pressure builds southward for the middle of the week, keeping rain chances low except for a few showers and thunderstorms during the afternoons. A slight warming trend begins on Wednesday with high temperatures expected to be in the upper 70s to mid 80s by the end of the week.

&&

.AVIATION /08Z SATURDAY THROUGH WEDNESDAY/...
Low clouds (IFR) will persist overnight over the western highlands, impacting JST and BFD. Elsewhere, conds will predominantly remain VFR, although airfields across the central mtns (AOO, UNV, IPT) could occasionally dip to MVFR.

Any lingering low cloudiness will dissipate around or shortly after sunrise, leaving widespread VFR conds areawide for Saturday. A northwesterly breeze will increase to 10-15 kts, occasionally gusting over 20 kts.

Outlook...

Sat Night-Mon...Predominantly VFR.

Tue-Wed...Brief restrictions possible in scattered SHRA/TSRA.

&&

.CTP WATCHES/WARNINGS/ADVISORIES...
None.

&&

\$\$

13.0 Winds and Temperature Aloft Forecast

The NWS 0402 EDT Winds and Temperature Aloft forecast valid for the closest point to the accident site is included below:

FBUS31 KWNO 170802

FD1US1

DATA BASED ON 170600Z

VALID 171200Z FOR USE 0800-1500Z. TEMPS NEG ABV 24000

FT 3000 6000 9000 12000 18000 24000 30000 34000 39000

AGC 3616 0119+07 3419+03 3427+00 3340-12 3351-25 335641 345551 334358

The closest forecast point to the accident site was the Pittsburgh, Pennsylvania (AGC). The 0402 EDT forecast was for use between 0400 and 1100 EDT.

14.0 Pilot Weather Information

Title 14 CFR 91.103 states that "Each pilot in command shall, before beginning a flight, become familiar with all available information concerning that flight." FAA AC 91-92 "Pilot's Guide to a Preflight Planning" (dated March 15, 2021) provided pilot guidance on preflight self-briefings, including planning, weather interpretation, and risk identification/mitigation skills. The AC further stated in part:

Pilots adopting these guidelines will be better prepared to interpret and utilize real-time weather information before departure and en route, in the cockpit, via technology like Automatic Dependent Surveillance-Broadcast (ADS-B) and via third-party providers.²²

A search of archived information indicated that the accident pilot did not request weather information from Leidos Flight Service. The accident pilot did have an account through ForeFlight and filed a flight plan (attachment 3) around 0452 EDT. No weather imagery was viewed in the ForeFlight App, nor is it known what weather briefing information was provided to the accident pilot through the ForeFlight App (attachment 3).

15.0 Astronomical Data

The astronomical data obtained for the accident site on June 17, 2023, indicated the following:

SUN

Accident time **0506 EDT**²³

Begin civil twilight 0511 EDT

Sunrise 0544 EDT

Sun transit 1316 EDT

Sunset 2048 EDT

End civil twilight 2121 EDT

MOON

Moonrise 0454 EDT

Accident time **0506 EDT**

Moon transit 1250 EDT

Moonset 2052 EDT

At the time of the accident the Moon was at an altitude of 1.29° and azimuth of 56.34° with 0.8% of Moon's visible disk illuminated.

²² https://www.faa.gov/documentLibrary/media/Advisory_Circular/AC_91-92.pdf. The AC also listed multiple online FAA resources for aviation flight planning services for adverse weather.

²³ Inserted accident time for reference and context.

E. LIST OF ATTACHMENTS

Attachment 1 - GOES-16 Nighttime Microphysics RGB imagery animation from 0301 to 0601 EDT

Attachment 2 - GFA information valid at the accident time

Attachment 3 - ForeFlight information

Submitted by:

Paul Suffern
Senior Meteorologist