



NATIONAL TRANSPORTATION SAFETY BOARD

Office of Aviation Safety
Washington, D.C. 20594

January 28, 2022

Specialist's Factual Report

METEOROLOGY

WPR22FA026

Table Of Contents

A.	ACCIDENT	3
B.	METEOROLOGIST	3
C.	DETAILS OF THE INVESTIGATION	3
D.	FACTUAL INFORMATION	3
1.0	Synoptic Situation	3
1.1	Surface Analysis Chart	4
2.0	Surface Observations	5
3.0	Upper Air Sounding	8
4.0	Satellite Data	10
5.0	Regional Radar Imagery Information	11
6.0	Pilot Reports	12
7.0	Significant Meteorological Information	12
8.0	Center Weather Service Advisories	12
9.0	Airmen's Meteorological Information	12
10.0	Graphical Forecasts for Aviation	13
11.0	Terminal Aerodrome Forecast	13
12.0	NWS Area Forecast Discussion	14
13.0	NWS Dense Fog Advisory	16
14.0	Winds and Temperature Aloft Forecast	17
15.0	Pilot Weather Briefing	17
16.0	Astronomical Data	17
E.	LIST OF ATTACHMENTS	17

A. ACCIDENT

Location: Shafter, California,
Date: November 3, 2021
Time: 1130 Pacific daylight time
1830 Coordinated Universal Time (UTC)
Airplane: Thrush Ayers Corporation S-2R; Registration: N8960Q

B. METEOROLOGIST

Paul Suffern
Senior Meteorologist
Operational Factors Division (AS-30)
National Transportation Safety Board

C. DETAILS OF THE INVESTIGATION

The National Transportation Safety Board's (NTSB) Meteorologist did not travel for this investigation and gathered the weather data for this investigation from official National Oceanic and Atmospheric Administration (NOAA) National Weather Service (NWS) sources and also from the National Centers for Environmental Information (NCEI). This Specialist's Factual Report contains the meteorological factors pertinent to the weather surrounding the accident time. All times are Pacific daylight time (PDT) and are based upon the 24-hour clock, where local time is - 7 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 latitude 35.5190° N, Longitude 119.2183° W, at an approximate elevation of 405 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 Weather Prediction Center, 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 joint NWS and Federal Aviation Administration (FAA) Advisory Circular "Aviation Weather Services", AC 00-45H.¹

¹

https://www.faa.gov/regulations_policies/advisory_circulars/index.cfm/go/document.information/documentID/1030

1.1 Surface Analysis Chart

The NWS Surface Analysis Chart centered over the southwestern United States for 1100 PDT is provided as figure 1 with the location of the accident site within the red circle. The chart depicted a trough² along the California coast from near San Francisco southward to the California and Mexico border. Another trough was in central Nevada and stretched southward into Arizona and northwestern Mexico. A high-pressure system with pressure of 1025-hectopascals (hPa) was located north of the accident near the central California and Nevada border. A low-pressure system with a pressure 1016-hPa was in southwestern Arizona. The accident site was between the 2 surface troughs and the high- and low-pressure systems.

The station models around the accident site depicted air temperatures in the upper 50's degrees Fahrenheit (°F), dew point temperatures in the mid 50's °F with temperature-dew point spreads of 3°F or less, cloudy skies and mist.

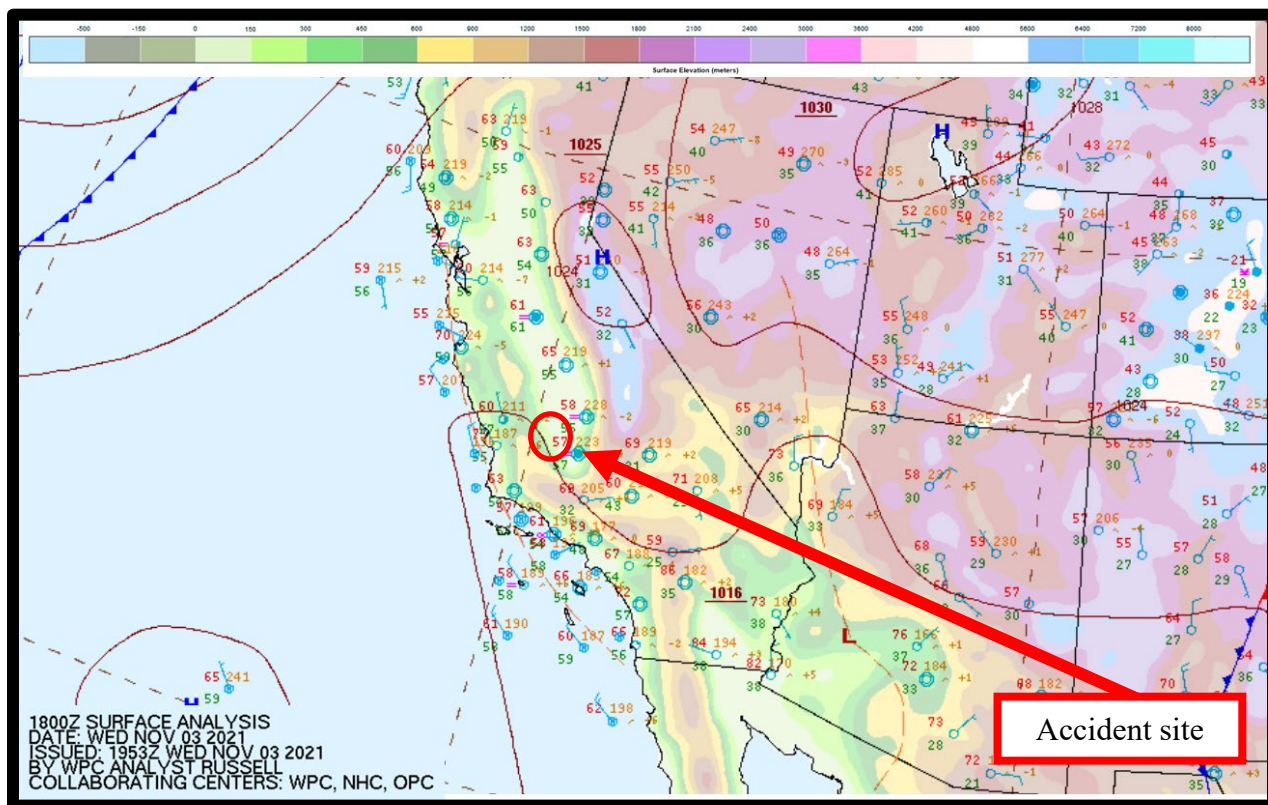


Figure 1 – NWS Surface Analysis Chart for 1100 PDT.

235

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

2.0 Surface Observations

The area surrounding the accident site was documented using official Aviation Routine Weather Reports (METARs) and Specials (SPECIs). The following observations were taken from standard code and are provided in plain language. Figure 2 is a local sectional chart with the accident site and the closest weather reporting locations marked.

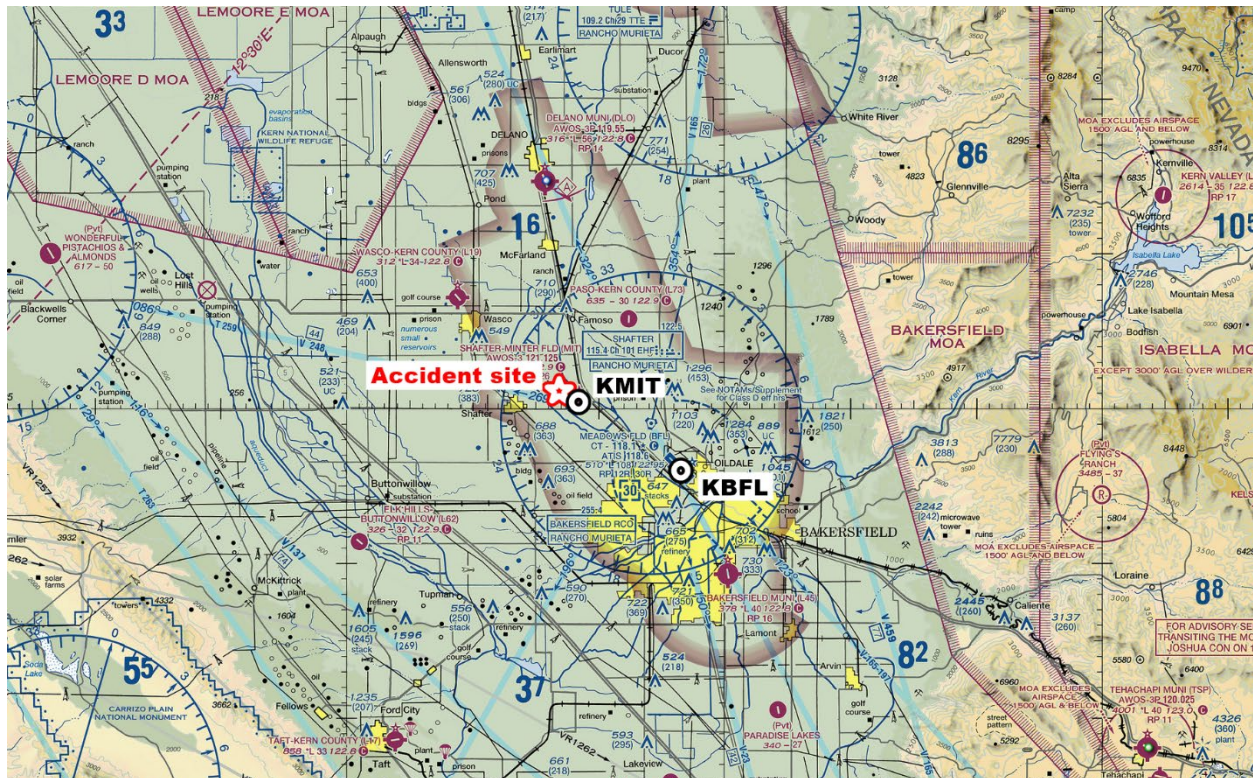


Figure 2 – Sectional map of the accident area with the location of the accident site and surface observation sites.

Shafter Airport-Minter Field (KMIT) was the departure airport and had the closest official weather station to the accident site. KMIT had an Automated Weather Observing System (AWOS³) whose longline⁴ reports were not augmented. The KMIT AWOS was located 1.5 miles southeast of the accident site, at an elevation of 425 ft, and had a 12.5° easterly magnetic variation⁵ (figure 2). KMIT AWOS observations retrieved via internal equipment archive and AWOS equipment personnel surrounding the accident time are shown below:⁶

[1005 PDT]	METAR KMIT 1705 OVC002	M1/4 013 013 00 000 3022	D
[1025 PDT]	METAR KMIT 1725 OVC002	M1/4 013 013 00 000 3022	D
[1045 PDT]	METAR KMIT 1745 OVC002	1/4 013 013 00 000 3022	D
[1105 PDT]	METAR KMIT 1805 OVC002	1/4 013 013 15 003 3021	D
[1125 PDT]	METAR KMIT 1825 OVC002	1/2 014 014 16 003 3020	D

ACCIDENT TIME 1130 PDT

[1145 PDT]	METAR KMIT 1845 OVC002	1 014 014 00 000 3020	D
[1205 PDT]	METAR KMIT 1905 OVC002	2 014 014 00 000 3019	D

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

KMIT weather at 1125 PDT, wind from 160° at 3 knots, visibility one half mile, overcast ceiling at 200 ft above ground level (agl), temperature of 14° Celsius (C), dew point temperature of 14°C, and an altimeter setting of 30.20 inches of mercury (inHg).

KMIT weather at 1145 PDT, wind calm, visibility one mile, overcast ceiling at 200 ft agl, temperature of 14°C, dew point temperature of 14°C, and an altimeter setting of 30.20 inHg. For more archived KMIT AWOS information please see attachment 1.

³ AWOS – Automated Weather Observing System is equipped with meteorological instruments to observe and report temperature, dewpoint, wind speed and direction, visibility, cloud coverage and ceiling up to 12,000 feet, and altimeter setting. AWOS are maintained by the FAA.

⁴ “Longline” refers to the dissemination of weather observations with the intent that they are available in near-real time to national databases (effectively, the whole world) 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 general global public has access to surface weather observations, particularly outside of the aviation community.

⁵ Magnetic variation – The angle (at a particular location) between magnetic north and true north. Latest measurement taken from <https://skyvector.com/>

⁶ The bold sections in this NWS product and the rest of the products in this report are intended to highlight the text that directly reference the weather conditions that affected the accident location around the accident time. The local times in this section next to the METARs are provided for quick reference between UTC and local times around the accident time.

Meadows Field Airport (KBFL) was the next closest official weather station to the accident site. KBFL had an Automated Surface Observing System (ASOS⁷) whose longline reports were supplemented by air traffic control (ATC) when the tower was in operation⁸. The KBFL ASOS was located 9 miles southeast of the accident site, at an elevation of 510 ft, and had a 12.5° easterly magnetic variation (figure 2). KBFL ASOS observations surrounding the accident time are shown below:

[0932 PDT] SPECI KBFL 031632Z 12003KT 1/4SM R30R/1600V3000FT FG OVC002 13/13 A3020 RMK AO2 TWR VIS 3/4 T01330128=

[0954 PDT] METAR KBFL 031654Z 00000KT 1/4SM R30R/2000V2800FT FG OVC002 14/13 A3020 RMK AO2 TWR VIS 3/4 SLP223 T01390133=

[1011 PDT] SPECI KBFL 031711Z 00000KT 1/2SM R30R/2600V3500FT FG OVC002 14/14 A3020 RMK AO2 TWR VIS 3/4 T01390139=

[1054 PDT] METAR KBFL 031754Z 00000KT 1SM R30R/4500VP6000FT BR OVC003 14/14 A3020 RMK AO2 SLP223 T01390139 10139 20111 50004=

[1119 PDT] SPECI KBFL 031819Z 23004KT 1 3/4SM BR OVC004 14/13 A3019 RMK AO2 TWR VIS 2 T01390133=

ACCIDENT TIME 1130 PDT

[1131 PDT] SPECI KBFL 031831Z 20005KT 2SM BR OVC005 14/13 A3018 RMK AO2 T01390133=

[1154 PDT] METAR KBFL 031854Z 00000KT 2SM BR OVC006 14/13 A3018 RMK AO2 SLP216 T01440133=

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

KBFL weather at 1119 PDT, wind from 230° at 4 knots, visibility 1 and ¾ miles, mist, overcast ceiling at 400 ft agl, temperature of 14°C, dew point temperature of 13°C, and an altimeter setting of 30.19 inHg. Remarks, station with a precipitation discriminator, tower visibility 2 miles, temperature 13.9°C, dew point temperature 13.3°C.

KBFL weather at 1131 PDT, wind from 200° at 5 knots, visibility 2 miles, mist, overcast ceiling at 500 ft agl, temperature of 14°C, dew point temperature of 13°C, and an altimeter setting of 30.18 inHg. Remarks, station with a precipitation discriminator, temperature 13.9°C, dew point temperature 13.3°C.

⁷ 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.

⁸ ATC hours of operation 0600 to 2300 local.

The observations from KMIT and KBFL surrounding the accident time indicated LIFR⁹ conditions in mist.

3.0 Upper Air Sounding

A High-Resolution Rapid Refresh (HRRR)¹⁰ model sounding was created for the accident site for 1100 PDT which provided a surface elevation of 423 ft.¹¹ The 1100 PDT HRRR sounding was plotted on a standard Skew-T Log P diagram¹² with the derived stability parameters included in figure 3 with data from the surface to 700-hPa (or approximately 10,000 ft above msl). These data were analyzed using the RAOB¹³ software package. The sounding depicted the lifted condensation level (LCL)¹⁴ and the level of free convection (LFC)¹⁵ at 586 ft agl (1,009 ft above msl), and the convective condensation level (CCL)¹⁶ at 13,319 ft above msl. The freezing level was located at 15,251 ft above msl. The precipitable water value was 0.82 inches.

⁹ As defined by 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.
- 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.

¹⁰ 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.

¹¹ HRRR sounding was created using NOAA Air Resource Laboratory: <https://ready.arl.noaa.gov/READYamet.php>

¹² 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.

¹³ RAOB – (The complete Rawinsonde Observation program) is an interactive sounding analysis program developed by Eosonde Research Services, The Villages, Florida.

¹⁴ LCL - The height at which a parcel of moist air becomes saturated when it is lifted dry adiabatically.

¹⁵ 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.

¹⁶ 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.

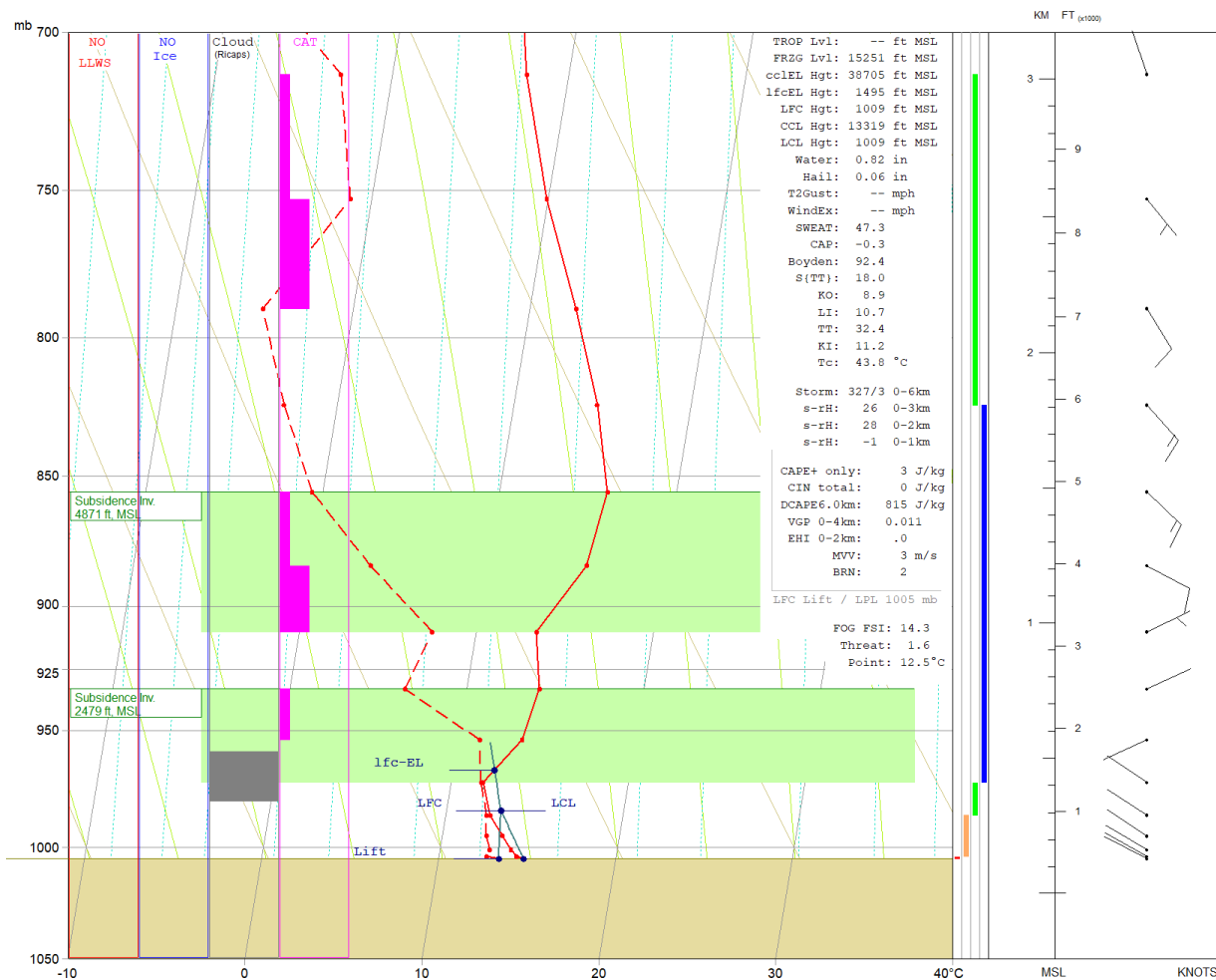


Figure 3 – 1100 PDT HRRR sounding.

The 1100 PDT HRRR sounding for the accident site indicated an unstable to conditionally unstable environment from the surface through 1,500 ft above msl, then a stable environment from 1,500 through 6,000 ft above msl. Clouds were indicated by RAOB to be present from 1,100 ft above msl (~700 ft agl) through 2,000 ft above msl. Two subsidence inversions¹⁷ were in place above the accident site at 2,479 and 4,871 ft above msl, respectively. No icing potential was indicated by RAOB below 10,000 ft above msl.

The 1100 PDT HRRR sounding wind profile indicated a near surface wind from 299° at 2 knots with the wind remaining light and variable at 5 knots or less below 3,000 ft above msl. The wind became southeasterly at 15 knots near 5,000 ft above msl. RAOB did not indicate the possibility of low-level wind shear (LLWS) or clear-air turbulence below 2,000 ft above msl.

¹⁷ 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").

4.0 Satellite Data

The Geostationary Operational Environmental Satellite number 17 (GOES-17) 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-17 bands 2 and 13) at wavelengths of 0.64 microns (μm) and 10.3 μm , respectively, were retrieved for the period from 0800 PDT through 1400 PDT and reviewed, and the closest images to the time of the accident were documented.

Figure 4 presents the GOES-17 visible imagery from 1130 PDT at 2X magnification with the accident site highlighted with a red square. There was cloud cover above the accident site and southeastward towards Bakersfield, California. The cloud cover was decreasing in areal coverage with time (attachment 2). Figure 5 presents the GOES-17 infrared imagery from 1130 PDT at 6X magnification with the accident site highlighted with a red square. The lower brightness temperatures (white colors; higher cloud tops) were located above and to the southeast of the accident site. The brightness temperature was about 285 Kelvin above the accident site at 1130 PDT. It should be noted these figures have not been corrected for any parallax error.

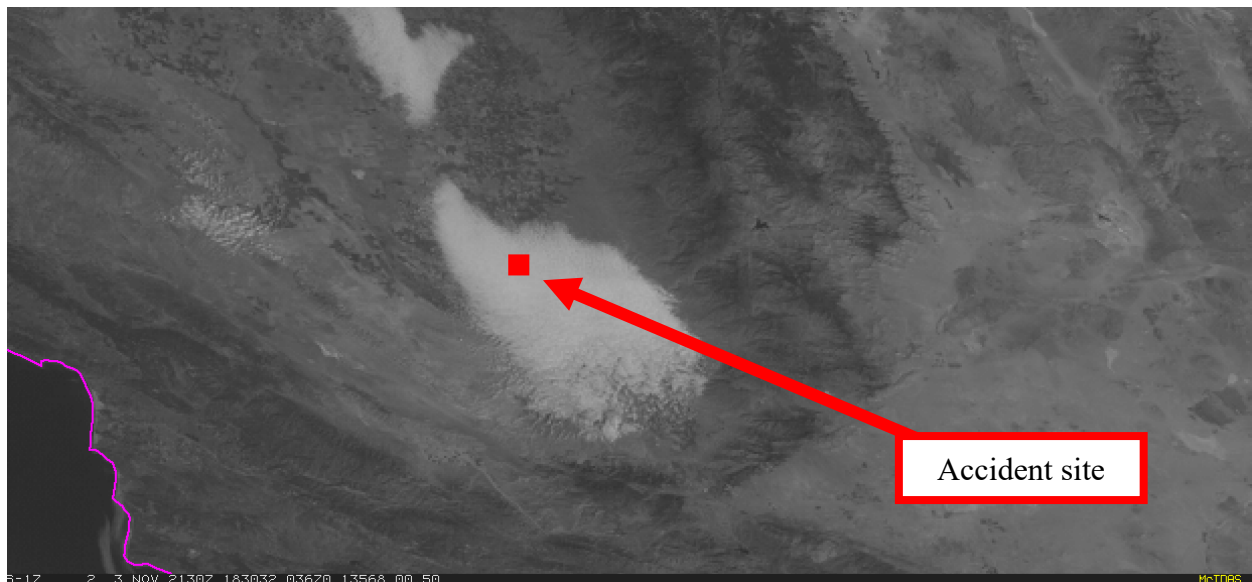


Figure 4 – GOES-17 visible image at 1130 PDT.

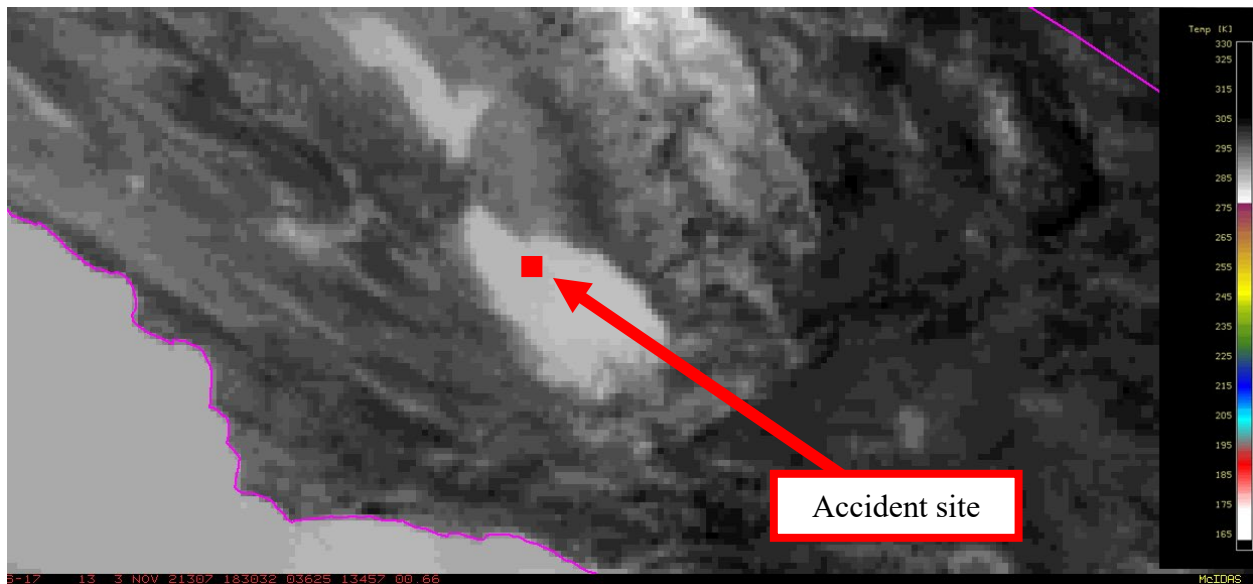


Figure 5 – GOES-17 infrared image at 1130 PDT.

5.0 Regional Radar Imagery Information

A regional view of the NWS National Reflectivity Mosaic is included as figure 6 for 1130 PDT with the approximate location of the accident site marked by a red circle. The image depicted no echoes above the accident site at the accident time.

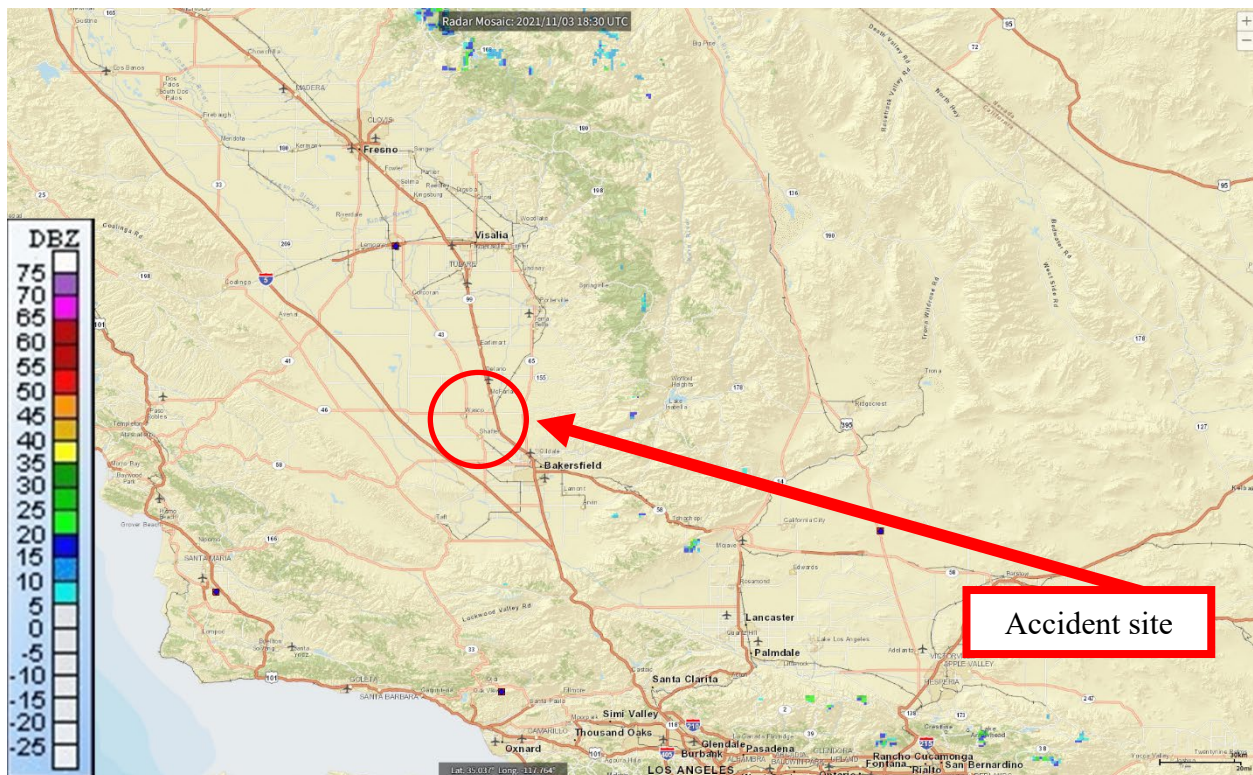


Figure 6 – National Reflectivity Mosaic for 1130 PDT.

6.0 Pilot Reports

The longline-disseminated pilot reports¹⁸ (PIREPs) distributed into the national airspace (NAS) were reviewed from about two hours prior to the accident time to two hours after the accident time and the PIREPs within 100 miles of the accident site below 18,000 ft above msl are shown below:

DLO UA /OV DLO/TM 1649/FL013/TP C208/RM FIELD IN SIGHT 3 MILE FINAL RWY 32 / 1300

BFL UA /OV BFL/TM 1718/FL700/TP TBM9/RM RWY 30R FIELD IN SIGHT RIGHT AT MINIMUMS 700

BUR UA /OV BUR150003/TM 1737/FL010/TP B737/RM LARGE FLOCK OF BIRDS

PRB UA /OV PRB/TM 1750/FL002/TP T210/SK SCT002/RM ZOA CWSU

VNY UA /OV VNY/TM 1910/FL055/TP P28A/SK SKC/WX FV99SM

BFL UA /OV BFL/TM 1951/FL023/TP CRJ2/RM TOPS 023 BASES 017

7.0 Significant Meteorological Information

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

8.0 Center Weather Service Advisories

The accident site was on the border of the Los Angeles (ZLA) and Oakland (ZOA) Air Route Traffic Control Center (ARTCC) Center Weather Service Units' (CWSU) areas of responsibility. There were no Center Weather Advisories (CWA) valid at the accident time.

9.0 Airmen's Meteorological Information

There was an Airmen's Meteorological Information (AIRMET) advisory Sierra valid for the accident site at the accident time. The AIRMET Sierra issued at 0745 PDT forecasted IFR conditions in mist and fog through 1400 PDT:

WAUS46 KKCI 031445

WA6S

-SFOS WA 031445

AIRMET SIERRA UPDT 3 FOR IFR AND MTN OBSCN VALID UNTIL 032100

.

AIRMET IFR...OR CA AND CSTL WTRS

**FROM 150NW FOT TO 60NW FOT TO 40WNW ENI TO 40ESE ENI TO 30ENE
SAC TO 50NNE EHF TO 20SSE EHF TO 40NNW RZS TO 40ESE RZS TO 40ENE
LAX TO 40E MZB TO 220SW MZB TO 140WSW FOT TO 150NW FOT
CIG BLW 010/VIS BLW 3SM BR/FG. CONDS CONTG BYD 21Z THRU 03Z.**

.

AIRMET IFR...OR ID MT WY

FROM 20N BKE TO 30E BOI TO 60N TWF TO 30S DLN TO 60ESE DLN TO
40NNE JAC TO 20S JAC TO 20SSW PIH TO 30W TWF TO 50NNW REO TO

¹⁸ Only pilot reports with the World Meteorological Organization headers UBCA**, UBNV**, and UBAZ** were considered. These do not include pilot reports only broadcast via radio.

60SW BKE TO 20N BKE
CIG BLW 010/VIS BLW 3SM BR. CONDS ENDG 18-21Z.

.
AIRMET IFR...WA OR AND CSTL WTRS
FROM 20NW HUH TO 40N BTG TO 50WSW YKM TO 20SSE YKM TO 40SE EPH
TO 60SSE GEG TO 60E PDT TO 30W DSD TO 40NNE OED TO 40W OED TO
40SW ONP TO 50SSE HQM TO 20ENE TOU TO 20NW HUH
CIG BLW 010/VIS BLW 3SM BR. CONDS CONTG BYD 21Z ENDG 21-00Z.

.
AIRMET MTN OBSCN...WA OR ID MT
FROM 50SW YQL TO 70E FCA TO 50W GTF TO 20NNW MLP TO 40ESE PDT TO
50SW DSD TO BTG TO 30ESE SEA TO 40E HUH TO 50SW YQL
MTNS OBSC BY CLDS/PCPN. CONDS CONTG BYD 21Z THRU 03Z.

.
OTLK VALID 2100-0300Z...MTN OBSCN WA OR CA
BOUNDED BY 20NW TOU-40SSW HUH-20SSE EUG-20WNW OED-30NNW RBL-PYE-
FOT-70WNW OED-HQM-20NW TOU
MTNS OBSC BY CLDS/PCPN/BR. CONDS DVLPG 21-00Z. CONDS CONTG THRU
03Z.

....

10.0 Graphical Forecasts for Aviation

The Graphical Forecasts for Aviation (GFA) products issued before the accident flight and valid at 0800 PDT are shown in attachment 3. The GFA surface forecast applicable to the accident region that was valid before departure for times surrounding the accident time indicated VFR surface visibilities and a variable surface wind to 5 knots. The GFA cloud forecast applicable to the accident region that was valid before departure for times surrounding the accident time indicated few to scattered clouds at 1,200 to 1,700 ft above msl above the accident site with cirrus clouds above. The accident site was on the southern edge of the Graphical AIRMET¹⁹ (G-AIRMET) Sierra for IFR conditions overlaid on the GFA surface forecast imagery issued at 0901 PDT. The only human-generated information reflected in the two GFA products were the G-AIRMETs. For more information, please see attachment 3.

11.0 Terminal Aerodrome Forecast

KBFL was the closest airport to the accident site with an NWS Terminal Aerodrome Forecast²⁰ (TAF). The KBFL TAF valid at the time of the accident was issued at 1027 PDT and was valid for a 24-hour period beginning at 1100 PDT. The 1027 PDT TAF for KBFL was as follows:

TAF KBFL 031727Z 0318/0418 **0000KT 1/2SM FG OVC004**
FM031930 30004KT P6SM SCT250
FM040600 VRB03KT 5SM BR SCT250
FM041000 35003KT 2SM BR SCT250
FM041300 01003KT 1/2SM FG BKN003=

¹⁹ <https://aviationweather.gov/gairmet>

²⁰ 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

Between 1100 and 1230 PDT the forecast expected a calm wind, one half mile visibility, fog, and an overcast ceiling at 400 ft agl.

12.0 National weather Service Area Forecast Discussion

The NWS office in the San Joaquin Valley/Hanford, California, (WFO HNX) was responsible for the public forecast and TAFs in the region of the accident site. WFO HNX issued the following Area Forecast Discussion at 0340 PDT with IFR conditions expected through 1100 PDT:

FXUS66 KHNX 031040
AFDHNX

Area Forecast Discussion
National Weather Service Hanford CA
340 AM PDT Wed Nov 3 2021

.SYNOPSIS...

High pressure will build back into the region today. A weak frontal system will move across Northern California on Thursday with little or no impact on the regions weather except some clouds. High pressure will then build back over California this weekend with a potentially stronger system impacting the region on Monday and Tuesday.

&&

.DISCUSSION...

The axis of the upper level ridge currently over the region and slowly drifting east. While visibility values across the Central and Southern San Joaquin Valley were above 1 mile, humidity values are now reaching their saturation point. Will continue to monitor visibility values as fog remains at high potential this morning for development near sunrise. Another level of support for better fog development is the lack of surface winds this morning. The surface pressure gradients from KSFO to KLAS were being observed at near 2mb. Not being very strong, wind speeds observed this morning were very light as most valley locations were reporting values under 6 knots. While some mixing is preventing widespread dense fog this morning, its only a matter of time before quite a few stations report visibility values under a half mile. Toward the end of the week, weather models move the ridge out and introduce a disturbance across the area.

The next disturbance enters the region and sweep across the Northern portions of Central California. Ensembles maintain a solution of slight chance to chance values of possible measurable precipitation north of Fresno County. Ensembles are showing minimal error on the current track of mainly affecting Northern California as it splits during its passage near the end of the week. While a majority of ensemble members keep portions of Central California dry, having some members reach our area, will warrant at least some cloud cover during storm passage. During storm passage, winds will see an increase with some ridge level

winds becoming breezy around the Thursday time frame. Temperature-wise, due to a possible split in the flow, will not expect a lot of cold air to filter into the during during storm passage. Therefore, will only see temperatures fluctuate about 2 to 3 degrees either side of seasonal normal values.

The storm will exit the region during by the end of the week with a persistent cyclonic flow lingering into early next week. Uncertainty growing into early next week, but most ensemble members lean in the direction of a trof pattern early next week. Current timing has the that storm moving into the district late on Monday with the bulk of its energy moving through closer to early Tuesday. While the first storm later this week may have limited precipitation, the second storm early next week looks more promising. Hopefully, the second storm will lead to additional precipitation that is needed over the region.

&&

.AVIATION...

Widespread MVFR to IFR with patches of LIFR to VLIFR conditions this morning across portions of the San Joaquin Valley due to Tule Fog. After 18Z today, VFR to local MVFR conditions will prevail throughout Central California until after 06Z Thursday.

&&

.AIR QUALITY ISSUES...

On Wednesday November 3 2021... Fireplace/Wood Stove Burning Status is: No Burning Unless Registered in Fresno, Kern, Kern (Greater Frazier Park Area), Kings, Madera, Merced and Tulare Counties. Further information is available at Valleyair.org

&&

.CERTAINTY...

The level of certainty for days 1 and 2 is high.
The level of certainty for days 3 through 7 is medium.

Certainty levels include low...medium...and high. Please visit www.weather.gov/hnx/certainty.html for additional information an/or to provide feedback.

&&

.HMX WATCHES/WARNINGS/ADVISORIES...

None.

&&

\$\$

13.0 National weather Service Dense Fog Advisory

WFO HNX issued the following Dense Fog Advisory at 0435 PDT, valid through 1200 PDT, and the Dense Fog Advisory was valid for the accident site:

WWUS76 KHNX 031135
NPWHNX

URGENT - WEATHER MESSAGE
National Weather Service Hanford CA
435 AM PDT Wed Nov 3 2021

CAZ302-306-307-310-311-031900-
/O.NEW.KHNX.FG.Y.0024.211103T1135Z-211103T1900Z/
Merced - Madera - Mendota-Caruthers - San Joaquin - Selma-Fresno-
Clovis-Delano-Wasco-Shafter-Hanford - Corcoran - Lemoore-
Including the cities of Merced, Madera, Atwater, Selma, Sanger,
Parlier, Kingsburg, Kerman, Fresno, Delano, Wasco, Alpaugh,
Shafter, Hanford, Lemoore, and Corcoran
435 AM PDT Wed Nov 3 2021

...DENSE FOG ADVISORY IN EFFECT UNTIL NOON PDT TODAY...

*** WHAT...Visibility one quarter mile or less in dense fog.**

*** WHERE...Across the San Joaquin Valley for an area from Merced, Madera, Caruthers and San Joaquin down through Selma, Fresno-Clovis, Delano-Wasco-Shafter and Hanford-Corcoran.**

*** WHEN...Until noon PDT today.**

*** IMPACTS...Hazardous driving conditions due to low visibility.**

PRECAUTIONARY/PREPAREDNESS ACTIONS...

If driving, slow down, use your headlights, and leave plenty of distance ahead of you.

&&

\$\$

14.0 Winds and Temperature Aloft Forecast

The NWS 0658 PDT Winds and Temperature Aloft forecast valid for the closest point to the accident site is included below:

```
FBUS31 KWNO 031358
FD1US1
DATA BASED ON 031200Z
VALID 031800Z    FOR USE 1400-2100Z. TEMPS NEG ABV 24000

FT  3000    6000    9000    12000    18000    24000    30000    34000    39000
FAT 9900 1308+14 1405+09 9900+05 2817-09 2633-21 263837 264447 273453
```

The closest forecast point to the accident site was Fresno, California (FAT). The 0658 PDT FAT forecast for use between 0700 PDT and 1400 PDT indicated a calm wind at 3,000 ft and a wind at 6,000 ft from 130° at 8 knots with a temperature of 14°C.

15.0 Pilot Weather Briefing

The accident pilot did not request weather information²¹ from Leidos Flight Service on the day of the accident. A search of archived ForeFlight information indicated that the accident pilot did not request weather information from ForeFlight on the day of the accident. There is no record of the accident pilot receiving or retrieving any other weather information before or during the accident flight.

16.0 Astronomical Data

The astronomical data obtained for the accident site on November 3, 2021, indicated the following:

SUN	
Begin civil twilight	0654 PDT
Sunrise	0721 PDT
Accident time	1130 PDT²²
Sun transit	1240 PDT
Sunset	1800 PDT
End civil twilight	1826 PDT

At the time of the accident the Sun was located at an altitude of 36.53° and azimuth of 158.71°.

E. LIST OF ATTACHMENTS

Attachment 1 – Additional KMIT METAR observations

²¹ https://www.faa.gov/documentLibrary/media/Advisory_Circular/AC_91-92.pdf

²² Inserted accident time for reference and context.

Attachment 2 – GOES-17 visible satellite animation between 1001 and 1201 PDT

Attachment 3 – GFA valid for the accident site at accident time

Submitted by:

Paul Suffern
Senior Meteorologist