



NATIONAL TRANSPORTATION SAFETY BOARD

Office of Aviation Safety
Washington, D.C. 20594

October 22, 2019

Factual Report

METEOROLOGY

WPR18MA087

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A. ACCIDENT

Location: Peach Springs, Arizona
Date: February 10, 2018
Time: 1719 mountain standard time (0019 UTC on February 11, 2018)¹
Aircraft: Type: EC-130 B4; Registration: N155GC

B. METEOROLOGIST

Mike Richards
Senior Meteorologist
Operational Factors Division (AS-30)
National Transportation Safety Board

C. SUMMARY

On February 10, 2018, about 1719 mountain standard time (MST), an Airbus Helicopters EC130 B4 helicopter, N155GC, was destroyed when it impacted a canyon wash while on an approach to land at Quartermaster landing zone near Peach Springs, Arizona. The commercial pilot and one passenger sustained serious injuries and five passengers were fatally injured. The air-tour flight was operated by Papillon Airways, Inc. under the provisions of 14 Code of Federal Regulations Part 136. The helicopter departed Boulder City Municipal Airport, Boulder City, Nevada at 1642 MST and had intended to land at Quartermaster landing zone, a group of unimproved landing pads within Quartermaster canyon. Visual meteorological conditions prevailed, and a company flight plan had been filed.

D. DETAILS OF THE INVESTIGATION

The National Transportation Safety Board's meteorological specialist did not travel in support of this accident investigation and gathered all weather data remotely. Unless otherwise noted, all times are in MST for February 10, 2018 (based upon the 24-hour clock), directions are referenced to true north unless otherwise noted, distances are in nautical miles and heights are above mean sea level (msl).

Coordinates used for the accident location: 35.967222° north latitude, 113.768889° west longitude, at an elevation of about 1,300 feet.

¹ UTC – abbreviation for Coordinated Universal Time

E. FACTUAL INFORMATION

1.0 Synoptic Conditions

The Southwestern portion of the continental United States National Weather Service (NWS) Surface Analysis Chart for 1400 and 1700 MST are presented in figures 1 and 2, respectively. The 1400 MST NWS Surface Analysis Chart identified a low pressure center of 998 hectopascals (hPa) located along the Utah/New Mexico border. A cold front extended west from this low pressure center through southern Nevada into California with the accident site located ahead of the front. The 1700 MST NWS Surface Analysis Chart showed the cold front had moved south into north-central Arizona and the accident site was located north of the front. Clear skies were noted across the region except in far northern Arizona and southern Utah, where overcast sky conditions were reported.

The NWS Weather Forecast Office (WFO) in Las Vegas, Nevada, provided forecast imagery of 10-meter sustained wind magnitudes for the accident region from the High-Resolution Rapid Refresh (HRRR) model, the Weather Research and Forecasting (WRF) model with the Advanced Weather WRF (ARW) core, the WRF model with the Nonhydrostatic Mesoscale Model (NMN) core and the NWS National Digital Forecast Database (NDFD). Imagery for times surrounding the accident time are provided in figures 3-6. An image of three-kilometer spatial resolution surface elevation considered in the HRRR model is presented in Figure 7.

A WSR-88D regional radar composite reflectivity mosaic obtained from the National Centers for Environmental Information (NCEI) for 1715 MST (figure 7) did not identify any values of reflectivity across the accident region.

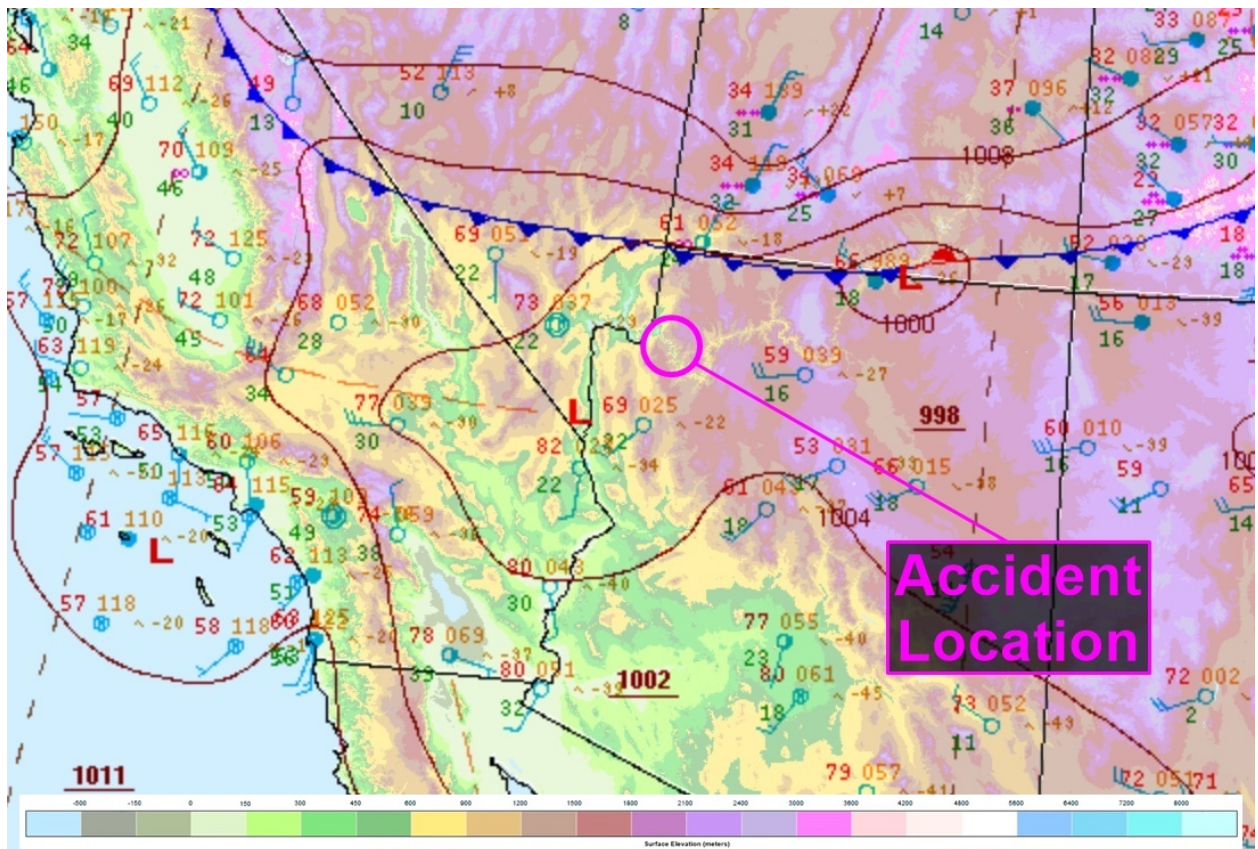


Figure 1 – Southwestern continental United States portion of the NWS Surface Analysis Chart for 1400 MST.

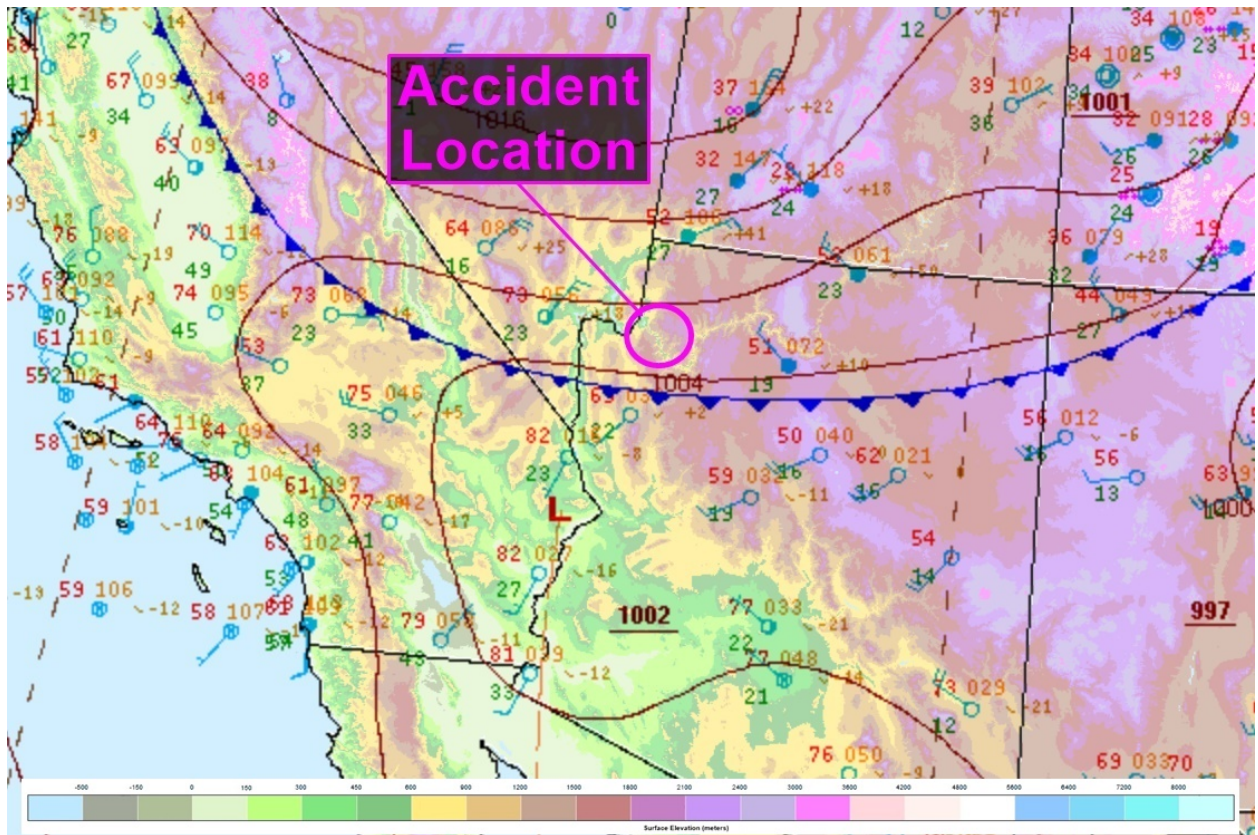


Figure 2 – Southwestern continental United States portion of the NWS Surface Analysis Chart for 1700 MST.

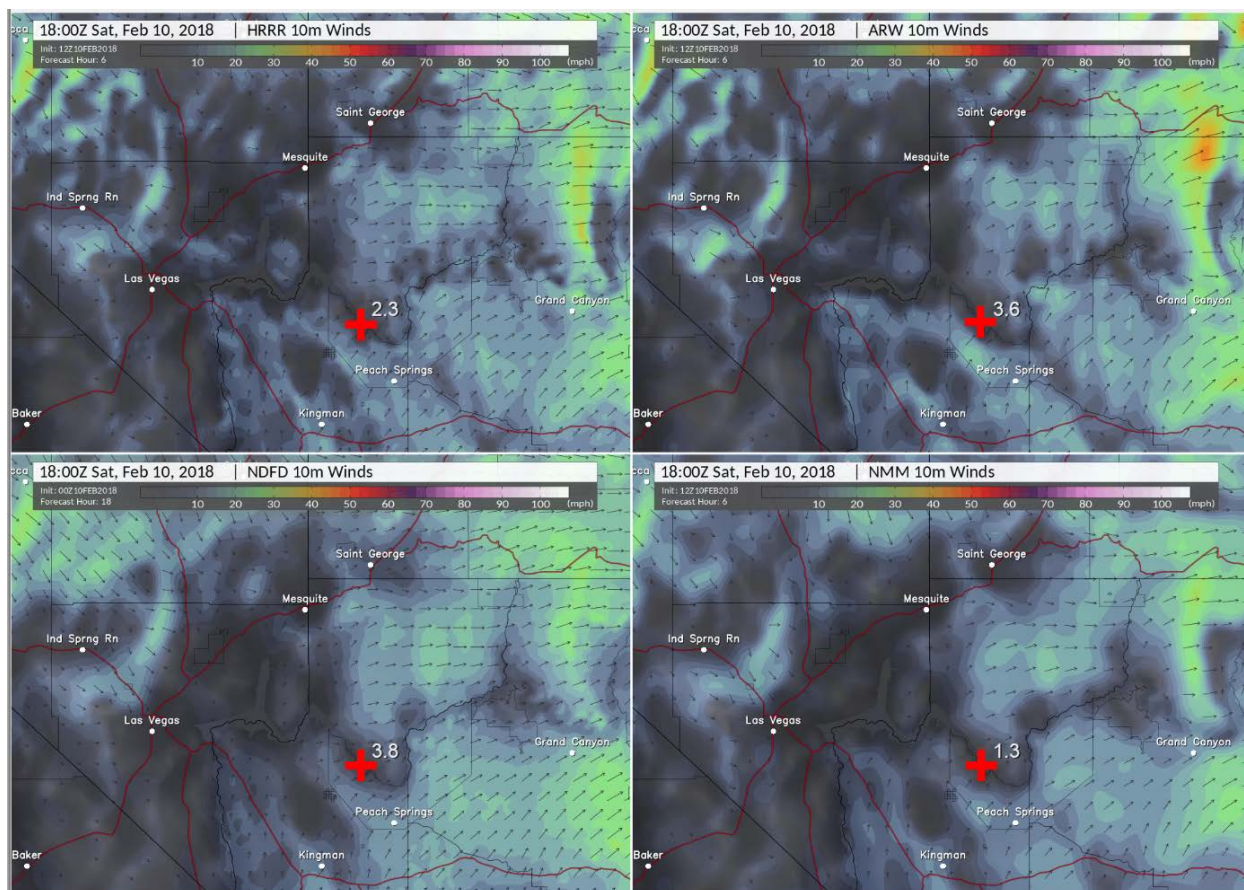


Figure 3 – 6-hour forecasts of 10-meter wind valid at 1100 MST from the HRRR, WRF-ARW and WRF-NMM models, as well as the NWS NDFD. Red crosshairs denote the approximate accident location. Numerical value to the upper-right of the crosshairs indicate 10-meter wind value (in miles-per-hour [mph]) at the crosshairs at the forecast time.

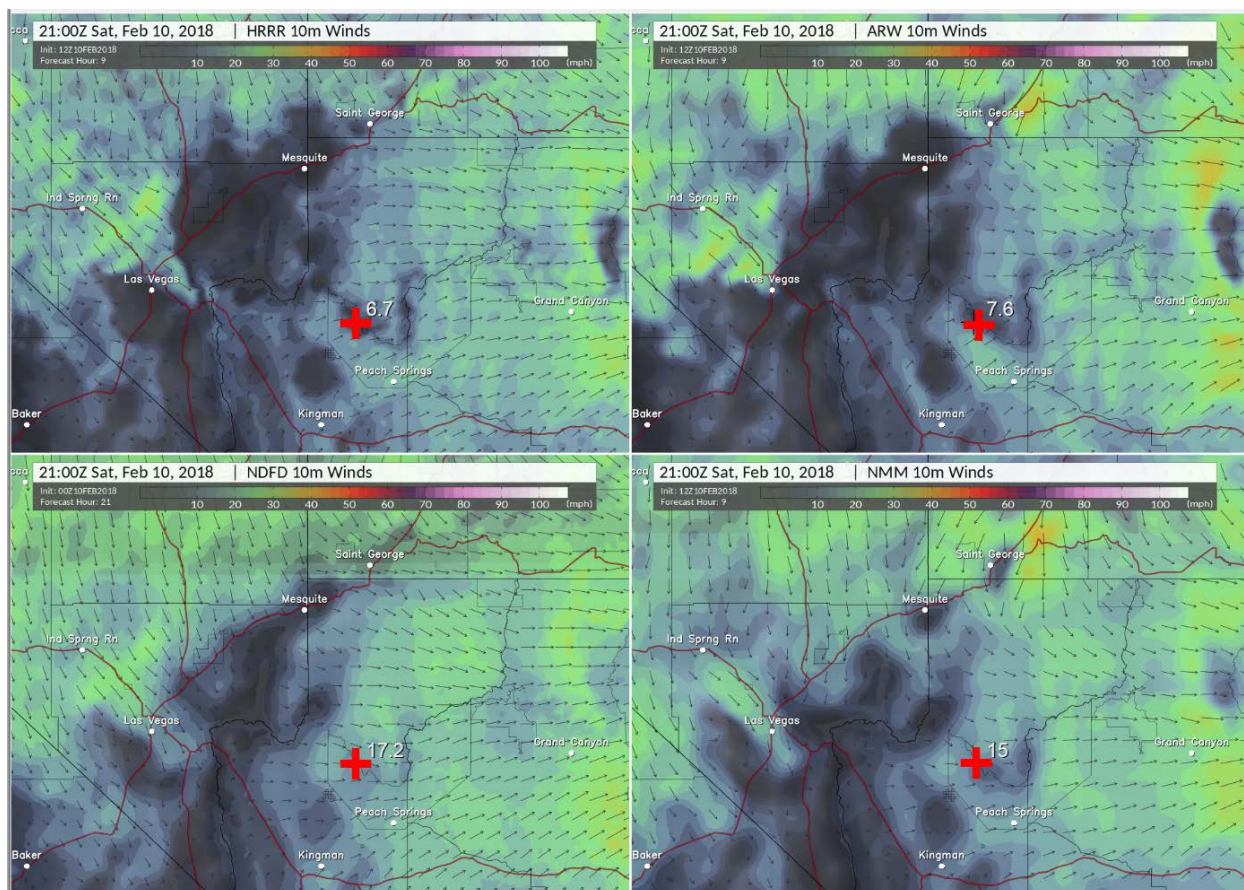


Figure 4 – 9-hour forecasts of 10-meter wind valid at 1400 MST from the HRRR, WRF-ARW and WRF-NMM models, as well as the NWS NDFD. Red crosshairs denote the approximate accident location. Numerical value to the upper-right of the crosshairs indicate 10-meter wind value (mph) at the crosshairs at the forecast time.

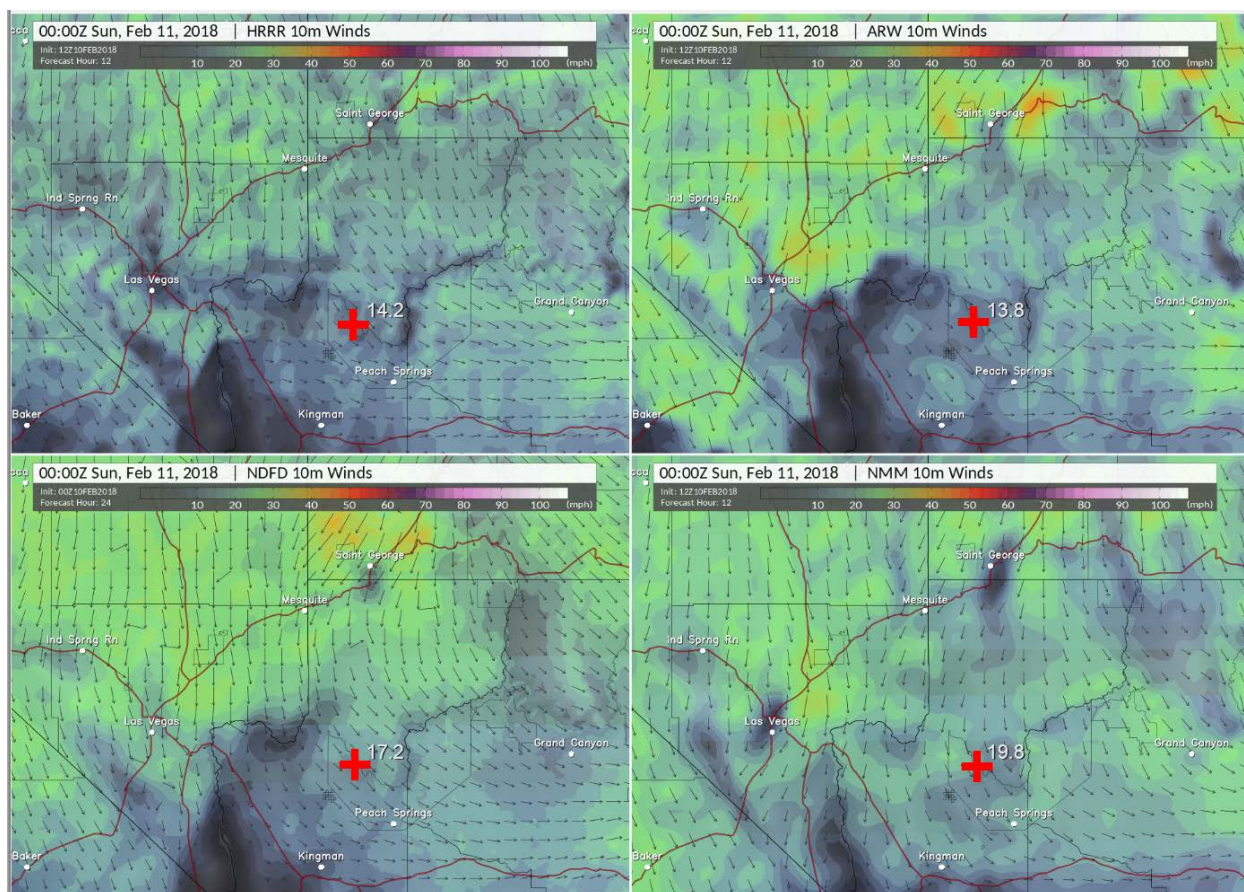


Figure 5 – 12-hour forecasts of 10-meter wind valid at 1700 MST from the HRRR, WRF-ARW and WRF-NMM models, as well as the NWS NDFD. Red crosshairs denote the approximate accident location. Numerical value to the upper-right of the crosshairs indicate 10-meter wind value (mph) at the crosshairs at the forecast time.

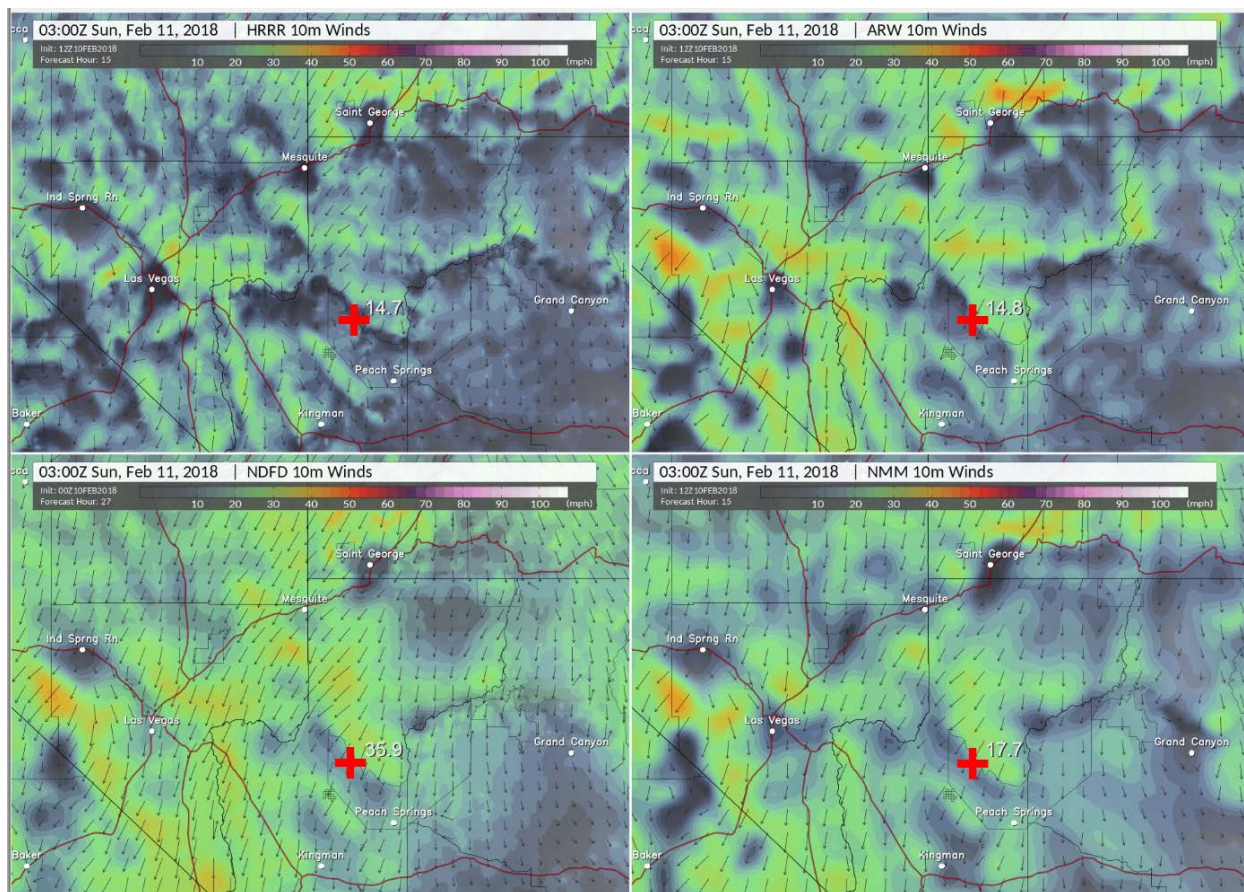


Figure 6 – 15-hour forecasts of 10-meter wind valid at 2000 MST from the HRRR, WRF-ARW and WRF-NMM models, as well as the NWS NDFD. Red crosshairs denote the approximate accident location. Numerical value to the upper-right of the crosshairs indicate 10-meter wind value (mph) at the crosshairs at the forecast time.

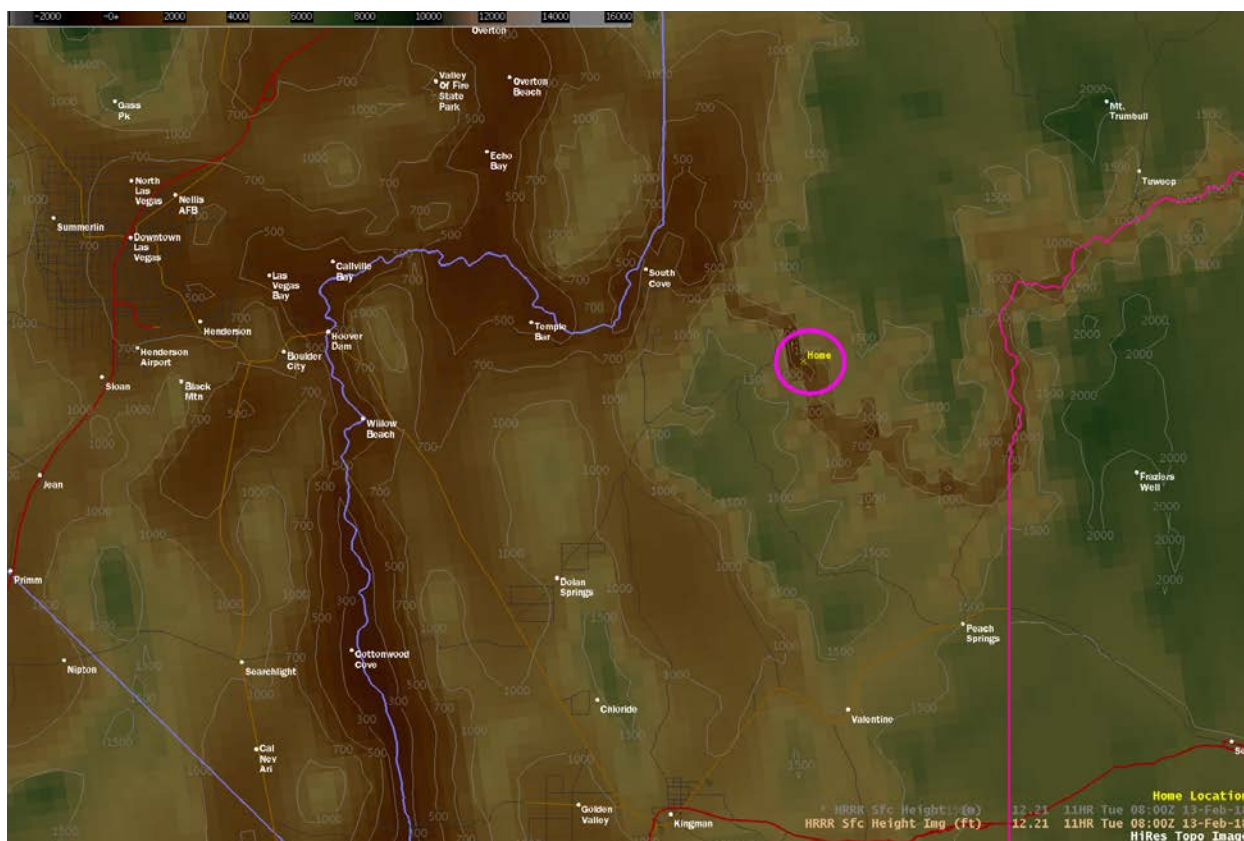


Figure 7 – Image of three-kilometer spatial resolution surface elevation considered in the HRRR model. Pink circle denotes approximate accident location.

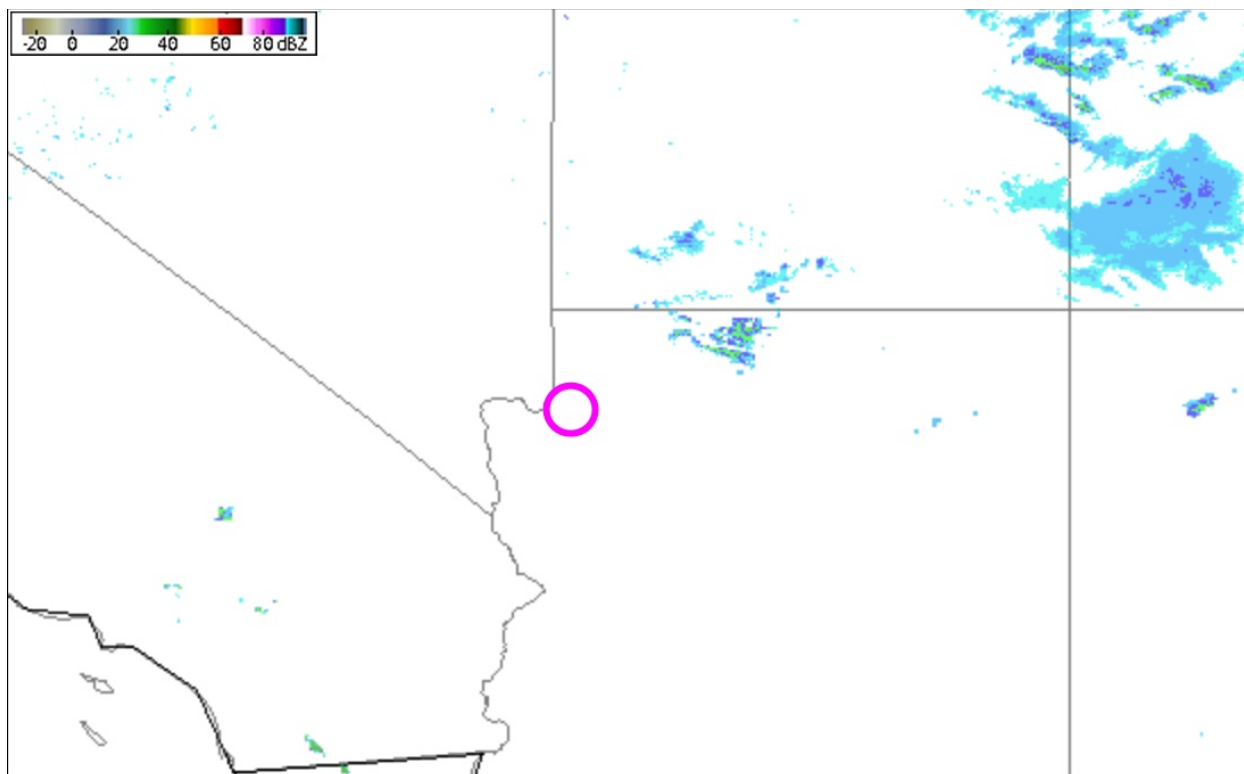
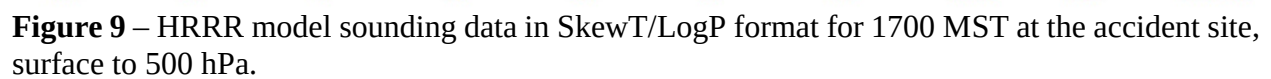


Figure 8 – NCEI WSR-88D mosaic from 1715 MST. Pink circle denotes approximate accident location.

2.0 Upper Air Data

A HRRR model sounding (figure 9) valid for the accident location at 1700 MST was retrieved from the NOAA Air Resources Laboratory. For the accident location, the near surface elevation in this HRRR run was 1,863 feet. The wind from near the surface through about 5,300 feet was (generally) from the north-northwest at magnitudes between 10 knots (near the surface) to about 20 knots (near 5,000 feet). Above this level, the wind backed rapidly to a west wind of 20 knots at about 10,000 feet. A near-isothermal layer was identified in the lowest 500 feet above ground level (agl). The HRRR sounding retrieved a near-surface temperature of 19.6° Celsius (C) with a dew point depression of 25.9°C. The freezing level was at about 9,600 feet. Calculations made by the RAWinsonde OBservation Program identified a very shallow layer of “light” low level wind shear near the surface.



3.0 Satellite Imagery

Geostationary Operational Environmental Satellite (GOES)-16 “visible” (0.64 μ m) data were obtained from an archive at the Space Science Engineering Center at the University of Wisconsin-Madison. Imagery from 1712 MST is presented in figure 10.

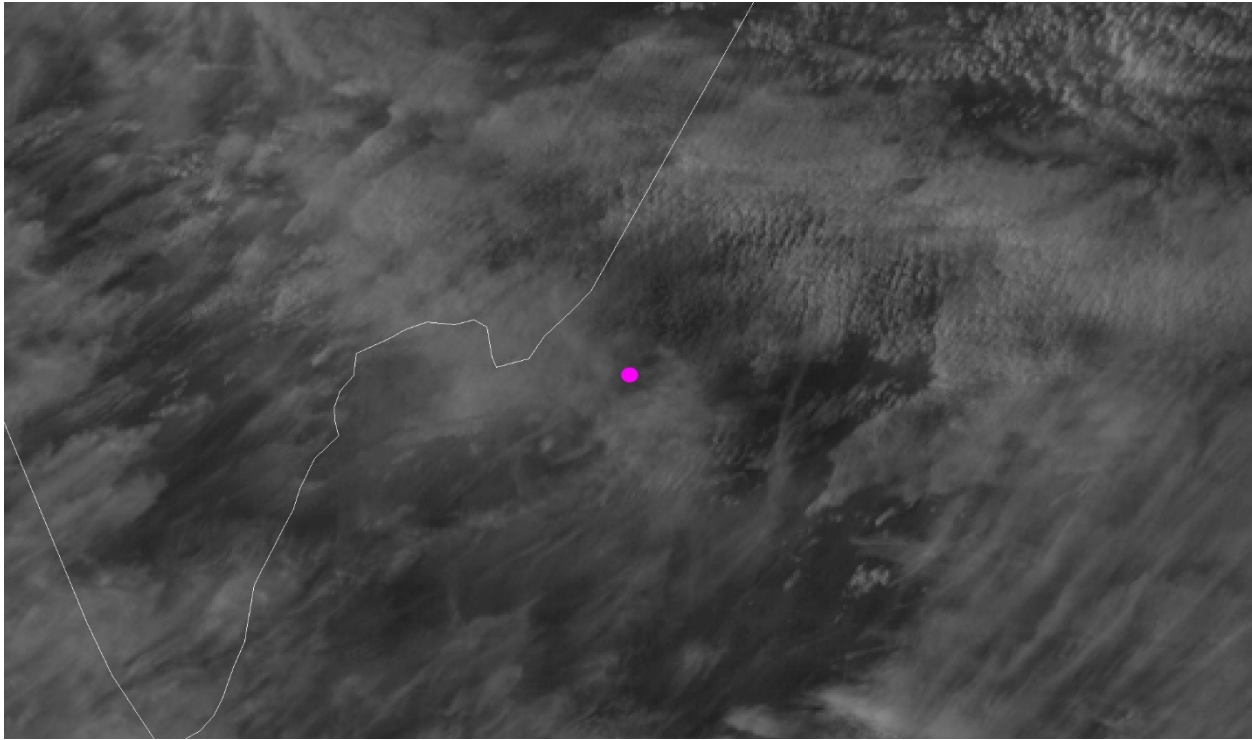


Figure 10 – GOES-16 visible imagery from 1712 MST. Pink dot denotes accident location. Image is not corrected for any parallax error.

4.0 Surface Observations

An Automated Weather Observing System (AWOS) -3PT was located at Grand Canyon West Airport (1G4)² in Peach Springs, Arizona, which was about 2.6 miles west-northwest of the accident location at an elevation of about 4,815 feet. The following raw 20-minute reports from the 1G4 AWOS-3PT, which were provided by the AWOS technician, were recorded during the times surrounding the accident time. Several of the raw reports are decoded below. Attachment 1 presents the 1G4 AWOS-3PT one-minute observations between 1330 and 1800 MST as provided by Grand Canyon West Airport. According to the AWOS’ technician, “The [one-minute observation] wind data...from the AWOS [Operator Terminal] are magnetic. The AWOS wind

² The NWS uses the 4-digit International Civil Aviation Organization (ICAO) format for station identifiers (as seen in the body of some formatted weather observations). This report uses the 3-digit International Air Transport Association format for station identification, which does not use the geographic designating digit (“K” for stations in the continental U.S. and “P” for U.S. stations in Alaska and the Pacific region) as found in the ICAO format.

speed is a running two-minute average calculated from the 5 second wind sensor data. If the current 2-minute average wind speed is equal to or greater than 9 knots and the greatest 5-second average wind speed (during the past minute) exceeds the current 2-minute average speed by 5-knots or more, then the greatest 5-second average speed observed during the past minute is reported [as] a gust for 10 minutes.”

[1545 MST] 0273 1802102245 CLR 10 017-008 30 0120172979 6400 00D
[1605 MST] 0271 1802102305 CLR 10 017-007 28 0120172979 6400 00D
[1625 MST] 0270 1802102325 CLR 10 017-007 31 0090152980 6400 00D
[1645 MST] 0269 1802102345 CLR 10 016-007 31 005 2980 6200 00D
[1705 MST] 0268 1802110005 CLR 10 015-006 33 0150192982 6100 00D
[1725 MST] 0267 1802110025 CLR 10 013-006 33 0160212983 5900 00D
[1745 MST] 0266 1802110045 SCT120 10 012-006 34 0170222986 00D
[1805 MST] 0265 1802110105 SCT085 SCT110 10 012-006 35 0140202987 00D
[1825 MST] 0264 1802110125 BKN095 10 011-007 34 0130192988 00N
[1845 MST] 0263 1802110145 SCT070 BKN095 BKN120 10 011-007 34 0110172989 00N
[1905 MST] 0262 1802110205 BKN095 BKN120 10 010-009 01 0170272991 34V04 00N

At 1645 MST, 1G4 reported clear sky conditions, visibility of 10 statute miles, temperature of 16°C, dew point temperature of -7°C, magnetic wind direction of 310°, wind magnitude of 5 knots, altimeter setting of 29.80 inches of mercury, density altitude of 6200 feet, 0.00 inches of precipitation, and daytime status.

At 1705 MST, 1G4 reported clear sky conditions, visibility of 10 statute miles, temperature of 15°C, dew point temperature of -6°C, magnetic wind direction of 330°, wind magnitude of 15 knots, wind gust of 19 knots, altimeter setting of 29.82 inches of mercury, density altitude of 6100 feet, 0.00 inches of precipitation, and daytime status.

At 1725 MST, 1G4 reported clear sky conditions, visibility of 10 statute miles, temperature of 13°C, dew point temperature of -6°C, magnetic wind direction of 330°, wind magnitude of 16 knots, wind gust of 21 knots, altimeter setting of 29.83 inches of mercury, density altitude of 5900 feet, 0.00 inches of precipitation, and daytime status.

At 1745 MST, 1G4 reported scattered clouds at 12,000 feet agl, visibility of 10 statute miles, temperature of 12°C, dew point temperature of -6°C, magnetic wind direction of 340°, wind magnitude of 17 knots, wind gust of 22 knots, altimeter setting of 29.86 inches of mercury, 0.00 inches of precipitation, and daytime status.³

³ Density altitude will not be reported if it is less than 1,000 feet above field elevation.

Papillon Airways, Inc. and Sundance Helicopters, Inc. each owned and operated one Dyacon weather station (product configurations MS-130) located about 2 miles north-northwest (downriver) of the accident site (see figure 11). The Papillon station was at an elevation of about 1,235 feet and the Sundance station was at an elevation of about 1,225 feet. Photographs of these stations are presented in figures 12 and 13, and Dyacon estimated anemometer heights as 15 feet for the Papillon station and 9 feet for the Sundance station. Real-time and archive reports from these stations were available via the Weather Underground website⁴ using the station names of KAZFREDO4 (Papillon) and KAZPEACH2 (Sundance). These data, reported at a 10-minute interval during the times surrounding the accident time, are presented below (note temperatures are in degrees Fahrenheit [F] and wind magnitudes are in mph).⁵ Average wind magnitude is the 10-minute average ending at the reporting time, average wind direction is the 10-minute average ending at the reporting time, and a gust magnitude is recorded (and reported at the next 10-minute reporting interval) when the current wind magnitude exceeds the running 2-minute average wind magnitude by 9 knots or more. The gust value is held for 10 minutes, higher gusts will immediately replace lower values, and lower values will replace higher values when the previous higher value expires it's 10-minute retention. Because a 2-minute average bin contains wind calculations made every 3 seconds, there are 200 2-minute average bins in every 10-minute period.

Papillon station:

<u>Time</u>	<u>Temp</u>	<u>D-Temp</u>	<u>RH</u>	<u>W Dir</u>	<u>W Mag</u>	<u>G Mag</u>	<u>Pressure</u>	<u>P Rate</u>	<u>P Acc</u>
1640	76.3°	24.1°	14	NE	9.4	20.1	29.58	--	--
1650	76.5°	24.5°	14	NE	11.2	21.5	29.59	--	--
1700	75.9°	24.6°	14	NNW	10.3	--	29.61	--	--
1710	74.5°	25.5°	16	NNW	13.6	22.1	29.62	--	--
1720	73.9°	25.2°	16	N	13.4	--	29.64	--	--
1730	73.2°	24.9°	16	NNW	14.1	28.6	29.66	--	--

Sundance station:

<u>Time</u>	<u>Temp</u>	<u>D-Temp</u>	<u>RH</u>	<u>W Dir</u>	<u>W Mag</u>	<u>G Mag</u>	<u>Pressure</u>	<u>P Rate</u>	<u>P Acc</u>
1640	76.5°	25.3°	15	NNE	7.6	--	29.52	--	--
1650	75.7°	26.2°	15	NNE	8.7	--	29.54	--	--
1700	75.7°	24.6°	14	NNW	11.9	23.7	29.55	--	--
1710	74.3°	25.3°	16	NW	13.4	--	29.57	--	--
1720	73.4°	25.2°	16	NNW	11.9	--	29.58	--	--
1730	72.9°	25.2°	16	NNW	13.4	--	29.60	--	--

⁴ <https://www.wunderground.com>

⁵ Time=station clock(MST); Temp=temperature(F); D_Temp=dew point temperature(F); RH=relative humidity(%); W_Dir=average wind direction(it is not known if wind direction is reference to true north or magnetic north); W_Mag=average wind magnitude direction(mph); G_Mag=gust wind magnitude(mph); Pressure=station pressure(inches of mercury); P_Rate=precipitation rate(inches); P_Acc=precipitation accumulation(inches)

Weather information could also be retrieved from these stations in real-time by sending a text message to a unique phone number assigned to each station (Papillon: +1[702] [REDACTED]; Sundance: +1[435] [REDACTED]). If a user texted the letter “M” to one of these phone number, a text message would be returned to the user providing real-time station information in METAR format with the addition of estimated cloud base information (agl) and density altitude. Average wind magnitude in these reports were a 2-minute average magnitude.⁶ For example, a text of “M” to the Sundance station’s phone number at 0851 MST on 27 March 2018 returned the following text message:

*** Advisory ***

METAR Beach WX

271451Z AUTO 22002KT 11/M04 A3001 RMK AO1 SLP161 EstCB064 DA010=

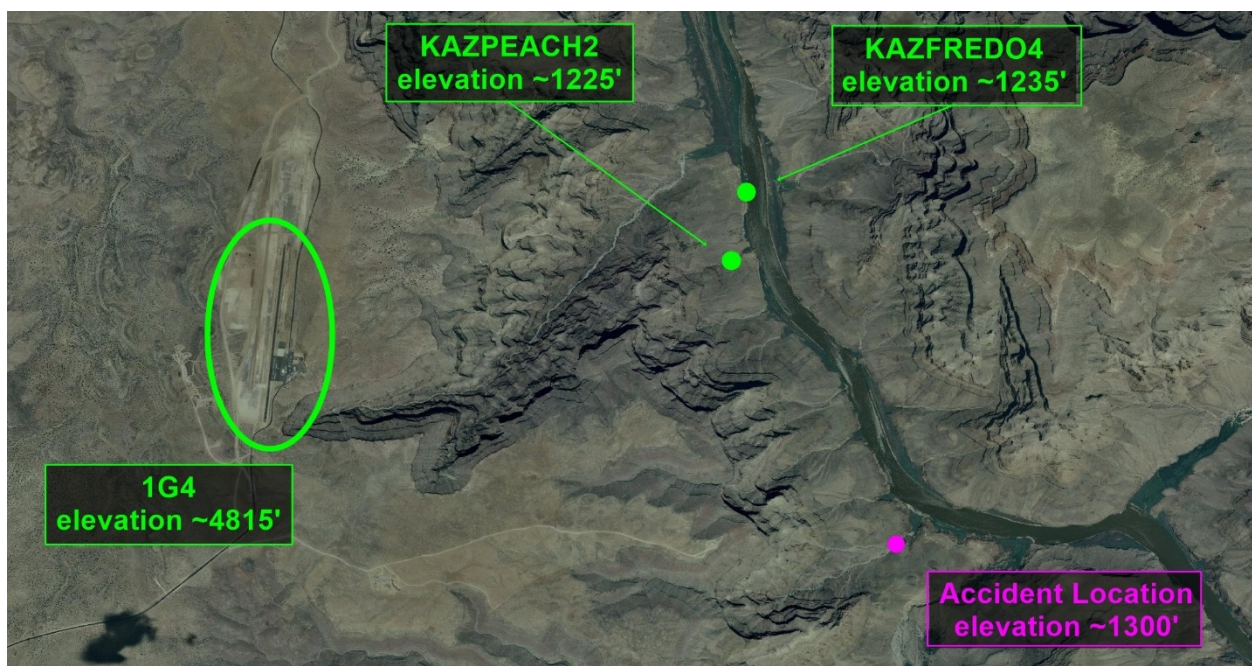


Figure 11 – Map showing locations of accident and nearby surface weather stations.

⁶ It is not known if wind direction is referenced to true north or magnetic north.

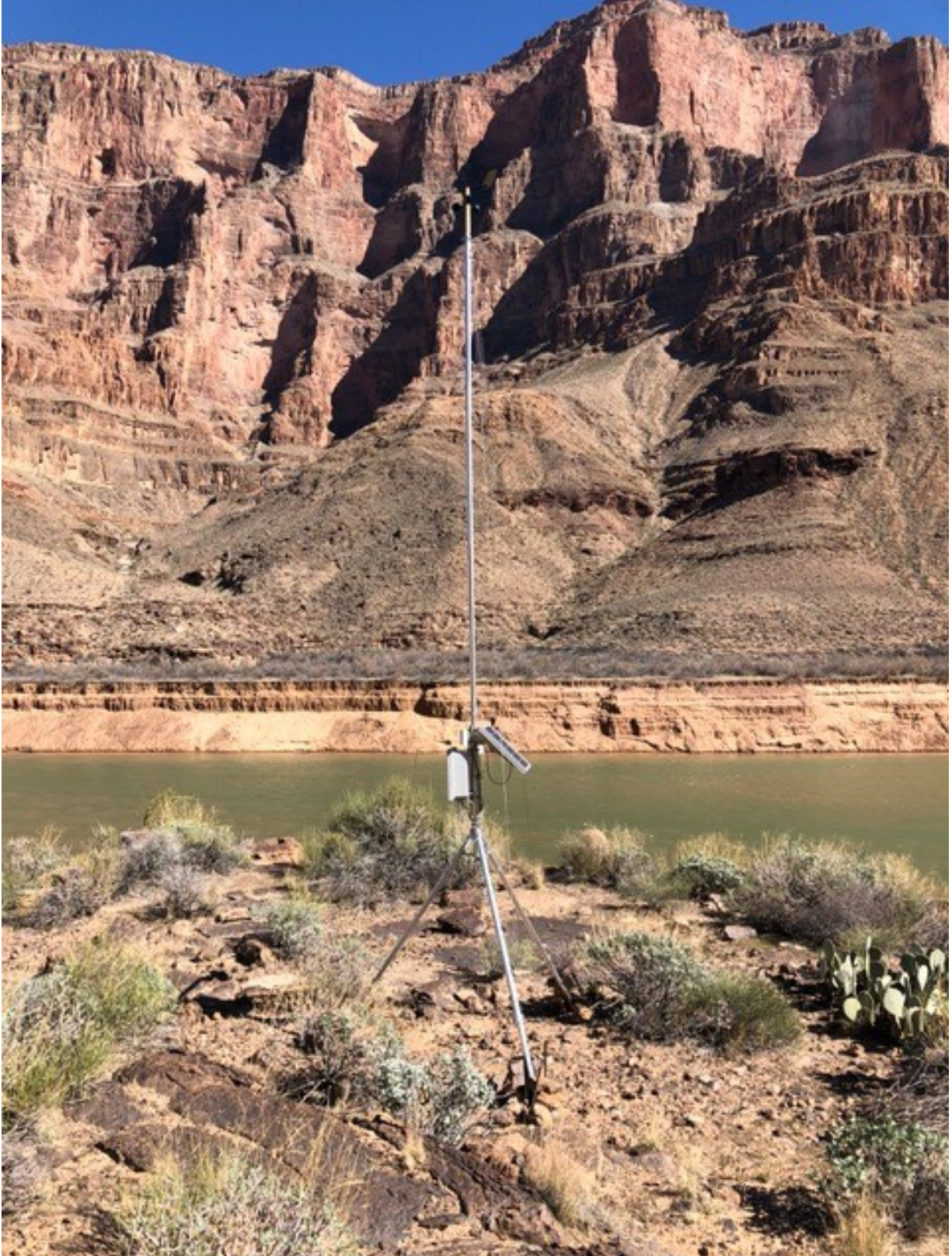


Figure 12 – Photograph of KAZFREDO4 (Papillon station). Date of capture unknown.



Figure 13 – Photograph of KAZPEACH2 (Sundance station). Date of capture unknown.

A wind sock was located at the accident aircraft's intended landing site. An image of this wind sock, taken at about 1713 MST, is presented in figure 14. According to the Papillon Airways, Inc. Base Manager at Grand Canyon West, the windsock is the 18"x48" Orange Replacement Windsock made by the Airport Windsock Corporation. The Airport Windsock Corporation website stated "Our orange airport windsock material meets FAA specifications." According to Federal Aviation Administration Advisory Circular 150/5345-27E, "The taper or the fabric windsock from the throat to the trailing end must be designed to cause the windsock to fully extend when exposed to a wind of 15 knots (28 km/hr or 17 mph)."⁷



Figure 14 – Photograph taken at 1713 MST of the windsock at the accident aircraft's landing site.

⁷ http://www.faa.gov/documentLibrary/media/Advisory_Circular/150_5345_27e.pdf

Remote Automated Weather Station (RAWS) TCRA3 (Truxton Canyon) was located about 11 miles south of the accident site at an elevation of about 5,305 feet. Calibration, maintenance and siting standards of this station, as well as the overall quality of the data, are not known. Reports⁸ from this station during the times surrounding the accident time are presented here:

<u>Time</u>	<u>Temp</u>	<u>D-Temp</u>	<u>RH</u>	<u>W_Mag</u>	<u>W_Dir</u>	<u>G_Mag</u>	<u>G_Dir</u>
1514	63.0°	18.7°	18	8.0	215°	18.0	181°
1614	61.0°	18.3°	19	17.0	255°	34.0	276°
1714	57.0°	19.2°	22	19.0	271°	28.0	260°
1814	51.0°	20.5°	30	23.0	295°	35.0	300°

RAWS QYJA3 (Yellow John Mountain) was located about 16 miles northeast of the accident site at an elevation of about 6,160 feet. Calibration, maintenance and siting standards of this station, as well as the overall quality of the data, are not known. Reports from this station during the times surrounding the accident time are presented here:

<u>Time</u>	<u>Temp</u>	<u>D-Temp</u>	<u>RH</u>	<u>W_Mag</u>	<u>W_Dir</u>	<u>G_Mag</u>	<u>G_Dir</u>
1550	55.0°	19.6°	25	5.0	293°	19.0	239°
1650	53.0°	21.4°	29	6.0	358°	15.0	353°
1750	43.0°	21.8°	43	4.0	003°	17.0	000°
1850	40.0°	22.2°	49	7.0	028°	15.0	030°

RAWS NVRA3 (Nevershine) was located about 18 miles north-northwest of the accident site at an elevation of about 2,165 feet. Calibration, maintenance and siting standards of this station, as well as the overall quality of the data, are not known. Reports from this station during the times surrounding the accident time are presented here:

<u>Time</u>	<u>Temp</u>	<u>D-Temp</u>	<u>RH</u>	<u>W_Mag</u>	<u>W_Dir</u>	<u>G_Mag</u>	<u>G_Dir</u>
1603	72.0°	20.2°	14	3.0	274°	10.0	234°
1703	66.0°	22.5°	19	15.0	358°	31.0	340°
1803	64.0°	19.6°	18	12.0	007°	28.0	356°
1903	62.0°	22.6°	22	11.0	012°	21.0	006°

Raw archive weather data from 1G4 (one-minute observations), McCarran International Airport (LAS), Boulder City Municipal Airport (BVU), and the Papillon and Sundance weather stations are included in the public docket for this investigation.

⁸ Columns are as noted before, except W_Dir=average wind direction(true) and G_Dir=gust wind direction(true)

5.0 Pilot Reports

There were no publicly-disseminated pilot reports⁹ made in the Grand Canyon region below 6,000 feet within about two hours of the accident time.

6.0 Terminal Aerodrome Forecasts

The closest NWS Terminal Aerodrome Forecast (TAF) site was located over 60 miles away from, and was not applicable to, the accident site. According to NWS Instruction 10-813: “A 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.”¹⁰

7.0 Area Forecast Discussion

An Area Forecast Discussion (AFD) was issued at 1637 MST by the NWS Weather Forecast Office in Las Vegas, Nevada (VEF).¹¹ The Synopsis and Update sections of that AFD are presented here, along with text from the previous VEF AFD issued at 1433 MST (which was contained in the 1637 MST AFD).

FXUS65 KVEF 102337
AFDVEF

Area Forecast Discussion
National Weather Service Las Vegas NV
337 PM PST Sat Feb 10 2018

.SYNOPSIS...A strong cold front will push south across the region this evening, bringing widespread gusty winds, blowing dust, and cooler temperatures. Winds will diminish through the day Sunday. Another weather system will drop south into the region early next week bringing chances for shower activity to the area off and on through the week.
&&

.UPDATE...Quick update to expand the areal coverage of blowing dust in the forecast - mainly in Lincoln County and the Owens Valley of CA. Will continue to monitor and update as needed. -Wolcott-
&&

⁹ Only pilot reports with the World Meteorological Organization headers UBAZ** and UBNV** were considered. Pilot reports only publicly-disseminated via radio were also not considered.

¹⁰ www.nws.noaa.gov/directives/sym/pd01008013curr.pdf

¹¹ This AFD covers the entire County Warning Area for VEF. A map of the NWS County Warning Areas may be found here: <https://www.weather.gov/gsp/nwsCWAMap>

.PREV DISCUSSION...133 PM PST Sat Feb 10 2018

.SHORT TERM...This afternoon through Sunday.

A vigorous cold front is pushing south across the southern Great Basin this afternoon, and is expected to reach the southern edge of the forecast area (near Lake Havasu City) by 800 PM. Widespread gusts of 40 to 50 MPH have been reported with this front so far, with 57 MPH near Goldfield, NV being the highest reported as of 100 PM. Fairly extensive areas of blowing dust have been noted on GOES-16 imagery across central NV and UT today, with more isolated areas of dust to the south. Expect widespread dust and poor air quality conditions as the front continues to push south this afternoon/evening. In the wake of the front, isolated areas of reverse downslope winds with gusts approaching 60 MPH will be possible tonight along the western slopes of the Spring Mountains (north of Pahrump), the Hualapai Mountains, and the mountains of the Mojave National Preserve.

Winds will gradually taper off from north to south overnight, lingering through Sunday morning down the Colorado River Valley. Sunday will be much cooler across the region, with temperatures 10-15 degrees cooler in most areas.

.AVIATION...For McCarran...A strong cold front will sweep through the valley late this afternoon with gusty northwest winds expected through 00z this evening. Winds will generally be between 12-25 kts. Stronger winds are the expected between 00z-03z as the main push of winds reaches the valley. Winds are forecast to then shift more to the northeast with speeds generally between 25-35 kts. Areas of blowing dust will also occur potentially lowering the vsby to around 3-5SM. Winds will then gradually decrease late evening and overnight with northeast winds less than 10 kts expected Sunday. Cloud cover is not expected to be an impact.

For the rest of southern Nevada, northwest Arizona and southeast California...A strong cold front will move through the region this afternoon and evening bringing gusty northwest to northeast winds across the area. Most areas will see winds between 20-30 kts with gusts between 40-50 kts through 03z this evening. The strongest winds are expected down the Colorado River Valley which are expected to last overnight with speeds between 35-45 kts. Winds will diminish over most areas by Sunday morning, but will remain gusty down the river near KIFP and KEED. Sct-bkn clouds around 10-14k feet over Nye, Lincoln, northeast Clark and northern Mohave Counties, but precipitation will remain east of the forecast area.

8.0 NWS Weather Messages

An urgent Weather Message was issued at 1008 MST by VEF that identified that a Wind Advisory was in effect for the accident region beginning at 1800 MST.¹² An NWS Wind Advisory is issued when the following conditions are expected: (1) sustained winds of 31 to 39 mph are expected to last for an hour or more, and/or (2) wind gusts of 46 to 57 mph are expected for any duration.

WWUS75 KVEF 101708

NPWVEF

URGENT - WEATHER MESSAGE

National Weather Service Las Vegas NV

908 AM PST Sat Feb 10 2018

AZZ003-110115-

/O.EXB.KVEF.WI.Y.0005.180211T0100Z-180211T1800Z/

Northwest Deserts-

Including Kingman, Golden Valley, Dolan Springs, Valentine, Wikieup, and Yucca

1008 AM MST Sat Feb 10 2018

...WIND ADVISORY IN EFFECT FROM 6 PM THIS EVENING TO 11 AM MST SUNDAY...

The National Weather Service in Las Vegas has issued a Wind Advisory, which is in effect from 6 PM this evening to 11 AM MST Sunday.

* TIMING...Winds will increase late this afternoon, peak overnight, and decrease through Sunday morning.

* WINDS...North winds 20 to 30 mph gusting 35-45 mph. Isolated gusts to 55 mph possible on the western slopes of the Hualapai Mountains.

* IMPACTS...Winds will make driving difficult for motorcyclists, large trucks, trailers, and campers traveling on area roadways.

PRECAUTIONARY/PREPAREDNESS ACTIONS...

A Wind Advisory means strong winds gusting over 40 mph can make driving difficult, especially for high profile vehicles. Tie down loose cargo, watch for wind prone areas, and allow for enough space while passing.

9.0 NWS Zone Forecasts

A Zone Forecast was issued for the accident region at 1641 MST, which identified that a Wind Advisory was in effect beginning at 1800 MST. Only the Tonight section of that Zone Forecast is presented here.

FPUS55 KVEF 102341

¹² The Wind Advisory was in effect for the "Northwest Deserts" zone. A map of this zone may be found on the following page: <https://forecast.weather.gov/MapClick.php?zoneid=AZZ003>

ZFPVEF

Zone forecasts for the Mojave Desert and Southern Great Basin
National Weather Service Las Vegas NV
340 PM PST Sat Feb 10 2018

This is an automatically generated product that provides average values for large geographical areas and may not be representative of the exact location that you are interested in. For a more site specific forecast...please visit weather.gov/lasvegas and either (1) Select a location from the dropdown menu above the map or (2) Click a location on the map. You can refine your selection by clicking on the map displayed on the resulting page.

AZZ003-111200-
Northwest Deserts-
including Kingman, Golden Valley, Dolan Springs,
Valentine, Wikieup, and Yucca
440 PM MST Sat Feb 10 2018

...WIND ADVISORY IN EFFECT UNTIL 11 AM MST SUNDAY...

.TONIGHT...Mostly clear. Breezy, colder. Areas of blowing dust in the evening. Lows around 40. Northeast winds 15 to 25 mph.

Prior to this, a Zone Forecast was issued for the accident region at 1406 MST, which identified that a Wind Advisory was in effect beginning at 1800 MST. Only the Tonight section of that Zone Forecast is presented here.

FPUS55 KVEF 102106
ZFPVEF

Zone forecasts for the Mojave Desert and Southern Great Basin
National Weather Service Las Vegas NV
105 PM PST Sat Feb 10 2018

This is an automatically generated product that provides average values for large geographical areas and may not be representative of the exact location that you are interested in. For a more site specific forecast...please visit weather.gov/lasvegas and either (1) Select a location from the dropdown menu above the map or (2) Click a location on the map. You can refine your selection by clicking on the map displayed on the resulting page.

AZZ003-111200-
Northwest Deserts-
including Kingman, Golden Valley, Dolan Springs,
Valentine, Wikieup, and Yucca
205 PM MST Sat Feb 10 2018

...WIND ADVISORY IN EFFECT FROM 6 PM THIS EVENING TO 11 AM MST
SUNDAY...

.TONIGHT...Mostly clear. Breezy, colder. Areas of blowing dust in the evening. Lows around 40. Northeast winds 15 to 25 mph.

10.0 Graphical Forecasts for Aviation

The Graphical Forecasts for Aviation (GFA) are intended to provide the necessary aviation weather information to give users a complete picture of the weather that might impact flight in the continental United States. Hourly model data and forecasts, including information on clouds, flight category, precipitation, icing, turbulence, wind, and other output from the NWS are available, however only certain imagery are archived by the NWS.

The following images (figures 15 and 16) depict GFA forecast information on sky condition, icing, mountain obscuration, instrument flight rule (IFR)¹³ condition and surface wind Airmen's Meteorological Information (AIRMET) advisories, surface visibility, surface wind, precipitation, and other obscurations and hazards, valid for the times surrounding the accident. GFA forecast information issued about 1500 MST and valid for 1700 MST depicted clear sky conditions, a surface visibility of greater than 5 statute miles, northwesterly surface wind gusts between 20 and 35 knots and dust/sand in the accident region.

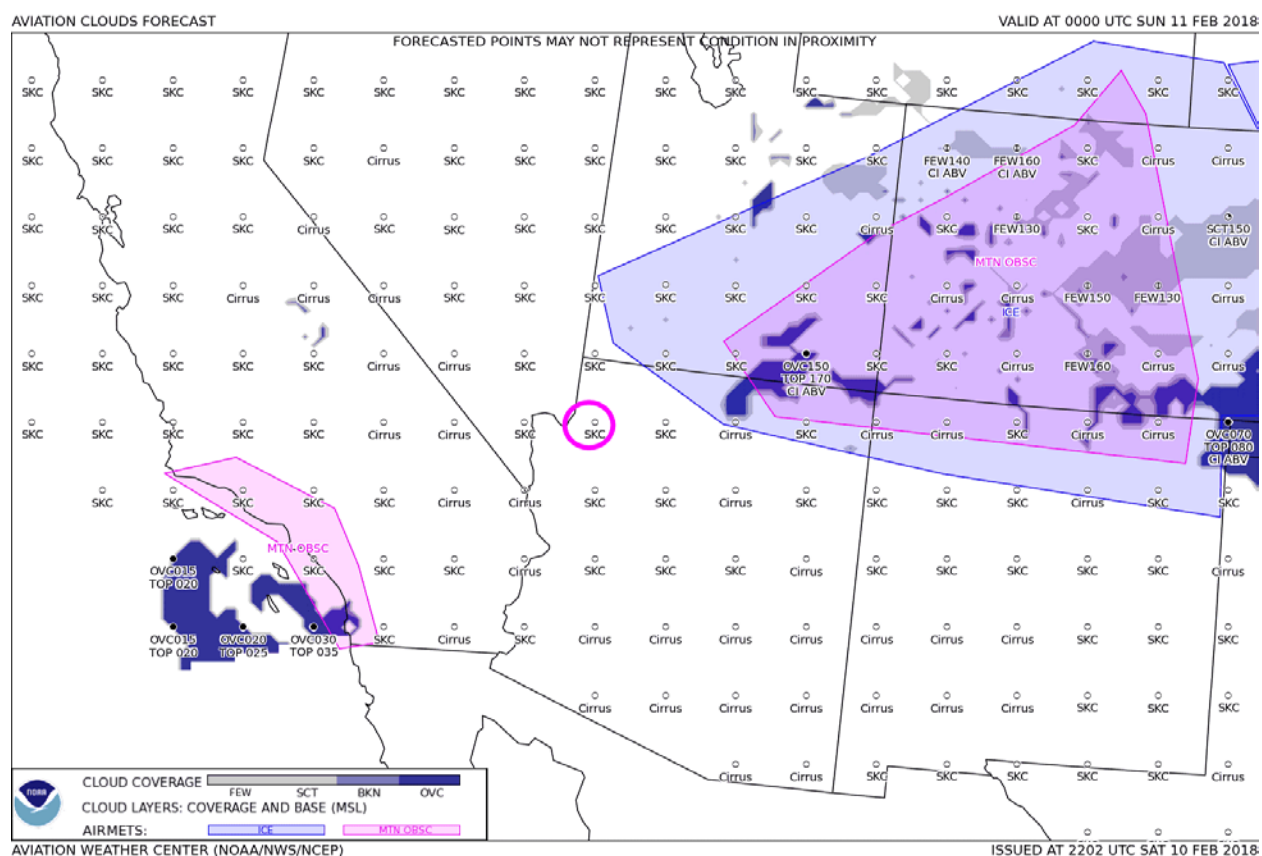


Figure 15 – GFA forecast imagery depicting sky condition and icing and mountain obscuration AIRMETs. Issued about 1500 MST and valid for 1700 MST. This GFA forecast imagery depicted clear conditions over the accident region. The accident location is denoted by the pink circle.

¹³ IFR conditions - Ceilings less than 1,000 feet agl and/or visibility less than three statute miles.

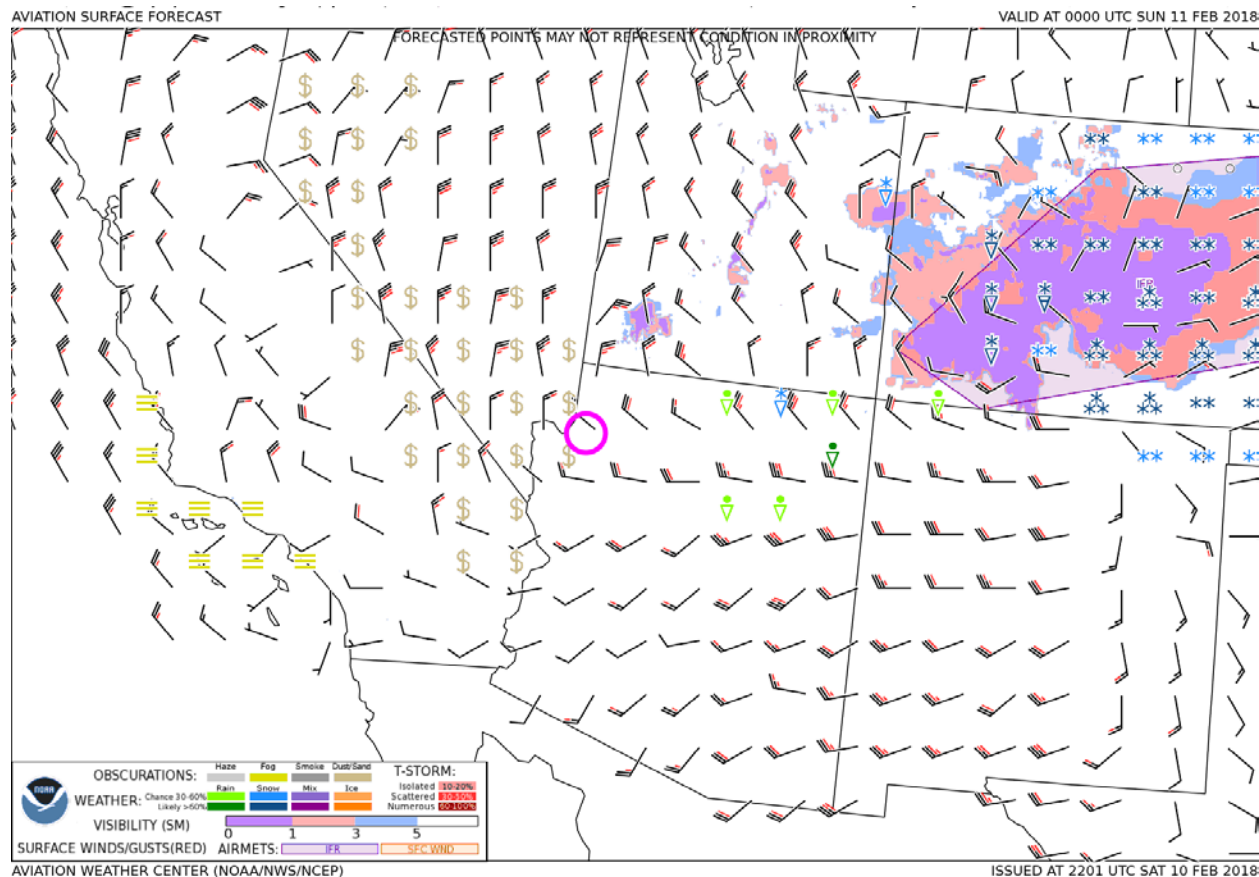


Figure 16 – GFA forecast imagery depicting IFR conditions and surface wind AIRMETs, surface visibility, surface wind, precipitation, and other obscurations and hazards. Issued about 1500 MST and valid for 1700 MST. This GFA forecast imagery depicted a surface visibility of greater than 5 statute miles, northwesterly surface wind gusts between 20 and 35 knots and dust/sand near the accident location. The accident location is denoted by the pink circle.

11.0 AIRMETs

One AIRMET was active for the accident location (below FL180¹⁴) at the accident time. An AIRMET TANGO advisory was issued at 1345 MST by the Aviation Weather Center in Kansas City, Missouri, for moderate turbulence below FL180 feet.

WAUS45 KNCI 102045
WA5T
-SLCT WA 102045

¹⁴ Flight Level (FL) - a standard nominal altitude of an aircraft, in hundreds of feet. This altitude is calculated from the international standard pressure datum of 1013.25 hPa (29.92 inches of mercury), the average sea-level pressure, and therefore is not necessarily the same as the aircraft's true altitude either above msl or agl.

AIRMET TANGO UPDT 3 FOR TURB AND LLWS VALID UNTIL 110300

.
AIRMET TURB...NV UT CO AZ NM CA
FROM 80NNW FMG TO 40W MTU TO 20WNW JNC TO 30WNW PUB TO 40ENE
LAA TO 50W LBL TO 30ESE TBE TO INK TO ELP TO 50S SSO TO 40SSW PHX
TO 20SW BZA TO 20S HEC TO 40SW FMG TO 80NNW FMG
MOD TURB BLW FL180. CONDS CONTG BYD 03Z THRU 09Z.

12.0 SIGMETs

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

13.0 Center Weather Advisories

There were no Center Weather Advisories issued by the Center Weather Service Unit (CWSU) at the Los Angeles Air Route Traffic Control Center (ZLA) active for the accident location at the accident time. The ZLA CWSU did issue the following Meteorological Impact Statement (MIS) at 1545 MST. MISs are labelled "For ATC Planning Purposes Only."

FAUS20 KZLA 102245
ZLA MIS 01 VALID 102244-111700
...FOR ATC PLANNING PURPOSES ONLY...

STRONG WEST TO NORTHWEST FLOW OVER ZLA AIRSPACE WILL SHIFT TO THE NORTH TO NORTHEAST OVERNIGHT TONIGHT AS A DRY COLD FRONT MOVES THROUGH THE GREAT BASIN. GUSTY WESTERLY WINDS OF 25-35 KNOTS GUSTING 40-45 KNOTS WILL OCCUR OVER THE MOUNTAINS AND DESERTS THIS AFTERNOON AND EARLY EVENING. AREAS OF BLOWING DUST WILL OCCUR OVER THE DESERTS. WINDS WILL BEGIN TO SHIFT TO THE NORTH OVER NORTHEAST ZLA AFTER 00Z AND OVER MOST OF ZLA BY 05Z TONIGHT PRODUCING GUSTY NORTH TO NORTHEAST WINDS OF 30-40 KNOTS FROM THE COASTAL MOUNTAINS EAST OVER THE DESERTS. WIND GUSTS OF 50-55 KNOTS ARE EXPECTED OVER THE SAN GABRIEL AND SAN BERNADINO MOUNTAINS. AREAS OF LOW LEVEL WIND SHEAR WILL OCCUR AT THE LOWER ELEVATIONS WHERE WINDS DO NOT MIX TO THE SURFACE. WIDESPREAD MODERATE TURBULENCE SURFACE AND ALOFT CAN BE EXPECTED WITH STRONG UP AND DOWN DRAFTS NEAR THE MOUNTAINS AND FOOTHILLS. WINDS ARE EXPECTED TO TAPER OFF BY 18Z SUNDAY.

14.0 Astronomical

The astronomical data obtained from the United States Naval Observatory for 35° 58' north latitude and 113° 46' west longitude, for the accident location, indicated the following:

SUN	
Sunrise	0727 MST
Sunset	1812 MST
End Civil Twilight	1838 MST

F. ATTACHMENTS

Attachment 1 - 1G4 AWOS-3PT one-minute observations between 1330 and 1800 MST.

Submitted by:

Mike Richards
Senior Meteorologist

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