



## **NATIONAL TRANSPORTATION SAFETY BOARD**

Office of Aviation Safety  
Washington, D.C. 20594

March 12, 2018

### **Weather Study**

# **METEOROLOGY**

WPR18FA088

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## **A. ACCIDENT**

Location: Agua Dulce, California  
Date: February 11, 2018  
Time: about 1059 Pacific standard time (1859 UTC)<sup>1</sup>  
Airplane: Type: VK-30; Registration: N52TH

## **B. METEOROLOGIST**

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

## **C. 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 Pacific standard time (PST) for February 11, 2018 (based upon the 24-hour clock), directions are referenced to true north, distances are in nautical miles and heights are above mean sea level (msl).

Coordinates used for the accident location: 34.454722° north latitude, 118.301111° west longitude, at an elevation of about 2,470 feet.

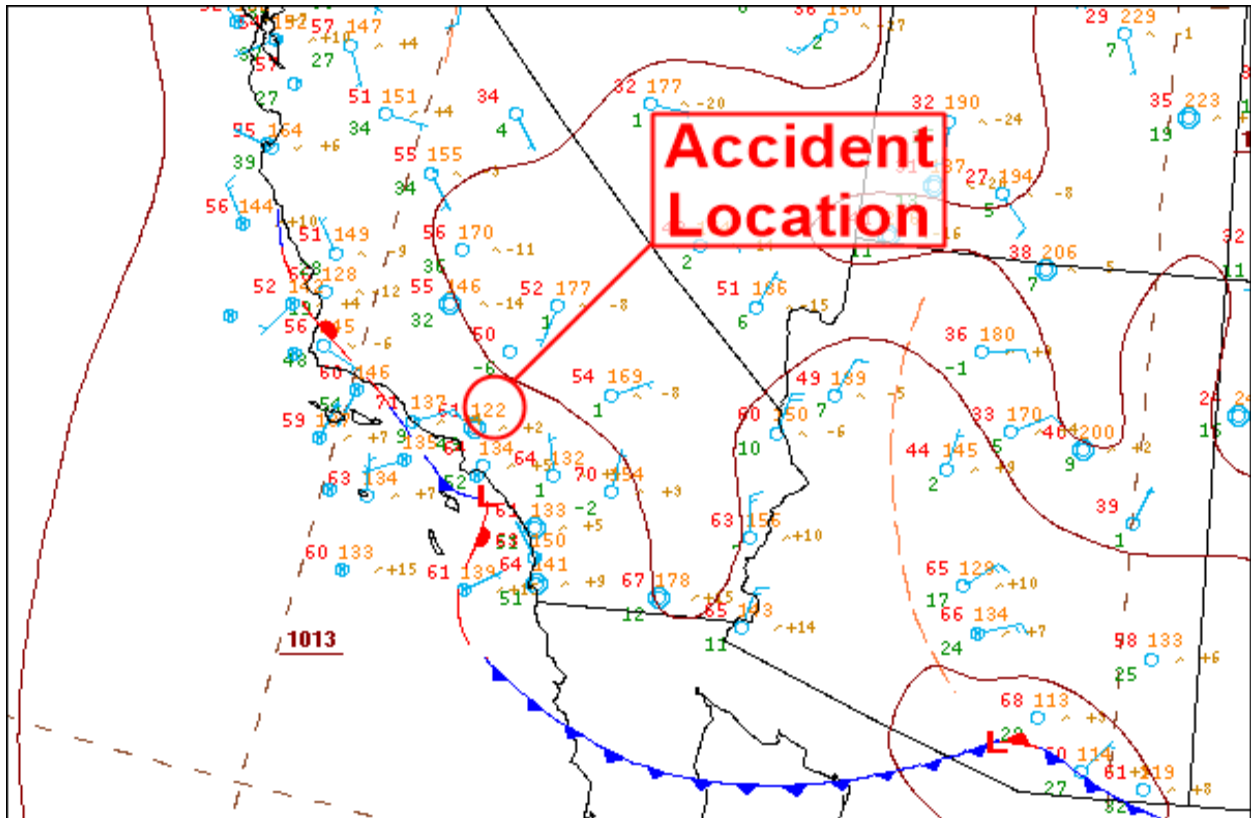
## **D. WEATHER INFORMATION**

### **1.0 Synoptic Conditions**

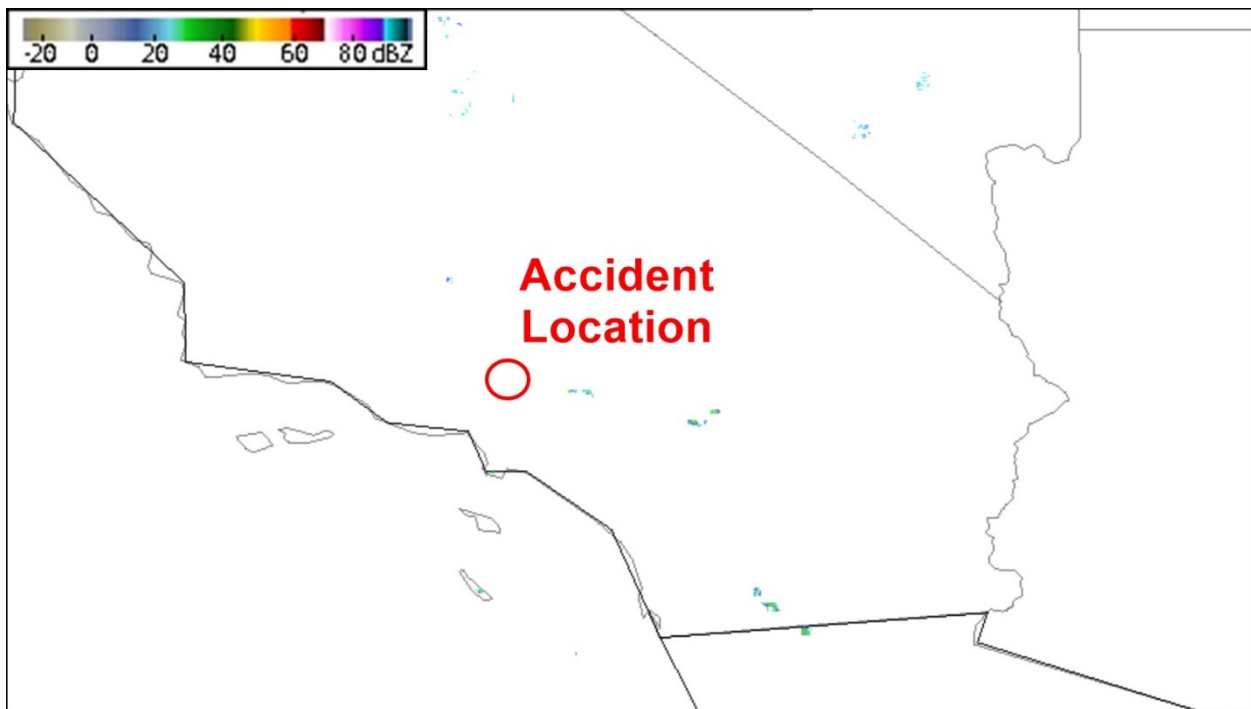
The Southwestern portion of the continental United States National Weather Service (NWS) Surface Analysis Chart for 1000 PST is presented in figure 1. The surface analysis chart showed a low pressure center at 1013 hectopascal (hPa), immediately to the south of the accident location along a stationary front extended north from the low pressure system along the California coast. Station models throughout southern California identified clear sky conditions, with calm to light and variable winds. A WSR-88D regional radar composite reflectivity mosaic obtained from the National Centers for Environmental Information (NCEI) for 1100 PST (figure 2) did not identify any values of reflectivity (that were meteorological targets) across the region.

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<sup>1</sup> UTC – abbreviation for Coordinated Universal Time



**Figure 1** – Southwestern continental United States portion of the NWS Surface Analysis Chart for 1000 PST.



**Figure 2** – NCEI WSR-88D mosaic from 1100 PST.

## 2.0 Surface Observations

An Automated Weather Observing System (AWOS) was located at Whiteman Airport (WHP)<sup>2</sup> in Los Angeles, California, and was located about 13 miles south-southwest of the accident location at an elevation of about 1,000 feet. The following reports from WHP, which were issued while a weather observer was logged into the AWOS augmentation system, were disseminated during the times surrounding the accident time.

[0855 PST] METAR KWHP 111655Z 29003KT 9SM SKC 14/09 A2997=

[0955 PST] METAR KWHP 111755Z 090003KT 9SM SKC 17/07 A2995=

**[1055 PST] METAR KWHP 111855Z 00000KT 10SM SKC 20/M04 A2994=**

[1156 PST] METAR KWHP 111956Z 27009G15KT 10SM SKC 21/M16 A2990=

At 1055 PST, WHP reported wind calm, visibility of 10 statute miles or greater, sky clear below 12,000 feet above ground level (agl), temperature of 20° Celsius (C) and a dew point temperature of -4°C, altimeter setting of 29.94.

An Automated Surface Observing System was located at Palmdale USAF Plant 42 Airport (PMD) in Palmdale, California, and was located about 15 miles northeast of the accident location at an elevation of 2,542 feet. Automated reports from PMD during the times surrounding the accident time are presented here.

[0853 PST] METAR KPMD 111653Z AUTO 03006KT 10SM CLR 09/M16 A3008  
RMK AO2 SLP177 T00891156=

[0953 PST] METAR KPMD 111753Z AUTO 08010KT 10SM CLR 13/M17 A3005  
RMK AO2 SLP167 T01281172 10128 20011 58007=

**[1053 PST] METAR KPMD 111853Z AUTO 07007KT 10SM CLR 14/M18 A3001  
RMK AO2 SLP155 T01391178=**

[1153 PST] METAR KPMD 111953Z AUTO 05007KT 10SM CLR 15/M18 A2996  
RMK AO2 SLP138 T01501183=

At 1053 PST, PMD reported a wind from 070° at 7 knots, visibility of 10 statute miles or greater, clear skies below 12,000 feet agl, temperature of 14°C and a dew point temperature of -18°C, altimeter setting of 30.01 inches of mercury; remarks included: station with a precipitation discriminator, temperature of 13.9°C and dew point temperature of -17.8°C.

An unofficial meteorological reporting station whose data were provided courtesy of the *Automatic Position Reporting System as a WX NETwork* was located about 4 miles west of the accident site

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<sup>2</sup> 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.

at an elevation of about 1,950 feet. Calibration, maintenance and siting standards of this station, as well as the overall quality of the data, are not known. Reports<sup>3</sup> 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> |
|-------------|-------------|---------------|-----------|--------------|--------------|--------------|
| 1024        | 60.0        | 3.3           | 10        | 4.3          | 125°         | 15.7         |
| 1039        | 61.0        | 1.8           | 9         | 6.1          | 032°         | 17.4         |
| 1054        | 61.0        | 1.8           | 9         | 5.2          | 011°         | 15.7         |
| 1109        | 62.0        | 0.1           | 8         | 3.5          | 014°         | 12.2         |
| 1124        | 62.0        | 0.1           | 8         | 5.2          | 319°         | 13.9         |

An unofficial meteorological reporting station whose data were provided courtesy of the Bureau of Land Management was located about 5 miles east of the accident site at an elevation of about 2,600 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> |
|-------------|-------------|---------------|-----------|--------------|--------------|--------------|
| 0954        | 55.0        | -5.2          | 8         | 12.2         | 047°         | 23.5         |
| 1054        | 57.0        | -3.7          | 8         | 10.4         | 032°         | 21.7         |
| 1154        | 59.0        | -2.2          | 8         | 12.2         | 014°         | 20.0         |

### 3.0 Pilot Reports

The following publicly-disseminated pilot reports<sup>4</sup> were made in the accident region below 12,000 feet within about two hours of the accident time.

Of note is a pilot report made at 0840 PST by a northwest-bound Piper PA-18 type aircraft at 6,500 feet and located 5 miles south of Tehachapi Municipal Airport in Tehachapi, California, that reported moderate turbulence and +/- 500-foot updrafts and downdrafts.

***TSP UA /OV TSP180005 /TM 1640 /FL065 /TP PA18 /TB MOD /RM +/- 500FT UP  
AND DOWN DRAFTS/NWBND=***

***ONT UA /OV ONT090004/TM 1645/FL025/TP B738/WV 04530KT/RM RT QTRING  
TLWND DURD ON FINAL. COR SA-ID. ZLA CWSU=***

***EDW UA /OV TSP180010/TM 1655/FL115/TP M20P/TB LGT CHOP=***

<sup>3</sup> Temp=temperature(°F); D\_Temp=dew point temperature(°F); RH=relative humidity(%); W\_Mag=average wind magnitude(knots); W\_Dir=average wind direction(true); G\_Mag=gust wind magnitude(knots)

<sup>4</sup> Only pilot reports with the World Meteorological Organization header UBCA\*\* were considered. Pilot reports publicly-disseminated via radio only were also not considered.

*TSP UA /OV TSP180010/TM 1655/FL115/TP M20P/TB LGT CHOP/RM COR SA-ID.  
ZLA CWSU=*

*CNO UA /OV CNO/TM 1947/FL015/TP C172/TB LGT/RM COR SA-ID. ZLA CWSU=*

*SBP UA /OV FUL-PRB180015 /TM 1948 /FL085 /TP DA40 /TB NEG /RM SMTH=*

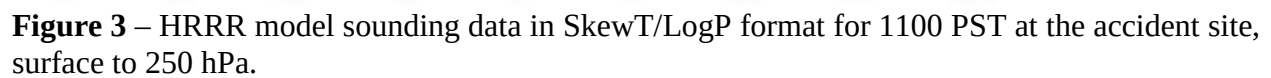
*TSP UA /OV TSP /TM 2054 /FL085 /TP C182 /TB NEG=*

#### **4.0 Upper Air Data**

A High-Resolution Rapid Refresh (HRRR) model<sup>5</sup> sounding (figure 3) valid for the accident location at 1100 PST was retrieved from the NOAA Air Resources Laboratory. The wind from near the surface through about 4,700 feet was (generally) westerly at magnitudes between 13 and 18 knots. Above this level, the wind veered rapidly to the south and decreased in magnitude to 6 knots at about 6,800 feet. Above this level the wind backed to a north wind of 13 knots at about 13,000 feet, and the wind continued to back above this level to a northwest wind at about 20,000 feet. The relative humidity was well below 90 percent throughout the troposphere. The freezing level was at about 10,800 feet. Calculations made by the Rawinsonde OBservation Program (RAOB) did not identify any layers of severe or greater turbulence. RAOB did identify “light” low level wind shear (LLWS) near the surface and between about 3,900 and 4,600 feet.

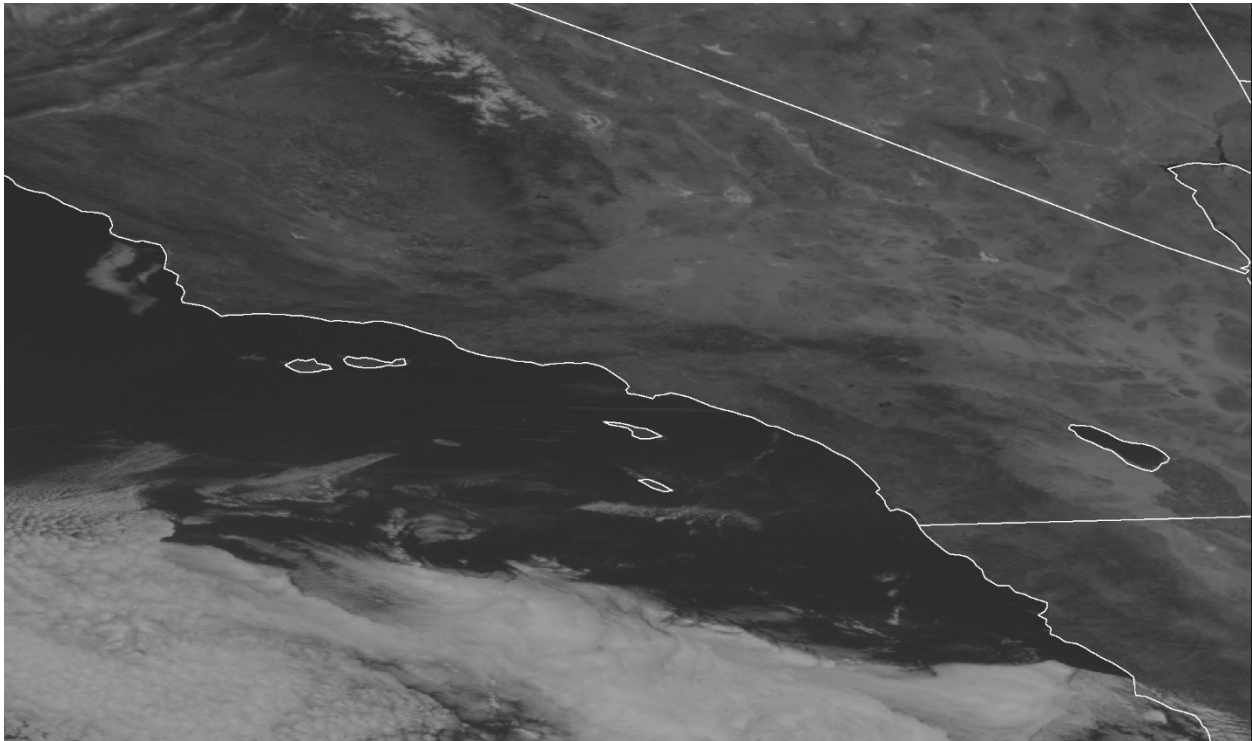
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<sup>5</sup> The HRRR is a National Oceanic and Atmospheric Administration (NOAA) real-time three-kilometer resolution, hourly-updated, cloud-resolving, convection-allowing atmospheric model, initialized by three-kilometer grids with three-kilometer radar assimilation. Radar data is assimilated in the HRRR every 15 minutes over a one-hour period.



## 5.0 Satellite Imagery

Geostationary Operational Environmental Satellite (GOES)-15 “visible” (0.62 $\mu$ m) data were obtained from an archive at the Space Science Engineering Center at the University of Wisconsin-Madison. Imagery from 1100 CST is presented in figure 4 and reveals clear skies over southern California, including the accident area.



**Figure 4** – GOES-15 visible imagery from 1100 PST.

## 6.0 Terminal Aerodrome Forecasts

The following Terminal Aerodrome Forecasts (TAF)<sup>6</sup> issued for Van Nuys Airport (VNY) in Van Nuys, California, which was the accident aircraft’s destination airport, were issued in the hours leading up to the accident time. VNY was located about 20 miles south-southwest of the accident location at an elevation of about 800 feet.

The 0827 PST VNY TAF forecasted for the accident time: wind from 020° at 12 knots, visibility greater than 6 statute miles and skies clear below 12,000 feet agl. Prior to 1000 PST this VNY

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<sup>6</sup> According to National Weather Service 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.”

TAF included a forecast for wind shear with a surface wind from 110° at 5 knots and a wind at 1,500 feet agl from 060° at 30 knots.

[0827 PST] KVN Y 111627Z 1116/1212 11005KT 5SM BR SKC WS015/06030KT  
**FM111800 02012KT P6SM SKC**  
FM120000 12006KT P6SM BKN200  
FM120300 VRB04KT P6SM BKN200  
FM121100 16006KT 5SM BR BKN020 BKN100=

The 0947 PST VNY TAF forecasted for the accident time: a variable wind at 6 knots, visibility greater than 6 statute miles and skies clear below 12,000 feet agl.

[0947 PST] KVN Y 111747Z **1118/1218 VRB06KT P6SM SKC**  
FM120000 12006KT P6SM BKN200  
FM120300 VRB04KT P6SM BKN200  
FM121100 16006KT 5SM BR BKN020 BKN100=

The closest TAF site to the accident location was PMD. The 0713 PST PMD TAF included a forecast for wind shear, applicable to the accident time, with a surface wind from 100° at 7 knots and a wind at 2,000 feet agl from 050° at 30 knots.

[0713 PST] KPMD 111513Z 1115/1212 **10007KT** P6SM SKC **WS020/05030KT**  
FM120000 24012G18KT P6SM BKN200  
FM120400 23010G30KT P6SM BKN180=

The 0947 PST PMD TAF included a forecast for wind shear, applicable to the accident time, with a surface wind from 030° at 6 knots and a wind at 2,000 feet agl from 050° at 30 knots.

[0947 PST] KPMD 111747Z 1118/1218 **03006KT** P6SM **SKC WS020/05030KT**  
FM120000 24012G18KT P6SM BKN200  
FM120400 23010G30KT P6SM BKN180=

## 7.0 Area Forecast Discussion

An Area Forecast Discussion (AFD) was issued at 1031 PST by the NWS Weather Forecast Office in Los Angeles/Oxnard, California (LOX). The Synopsis, Short Term and Aviation sections of that AFD are presented here, which includes the LOX AFD's Short Term discussion issued initially at 0434 PST (and also included in the 0912 PST LOX AFD).

FXUS66 KLOX 111831  
AFDLOX

Area Forecast Discussion  
National Weather Service Los Angeles/Oxnard CA  
1031 AM PST Sun Feb 11 2018  
.SYNOPSIS...11/700 AM.

Warmer and drier conditions today in gusty offshore flow. Much cooler temperatures and a chance of showers will develop tonight and continue through Thursday then warm and dry weather will return for the weekend.

&&

.SHORT TERM (TDY-TUE)...11/912 AM.

The focus this morning is on the developing wind and dry conditions driving the red flag warning. The gusty wind has now made it to the Ventura coastal valley with Camarillo gusting to 32 mph. That brings it up to 14 stations currently in red flag conditions with another 13 very close. There should be a switch to onshore winds by later this afternoon or evening. There is a little haze in LA County which should clear in the next few hours.

\*\*\* From Previous Discussion \*\*\*

Gusty Santa Ana winds continue to develop across much of Los Angeles and Ventura Counties this morning. Damaging wind gusts have already been recorded in the Los Angeles County Mountains this morning. Winds have been a little slower to develop as the marine layer has been lodged in over the coast and valleys. Gusty northeast winds now are spreading into the valleys and will spread into the coastal areas through sunrise. With the Santa Ana in place and offshore flow, warmer and drier conditions should be expected today. No changes are planned to the headlines, but wind speeds have tweaked slightly to where the strongest winds are expected.

Santa Ana winds will shut off quickly today, dying through the late morning and early afternoon hours, then switching to onshore by the late afternoon and early evening hours. The reversal will develop quickly ahead of a trough of low pressure moving through the Pacific Northwest and British Columbia this morning. This trough will consolidate and merge through Monday over the Northern Sierras, then dig south through Wednesday. The cut-off trough will bottom out about 150-250 miles to the south or southwest of Point Conception on Wednesday. PoPs have been tweaked slightly as the models struggle with timing and position of the cut-off trough. Enough confidence still exists to keep slight chance to chance PoPs over the region, but a more clear picture in the model solutions will not arrive until Monday when the troughs merge, and the circulation closes and cuts off. The most likely time period for any rainfall looks to be between late Monday and early Wednesday across the region, with the highest amounts for areas south of Point Conception. Snow levels will drop quickly tonight and into Monday to 4000 to 4500 feet. Locally, snow levels could drop to the 3500 foot elevation, especially the northern and interior portions of the area. This could impact travel through the mountains passes such as the Grapevine portion of Interstate 5.

&&

.AVIATION...11/1829Z.

At 1722Z near KLAX, there was no marine inversion.

for 18z TAFS... Will continue with Moderate-to-high confidence in the current forecast through 00Z, then low to moderate confidence that MVFR cigs will develop sometime

after 00z to 06z. There is a 20% chance for IFR cigs to develop along coastal tafs as well after 06z. Periods of moderate to strong turbulence and wind shear are possible at most terminals through 20Z.

KLAX...There is a 30 percent chance of light rain or drizzle after 11z Mon morning.

KBUR...There is a 50 percent chance of moderate turbulence and wind shear through 18Z. IFR to MVFR conditions are possible after 11Z. There is a 30 percent chance of light rain or drizzle after 11z Mon morning.

Prior to this, an AFD was issued at 0912 PST by LOX. The Aviation section of that AFD is presented here.

FXUS66 KLOX 111712  
AFDLOX

Area Forecast Discussion  
National Weather Service Los Angeles/Oxnard CA  
912 AM PST Sun Feb 11 2018

.AVIATION...11/1233Z.

At 1020Z near KLAX, there was a surface based inversion with the top of the inversion around 2700 feet deep at 13 degrees Celsius.

for 12z TAFS... Will continue with Moderate-to-high confidence in the current forecast through 00Z, then for areas N of Point Conception Low to moderate confidence that MVFR cigs will develop sometime after 00z to 06z. There is a 30% chance for IFR cigs to develop along coastal tafs as well after 06z. Periods of moderate to strong turbulence and wind shear are possible at all terminals south of Point Conception through 20Z.

KLAX...There is a 40 percent chance of moderate turbulence and wind shear through 16Z. There is a 40% percent chance of IFR conditions after 06z this eve. There will be a very slight chance of light rain or drizzle between 11z-16z Mon morning for a few hours.

KBUR...There is a good chance of moderate turbulence and wind shear through 18Z. IFR to MVFR conditions are likely after 11Z. There will be a very slight chance of light rain or drizzle between 11z-16z Mon morning for a few hours.

## 8.0 NWS Weather Messages

An urgent Fire Weather Message was issued at 1006 PST by LOX that discussed gusty surface wind conditions in the accident region.

WWUS86 KLOX 111806  
RFWLOX

URGENT - FIRE WEATHER MESSAGE  
National Weather Service Los Angeles/Oxnard CA  
1006 AM PST Sun Feb 11 2018

...RED FLAG WARNING IN EFFECT UNTIL THIS EVENING TO 6 PM PST  
SUNDAY FOR GUSTY WINDS AND LOW HUMIDITIES ACROSS MOUNTAINS  
AND MOST VALLEYS OF LOS ANGELES AND VENTURA COUNTIES...

**.Gusty northeast winds of up to 40 mph in the valleys and 50 mph in the mountains will continue to diminish through early this afternoon.** However, winds will quickly reverse to onshore in most areas by late Sunday afternoon or early evening. Onshore wind gusts will generally be between 20 and 30 mph through early evening. Very dry conditions will linger initially with widespread humidities between 5 and 15 percent, bringing continued critical fire danger especially for interior wind prone valleys and the Los Angeles and Ventura Mountains. Humidities will improve late this afternoon through tonight as the onshore and marine layer depth increases. Elevated fire danger will likely continue into Sunday evening across higher elevations of the Los Angeles county mountains into the Antelope Valley as lingering dry air combines with the increasingly gusty onshore winds. There will be a chance of showers across the region Monday through Wednesday or Thursday.

CAZ246-253-254-120200-  
/O.CON.KLOX.FW.W.0003.000000T0000Z-180212T0200Z/  
Santa Monica Mountains Recreational Area-Ventura County Mountains / Los Padres  
National Forest-Los Angeles County Mountains / Angeles National Forest-  
1006 AM PST Sun Feb 11 2018

...RED FLAG WARNING REMAINS IN EFFECT UNTIL 6 PM PST THIS  
EVENING FOR GUSTY NORTHEAST WINDS AND LOW RELATIVE  
HUMIDITY FOR THE LOS ANGELES AND VENTURA COUNTY MOUNTAINS  
INCLUDING THE SANTA MONICA MOUNTAINS...

\* **Winds...Northeast 15 to 30 mph with gusts up to 45 mph in the morning**  
becoming west to southwest 10 to 20 mph with gusts to 30 mph in the late afternoon.

\* Relative Humidity...6 to 12 percent through late this afternoon or early this evening.

PRECAUTIONARY/PREPAREDNESS ACTIONS...

A Red Flag Warning means that critical fire weather conditions are either occurring now....or will shortly. A combination of strong winds...low relative humidity...and warm temperatures can contribute to extreme fire behavior.

An urgent Weather Message was issued at 0959 PST by LOX that discussed gusty surface wind conditions in the accident area.

WWUS76 KLOX 111759  
NPWLOX

URGENT - WEATHER MESSAGE  
National Weather Service Los Angeles/Oxnard CA  
959 AM PST Sun Feb 11 2018

...DAMAGING WINDS ACROSS THE LOS ANGELES AND VENTURA COUNTY MOUNTAINS THIS MORNING INCLUDING THE SANTA MONICA RANGE...

...GUSTY NORTHEAST WINDS FOR PORTIONS OF THE COAST AND VALLEYS OF VENTURA AND LOS ANGELES COUNTIES THIS MORNING...

**.A strong Santa Ana wind event will persist through this morning over much of Ventura and Los Angeles Counties. Damaging wind gusts of 60 to 65 mph can be expected in the mountains,** including the Santa Monica Mountains. Gusty northeast winds 40 to 50 mph will also affect portions of the coast and valleys during the period. **Winds will diminish quickly by noon today,** with much weaker winds expected this afternoon.

CAZ053-054-111900-  
/O.EXP.KLOX.HW.W.0003.000000T0000Z-180211T1800Z/  
Ventura County Mountains-Los Angeles County Mountains excluding the Santa Monica Range-Including the cities of Lockwood Valley, Mount Pinos, Acton, Mount Wilson, and Sandberg  
959 AM PST Sun Feb 11 2018

...HIGH WIND WARNING WILL EXPIRE AT 10 AM PST THIS MORNING...

**Isolated gusts up to 40 mph are still possible** but widespread warning level winds have subsided. Wind will probably return to the Los Angeles County mountains this evening near or at advisory strength.

Prior to this, an urgent Weather Message was issued at 0311 PST by LOX that discussed gusty surface wind conditions in the accident area.

WWUS76 KLOX 111111  
NPWLOX

URGENT - WEATHER MESSAGE  
National Weather Service Los Angeles/Oxnard CA  
311 AM PST Sun Feb 11 2018

...DAMAGING WINDS ACROSS THE LOS ANGELES AND VENTURA COUNTY MOUNTAINS THIS MORNING INCLUDING THE SANTA MONICA RANGE...

...GUSTY NORTHEAST WINDS FOR PORTIONS OF THE COAST AND VALLEYS OF VENTURA AND LOS ANGELES COUNTIES THIS MORNING...

**.A strong Santa Ana wind event will persist through this morning over much of Ventura and Los Angeles Counties. Damaging wind gusts of 60 to 65 mph can be expected in the mountains,** including the Santa Monica Mountains. Gusty northeast winds 40 to 50 mph will also affect portions of the coast and valleys during the period. **Winds will diminish quickly by noon today,** with much weaker winds expected this afternoon.

CAZ053-054-111800-

/O.CON.KLOX.HW.W.0003.000000T0000Z-180211T1800Z/

Ventura County Mountains-Los Angeles County Mountains excluding the Santa Monica Range-Including the cities of Lockwood Valley, Mount Pinos, Acton, Mount Wilson, and Sandberg

311 AM PST Sun Feb 11 2018

...HIGH WIND WARNING REMAINS IN EFFECT UNTIL 10 AM PST THIS MORNING...

**\* WINDS AND TIMING...North to northeast winds 25 to 40 mph with gusts to 60 to 65 mph will continue through this morning.**

\* Impacts...Gusty winds will make driving difficult, especially for high profile vehicles. Winds this strong may down trees and power lines, causing property damage or power outages. Cross winds can make driving difficult, especially for drivers of high profile vehicles and vehicles towing trailers. Roadways that will be affected include Highway 33 in Ventura County as well as Interstate 5 and Highway 14 in Los Angeles County.

PRECAUTIONARY/PREPAREDNESS ACTIONS...

A High Wind Warning means that damaging high winds of 58 mph or greater are likely or imminent. Secure all loose outdoor furniture in advance of the onset of strong winds. Monitor the latest forecasts on NOAA Weather Radio or your favorite media source.

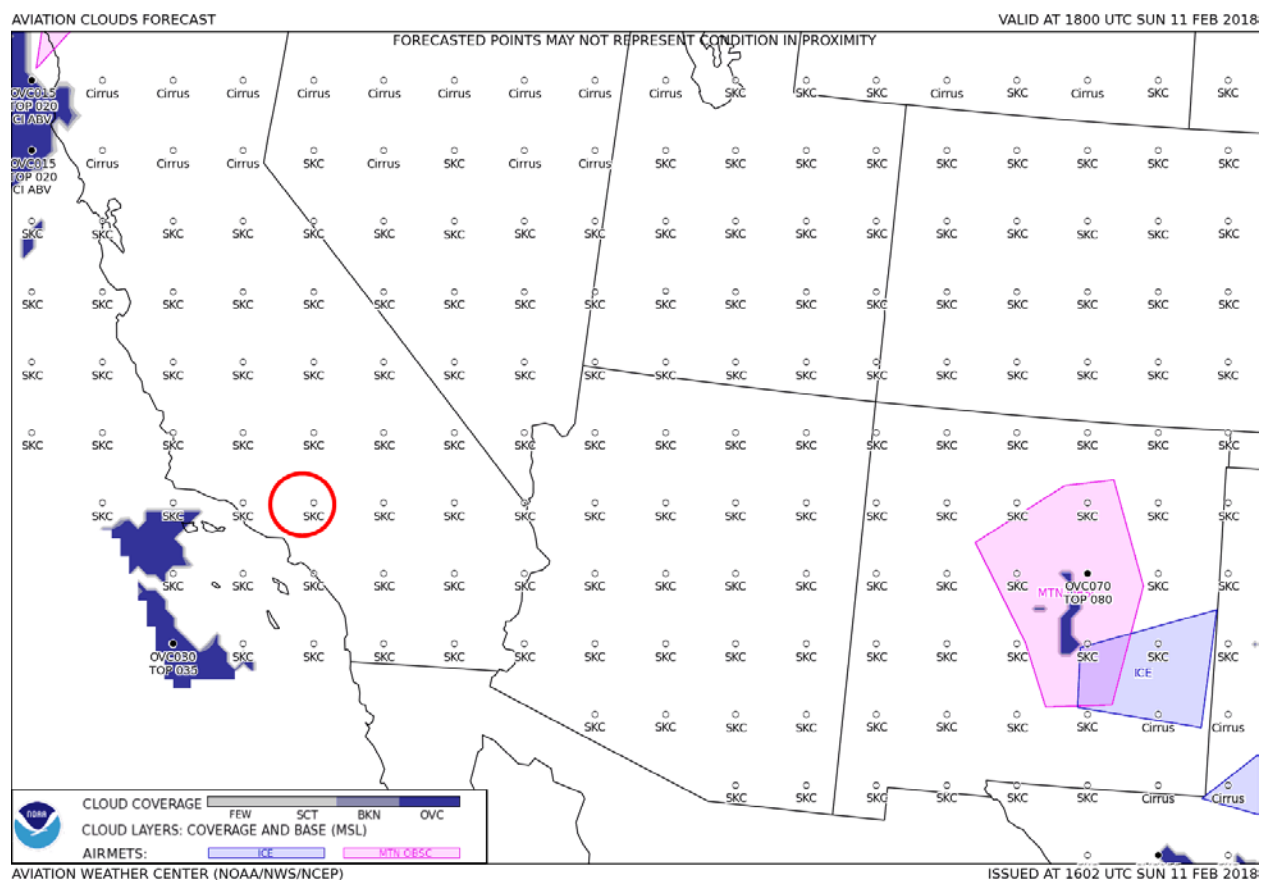
## 9.0 Graphical Forecasts for Aviation

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 may 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.

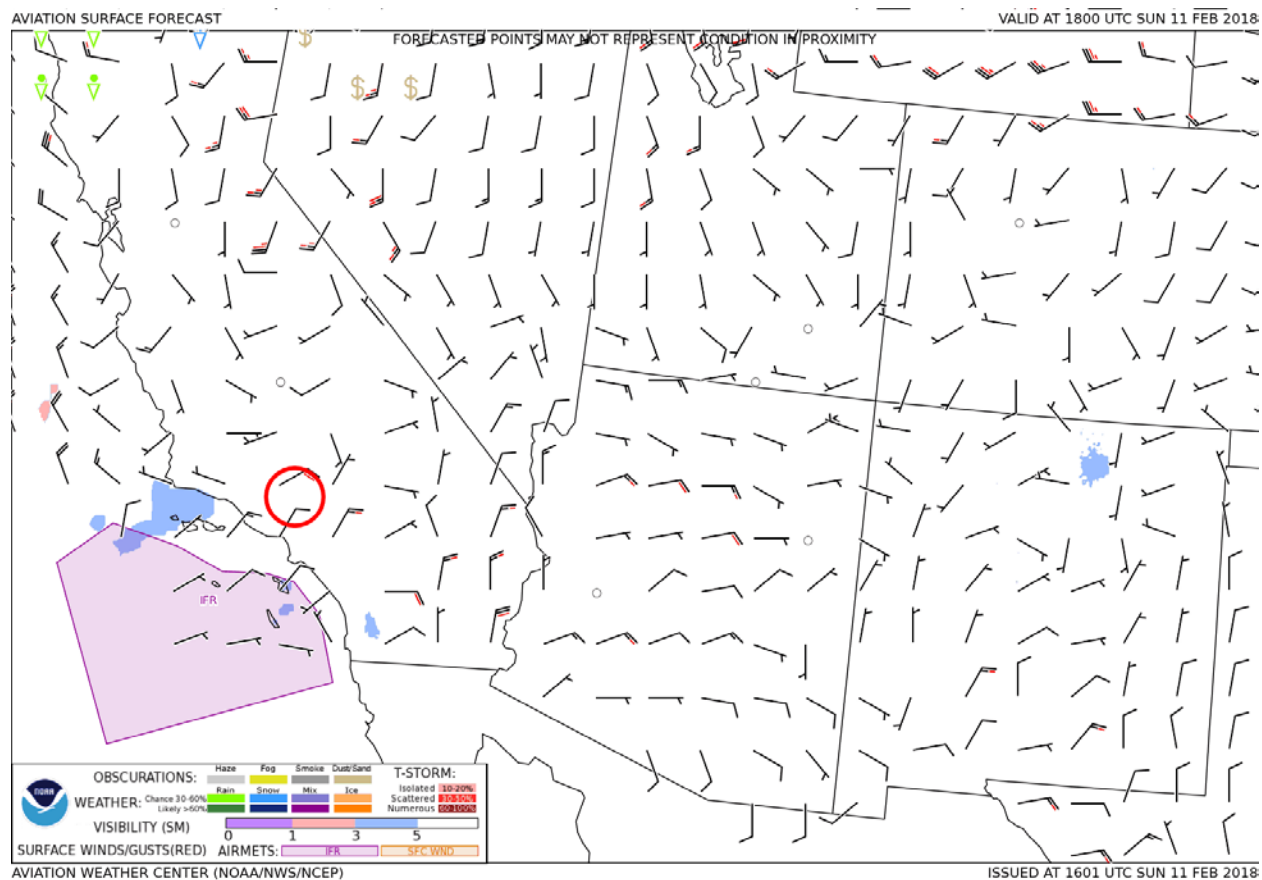
The following images (figures 5-8) depict GFA forecast information on sky condition, icing, mountain obscuration, instrument flight rule (IFR)<sup>7</sup> condition and surface wind Airmen's Meteorological Information (AIRMET) advisories, surface visibility, surface wind, precipitation, and other obscurations and hazards, valid for the times surrounding the accident.

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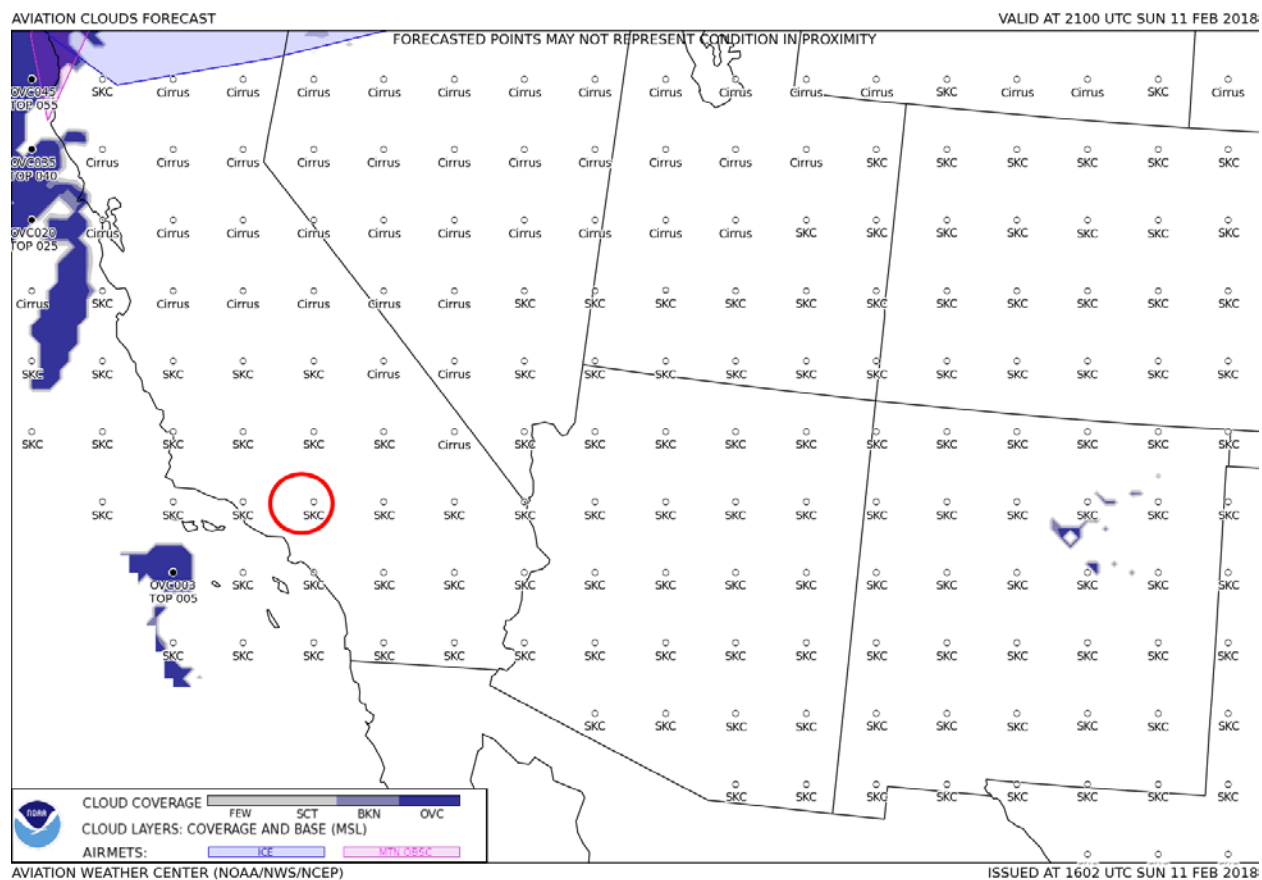
<sup>7</sup> IFR conditions - Ceilings less than 1,000 feet agl and/or visibility less than three statute miles.



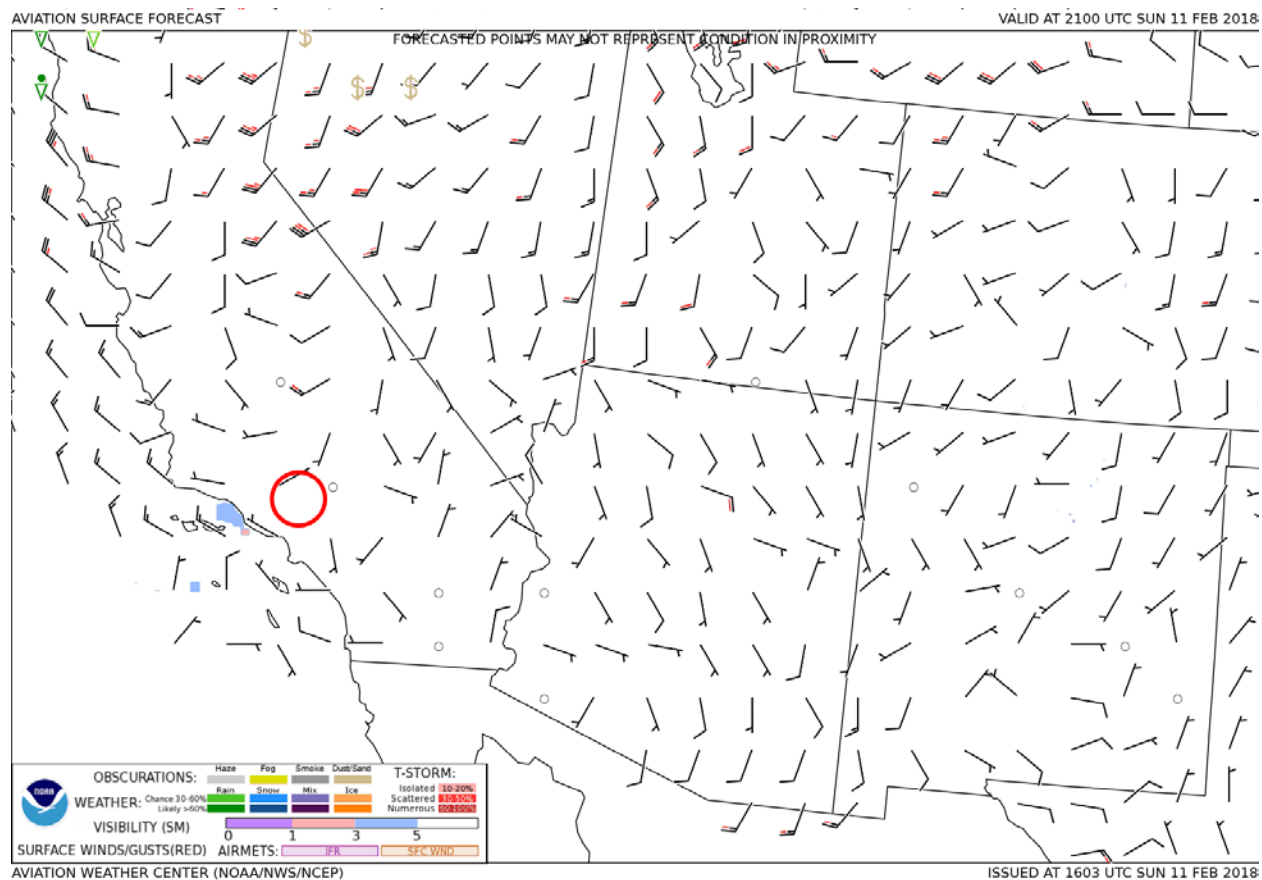
**Figure 5** – GFA forecast imagery depicting sky condition and icing and mountain obscuration AIRMETs. Issued about 0800 PST and valid for 1000 PST. This GFA forecast imagery depicted clear conditions over the accident region. The accident location is denoted by the red circle.



**Figure 6** – GFA forecast imagery depicting IFR conditions and surface wind AIRMETS, surface visibility, surface wind, precipitation, and other obscurations and hazards. Issued about 0800 PST and valid for 1000 PST. This GFA forecast imagery depicted a surface visibility of greater than 5 statute miles and a northeasterly surface wind of 10 knots with gusts to 20 knots near the accident location. The accident location is denoted by the red circle.



**Figure 7** – GFA forecast imagery depicting sky condition and icing and mountain obscuration AIRMETS. Issued about 0800 PST and valid for 1300 PST. This GFA forecast imagery depicted clear conditions over the accident region. The accident location is denoted by the red circle.



**Figure 8** – GFA forecast imagery depicting IFR conditions and surface wind AIRMETs, surface visibility, surface wind, precipitation, and other obscurations and hazards. Issued about 0800 PST and valid for 1300 PST. This GFA forecast imagery depicted a surface visibility of greater than 5 statute miles and a light and calm surface winds near the accident location. The accident location is denoted by the red circle.

## 10.0 AIRMETs

Amended AIRMET advisories for moderate turbulence below 12,000 feet and LLWS potential, which were issued at 0949 PST, were active for the accident location at the accident time.

WAUS46 KPCI 111749 AAA  
WA6T  
-SFOT WA 111749 AMD  
AIRMET TANGO UPDT 3 FOR TURB AND LLWS VALID UNTIL 112100  
.  
AIRMET TURB...CA AND CSTL WTRS  
FROM 20S BTY TO EED TO BZA TO 30SSW MZB TO 30SE LAX TO 50W RZS  
TO 20S BTY  
**MOD TURB BLW 120.** CONDS ENDG 18-21Z.  
.  
LLWS POTENTIAL...CA AND CSTL WTRS  
BOUNDED BY 20ESE EHF-50WNW HEC-30WSW TRM-40NW MZB-20WSW  
RZS- 20ESE EHF  
**LLWS EXP.** CONDS CONTG BYD 21Z ENDG 21-00Z.

Prior to this, AIRMET advisories for moderate turbulence below 12,000 feet and LLWS potential, which were issued at 0645 PST, were active for the accident location at the accident time.

WAUS46 KPCI 111445  
WA6T  
-SFOT WA 111445  
AIRMET TANGO UPDT 2 FOR TURB AND LLWS VALID UNTIL 112100  
.  
AIRMET TURB...CA AND CSTL WTRS  
FROM 20S BTY TO EED TO BZA TO 30SSW MZB TO 30SE LAX TO 50W RZS  
TO 20S BTY  
**MOD TURB BLW 120.** CONDS ENDG 18-21Z.  
.  
LLWS POTENTIAL...CA AND CSTL WTRS  
BOUNDED BY 20ESE EHF-50WNW HEC-30WSW TRM-40NW MZB-20WSW  
RZS-20ESE EHF  
**LLWS EXP.** CONDS CONTG BYD 21Z ENDG 21-00Z.

## 11.0 SIGMETs

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

## **12.0 Center Weather Advisories**

There were no Center Weather Advisories or Meteorological Impact Statements issued by the Center Weather Service Unit at the Los Angeles Air Route Traffic Control Center active for the accident location at the accident time.

## **13.0 Astronomical**

The astronomical data obtained from the United States Naval Observatory for 34° 27' north latitude and 118° 18' west longitude, for the accident location, indicated the following:

| <b>SUN</b>  |          |
|-------------|----------|
| Sunrise     | 0642 PST |
| Sunset      | 1733 PST |
| <b>MOON</b> |          |
| Moonrise    | 0345 PST |
| Moonset     | 1409 PST |

## **14.0 Preflight Weather Briefing**

At 0849 PST, N52TH received a telephonic preflight weather briefing from Leidos Flight Service. A transcript of this briefing is presented in Attachment 1. The Leidos Briefing History document for this weather briefing is presented in Attachment 2.

Several questions regarding this weather briefing were sent to Leidos via email. This email correspondence is documented in Attachment 3.

A question regarding transmission of a pilot report (referred to in the Leidos correspondence) to the Federal Aviation Administration's (FAA) national database was sent to the FAA via email. This email correspondence is documented in Attachment 4.

## **E. LIST OF ATTACHMENTS**

- Attachment 1 - Transcript of N52TH Leidos preflight weather briefing.
- Attachment 2 - Briefing History document for N52TH Leidos preflight weather briefing.
- Attachment 3 - Email correspondence with Leidos regarding N52TH Leidos preflight weather briefing.
- Attachment 4 - Email correspondence with the FAA regarding transmission of a pilot report.

Submitted by:

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Mike Richards  
Senior Meteorologist

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