



NATIONAL TRANSPORTATION SAFETY BOARD

**Office of Aviation Safety
Washington, D.C. 20594**

December 10, 2015

WEATHER STUDY

ERA16LA028

A. ACCIDENT

Location: Pascagoula, Mississippi
Date: October 26, 2015
Time: 1237 central daylight time (1737 UTC¹)
Airplane: Lancair Super ES; registration N817PR

B. METEOROLOGY GROUP

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C. SUMMARY

On October 26, 2015, about 1237 central daylight time, an experimental, amateur-built Lancair Super ES, N817PR, operated by a private individual, was presumed destroyed after it impacted the Mississippi Sound, in the vicinity of Pascagoula, Mississippi. The commercial pilot and two passengers were presumed fatally injured. The airplane departed from Gulfport-Biloxi International Airport (GPT), Gulfport, Mississippi, about 1220. Visual meteorological conditions prevailed at the departure airport. No flight plan had been filed for the personal flight that was conducted under the provisions of 14 Code of Federal Regulations Part 91.

D. DETAILS OF THE INVESTIGATION

The National Transportation Safety Board's (NTSB) Senior Meteorologist was not on scene for this investigation and conducted the meteorology phase of the investigation from the Washington D.C. office, collecting data from official National Weather Service (NWS) sources including the Weather Prediction Center (WPC) and the National Center for Environmental Information (NCEI). All times are central daylight time (CDT) based upon the 24 hour clock, local time is +5 hours to UTC, and UTC=Z. Directions are referenced to true north and distances in nautical miles. Heights are above mean sea level (msl) unless otherwise noted. Visibility is in statute miles and fractions of statute miles. NWS airport and station identifiers use standard International Civil Aviation Organization (ICAO) 4-letter station identifiers versus International Air Transport Association (IATA) 3-letter identifiers which deletes the initial country code designator "K" for U.S. airports. Both codes are both used intermittently in this report.

The accident site location plotted in this investigation is based on the aircraft's last known position at latitude 30.3466° N and longitude 88.6936° W.

¹ UTC – is an abbreviation for Coordinated Universal Time.

E. 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 (NCEP) located in Camp Springs, Maryland. These are the base products used in describing weather features and in the creation of forecasts and warnings. Reference to these charts can be found in the joint NWS and Federal Aviation Administration (FAA) Advisory Circular “Aviation Weather Services”, AC 00-45G.

1.1 Surface Analysis Chart

The south central NWS Surface Analysis Chart for 1300 CDT (1800Z) on October 26, 2015 is included as figure 1 with the approximate accident location marked by a red star which depicted the primary surface features at the time. The chart depicted a low pressure system with a central pressure of 1000-hectopascals (hPa) over Louisiana along an occluded front which wrapped around the low and extended into Mississippi to the triple point, where the front split into two to three other fronts with a stationary front extending northeastward, a developing warm front to the east, and a cold front to the southeast. The station front extended into northern Mississippi and then eastward across central Alabama into southern Georgia, and was responsible for an extensive area of clouds and precipitation across the southeast during the period. The cold front extended east-southeastward from the low over Mississippi in the vicinity of the accident site.

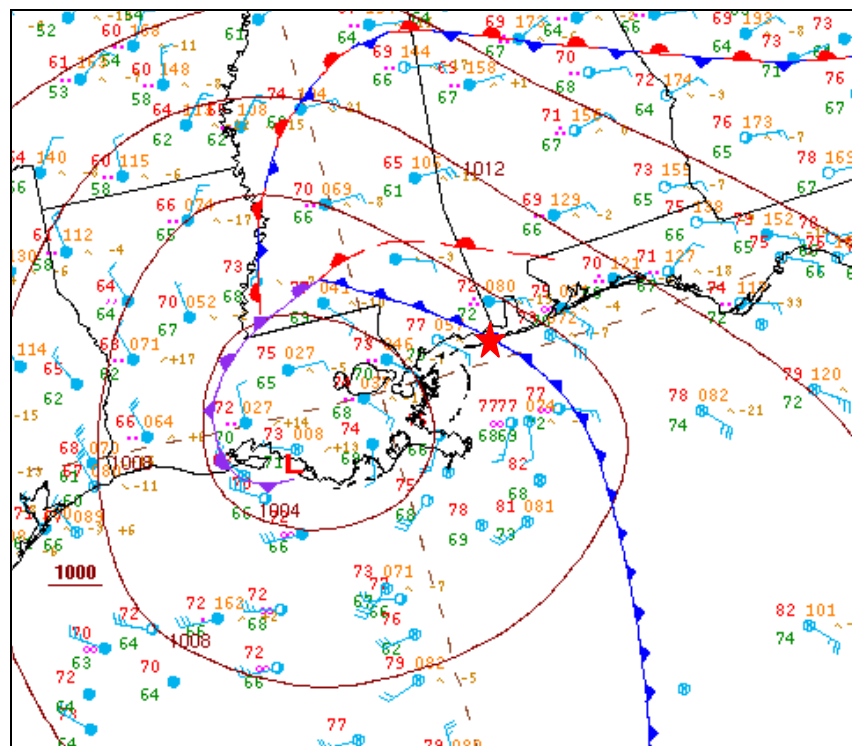


Figure 1 - NWS Surface Analysis Chart for 1300 CDT

The station models depicted a defined cyclonic or counter clockwise circulation around the low pressure system with warm moist air from the Gulf of Mexico advecting northward into the storms circulation. Numerous stations in the vicinity of the accident site reported south to southeast winds of 15 knots, light to heavy rain, with temperatures in the mid to upper 70's degrees Fahrenheit, with temperature-dew point spreads of 2° F or less.

1.2 Weather Radar Mosaic

The NWS National radar mosaic for 1240 CDT (1740Z) for the region is included as figure 2 and depicted an extensive area of echoes extending from the Gulf of Mexico northward into the Florida panhandle, Mississippi, and Alabama with an area of strong echoes greater than 40 dBZ in the vicinity of the accident site.

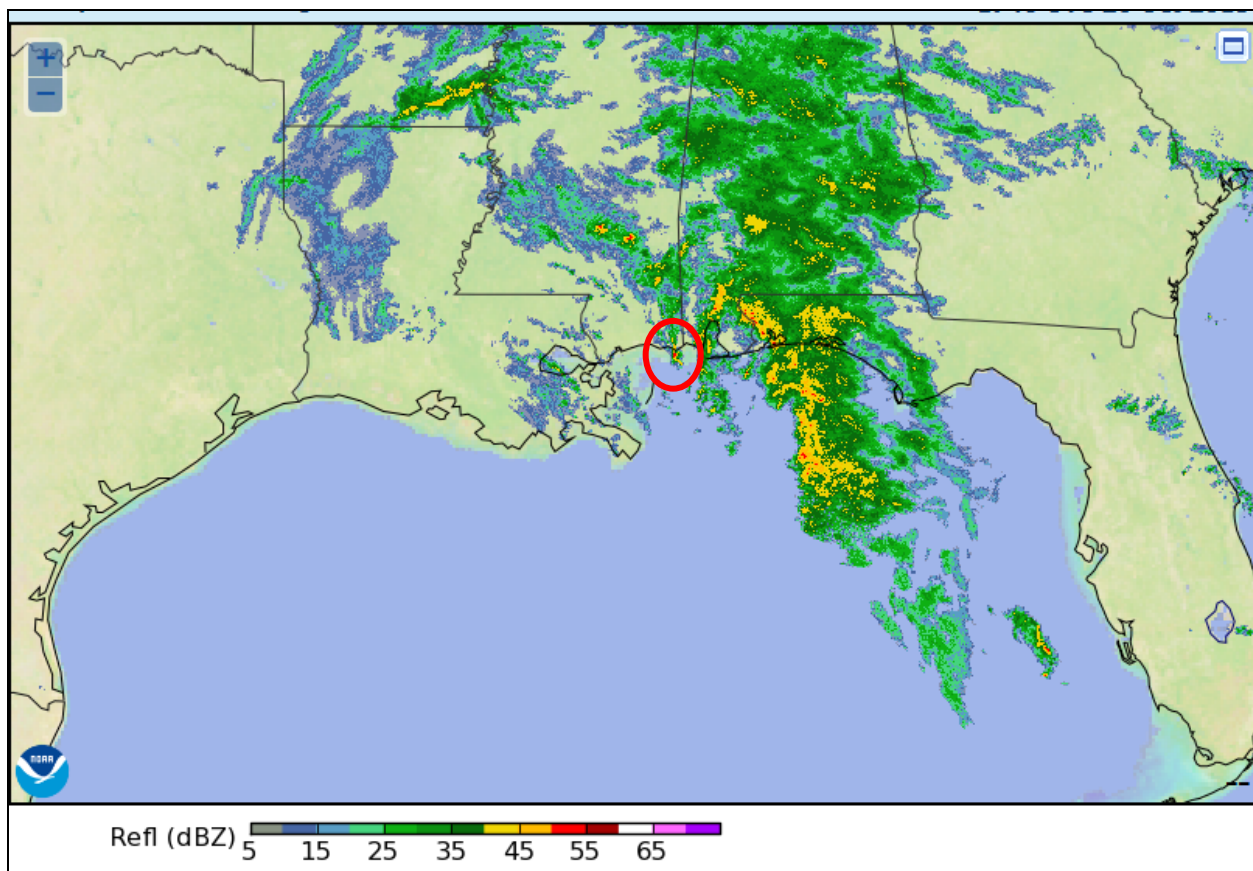


Figure 2 - NWS National Radar Mosaic at 1240 CDT

The closest NWS weather radar and the flight track of the accident airplane will be further documented in section 5.0 of this report as potential strong echoes were identified in the vicinity of the accident site.

1.3 NWS Low-Level Significant Weather Prognostic Charts

The NWS 12-hour Surface and Low-Level Significant Weather Prognostic charts valid for the period of any preflight briefing are included as figure 3 and 4 respectively, with a valid for 1900 CDT (0000Z on October 27, 2015).

The 12-hour Surface Prognostic Chart showed the progression and expected track and development of the synoptic features during the period, with the low moving slowly eastward and the main station front dropping along the coast and producing an extensive area of precipitation across the southeast. The dark green area over Arkansas, Mississippi, Alabama, Georgia, Tennessee, and the Florida panhandle indicated more than 50% coverage of rain with the red hatched area where thunderstorms were expected.

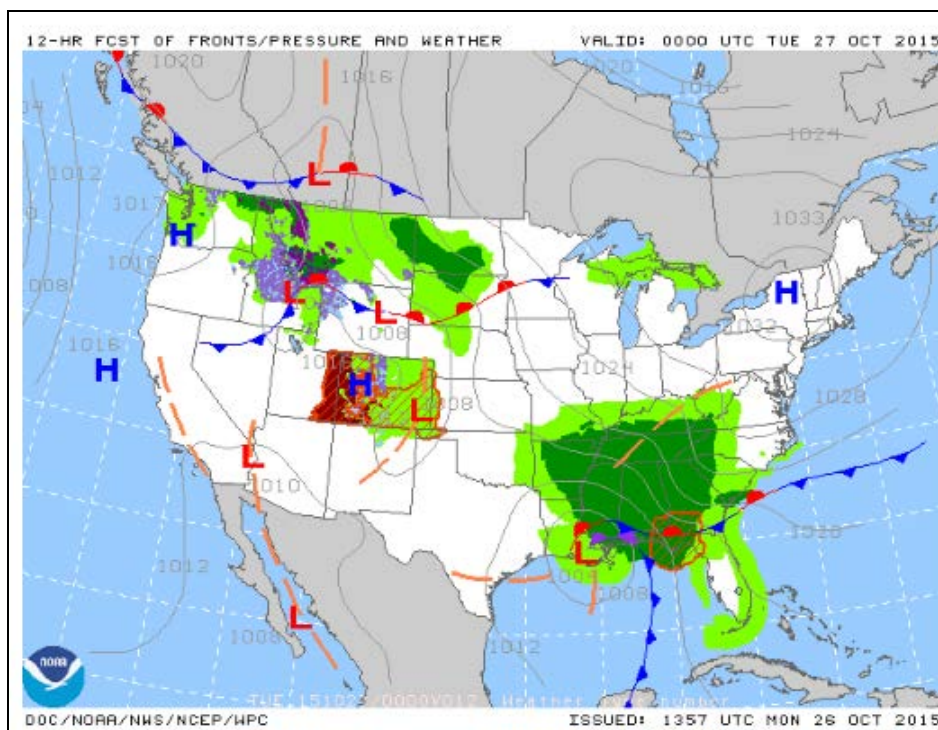


Figure 3 - 12-hour Surface Prognostic Chart valid for 1900 CDT

The 12-hour Low Level Significant Weather Prognostic chart depicted an extensive area of instrument flight rule (IFR) conditions over Louisiana, Arkansas, and portions of the Florida panhandle, and Georgia by a red contour line. Surrounding that area was a blue scalloped area indicating marginal visual flight rule (MVFR) conditions extending over the southeast and included the accident site. The brown dash line surround the area indicated the potential of moderate turbulence from the surface to 12,000 feet, which included the accident site. The chart also depicted the freezing level over the region by a dashed light blue line, which indicated the freezing level near 16,000 feet over the area.

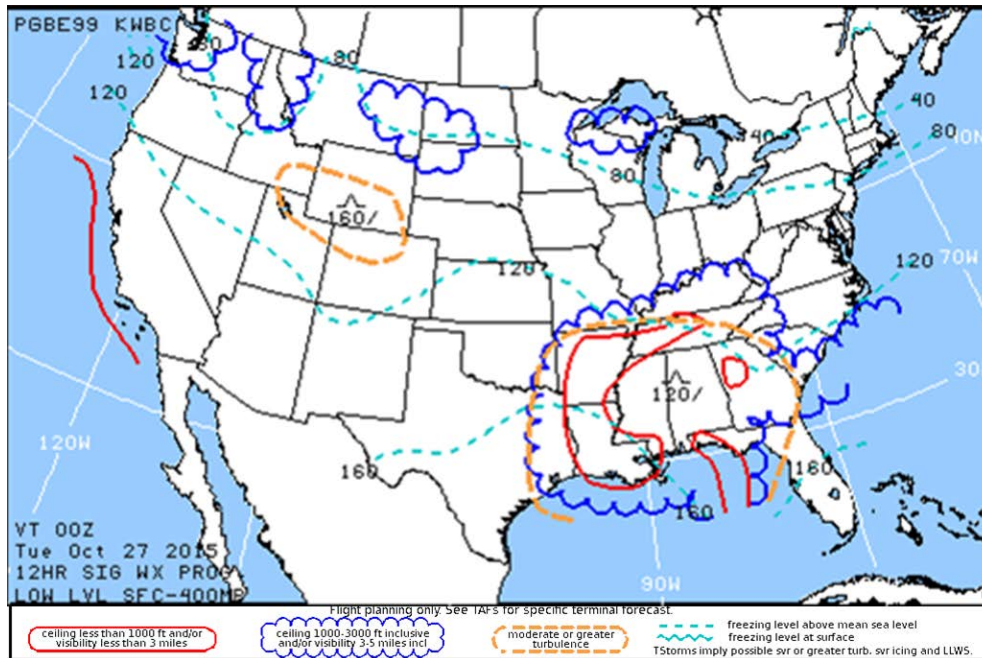


Figure 4 - 12-hour Low Level Significant Weather Prognostic Chart valid for 1900 CDT

2.0 Surface Observations

The official NWS Meteorological Aerodrome Reports (METARs) and special reports (SPECIs) surrounding the period were documented for the departure and the closest airport to the accident site. The cloud heights are reported above ground level (agl) in the following section.

2.1 Gulfport-Biloxi International Airport (KGPT), Gulfport, Mississippi

The accident airplane departed from Gulfport-Biloxi International Airport (KGPT), Gulfport, MS, at 1220 CDT. The airport lists an elevation of 29 feet, a magnetic variation of 2° E, and an Automated Surface Observation System (ASOS) which was also augmented by human observers. The following weather conditions were reported at the approximate time of the accident:

Gulfport-Biloxi weather at 1253 CDT, wind from 130° true at 16 knots gusting to 22 knots, visibility 10 statute miles, a few clouds at 5,000 feet agl, temperature 25° Celsius (C), dew point temperature 21° C, altimeter 29.70 inches of mercury (Hg).

The raw observations and the general flight categories² reported surrounding the period were as follows:

² 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 or lowest layer of clouds reported as broken, overcast or the vertical visibility into a surface based obscuration below 500 feet 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.

*MVFR SPECI KGPT 261438Z 16012KT 6SM BR FEW014 BKN030 OVC055 24/22 A2972 RMK AO2 RAE11
P0001 T02390222=*

*VFR METAR KGPT 261453Z 15014KT 7SM FEW030 BKN055 BKN090 24/22 A2971 RMK AO2 RAE11
SLP059 P0001 60003 T02440222 53006=*

*VFR METAR KGPT 261553Z 15012KT 10SM BKN045 BKN055 OVC090 26/22 A2973 RMK AO2 SLP067
T02560222=*

*VFR METAR KGPT 261653Z 14015KT 10SM FEW013 SCT018 BKN090 26/21 A2973 RMK AO2 SLP066
T02560211=*

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*VFR METAR KGPT 261753Z 13016G22KT 10SM FEW050 25/21 A2970 RMK AO2 SLP057 60003 T02500211
10261 20228 58009=*

MVFR METAR KGPT 261853Z 13015KT 10SM SCT010 BKN030 24/22 A2968 RMK AO2 SLP050 T02440217=

*IFR SPECI KGPT 261925Z 16013G24KT 2 1/2SM RA BR FEW010 BKN029 OVC034 23/21 A2968 RMK AO2
RAB18 P0002 T02280211=*

2.2 Trent Lott International Airport (KPQL), Pascagoula, Mississippi

The accident site was located approximately 12 miles south of the Trent Lott International Airport (KPQL), Pascagoula, Mississippi, which also had an ASOS. The airport lists an elevation of 17 feet, and a magnetic variation of 1° E. The following conditions were reported at the approximate time of the accident:

Pascagoula weather at 1237 CDT, wind from 110° at 15 knots gusting to 25 knots, visibility 4 miles in light rain and mist, scattered clouds at 800 feet agl, ceiling broken at 1,200 feet, overcast at 2,100 feet, temperature 23° C, dew point 22° C, altimeter 29.73 inches of Hg. Remarks: automated observation system, rain began at 1215 CDT, hourly precipitation less than 0.01 inches or a trace, temperature 22.8° C, dew point 22.2° C.

The raw observations and flight conditions surrounding the period were as follows:

*IFR SPECI KPQL 261402Z 13016G34KT 5SM -RA BR BKN008 OVC013 23/22 A2975 RMK AO2 PK WND
14034/1359 P0000 T02280217=*

*MVFR SPECI KPQL 261451Z 14016G25KT 9SM SCT010 BKN013 OVC031 23/22 A2975 RMK AO2 PK WND
15037/1416 RAE45 P0000=*

-
- Marginal Visual Flight Rules (MVFR**) – ceiling from 1,000 to 3,000 feet agl and/or visibility 3 to 5 miles.
 - Visual Flight Rules (VFR) – ceiling greater 3,000 feet agl and visibility greater than 5 miles.

* By definition, IFR is a ceiling less than 1,000 feet 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 feet agl and visibility greater than 5 miles while MVFR is a sub-category of VFR.

MVFR METAR KPQL 261453Z 13016G25KT 9SM FEW008 BKN013 OVC031 23/22 A2975 RMK AO2 PK WND 15037/1416 RAE45 SLP076 P0000 60115 T02280217 51008=

MVFR METAR KPQL 261553Z 13016G26KT 10SM BKN013 BKN024 OVC035 23/22 A2976 RMK AO2 PK WND 14030/1513 RAB39E49 SLP080 P0000 T02330217=

IFR SPECI KPQL 261625Z 15013KT 2 1/2SM -RA BR BKN010 OVC015 23/22 A2976 RMK AO2 PK WND 13032/1601 RAB01 CIG 006V012 P0000 T02280217=

IFR SPECI KPQL 261627Z 14010G19KT 3SM -RA BR BKN007 OVC013 23/22 A2976 RMK AO2 PK WND 13032/1601 RAB01 CIG 005V010 P0000 T02280217=

MVFR METAR KPQL 261653Z 16011KT 8SM SCT007 BKN011 OVC044 25/23 A2976 RMK AO2 PK WND 13032/1601 RAB01E33 SLP078 P0000 T02500233=

IFR SPECI KPQL 261704Z 15011G20KT 8SM BKN009 BKN016 OVC042 24/23 A2976 RMK AO2 T02440228=

MVFR SPECI KPQL 261721Z 15011G19KT 6SM -RA BR BKN010 BKN016 OVC031 24/23 A2974 RMK AO2 RAB15 P0000 T02440233=

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MVFR SPECI KPQL 261737Z 11015G25KT 4SM -RA BR SCT008 BKN012 OVC021 23/22 A2973 RMK AO2 RAB15 P0000 T02280222=

IFR SPECI KPQL 261740Z 13010G22KT 2 1/2SM RA BR BKN008 BKN014 OVC021 23/22 A2973 RMK AO2 RAB15 P0001 T02280222=

IFR SPECI KPQL 261751Z 13011G18KT 1 1/4SM +RA BR BKN008 OVC014 23/22 A2973 RMK AO2 RAB15 P0010=

IFR METAR KPQL 261753Z 13010G18KT 1SM +RA BR BKN008 OVC014 23/22 A2973 RMK AO2 RAB15 SLP069 P0013 60128 T02280222 10250 20222 56010=

IFR SPECI KPQL 261809Z 20008KT 2 1/2SM -RA BR OVC008 23/22 A2973 RMK AO2 P0005 T02280222=

IFR SPECI KPQL 261817Z 16010KT 1SM -RA BR BKN007 BKN016 OVC030 22/22 A2973 RMK AO2 VIS 1/4V4 P0015 T02220217=

IFR SPECI KPQL 261822Z 15011KT 2 1/2SM -RA BR SCT007 BKN021 OVC034 23/22 A2973 RMK AO2 VIS 1V5 P0015 T02280217=

MVFR SPECI KPQL 261826Z 16010KT 6SM -RA BR SCT007 BKN030 OVC038 23/22 A2972 RMK AO2 P0015 T02280217=

MVFR METAR KPQL 261853Z 15008KT 10SM BKN012 BKN042 BKN070 23/22 A2972 RMK AO2 RAE28 SLP064 P0015 T02330222=

IFR SPECI KPQL 261901Z 13008KT 10SM BKN009 BKN012 BKN070 23/22 A2971 RMK AO2 CIG 007V010 T02330222=

MVFR SPECI KPQL 261926Z 13012G19KT 10SM -RA SCT009 BKN027 OVC065 23/22 A2971 RMK AO2 RAB17 P0000 T02280222=

A display of the reporting stations with the radar overlaid at 1240 CDT (1740Z) from the NWS Aviation Weather Center's website during the period is included as figure 5, with the accident site within the red circle and the Trent Lott International Airport (KPQL), Pascagoula station weather plot. The image depicts an area of strong to intense echoes in the immediate vicinity of the accident site.



The NOAA Air Resource Laboratory (ARL) North American Mesoscale (NAM) numerical model archive data was utilized to plot an upper air sounding over the accident site and near the time of the accident. Figure 6 is the NAM model sounding at 1300 CDT (1900Z) on October 26, 2015 plotted on a standard Skew-T log P diagram³ from the surface to 18,000 feet utilizing RAOB⁴ software.

⁴ RAOB – (The complete Rawinsonde Observation program) is an interactive sounding analysis program developed by Environmental Research Services, Matamoras, Pennsylvania.

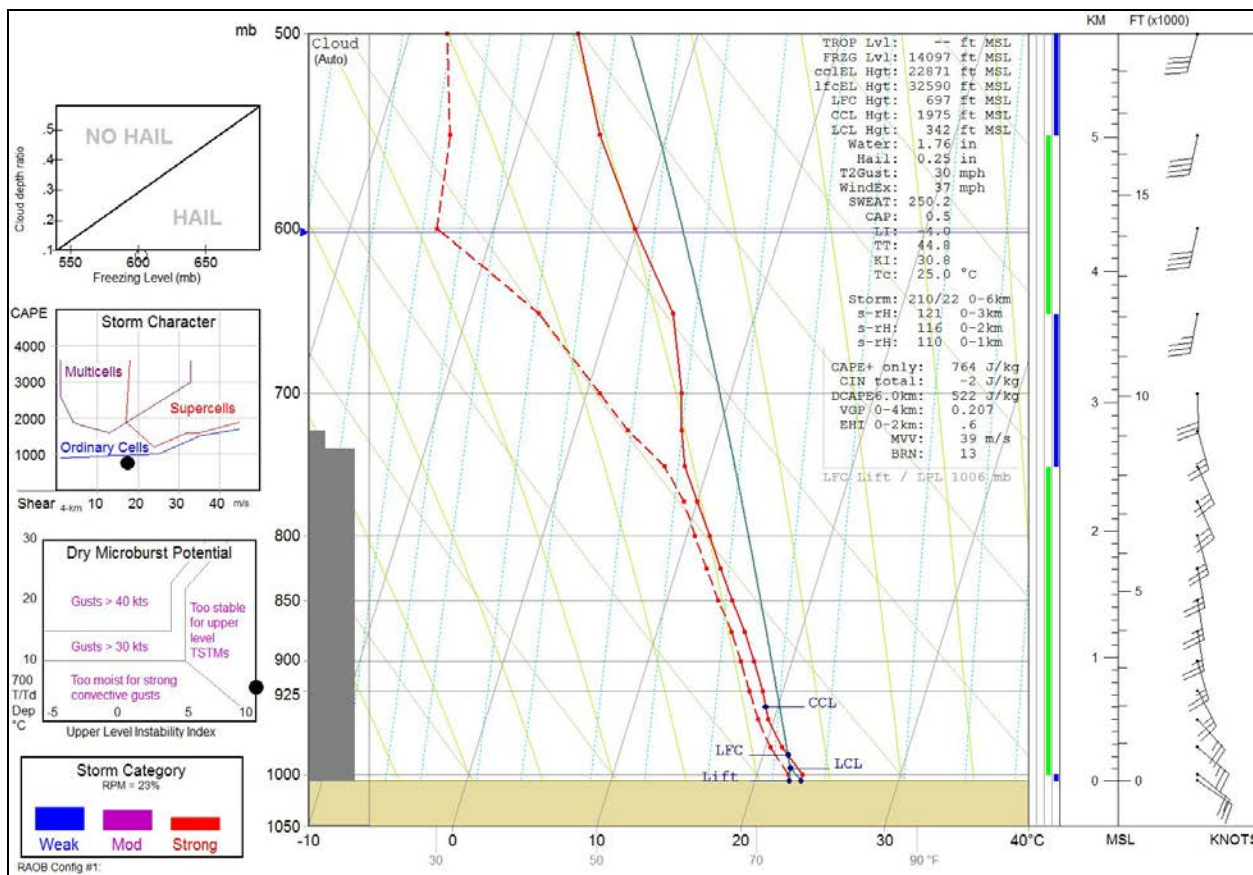


Figure 6 - North American Mesoscale numerical model sounding for 1300 CDT

The NAM model sounding depicted a moist low level environment with a relative humidity greater than 90% from the surface through 8,200 feet, and resulted in a precipitable water content of 1.76 inches. The estimated cloud bases or lifted condensation level (LCL) was estimated to be from 340 feet agl, the level of free convection (LFC) at 690 feet agl, and the convective condensation level (CCL) at 1,972 feet agl with cloud tops near 8,200 feet based on the greater than 80% relative humidity, and the potential for convective cloud tops to 32,500 feet. The freezing level was at 14,000 feet. The sounding was unstable with a Lifted Index (LI)⁵ of -4 and supported strong updrafts to 80 knots, and the K-index⁶ of 30.8 indicated a greater than 60% probability of thunderstorms.

⁵ Lifted Index (LI) - A common measure of atmospheric instability. Its value is obtained by computing the temperature that air near the ground would have if it were lifted to 500-hPa or approximately 18,000 feet and comparing that temperature to the actual temperature at that level. Negative values indicate instability - the more negative, the more unstable the air is, and the stronger the updrafts are likely to be with any developing thunderstorms.

⁶ K-Index - The measure of thunderstorm potential based on the vertical temperature lapse rate, the moisture content of the lower atmosphere and the vertical extent of the moist layer. The higher the K-Index value the greater the probability of air mass type thunderstorm development across the region.

The wind profile indicated southeast surface wind at 15 knots, veering to the south with height thru 18,000 feet and increasing wind speeds with height. The mean 0 to 6 kilometer or 18,000 feet wind was from 180° at 30 knots. The wind profile also supported a high probability of light low-level turbulence between 1,000 and 2,500 feet.

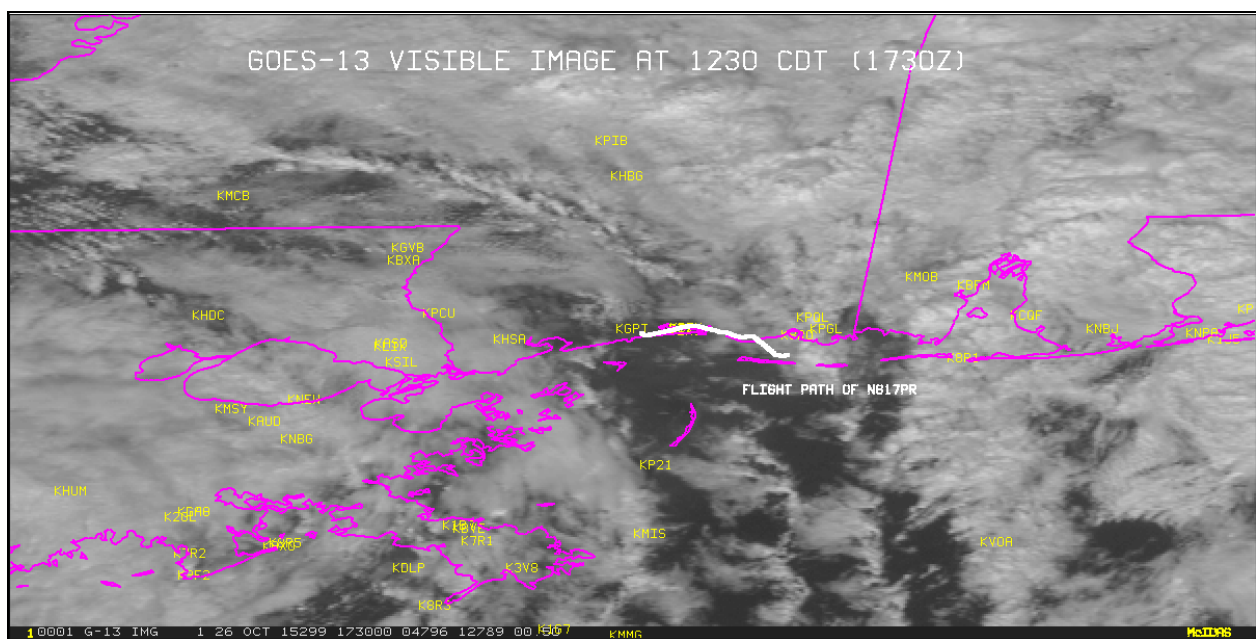
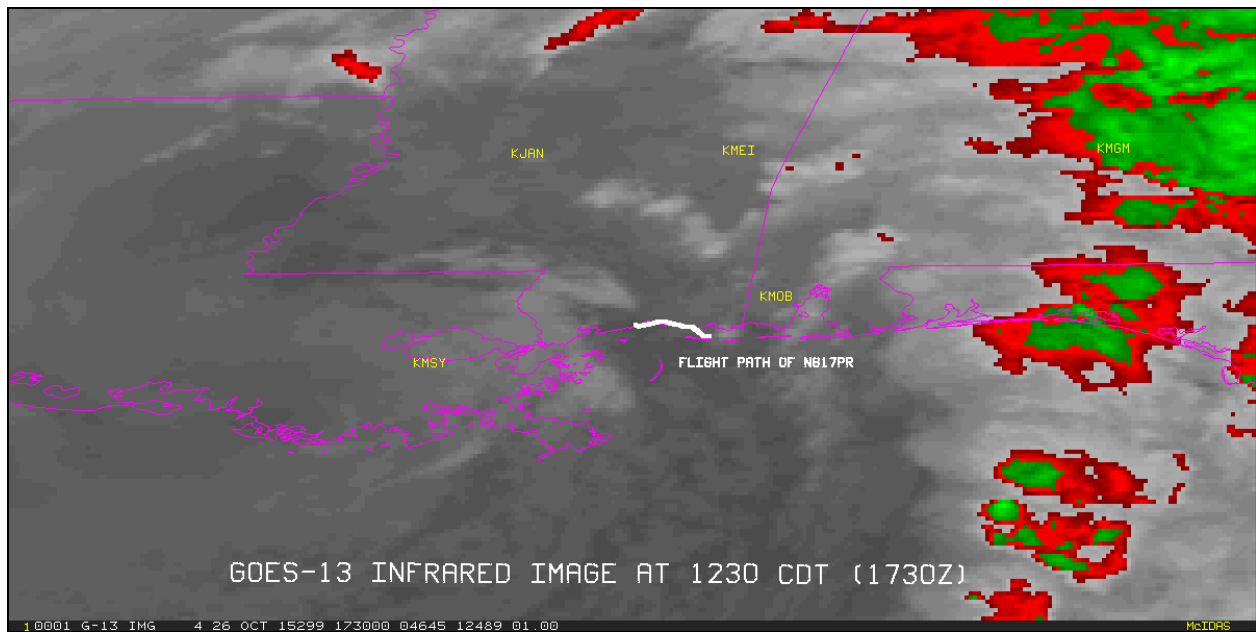
The temperature and relative humidity profile of the sounding also supported a moderate to severe risk for carburetor icing for non-fuel injected reciprocating engines from the surface to 10,000 feet.

4.0 Satellite Data

The Geostationary Operational Environmental Satellite number 13 (GOES-13) data was obtained from an archive at the Space Science Engineering Center (SSEC) at the University of Wisconsin-Madison (UW) in Madison, Wisconsin, and processed using the Safety Board's Man-computer Interactive Data Access System (McIDAS) software. Both the infrared long wave and visible band imagery were obtained surrounding the time of the accident. The infrared long wave imagery (band 4) at a wavelength of 10.7 microns (μm) provided standard satellite image with radiative cloud top temperatures with a resolution of 4 km. The visible imagery (band 1) at a wavelength of 0.65 μm provided a resolution of 1 km.

The GOES-13 infrared (band 4) image at 1230 CDT at 4X magnification with a standard MB temperature enhancement curve applied is included as figure 7, with the air traffic control observed flight track of N817PR overlaid. The image depicts several enhanced areas of clouds (depicted in red and green) associated with deep convection over the Gulf of Mexico into the Florida panhandle and Alabama to the east of the accident site, with tops near 37,000 feet. Over the flight track and accident site only low to mid-level clouds are noted with radiative cloud top temperatures of 282° Kelvin or 8.84° C, which corresponded to cloud tops near 8,000 feet based on the NAM model sounding. Higher clouds located immediately east of the last track position rapidly increase to a radiative temperature of 263° K or -10.16° C, which corresponded to cloud tops near 21,000 feet.

Figure 8 is the GOES-13 visible (band 1) satellite imagery for the same period at 1230 CDT at 2X magnification. The flight track overlaid depicts the aircraft entering the clouds with tops near 21,000 feet associated with cumulus congestus type clouds.



5.0 Weather Radar Information

The closest Weather Surveillance Radar-1988, Doppler (WSR-88D) to the accident site was from the NWS Mobile (KMOB), Alabama forecast office located approximately 30 miles east-northeast of the accident site. The level II and III archive data was obtained from the National Climatic Data Center (NCDC) utilizing the Hierarchical Data Storage System (HDSS) and

displayed using the NWS NEXRAD Interactive Viewer and Data Exporter software and the NTSB's McIDAS system.

During the period surrounding the accident the KMOB WSR-88D radar was operating in the precipitation scanning mode VCP-212, where the radar makes 14 different elevation scans in 4 ½ minutes. This mode is typically used by the NWS during periods when rapidly evolving wide spread severe convection is expected, and allows for improved low-level vertical resolution of the storms.

Assuming standard refraction⁷ of the radar beam of the KMOB WSR-88D with an antenna height of 289 feet and a distance of 30 miles from the radar, the 0.5 base reflectivity scan was centered at approximately 2,480 feet over the last radar target.

Reflectivity is the measure of the efficiency of a target in intercepting and returning radio energy. With hydrometeors⁸, it is a function of the drop size distribution, number of particles per unit volume, physical state (ice or water), shape, and aspect. Reflectivity is normally displayed in decibels (dBZ⁹), and is a general measure of echo intensity. The chart below relates the NWS video integrator and processor (VIP) intensity levels versus the WSR-88D's display levels, precipitation mode reflectivity in decibels, and rainfall rates.

⁷ Standard Refraction in the atmosphere is when the temperature and humidity distributions are approximately average, and values set at the standard atmosphere.

⁸ Hydrometeors are any product of condensation or sublimation of atmospheric water vapor, whether formed in the free atmosphere or at the earth's surface; also, any water particles blown by the wind from the earth's surface. Hydrometeors are classified as; (a) Liquid or solid water particles suspended in the air: cloud, water droplets, mist or fog. (b) Liquid precipitation: drizzle and rain. (c) Freezing precipitation: freezing drizzle and freezing rain. (d) Solid (frozen) precipitation: ice pellets, hail, snow, snow pellets, and ice crystals. (e) Falling particles that evaporate before reaching the ground: virga. (f) Liquid or solid water particles lifted by the wind from the earth's surface: drifting snow, blowing snow, blowing spray. (g) Liquid or solid deposits on exposed objects: dew, frost, rime, and glaze ice.

⁹ dBZ - 10 log Ze

NWS VIP/DBZ CONVERSION TABLE

NWS VIP	WSR-88D LEVEL	PREC MODE DBZ	RAINFALL
0	0	< 5	
	1	5 to 9	
	2	10 to 14	
1 Very Light	3	15 to 19	.01 in/hr
	4	20 to 24	.02 in/hr
	5	25 to 29	.04 in/hr
2 Light to Moderate	6	30 to 34	.09 in/hr
	7	35 to 39	.21 in/hr
3 Strong	8	40 to 44	.48 in/hr
4 Very Strong	9	45 to 49	1.10 in/hr
5 Intense	10	50 to 54	2.49 in/hr
6 Extreme	11	55 to 59	>5.67 in/hr
	12	60 to 64	
	13	65 to 69	
	14	70 to 74	
	15	> 75	

Air traffic control (ATC) weather display systems also use radar weather processors with the ability to determine precipitation intensity, with controllers instructed to describe the intensity to pilots based on the following scale:

- (a) "Light" (< 30 dBZ, NWS VIP level 1)
- (b) "Moderate" (30 to 40 dBZ, NWS VIP level 2)
- (c) "Heavy" (> 40 to 50 dBZ, NWS VIP level 3 and 4)
- (d) "Extreme" (> 50 dBZ, NWS VIP level 5 and 6)

The Mobile WSR-88D 0.5° base reflectivity image at 1235 CDT (1735Z) with the flight track overlaid is included as figures 9 and 10 at various resolutions and depicts the aircraft approaching an area of echoes from 40 to 50 dBZ or heavy intensity echoes. The last radar track is along the leading edge of the echo in echoes of 5 to 15 dBZ at 3,650 feet when the aircraft target ends.

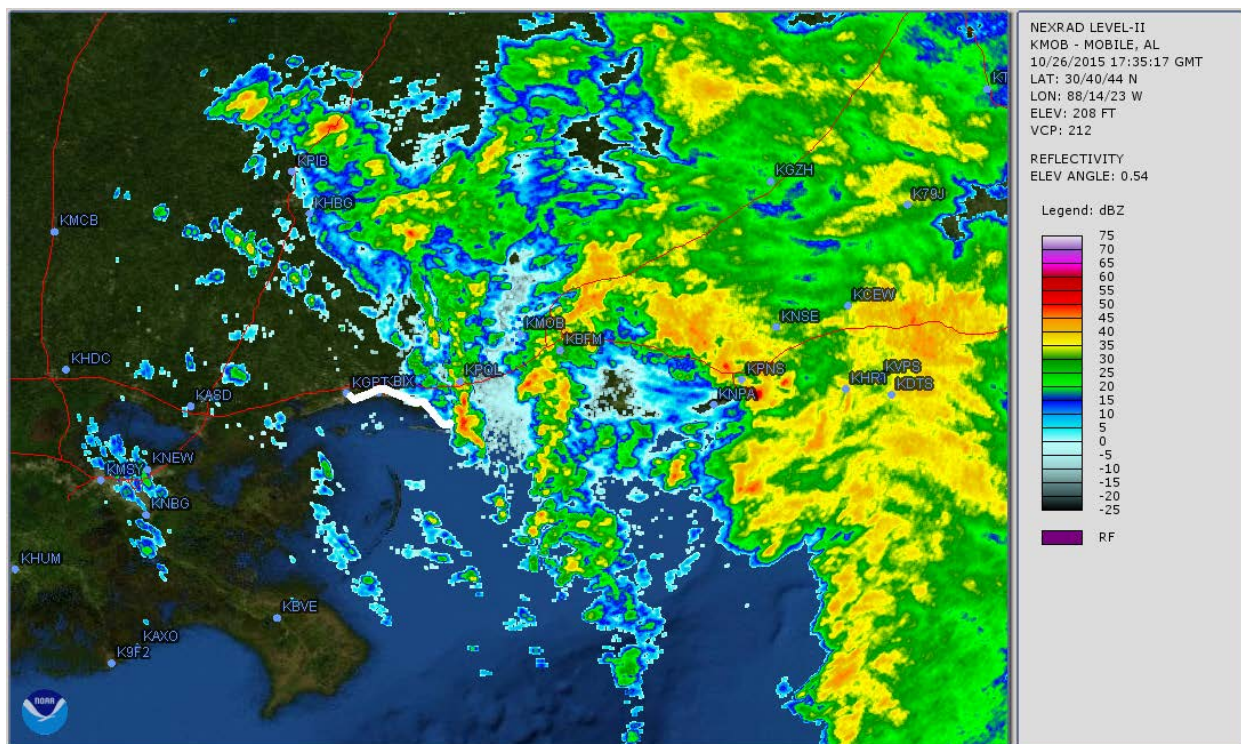


Figure 9 - KMOB WSR-88D 0.5° base reflectivity image at 1235 CDT with flight track



Figure 10 - KMOB WSR-88D 0.5° base reflectivity close-up at 1235 CDT

The NWS composite reflectivity images are completed at the end of the 4 ½ minute VCP scan and depicts the maximum reflectivity in dBZ of each of the 14 different elevation scans. Composite reflectivity images show the highest reflectivity value retrieved for a column from the individual radar sweeps for a single volume scan. Composite reflectivity provides a plan view of the most intense portions of the storm, and can be compared with the lowest elevation scan base reflectivity image to help determine the 3-dimensional structure of a storm. Figure 11 is the KMOB WSR-88D composite reflectivity image at 1235 CDT, which shows the flight track end on the western edge of the area of echoes with a maximum reflectivity of 50 dBZ immediately east of the last known position. Echo values of 15 to 20 dBZ are in the vicinity of the last position.

The KMOB WSR-88D echo tops product for 1235 CDT is included as figure 12 and shows the area of echoes immediately east of the flight track reaching 25,000 feet.

A review of the Earth Networks Lightning database indicated no lightning detected between 1145 through 1245 CDT in a 20-mile radius of the accident site. Therefore, the echoes identified by the KMOB WSR-88D are not associated with thunderstorms, but rather heavy rain showers and cumulus congestus type clouds.

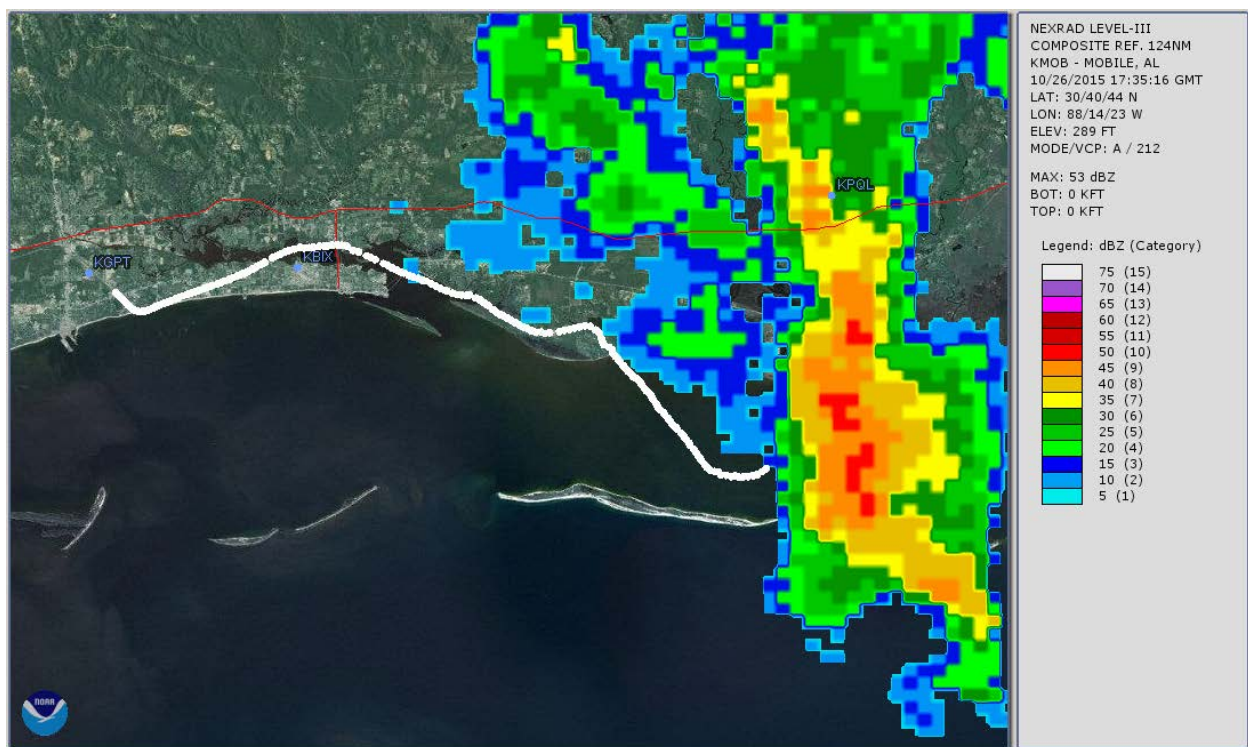


Figure 11 - KMOB WSR-88D composite reflectivity image at 1235 CDT

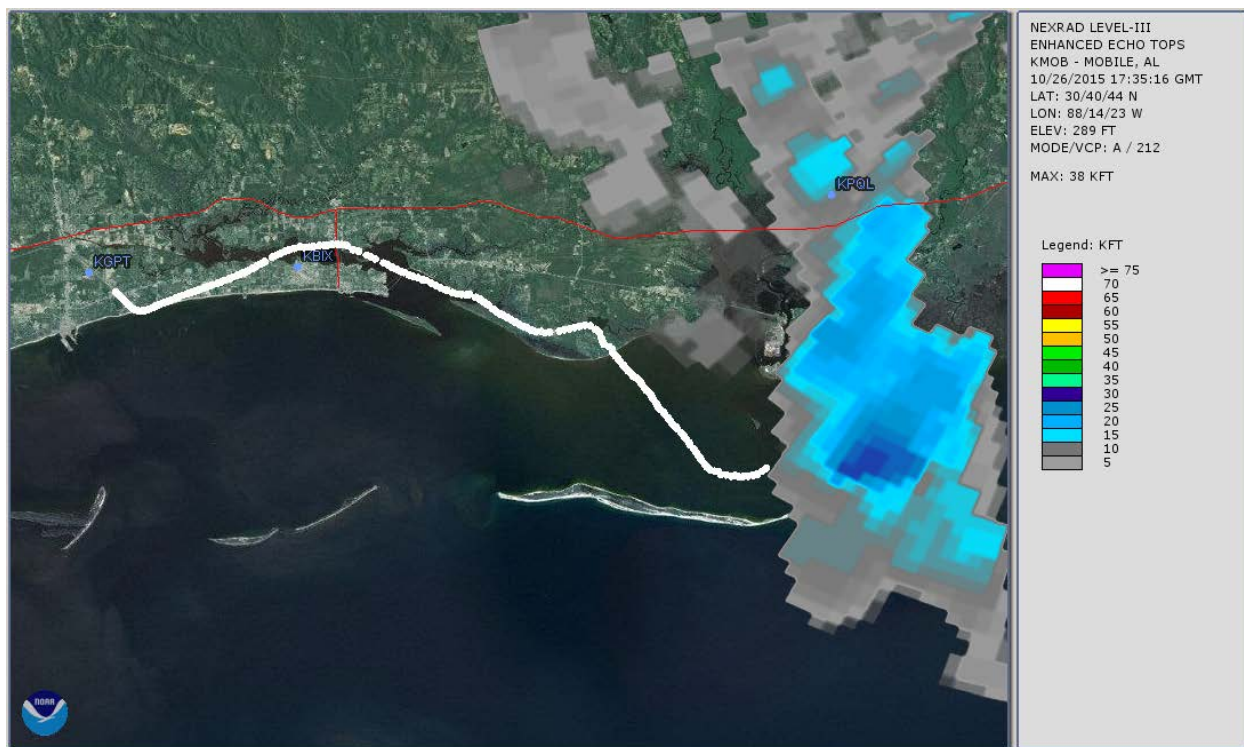


Figure 12 - KMOB Echot Tops product for 1235 CDT

6.0 Pilot Reports

The following pilot reports (PIREPs) were recorded over the region during the period. The reports are as follows:

MOB UUA /OV MOB /TM 1347 /FL020 /TP CRJ2 /TB MOD /RM LLWS+/-10KTSFC-020 DURD RY15 MOB

KBFM UA /OV BFM/TM 1406/FL004/TP C650/G/SK BKN016/WX FV02SM +RA/WV 14025G34KT/TB LGT-MOD/RM LLWS AT 400FT ON FINAL TO RWY14/ +/- 10KTS ON FINAL.

MOB UUA /OV MOB/TM 1420/FL020/TP CRJ2/TB MOD CHOP/RM LLWS +/-15KT SFC-020 DURD FA RY15 MOB

LUL UA /OV SJI360050/TM 1619/FL110/TP CRJ2/TB MOD 110-110/RM FM ZHU AWC-WEB:KZHU=

MOB UUA /OV MOB/TM 1635/FL010/TP CRJ2/RM LLWS +/-45KT SFC-010 /DURD FINAL RY15

JAN UA /OV KJAN/TM 1700/FL020/TP E145/TB CONT MOD CAT 020 IN CLD/RM IMC // MOD CHOP BEGIN AT AT FL020 - WINDS 090050 // +/- 15 ON SHORT FINAL

7.0 Terminal Aerodrome Forecast

The closest Terminal Aerodrome Forecast (TAF) to the accident site was issued for Gulfport-Biloxi International Airport (KGPT) at 0641 CDT and was current during the period:

TAF KGPT 261141Z 2612/2712 14020G30KT 4SM SHRA SCT012 BKN030 OVC040
 TEMPO 2612/2614 2SM SHRA SCT010 OVC015
 FM261500 15013KT P6SM VCSH BKN020
 TEMPO 2615/2619 5SM -SHRA
 FM270300 16010KT 5SM BR OVC010
 FM270600 20005KT P6SM OVC007=

The forecast current for the period expected southeasterly winds from 150 at 13 knots, with ceilings broken at 2,000 feet agl and with rain showers in the vicinity.

8.0 Area Forecast

The Area Forecast (FA) is a forecast of visual Flight Rules (VFR) clouds and weather conditions over an area as large as the size of several states. It must be used in conjunction with the AIRMET Sierra (IFR) bulletin for the same area in order to get a complete picture of the weather. The area forecast together with the AIRMET Sierra bulletin are used to determine forecast enroute weather and to interpolate conditions at airports which do not have a terminal forecast (TAF) issued. The NWS Aviation Weather Center (AWC) located in Kansas City, Missouri, issues the FA at regular intervals and issues specials reports as necessary usually in the form of an AIRMET. The Dallas-Fort Worth (KDFW) and Miami regional forecast that were current at the time of the accident was issued at 0445 and 0345 CDT respectively and valid through 1700 CDT on October 26, 2015. The forecast was as follows:

FAUS44 KPCI 260945
 FA4W
 DFWC FA 260945
 SYNOPSIS AND VFR CLDS/WX
 SYNOPSIS VALID UNTIL 270400
 CLDS/WX VALID UNTIL 262200...OTLK VALID 262200-270400
 OK TX AR TN LA MS AL
 .
 SEE AIRMET SIERRA FOR IFR CONDS AND MTN OBSCN.
 TS IMPLY SEV OR GTR TURB SEV ICE LLWS AND IFR CONDS.
 NON MSL HGTS DENOTED BY AGL OR CIG.
 .
 SYNOPSIS...10Z LOW PRES SCNTRL LA. TROF SCNTRL LA-NE TX-CNTRL OK. OCFNT SCNTRL LA-40N
 HRV. WRMFNT 40N HRV-SCNTRL AL. CDFNT 40N
 HRV-MS CSTL WTRS-CNTRL GLFMEX. STNR FNT SW MS-CNTRL AL-CHS. INVERTED TROF CNTRL
 WV-ERN KY-GQO. HI PRES RDG NERN KS-SW TX.
 04Z TROF LA CSTL WTRS-CRP-LRD. OCFNT FM LOW PRES 50NW HRV-SJI-FL PNHDL. CDFNT 60SW
 CEW SWD THRU GLFMEX. INVERTED TROF SE LA-SW
 AR-NW AR. HI PRES NERN OK-SW TX.
 .
 MS AL
 NRN AND SW MS/NW AL...BKN010-020 OVC050 TOP FL300. VIS 3-5SM RA BR. WND NELY G25KT.
 16Z WND ELY G25KT. OTLK...MVFR CIG RA BR.
 SE MS/SW AL...OVC010-020 TOP FL300. VIS 3-5SM RA BR. ISOL EMBD -TSRA POSS SEV. CB TOP
 FL320. WND SE 20G35KT. 16Z OVC015-025. OCNL -RA. WND SE G25KT. OTLK...MVFR CIG RA WND.
 NERN AL...BKN070 OVC100 TOP FL300. OCNL VIS 3-5SM -RA BR. 11Z OVC015-025. VIS 3-5SM -RA BR.
 OTLK...MVFR CIG RA BR.

SE AL...BKN025 OVC100 TOP FL200. ISOL -SHRA. 16Z OVC010-020. VIS 3-5SM RA BR. WND E G25KT.
OTLK...MVFR CIG RA BR WND.

....

FAUS42 KKCI 260845

FA2W

-MIAC FA 260845

SYNOPSIS AND VFR CLDS/WX

SYNOPSIS VALID UNTIL 270300

CLDS/WX VALID UNTIL 262100...OTLK VALID 262100-270300

NC SC GA FL AND CSTL WTRS E OF 85W

.

SEE AIRMET SIERRA FOR IFR CONDS AND MTN OBSCN.

TS IMPLY SEV OR GTR TURB SEV ICE LLWS AND IFR CONDS.

NON MSL HGTS DENOTED BY AGL OR CIG.

.

SYNOPSIS...CDFNT FROM NC CSTL WTRS TO SRN SC-NRN GA. HI PRES

BUILDING INTO NRN NC. LRG AREA LOW PRES CNTRL GULF STATES MOVG

SLOLY NEWD WITH INCRS CLDS ACRS FCST AREA.

.

SC

MTNS...SCT035 BKN050 OVC110 TOP FL270. -RA. OTLK...VFR SHRA.

RMNDR N HLF...BKN035 OVC100 TOP FL270. OTLK...VFR.

RMNDR S HLF...SCT015 BKN035 OVC100 TOP FL270. VIS 3-5SM -RA BR.

18Z SCT035 SCT100. OTLK...VFR...03Z MVFR CIG RA.

.

GA

N 1/3...BKN020-030 OVC050 TOP FL270. VIS 3-5SM -RA BR. OTLK...MVFR CIG RA.

CNTRL 1/3...BKN010 OVC050 TOP FL270. VIS 3-5SM -RA BR. 14Z SCT030

SCT-BKN120. ISOL -SHRA. 19Z BKN020. -RA. OTLK...MVFR CIG RA.

SRN 1/3...SCT050 BKN CI. 15Z SCT050 BKN100 TOP FL270. SCT -SHRA. OTLK...VFR SHRA.

.

FL

PNHDL...SCT025 BKN050 TOP FL270. SCT -SHRA. ISOL -TSRA. CB TOP FL320.

15Z BKN025. VIS 3-5SM -RA BR. WDLY SCT -TSRA. OTLK...IFR CIG RA BR WND.

NRN...SCT100 BKN CI. 19Z SCT050 SCT-BKN 100. OTLK...VFR SHRA.

CNTRL-SRN...SCT035 SCT-BKN CI. 19Z BKN035 TOP 060. ISOL -SHRA. OTLK...VFR SHRA.

KEYS...SCT025 SCT050. WDLY SCT -SHRA. OTLK...VFR SHRA.

.

GULF WTRS E OF 85W...

SE CTY...SCT025 SCT050. WDLY SCT -SHRA. WND SE 20-25KT. OTLK...VFR SHRA WND.

NW CTY...BKN010-020 OVC100 TOP FL270. SCT -SHRA. WDLY SCT -TSRA.

CB TOP FL450. WND SE 30KT. OTLK...IFR CIG RA BR WND.

....

The forecast for southeast Mississippi and southwest Alabama expected overcast clouds at 1,500 to 2,500 feet with tops to 30,000 feet with occasional light rain, with southeast winds gusting to 25 knots. Earlier in the period isolated embedded thunderstorms and light rain were expected, with a few possible severe were forecast. The forecast for the Florida panhandle continued to expect widely scattered thunderstorms through the period.

9.0 Convective Outlook

The NWS Storms Prediction Center (SPC) responsible for forecast severe and organized convection issued their regular scheduled Convective Outlook at 1120 CDT in both graphic and text form. The graphic Convective Outlook chart is included as figure 13 and depicted a marginal risk¹⁰ of severe thunderstorms over the Florida panhandle into extreme southern Alabama and into the extreme southeast section of Mississippi.

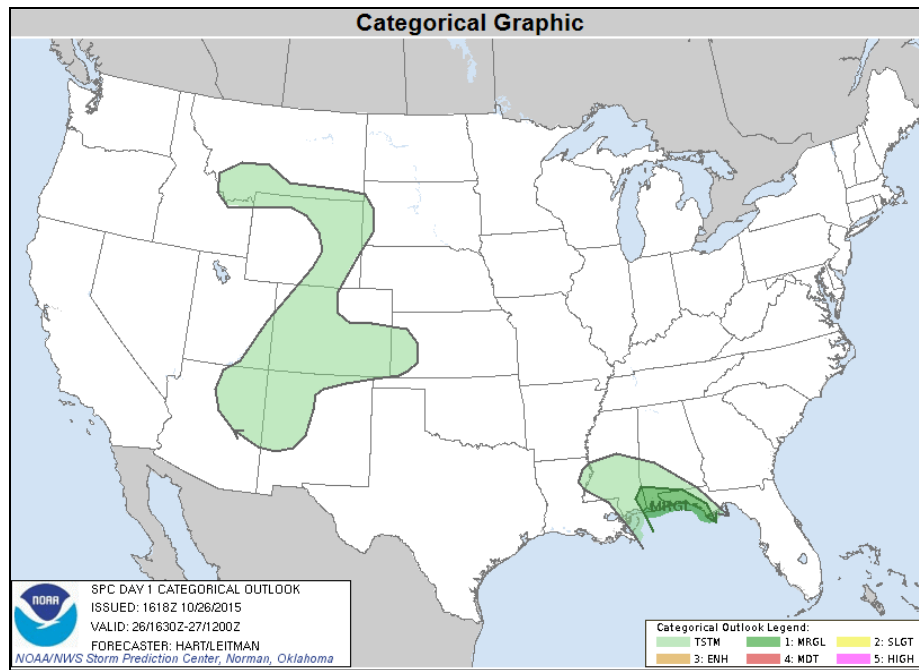


Figure 13 - NWS Storm Prediction Centers Convective Outlook

ACUS01 KWNS 261620
SWODY1
SPC AC 261618
DAY 1 CONVECTIVE OUTLOOK
NWS STORM PREDICTION CENTER NORMAN OK
1118 AM CDT MON OCT 26 2015
VALID 261630Z - 271200Z

...THERE IS A MRGL RISK OF SVR TSTMS OVER PARTS OF SOUTHERN MS/AL AND THE WESTERN FL PANHANDLE...

...SUMMARY...
A BRIEF TORNADO OR TWO AND ISOLATED STRONG WIND GUSTS WILL BE POSSIBLE TODAY ALONG THE GULF COAST FROM SOUTHEAST MISSISSIPPI TO THE WESTERN FLORIDA PANHANDLE.

...MS/AL...
LATEST SURFACE ANALYSIS SHOWS A DEEP LOW OVER SOUTHEAST LA TRACKING SLOWLY EASTWARD ALONG THE COAST. THE WARM SECTOR AHEAD OF THE LOW IS VERY MOIST /SURFACE DEWPOINTS IN THE 70S AND GPS PWAT VALUES OVER 2 INCHES/...BUT MOIST-ADIABATIC LAPSE

¹⁰ Marginal risk is 5% probability of occurrence of severe storms.

RATES AND WIDESPREAD CLOUDS/RAIN ARE RESULTING IN VERY LIMITED CAPE. REGIONAL VAD PROFILES SHOWS STRONG LOW-LEVEL VERTICAL SHEAR FAVORABLE FOR ROTATING UPDRAFTS OVER PARTS OF SOUTHERN MS/AL AND THE WESTERN FL PANHANDLE. LOCAL RADARS ALSO CONTINUE TO SHOW OCCASIONAL TRANSIENT ROTATION SIGNATURES. FOR THESE REASONS...WILL MAINTAIN THE MARGINAL RISK OF A BRIEF TORNADO OR WIND GUST IN THE STRONGER CELLS THIS AFTERNOON.
..HART/LEITMAN.. 10/26/2015

10.0 In-Flight Weather Advisories

The NWS issues in-flight weather advisories designated as Severe Weather Forecast Alerts (AWW's), Convective SIGMET's (WST's), SIGMET's (WS's), Center Weather Advisories (CWA's), and AIRMET's (WA's). In-flight advisories serve to notify en route pilots of the possibility of encountering hazardous flying conditions, which may not have been forecast at the time of the preflight briefing. Whether or not the condition described is potentially hazardous to a particular flight is for the pilot to evaluate on the basis of experience and the operational limits of the aircraft. The following advisories were current for the general route of flight at the time.

Convective SIGMETs

WSUS32 KPCI 261655

SIGC

MKCC WST 261655

CONVECTIVE SIGMET 28C

VALID UNTIL 1855Z

FL GA AL MS AND FL AL MS CSTL WTRS

FROM 10W LGC-100WNW PIE-190WSW PIE-170ESE LEV-40NNE MCB-10W LGC

AREA EMBD TS MOV FROM 19035KT. TOPS TO FL370.

.

OUTLOOK VALID 261855-262255

FROM 50E DYT-40NNE ATL-40WNW AMG-110W PIE-190WSW PIE-LEV-50W MEM-50E DYT

WST ISSUANCES EXPD. REFER TO MOST RECENT ACUS01 KWNS FROM STORM

PREDICTION CENTER FOR SYNOPSIS AND METEOROLOGICAL DETAILS.

Figure 14 is a plot of Convective SIGMET 28C, which extended over the accident site for an area of embedded thunderstorms, with tops to 37,000 feet moving northward at 35 knots.

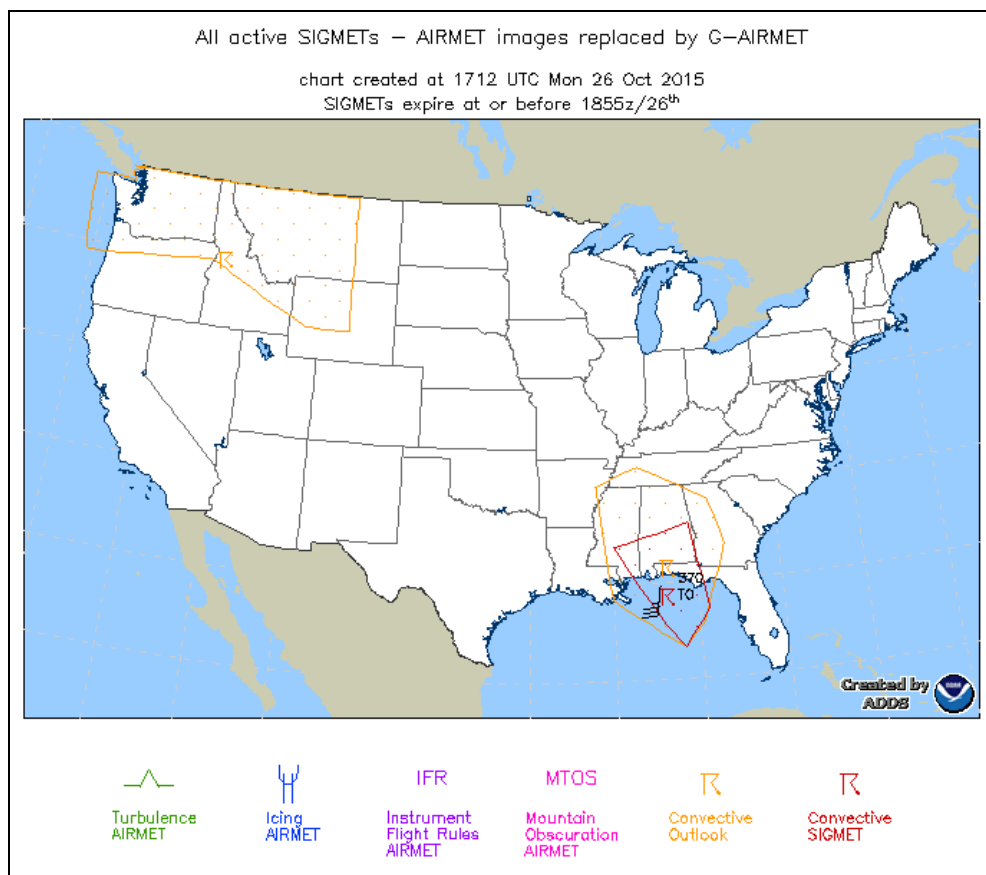


Figure 14 - Plot of Convective SIGMET

AIRMETs

WAUS44 KPCI 261445

2015299 1437

WA4S

DFWS WA 261445

AIRMET SIERRA UPDT 2 FOR IFR AND MTN OBSCN VALID UNTIL 262100

.

AIRMET IFR...TX AR TN LA MS AL AND CSTL WTRS

FROM 20ENE BNA TO GQO TO 40WNW PZD TO 40SW VUZ TO 40W CEW TO 130ESE LEV TO 70SE LEV
TO 110S LCH TO 30SSW LFK TO 60SW GGG TO 20W TXK TO 20SSE FSM TO 20S ARG TO 20ENE BNA
CIG BLW 010/VIS BLW 3SM PCPN/BR. CONDS CONTG BYD 21Z THRU 03Z.

Figure 15 is a plot of AIRMET Sierra update 2 which was current over the accident site.

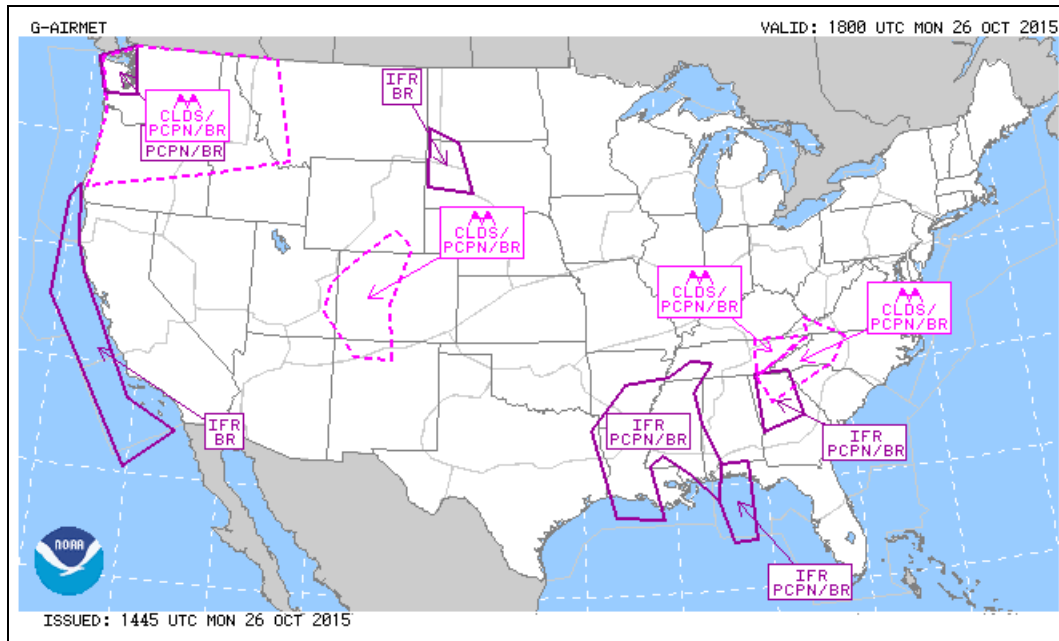


Figure 15 - AIRMET Sierra for IFR conditions

WAUS44 KNCI 261445

2015299 1447

WA4T

DFWT WA 261445

AIRMET TANGO UPDT 2 FOR TURB STG WNDZ AND LLWS VALID UNTIL 262100

AIRMET TURB...TX AR LA MS AL AND CSTL WTRS

FROM GQO TO 50SW PZD TO 40W CEW TO 130ESE LEV TO 110ESE PSX TO 40ENE IAH TO 30S TXK TO 30SSE LIT TO GQO

MOD TURB BTN FL180 AND FL420. CONDS CONTG BYD 21Z THRU 03Z.

AIRMET TURB...OK TX AR TN LA MS AL AND CSTL WTRS

FROM 20WNW RZC TO 30NE DYC TO 20WSW BNA TO GQO TO 50SW PZD TO 40W CEW TO 130ESE LEV TO 120SSW LCH TO 80E BRO TO 20W BRO TO 20SSE SAT TO 40ENE ACT TO 20WNW RZC

MOD TURB BLW FL180. CONDS CONTG BYD 21Z THRU 03Z.

Figure 16 is a plot of AIRMET Tango series for turbulence, which included moderate turbulence below 18,000 feet along the proposed route and the accident site.

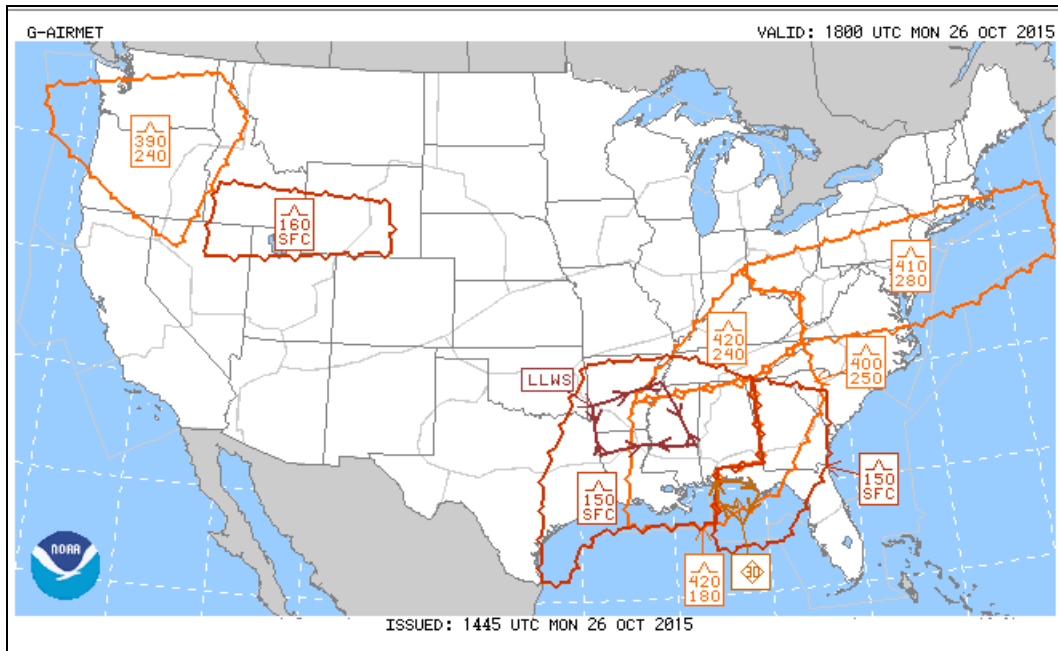


Figure 16 - AIRMET Tango series for turbulence, low-level wind shear, and strong surface winds

11.0 Winds and Temperature Aloft Forecast

The NWS Wind and Temperature Aloft forecast current for the period was as follows:

WINDS ALOFT FORECASTS

DATA BASED ON 261200Z

VALID 261800Z FOR USE 1400-2100Z. TEMPS NEG ABV 24000

FT	3000	6000	9000	12000	18000	24000	30000	34000	39000
MOB	1244	1635+13	1731+07	1838+03	1948-09	1948-19	204132	224339	254348
MSY	1623	1723+12	1827+08	2123+03	2426-06	2933-15	305631	305939	297550
PFN	1349	1446+11	1746+09	1847+04	2260-05	2349-15	214632	225140	235451
TLH	1227	1433+12	1628+07	1830+05	2138-06	2443-15	234331	224841	245452

Submitted by:

Donald Eick
NTSB Senior Meteorologist