

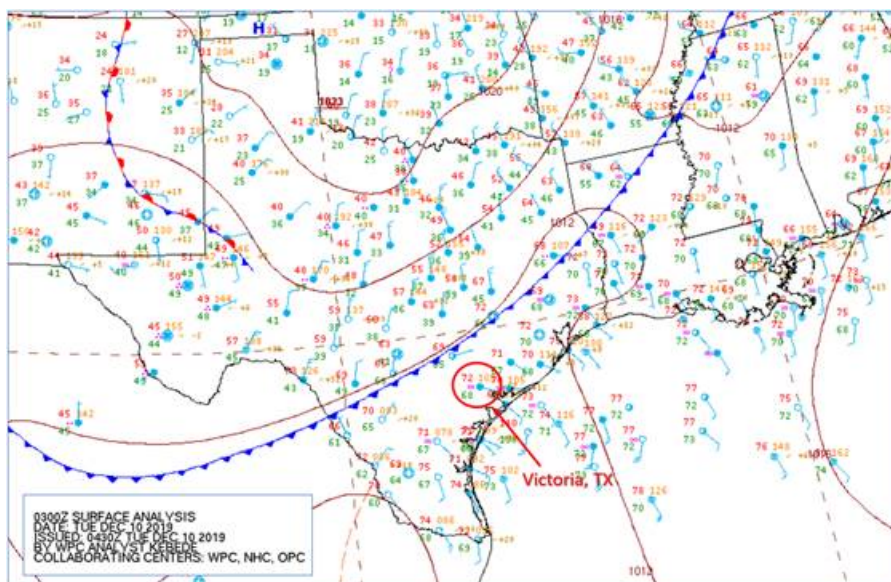
Folkerts Michael

From: Eick Donald
Sent: Friday, December 13, 2019 8:02 AM
To: Folkerts Michael
Cc: Olvis Charles; Etcher Shawn; Helson David
Subject: CEN20FA032 - Victoria, TX Weather

Weather conditions in the vicinity of Victoria, TX on December 9, 22019

Synoptic conditions – The NWS Surface Analysis Chart for 2100 CST (0300Z) depicted a cold front stretching across northern Louisiana, into central and southern Texas. The accident site was located to the south of the cold front in the warm air sector.

The station models depicted light southeasterly winds at 10 knots or less with broken to overcast cloud cover. Several station in the area reported visibility restricted in mist and haze with temperatures near 72° Fahrenheit (F), and dew point 68° F, or within 4° F showing near saturated conditions.



Observations – Victoria Regional Airport (KVCT), Victoria, Texas, at an elevation of 115 ft, and a magnetic variation of 4 E. The airport had an Automated Surface Observation System (ASOS) and was augmented by air traffic control personnel and reported the following conditions surrounding the period:

KVCT weather observation at 1951 CST (0151Z), wind from 140° at 6 knots, visibility 6 miles in haze, a few clouds at 2,800 ft agl, ceiling overcast at 4,700 ft, temperature 23° C (73° F), dew point temperature 19° C (67° F), altimeter 29.82 inches of mercury (Hg). Remarks: automated station with a precipitation discriminator, sea level pressure 1009.7-hPa, temperature 22.8° C, dew point 19.4° C.

KVCT special weather observation at 2034 CST (0234Z), wind from 160° at 6 knots, visibility 6 miles in haze, a few clouds at 1,500 ft agl, scattered at 3,900 ft, ceiling overcast at 4,800 ft, temperature 23° C (73° F), dew point temperature 20° C (68° F), altimeter 29.84 inches of Hg. Remarks: automated station with a precipitation discriminator, temperature 22.8° C, dew point 20.0° C.

The general flight categories and raw observations surrounding the period:

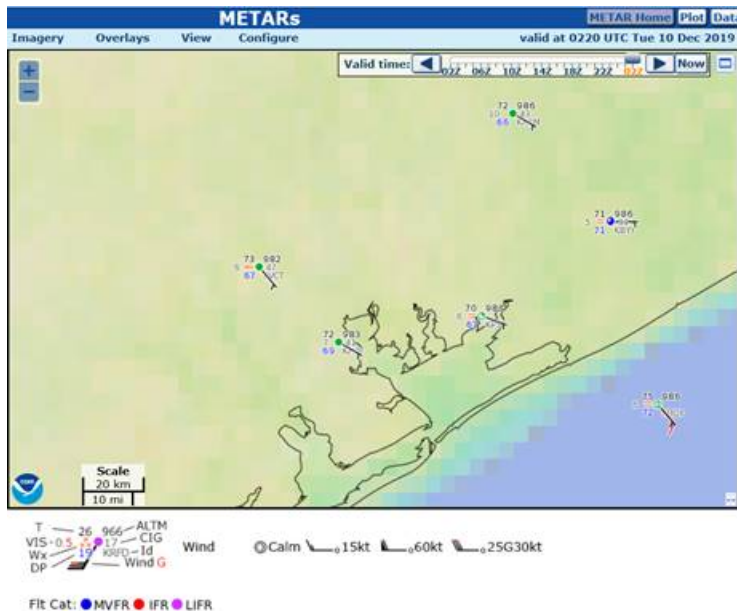
VFR METAR KVCT 092351Z 17011KT 8SM BKN043 24/19 A2979 RMK AO2 SLP087 T02390194 10283 20239 53006
VFR METAR KVCT 100051Z 16006KT 7SM BKN045 23/19 A2981 RMK AO2 SLP094 T02330194
VFR METAR KVCT 100151Z 14006KT 6SM HZ FEW028 OVC047 23/19 A2982 RMK AO2 SLP097 T02280194

Accident 0216Z

VFR SPECI KVCT 100234Z 16006KT 6SM HZ FEW015 SCT039 OVC048 23/20 A2984 RMK AO2 T02280200=
MVFR METAR KVCT 100251Z 11003KT 5SM BR SCT016 BKN020 OVC050 22/20 A2985 RMK AO2 SLP105 T02220200 53017=
MVFR SPECI KVCT 100318Z 00000KT 5SM BR OVC013 22/20 A2986 RMK AO2 T02220200=
MVFR METAR KVCT 100351Z AUTO 11005KT 5SM BR OVC012 22/20 A2986 RMK AO2 SLP109 T02220200=
MVFR METAR KVCT 100451Z AUTO 11004KT 5SM BR OVC014 22/19 A2988 RMK AO2 SLP115 T02170194=
MVFR SPECI KVCT 100520Z AUTO 10003KT 4SM BR SCT015 BKN024 OVC043 21/19 A2988 RMK AO2 T02110194=
MVFR SPECI KVCT 100528Z AUTO 10004KT 4SM BR FEW015 SCT024 OVC043 21/19 A2988 RMK AO2 T02110194=
MVFR METAR KVCT 100551Z AUTO 11005KT 3SM BR FEW025 OVC047 21/19 A2988 RMK AO2 SLP116 T02060189 10239 20206 402830178 51011=

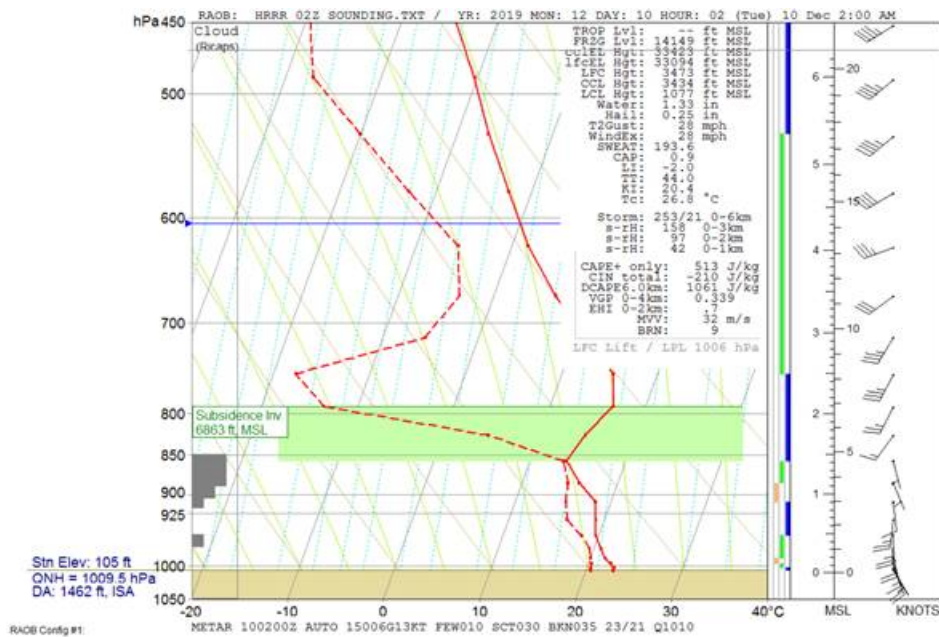
The observations indicated multiple layers of clouds with haze being reported at the time of departure with for or mist developing an hour after the accident and MVFR conditions.

The METAR display from the NWS Aviation Weather Center (AWC) for the period of the accident indicated general VFR to MVFR conditions over the area with overcast clouds and visibility restrictions in haze and mist.



PIREPs – none available within 50 miles of the accident site.

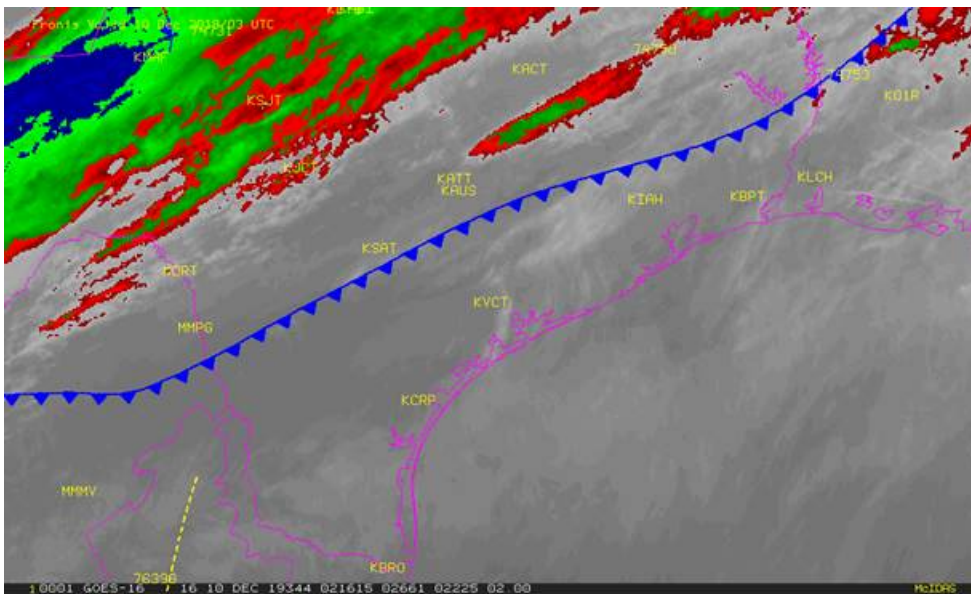
Sounding – A High Resolution Rapid Refresh (HRRR) numerical model was obtained from archived data from the NWS and plotted on a Skew T log P diagram for 2000 CST over the accident site. The sounding depicted a lifted condensation level at 972 ft agl, and a convective condensation level (CCL) and level of free convection (LFC) at approximately 3,350 ft. A defined temperature inversion was identified above this level between 4,800 to 6,860 ft due to subsidence, with dry air above. Restricted visibility in haze could be expected below the inversion, which restricted vertical mixing of the atmosphere. This inversion would support multiple layers of clouds with a few clouds at 1,000 ft agl, scattered at 3,000 ft agl, and broken to overcast at 3,500 ft agl with tops near 5,000 ft. The freezing level was at approximately 14,000 ft, with no icing indicated.



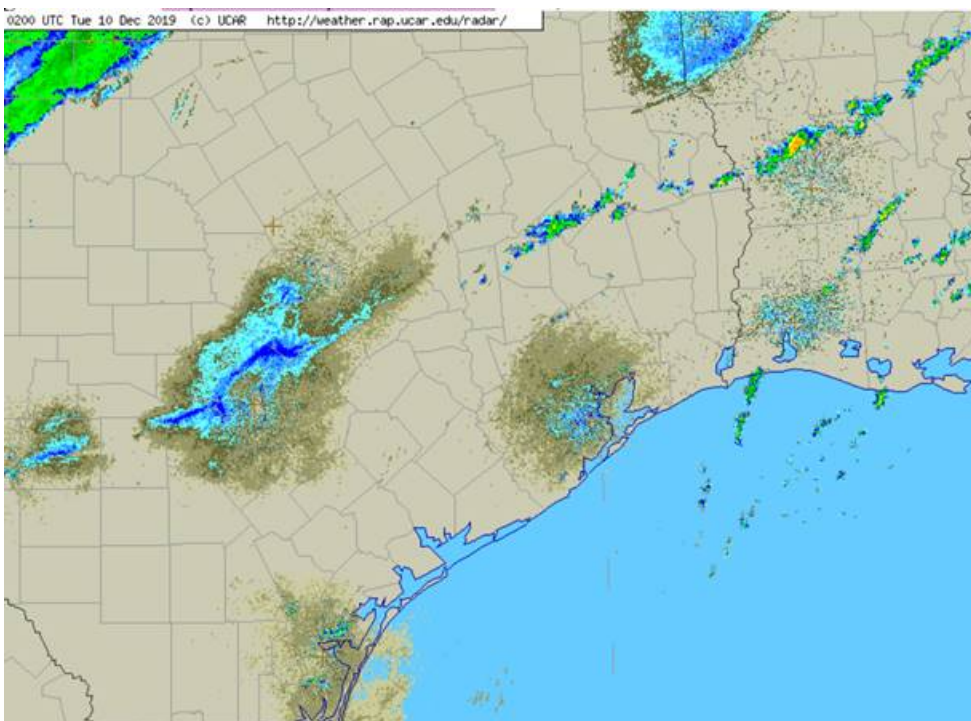
The sounding wind profile indicated a surface wind from the southeast which veered clockwise with height to the south and then to the southwest above the inversion, with wind speeds increasing to 25 knots or more above 7,000 ft. A low-level jet was identified at 1,500 ft with wind from 180° at 25 knots with winds decreasing through the inversion before increasing above it at 7,000 ft. The mean 0 to 6 kilometer or 18,000 ft wind was from 220° at 28 knots. The sounding support multiple layer of turbulence which are indicated on the parameter list below.

Height (ft-MSL)	Pres (hPa)	T (C)	Td (C)	RH (%)	DD / FF (deg / kts)	CAT (FAA)	LLWS	Icing - Type (AFGWC method)
105	1006	22.8	20.5	87	152 / 6			
134	1005	22.8	20.4	86	152 / 5	LGT	MODRT	
220	1002	22.8	20.4	86	159 / 10		LIGHT	
392	996	22.3	20.3	88	162 / 12	LGT	LIGHT	
623	988	21.5	20.0	91	167 / 16	LGT	LIGHT	
1030	974	20.7	19.5	93	175 / 21	LGT		
1560	956	19.7	18.2	91	182 / 25			
2220	934	19.1	16.1	83	187 / 23	SVR		
2956	910	18.4	15.3	82	174 / 10	LGT		
3739	885	16.0	14.8	93	159 / 5			
4635	857	13.8	13.5	98	167 / 3	SVR		
5692	825	14.8	4.7	51	214 / 13	SVR		
6863	791	16.6	-13.5	11	205 / 27	MDT		
8195	754	15.4	-17.7	9	206 / 35			
9659	715	11.1	-5.6	30	209 / 35	MDT		
11343	672	6.4	-3.6	49	231 / 30	MDT		
13279	625	1.7	-5.6	58	249 / 36	LGT		

Satellite Imagery – The GOES-16 infrared image for 2016 CST at 2X magnification is included below and depicted multiple layers of low stratiform type clouds over the area. The frontal position is overlaid for reference.



Radar Imagery – The regional radar mosaic for the area depicted no significant meteorological echoes in the vicinity of the accident site. Some very light intensity echoes were identified in the vicinity of the front, and over northern Texas.



Forecasts

Terminal Aerodrome Forecast (TAF) current for KVCT:

TAF KVCT 092340Z 1000/1024 17014KT P6SM SCT040 SCT250
 FM100300 15007KT 5SM BR SCT010 BKN020
 TEMPO 1004/1008 1SM BR BKN010
 FM100800 36014G23KT 4SM -SHRA BR OVC008
 FM101200 35021G29KT 6SM -RA BR OVC015
 FM102200 35017G25KT P6SM OVC015

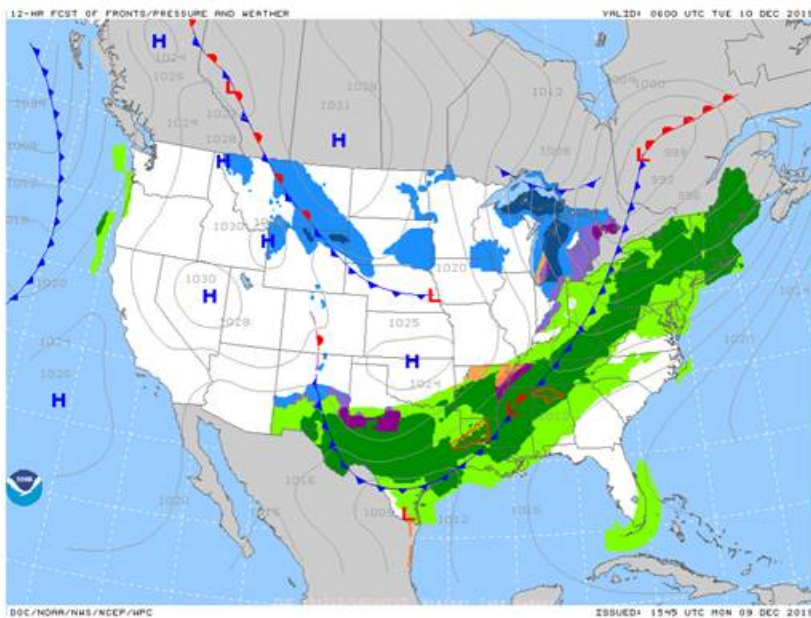
Winds Aloft Forecast – current for the route of flight:

WINDS ALOFT FORECASTS
 DATA BASED ON 100000Z
 VALID 100600Z FOR USE 0200-0900Z. TEMPS NEG ABV 24000

FT	3000	6000	9000	12000	18000	24000	30000	34000	39000	45000	53000
PSX	1926	2026+13	2036+13	2232+05	2445-09	2453-21	256435	256845	247556		
CRP	1928	1924+18	2027+13	2029+05	2444-09	2351-20	246335	256744	247156	257070	254674
SAT	1206	1105+12	2133+12	2140+04	2459-09	2364-20	257336	247545	248456	248070	264373
HOU	2022	2222+11	2138+11	2240+04	2448-09	2456-21	256736	257146	248257	248670	254872
CLL	0517	1819+12	2025+07	2246+03	2462-10	2474-21	258237	248846	249757		

Inflight Weather Advisories – There was an AIRMET Sierra for IFR conditions over southeastern Texas, which did not impact the route of flight. Otherwise, there were no SIGMETs, Convective SIGMETs, CWA's, or AIRMETs current for the period over the accident site.

12-hour Surface Forecast – the area was expected lower ceilings and visibility in fog, with rain with the approaching front.



Astronomical Conditions – obtained for the period over Victoria, TX:

SUN

Begin civil twilight	0643 CST
Sunrise	0709 CST
Sun transition	1220 CST
Sunset	1731 CST
End civil twilight	1756 CST
Accident	2016 CST

MOON

Moonrise	1557 CST
Accident	2016 CST
Moon culmination	2241 CST
Moonset	0434 CST

At the time of the accident the sun was 35° below the horizon and official night. The Moon was 54° above the horizon at an azimuth of 106°, with the phase a Waxing Gibbous with 95% of the moon's disk illuminated.

Donald Eick
NTSB Senior Meteorologist
Office of Aviation Safety
Operational Factors Division (AS-30)
490 L'Enfant Plaza East, SW
Washington, DC 20594

[REDACTED]
202-314-6384 Office M-W

