NATIONAL TRANSPORTATION SAFETY BOARD
Office of Aviation Safety
Washington D.C. 20594

December 5, 2008

METEOROLOGICAL GROUP CHAIRMAN'S FACTUAL REPORT
SEA-07-FA277

A. **ACCIDENT**

Location:	Near Mammoth Lakes, California
Date / Time:	September 3, 2007 at 0930 Pacific Daylight Time (PDT) September 3, 2007 at 1630 Coordinated Universal Time (UTC)
Aircraft:	Bellanca 8KCAB-180, N240R

B. **WEATHER GROUP**

Chairman:	Gregory D. Salottolo National Resource Specialist, Meteorology National Transportation Safety Board Washington D.C.
Member:	None

C. **SUMMARY**

On September 3, 2007, approximately 0930 Pacific daylight time (September 3, 2007 at 1630 UTC), a Bellanca 8KCAB-180 (Super Decathlon), N240R, was reported overdue/missing. The wreckage was discovered on October 1, 2008, in remote mountainous terrain approximately 15 nautical miles west-northwest of Mammoth Lakes, California (KMMH) at latitude 37.6676 degrees north and longitude 119.1332 degrees west. The airplane was destroyed, and the airline transport pilot was killed. The airplane was owned by the Flying M Hunting Club, Inc., and was loaned to the pilot for the 14 Code of Federal Regulations (CFR) Part 91 flight. Visual meteorological conditions prevailed for the local personal flight, which originated from a private airport near Yerington, Nevada, between 0820 PDT (1520 UTC) and 0830 PDT (1530 UTC). No flight plan had been filed.

D. **DETAILS OF INVESTIGATION**

Note: All times are stated as PDT based on the 24-hour clock unless otherwise noted. All heights above mean sea level (MSL) unless otherwise noted. Heights in surface weather

observations above ground level (AGL). All directions are referenced to true north unless otherwise noted. Z = UTC.

1. Surface Weather Observations

Mammoth Lakes, California (KMMH)
KMMH is located about 102 degrees at 14.7 nautical miles from the accident site at an elevation of 7,129 feet.

September 3, 2007 at 0848 PDT (AUTO): Wind 120 degrees at 7 knots, visibility 10 miles, clear at or below 12,000 feet, temperature 21 degrees C, dew point 7 degrees C, altimeter setting 30.33 inches of Hg., density altitude 8,900 feet.

September 3, 2007 at 1049 PDT (AUTO): Wind 090 degrees at 9 knots, visibility 10 miles, clear at or below 12,000 feet, temperature 27 degrees C, dew point 4 degrees C, altimeter setting 30.32 inches of Hg., density altitude 9,700 feet.

Data from: http://cirrus.sprl.umich.edu/wxnet/index.html

Mt. Warren, California, September 3, 2007
Mt. Warren is located about 19.4 nautical miles north of the accident site at an elevation of 12,327 feet.

Time PDT	Wind Speed Average MPH	Wind Direction Degrees	Wind Speed Maximum MPH	Temperature Mean Degrees F	Relative Humidity Mean %
0700	21.9	192	31.8	47.3	42
0800	22.4	199	31.8	48.7	38
0900	20.0	196	36.7	50.7	38
1000	22.9	192	41.7	52.6	40
1100	21.4	205	54.5	54.5	38
1200	19.7	209	56.2	56.2	39

Data was provided by the Federal Aviation Administration (e-mail 10/3/2008). These data were obtained from the Western Regional Climate Center, Desert Research Institute, Reno, Nevada. See attachment 1 for a listing of these data.

2. Images from the Tioga Pass, California, Webcam

Tioga Pass is located about 16.2 nautical miles north-northwest of the accident site at an elevation of 9,600 feet. The images are from September 3, 2007 looking toward the south.

Images from Dr. Dan Cayan of the Scripps Institution of Oceanography, University of California, San Diego.

0915:00 PDT

0925:02 PDT

0930:01 PDT

0935:01 PDT

3.Witness Interviews

The following are excerpts of phone interviews conducted by the NTSB Investigator in Charge. See attachment 2 for the entire phone interviews.

a) In response to questions, the witness provided the following information:

He has a home in Bishop and often flies across the Sierras. On the morning of the accident, he flew a Cessna 206 from Rio Vista Airport (O88) to the Mammoth Lakes Airport. About 1130 PDT, he crossed from west to east near Mt. Ritter (one of the Minarets) about 2 miles north of the accident site at 13,500 feet. The winds aloft were from the south about 10 knots. There were no clouds and 60 miles visibility. There were no ripples visible on lake surfaces. He did not encounter any "big turbulence," was not tossed around, and did not have to slow down due to rough air. He stated that it was a "wonderful day to go flying."

b) In response to questions, the witness provided the following information:

He is the owner of Santa Barbara Aviation. On the day of the accident, he flew a King Air from Santa Barbara to Reno and back to Santa Barbara. He departed about 0730 PDT and reported encountering clear blue skies and no clouds on the flight to Reno. He hit "random clear air turbulence (CAT)" during descent into Reno. The surface wind at

Reno was calm. Above 2,500 feet agl, the winds were 30 to 35 knots out of the west (heading 240 to 290). The winds aloft were strong enough that he questioned the tower about the ground winds to confirm they were calm.

He departed Reno about 0930 PDT. The wind conditions during the departure were the same as he had on approach – calm on the surface, strong at 2,000 to 3,000 feet agl. He stated this was a very unusual wind condition.

At the request of his passengers, he flew over Yosemite National Park; this route took him to no more than 20 miles from the accident site. He was near the site about 1000 PDT to 1015 PDT. It was a "very nice day," and he cautioned his passengers to wear their seatbelts because of the CAT he had encountered earlier. It was "unusually smooth when it was not turbulent." About 95% of the time it was smooth. The smooth ride was interrupted by "random rough chop."

He recalls the day because it was unusual – "a weird day." He is familiar with the area and flies into Mammoth Lakes about 50 times a year.

c) In response to questions, the witness provided the following information:

On the day of the accident, he flew his glider from the Bishop Airport. He departed about 1200 PDT and stayed airborne for about 3 hours. During the time he was airborne, he heard the California CAP call on the radio looking for anyone who had seen the accident airplane.

He recalled that it was unusually windy on the ground at Bishop for his takeoff. He recalled the winds were out of the south. Once he got above 10,000 feet, the wind dropped off and the air was smooth. He went soaring over the White Mountains and did not go over the accident area. It was an unusual day.

d) In response to questions, the witness provided the following information:

On the day of the accident, he was camping at East Lake, about 30 miles north of the accident site. His camp was at an elevation of about 9,400 feet, and there are 12,000-foot peaks in the area.

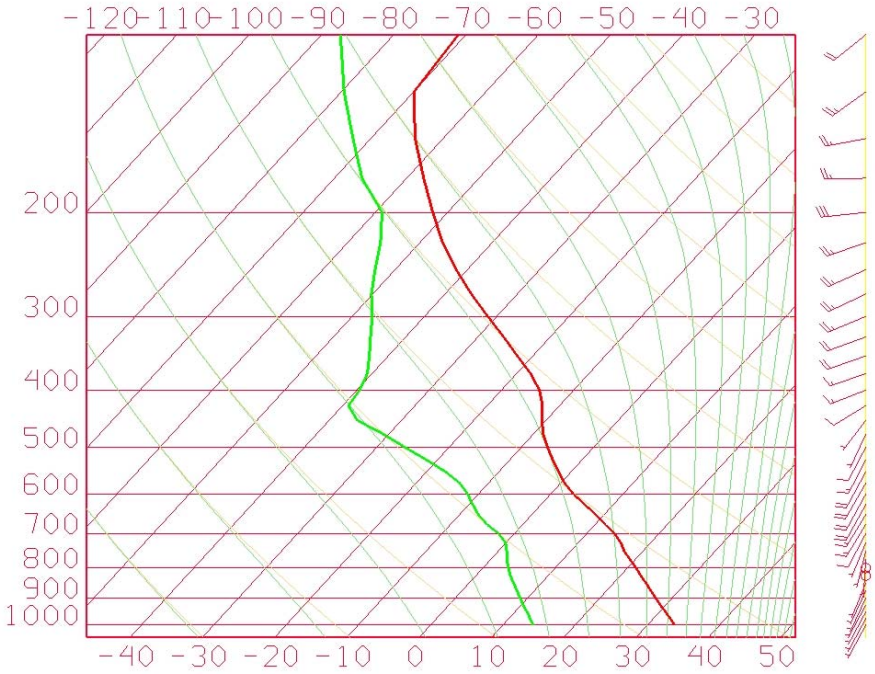
A little before 1000 PDT, he saw an airplane that he believes was the accident airplane. The airplane was flying from north to south, heading towards Yosemite. When he saw the airplane it was about ½ mile north of the camp at an altitude of about 11,500 feet. He pointed the airplane out to the people he was camping with and they saw it also.

It had been very windy during the night and in the morning. The wind was out of the southwest. The airplane was heading into the wind, and it looked like it was standing still due to the wind.

When the camping trip was over, he saw pictures of the accident airplane on television and identified it as the airplane he observed.

4. Upper Air Data

Data from the Rapid Update Cycle (RUC – 20 kilometers resolution – RUC20) numerical model for September 3, 2007 at 1000 PDT (1700Z) for the location of the accident. Data reviewed using IDV. See: http://www.unidata.ucar.edu/software/idv/



Skew-T Log-P Upper Air Diagram

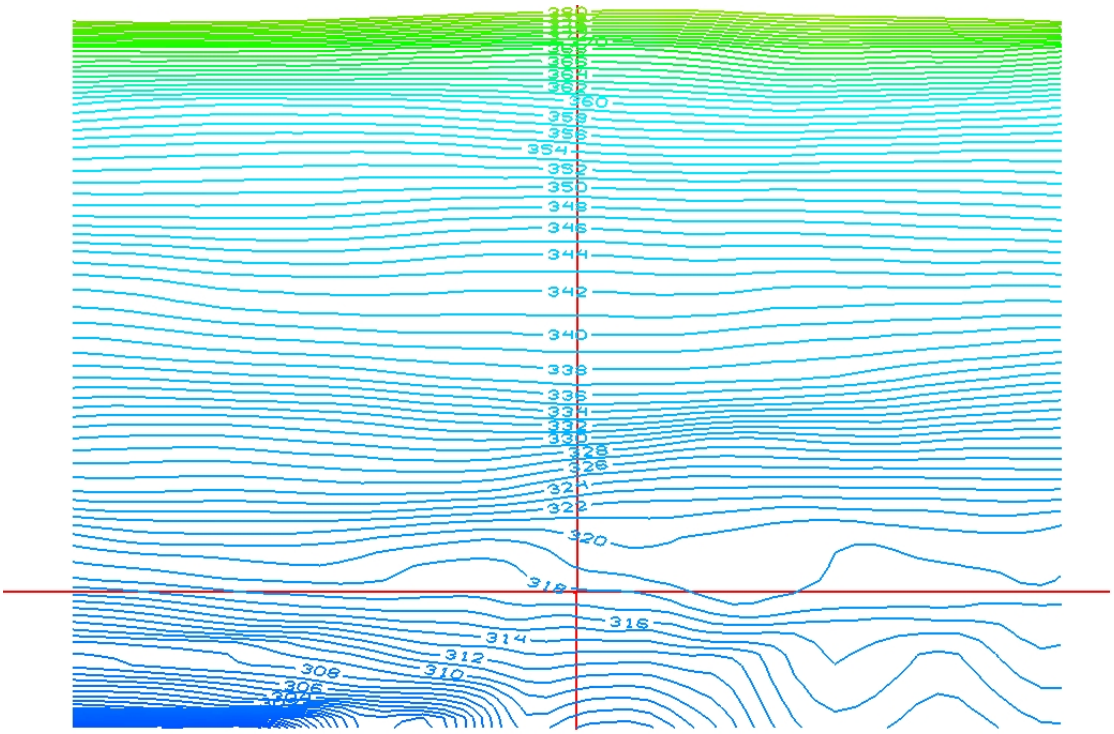
Altitude Meters	Wind Direction degrees	Wind Speed meters/second	Temperature degrees C	Dew Point degrees C
576	208.3	1.5	30.6	11.5
995	204.8	1.4	27.7	9.0
1,410	203.1	1.3	24.9	6.5
1,890	190.5	1.2	21.6	3.8
2,567	198	2.9	16.9	0.7
3,034	208.2	5.7	13.7	-2.4
3,626	211	8.8	8.5	-7.6
4,146	208.7	10.8	3.7	-11.1
4,850	208.5	10	-1.6	-17.2
5,543	207.7	4.5	-6.1	-25.6

Upper Air Data from the RUC20 Numerical Model.

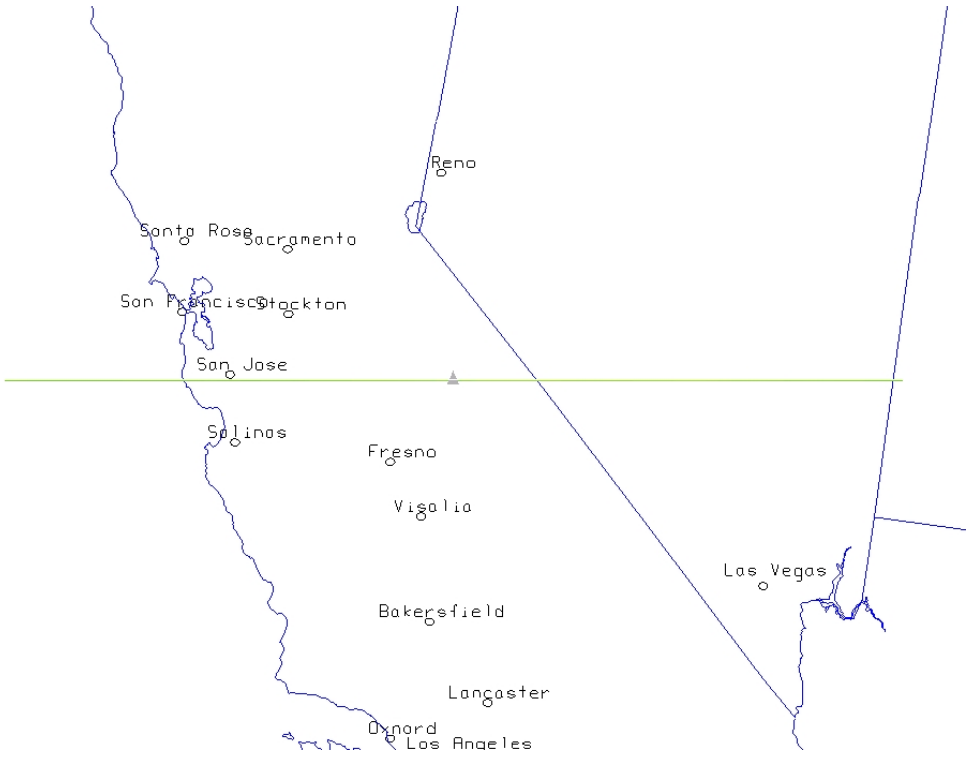
At an altitude of 10,000 feet and using a temperature of 13.7 degrees C, a dew point of –2.4 degrees C, and a pressure of 698.2 millibars, results in a density altitude of about 12,100 feet, a pressure altitude of about 9,950 feet, and a temperature deviation from the standard atmosphere temperature of about +18.49 degrees C (from RUC20).

Using data from Mt. Warren, California for 1000 PDT (see the Surface Weather Observations section of this report) with the mean temperature value adjusted from 12, 327 feet to 10,000 feet (dry adiabatic lapse rate +3 degrees C per 1,000 feet decrease in altitude) results in a density altitude of about 12,700 feet and a temperature deviation from the standard atmosphere of about +23.2 degrees C.

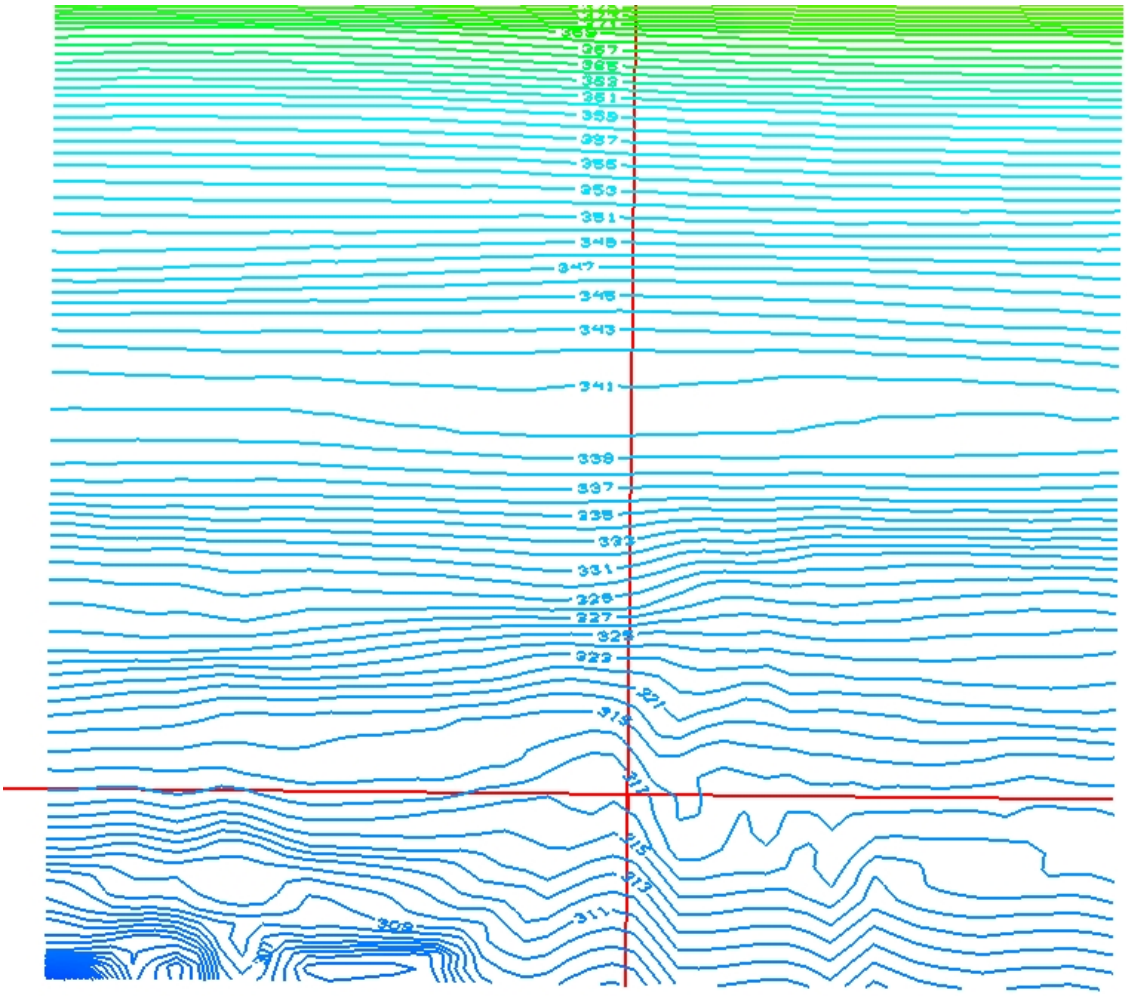
Mean Temperature (adjusted for 10,000 feet): 18.4 degrees C (Mt. Warren data).
Dew Point: -1.7 degrees C (Mt. Warren data).
Pressure: 698.2 millibars (at 10,000 feet from RUC20 data).



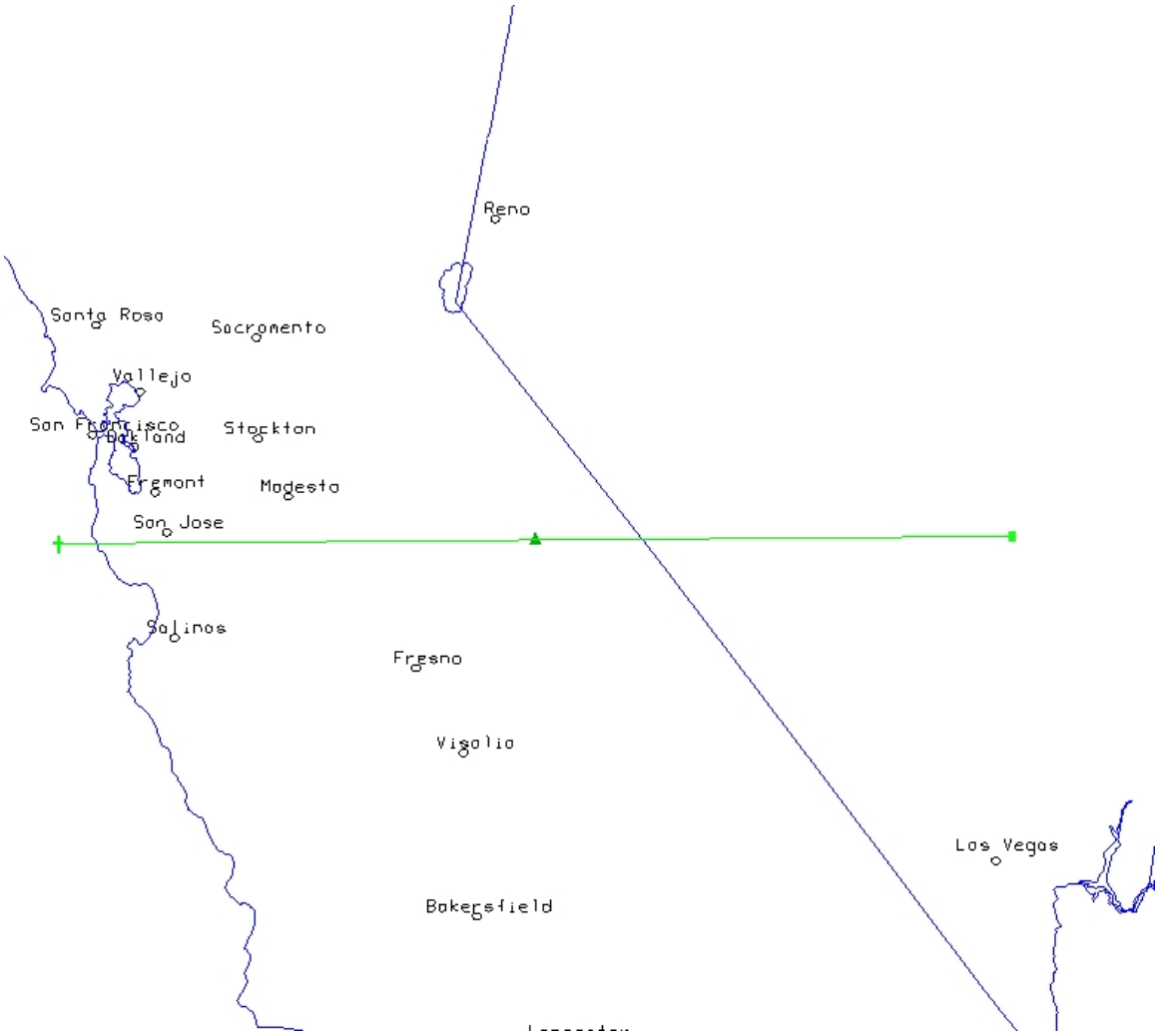
West to east cross-section of potential temperature for September 3, 2007 at 1000 PDT (1700Z) from the RUC model 20 kilometers resolution data. The red vertical line indicates the accident location. The horizontal red line is at an altitude of about 10,000 feet.



Location of RUC model 20 kilometers resolution potential temperature cross-section. The triangle is the approximate accident location.



West to east cross-section of potential temperature for September 3, 2007 at 1100 PDT (1800Z) from the NAM (North American Mesoscale) model 12 kilometers resolution data. The red vertical line indicates the accident location. The horizontal red line is at an altitude of about 10,000 feet.



Location of NAM model 12 kilometers resolution potential temperature cross-section. The triangle is the approximate accident location.

5. WRF-ARW Numerical Simulation

Dr. John W. Glendening, a meteorologist from Salinas, California, provided a numerical simulation of the conditions in the accident area using the WRF-ARW (Advanced Research Weather Research and Forecasting) numerical model.

At 1630Z (0930 PDT) the model displayed downdrafts in the accident area of approximately 300 feet per minute. The model was run for a horizontal resolution of 800 meters and according to Dr. Glendening, these values probably underestimate the downdraft magnitudes due to the inability of the model grid to fully resolve the steep terrain slopes in the region or to treat small-scale transient eddies.

Dr. Glendening also ran the model at a 600 meters resolution. The results indicated slightly stronger downdrafts near 400 feet per minute.

For information on Dr. Glendening see: http://www.drjack.info/

See attachment 3 for the numerical simulation results.

6. NCAR Data

Meteorological data provided by the National Center for Atmospheric Research (NCAR) for the time and area of the accident:

a) Turbulence indicators were computed on a horizontal MSL plane at 10,000 feet elevation.

b) Only null pilot reports in the vicinity of the accident.

c) Richardson Number (Ri) was relatively low a little to the east of the incident.

d) The latest GTG3.0 (Graphical Turbulence Guidance) output predicted light turbulence at the incident location.

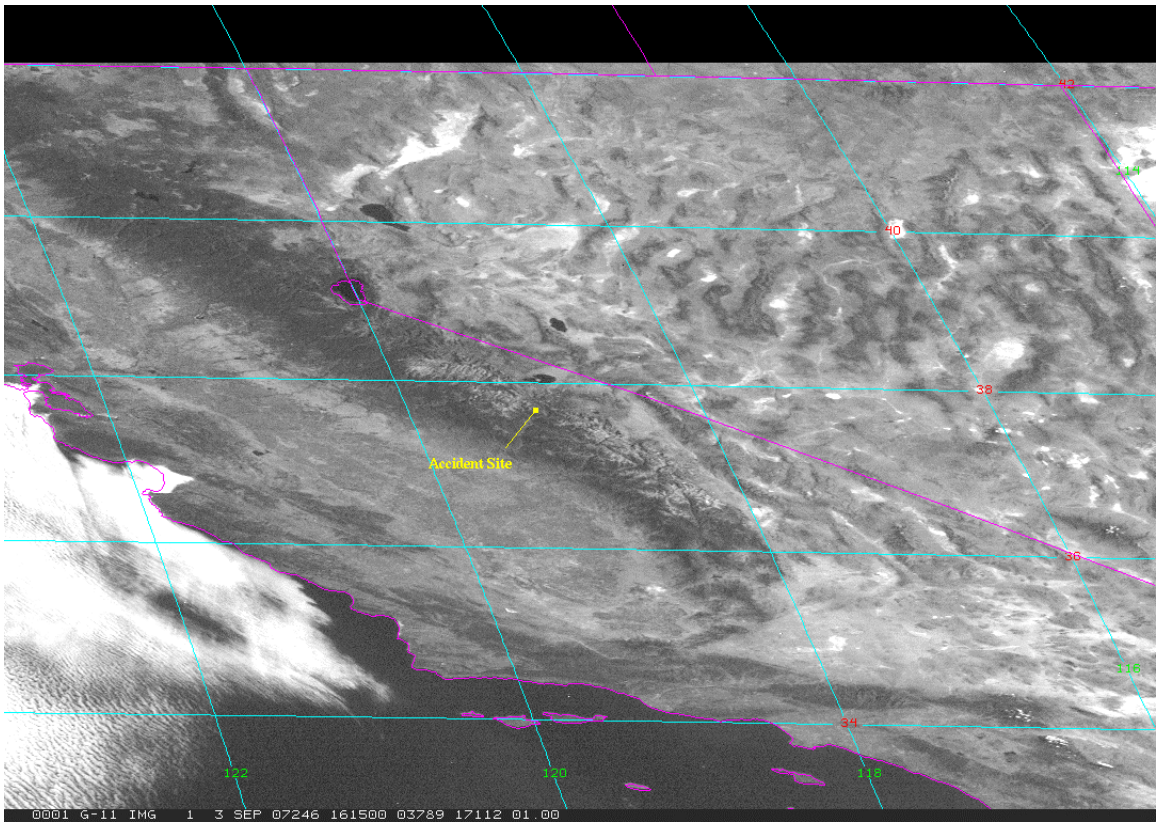
e) MWT (Mountain Wave Turbulence) diagnostic indicated perhaps light MWT activity.

f) Probabilities of exceeding either moderate or severe turbulence, was based on the consensus of the 12 current diagnostics within GTG. The probabilistic output was experimental, but at the accident location about a 40% probability of moderate or greater turbulence and about a 10% probability of severe or greater turbulence was estimated.

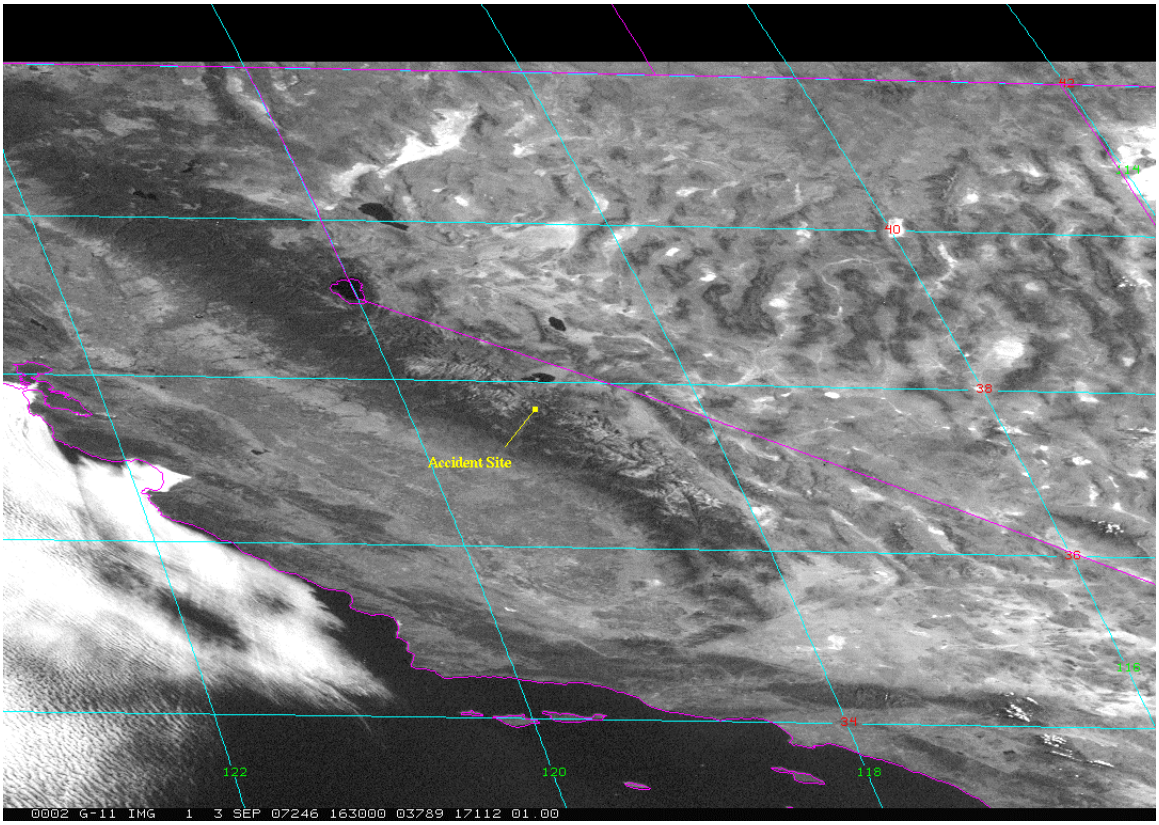
See attachment 4 for NCAR data.

7. Satellite Data

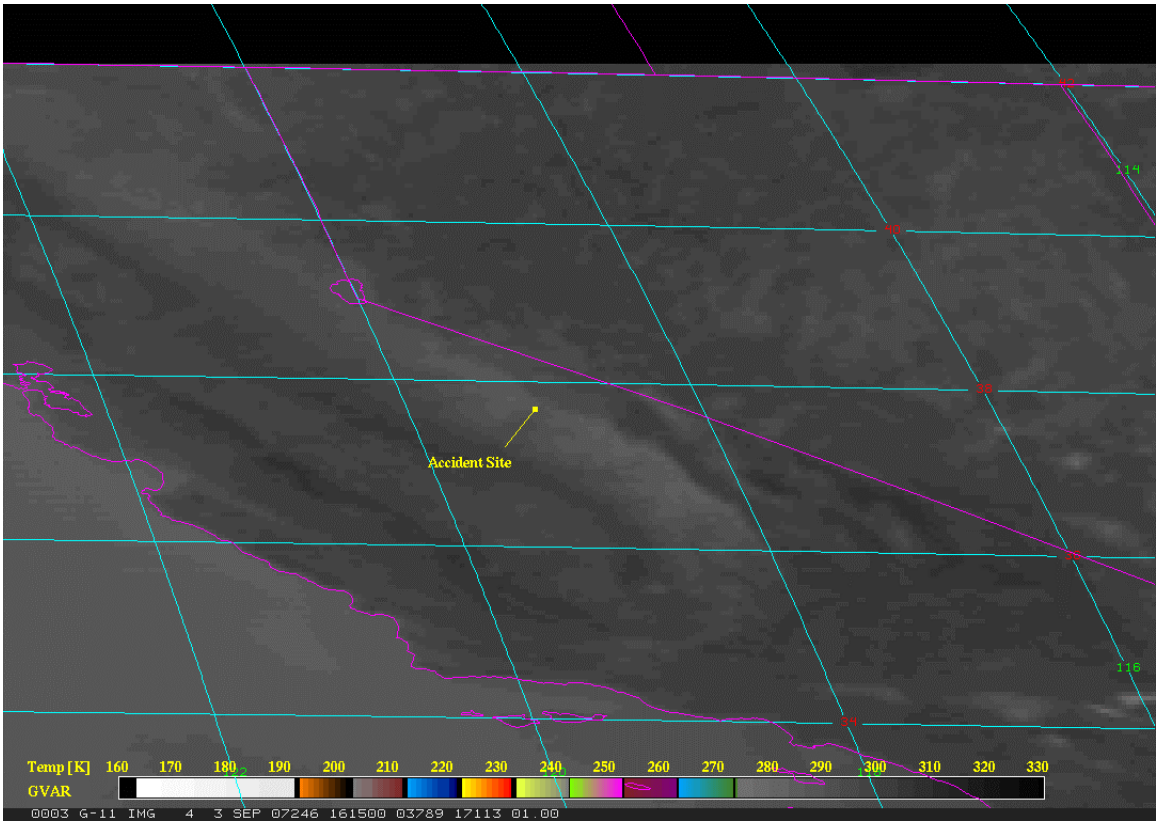
Geostationary Operational Environmental Satellite (GOES)-11 data were reviewed using McIDAS.



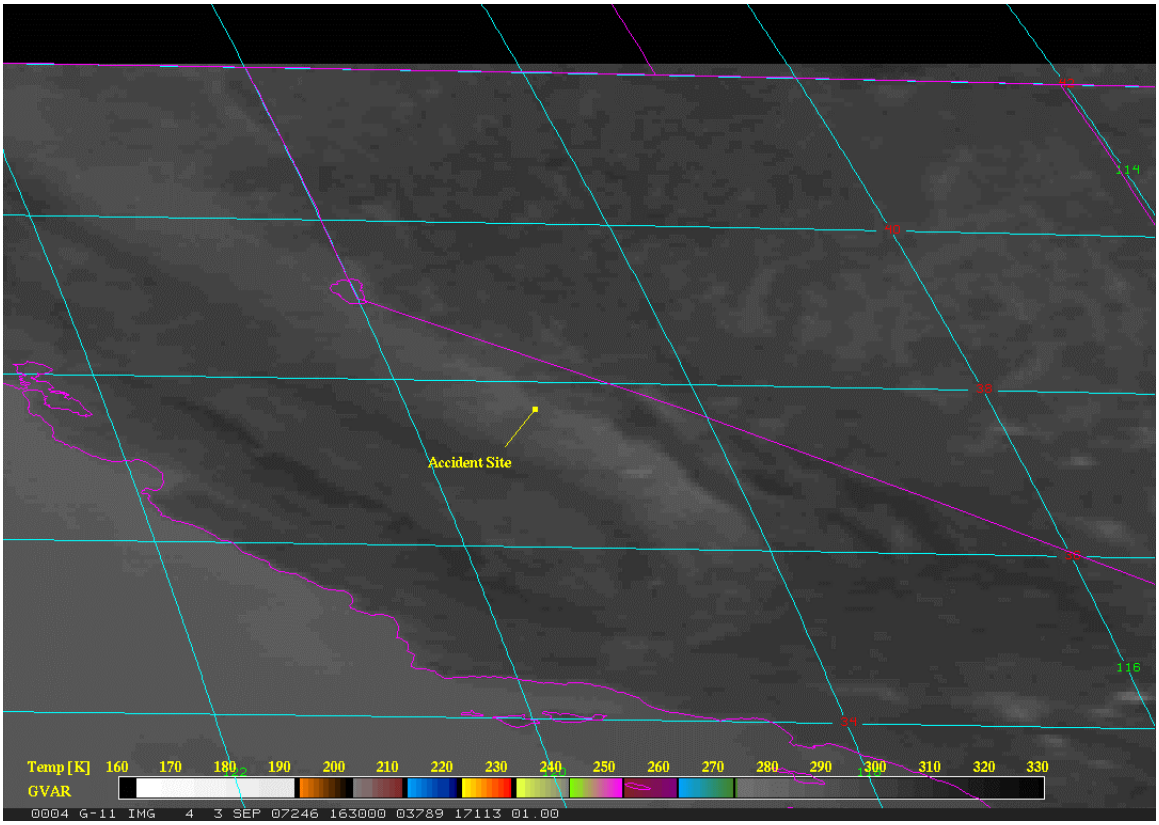
GOES-11 visible image for September 3, 2007 at 0915 PDT (1615Z). The image is at a 1 kilometer resolution. The image has been contrast stretched. The accident site is plotted.



GOES-11 visible image for September 3, 2007 at 0930 PDT (1630Z). The image is at a 1 kilometer resolution. The image is contrast stretched. The accident site is plotted.



GOES-11 infrared image (band number 4) for September 3, 2007 at 0915 PDT (1615Z). The image is at a 1 kilometer (blow up) resolution. The image is color enhanced (see the color bar at the bottom of the image). The accident site is plotted.



GOES-11 infrared image (band number 4) for September 3, 2007 at 0930 PDT (1630Z). The image is at a 1 kilometer (blow up) resolution. The image is color enhanced (see the color bar at the bottom of the image). The accident site is plotted.

For information on McIDAS see: http://www.ssec.wisc.edu/mcidas/

Astronomical Data

The location of the sun on September 3, 2007, at 0930 PDT, at the accident site:
Altitude 34.7 degrees.
Azimuth 109.4 degrees.

These data are from the U.S. Naval Observatory.

Gregory D. Salottolo
National Resource Specialist
Meteorology