

Squawk List for flight 1902,
flown Wednesday, 19 December 2001,
IMPROVE II CV-580 flight 12.

Instruments not mentioned as having a problem are believed to have worked satisfactorily.

OVERALL LOOK-WEATHER

This flight took place as a warm front and associated rainband moved northward over Oregon State and across the Cascades. The CV-580 flew two sets of N-S legs over and east of the Oregon Cascades and a southwesterly leg to over Sweet Home. The frontal inversion was sampled.

The clouds system was mainly glaciated though isolated patches of low liquid water content in the form of altocumulus clouds or stratocumulus clouds were encountered. Little riming overall, except in a small, but intense region of riming and splintering within a bank of stratocumulus clouds with extremely high ice particle concentrations was encountered in an MVA leg to Sweet Home about mid-flight.

The flight terminated at Salem, Oregon, and the following flight was a ferry flight to PAE.

OVERALL LOOK-INSTRUMENTATION

CPI was installed just prior to takeoff after working well on the bench (C. Black). However, it did not work after being installed on the Convair (by Don and Charlie). They found a broken wire in a connector in the back of the CPI at that time, but re-soldering it did not fix the problem. The flight was delayed by about 20 min in hopes of reviving the CPI.

Hot wire LWCs did not work.

1. AIRCRAFT PARAMETERS

Lost trans-azimuth (heading) at the beginning of the flight and so no winds are available from takeoff until 0020 UTC, a period of over an hour.

2. STATE PARAMETERS

Rosemount static temperature (tstat): The Rosemount temperature is virtually the same as the tstatr until about 0120 UTC when tstat began diverging to higher temperatures. This separation in values gradually grew larger until 0205 UTC reaching a maximum of several deg C. At 0205 UTC, there was a sudden convergence of tstat

back to the tstatr value as the climb from Sweet Home began. The two temperatures were virtually the same temperature thereafter. The pilot was asked whether any heaters had been turned off or on at a point shortly after they came into sudden agreement but the answer was “no.” The mystery continues though it does LOOK like a heater problem somewhere.

The odd behavior that occurred between 0120 and 0205 UTC is very much similar to the old problem we have had with tstat that was first noted around flight 1809 except that the magnitude of the maximum temperature difference (about 2-3° C) is less than we were observing in those early days of the problem. Thus, tstat cannot always be considered a reliable measure of temperature.

Cambridge chilled mirror dewpoint (dp): Most reliable of the dewpoint measurements, though it was somewhat higher than the ambient static temperature for much of the flight when precipitation and droplet clouds were present. However, it appeared to perform well in drier conditions.

Ophir dewpoint (dp_o): Higher than the ambient temperature for much of the flight. Not considered reliable in moist conditions at present. The cause is unknown at this time.

Rosemount analog pressure transducer (pstat): Continues to exhibit spurious changes in pressure of up to several mb in per second.

3. Cloud Microstructure Probes

DMT Hot wire device: Did not work; no response whatever to cloud penetrations.

JW Hot wire device: Power was shutoff to the J-W to eradicate the noise spikes generated by the J-W system that also affected several other parameters.

PMS 1-D cloud probe: The data need to be examined very closely to see if they are OK. However, 1-DC concentrations were clearly well-correlated with the 2-DC concentrations (just available as of 12-26-01) giving new hope that the spectra may be OK afterall.

SPEC CPI: CPI was installed just prior to takeoff after working well on the bench. However, it could not be made to work on the plane—a delay of about 20 min was used to see if a broken wire in a connector in the back of the CPI was the culprit. It turned out not to be.

However, in the hopes that the problem might be rectified in flight, Charlie Black, engineer, was retained as a crew member. He was not able to resuscitate the CPI.

It is now believed that the failure upon installation in the Convair was 1) caused by a wiring problem on the Convair, 2) the camera may have had a long term problem possibly dating back to the IMPROVE 1 lightning strike of flight 1859—sort of the catchall for instrument problems it seems.

4. AEROSOLS

Not QC-ed.