

Squawk List for flight 1858,
flown on Friday, 9 February 2001 (UTC date)
(Thursday evening, local day/time)

Project IMPROVE flight 12

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

OVERALL ASSESSMENT OF MEAUREMENTS

- Generally a very good measurement day.
- The 35 GHz radar continues to work very well and data are being recorded. One problem that has recurred is the inability to switch it from upward or downward-pointed positions at low temperatures.
- Electrical noise continues to impact some key instruments.

1. GPS /WINDS/TURBULENCE/AIRSPEED

GPS tans-vector: No change; data OK; apparently a characteristic of this system is to only find a new lat-long every 3-15 seconds. Thus for intervals of the same time period, winds cannot be updated, nor do we show a location change. Winds and ground speed are thus necessarily constant, and are derived from the last last lat-long position, which may have been as much as 10 or more seconds earlier. This also appears true for the Shadin static temperature measurement.

Rosemount TAS: No change. LOTS of noise due to dropouts. Appears accurate otherwise; in essence, the trace looks like a bar diagram whose peaks are at the correct true airspeed.

BAT: Not working yet.

2. STATE PARAMETERS

Rosemount temperature sensor: Sporadic large noise spikes otherwise no change. The Rosemount-derived static temperature continues 5-12° C higher than both the reverse flow temperature (tstatr) and the Shadin Air Computer static temperature.

Reverse flow temperature: Burst of large noise spikes between 0451-0509 UTC, but rather rare outside that period.

Cambridge Chilled Mirror: Worked well overall until the ambient temperature declined to below -25°C at 0600 UTC. At that time the frostpoint temperature became several to as many as nine degrees higher than the ambient temperature. It resumed normal operation at about 0624 UTC when the ambient temperature returned to about -20°C , and worked well from then on. No action is required.

Ophir infrared hygrometer: Tracked the chilled mirror dewpoints/frostpoints extremely well but was higher still in these temperatures than was the chilled mirror. Thus, for most of the flight in which the dewpoint was nearly the same as the ambient temperature, the indicated dewpoint/frostpoint temperature was higher than the ambient temperature by a degree or more. And, in the period of time when the ambient temperatures were below -23°C (0600-0625 UTC), the dp_o was as much as 10°C higher than the ambient temperature. Since it was cleaned by Don before the flight, I suspect this is a problem that can only be fixed via a software correction or through a return to the manufacturer.

3. CLOUD PHYSICS

PVM-100: Except for a brief period early in the flight when the PVM LWC was lower than the FSSP-100 LWC, there was good agreement between these two probes. However, occasional noise spikes in the PVM LWC channel became numerous after 0440 UTC. The effective radius (ER) was generally low relative to the FSSP and 1-DC effective radii. However, the PVM surface area (SA) channel showed generally very good agreement with the FSSP-100 derived surface area. However, both the PVM ER and PVM SA had hundreds of noise spikes during cloud quiet times.

DMT hot wire: No change. Still impacted by too much rambly drift-type noise rather than spikes of the kind that impact the PVM and J-W probes. DMT LWCs are pretty close to that of other probes when the noise is absent and the LWC appreciable. On this flight good measurements began after 0319 UTC. Little recoverable data prior to that time.

J-W: Generally worked well with the exception of noise spikes and a "dead" period at 0252 to 0253 UTC in-cloud. Also, LWCs were low relative to the FSSP-100 until 0319 UTC as were the PVM LWCs re the FSSP-100.

HVPS: Occasional noise problems/data dropouts, but in general worked. Some dropouts are associated with steep descents and likely condensation because the probe remains colder than the warming moist air that the plane is descending into. However, it has also been noticed that the probe seems to drop out in some climbs as well.

CPI: Don dried out the CPI prior to this flight and it worked extremely well.

35 GHz radar: Unable to be switched to a different vertically-pointed mode at low temperatures.