

Squawk List for flight 1860
Flight flown Saturday-Sunday 10-11 February 2001 (UTC days and
dates)

Project IMPROVE flight 14

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

OVERALL ASSESSMENT OF MEAUREMENTS

- Very good measurement flight overall.
- 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. While the Shadin output has some drawbacks, our own calculations of the winds continue to look very good.

Rosemount TAS: No change. Continues to have excessive noise at about a frequency of 1 Hz. Appears accurate otherwise; in essence, the TAS trace for a flight looks like a long bar diagram whose peaks are at the correct true airspeed.

BAT: Not working yet.

2. STATE PARAMETERS

Rosemount temperature sensor: The (tstat-tstatr) value rises in climb to 14 kft, then falls steadily in further climb, reaching its minimum value at the end of a level leg at the highest level flown and in the first portion of the descent at the end of that leg (!) The greatest delta value was reached just prior to landing at PAE. It has also been recently learned that while there were similar differences between tstat and tstatr during the SAFARI project, they were smaller in value. The

aircraft was unpressurized in SAFARI and is pressurized in the present project. The mystery continues...

Reverse flow temperature: Huge amount of noise between 2240 and 0002 UTC.

Cambridge Chilled Mirror: Occasional noise spikes (e.g., 2202 and 2236 UTC), otherwise no change.

Ophir infrared hygrometer: Hashy noise consisting of large spikes between 2330 and 2354 UTC, otherwise no change.

3. CLOUD PHYSICS

PVM-100: There are still noise spikes when the LWC is zero or very low, otherwise the probe is in reasonably good agreement with the FSSP-100 LWC. The PVM effective radius (ER) was generally low relative to the combined FSSP and 1-DC effective radii. Some of this is due to the contribution of the 1-DC on the ER calculation. The PVM surface area (SA) channel showed generally good agreement with the FSSP-100 derived surface area. However, both the PVM ER and PVM SA channels had hundreds of noise spikes during cloud free 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.

J-W: Did not work. Damaged by a lightning strike on the previous flight.

HVPS: Occasional noise problems/data dropouts, but in general worked well. 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: The images did not appear as sharp as they had been prior to the lightning strike on the previous flight. Also, needed attention due to poor imaging and large numbers of blank images. Nevertheless, many good images obtained.

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