

## Squawk List Flight 1841, 21 November 2000

### Project IMPROVE test flight

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

Flight in north Puget Sound and the Strait of Juan De Fuca on fair-weather day with offshore flow. Considerable haze in Strait and a few scruffs of stratus clouds. The clouds were sampled intermittently for 10-15 minutes.

### OVERALL ASSESSMENT

Many things did not work properly.

#### 1. GPS /WINDS/TURBULENCE

GPS system. No data at all.

No turbulence data: Unrealistic values; meter not hooked up or not working properly.

Winds: None

BAT: Not working yet.

Rosemount True AirSpeed. Discrepancy between the Shadin and the Rosemount true airspeed continues. We now use the Shadin TAS to calculate static temperature for our Rosemount probe, and well as for concentration calculations. Grant has suggested that the low Rosemount TAS may not be corrected for pressure.

#### 2. STATE PARAMETERS

Rosemount temperature sensor: Same as in SAFARI. The Rosemount temperature continues 5-10° C higher than the reverse flow temperature and the Shadin Air Computer static temperature due to a calibration problem with the Rosemount sensor. Implementing a calibration is complexed by a Rosemount temperature dependency on TAS. More studies are needed to solve this problem before a calibration can be applied.

Reverse flow temperature sensor: We still continue to see large spikes (electrical noise) in the data.

Ophir hygrometer: The same types of noise spikes seen in tstatr also affect this instrument. In-cloud humidities topping out around 80-85%. Indicated humidity in extremely dry air are far lower than those indicated by the chilled mirror. Suspect these extremely low values are inaccurate.

### 3. CLOUD PHYSICS

A few stratus clouds were sampled in the Strait of San Juan de Fuca.

FSSP-100: Initially appeared to work well but examination of the data reveals that concentrations, and therefore calculated LWC values are too high by a factor of at least two. Probably is a software problem dealing with sample volume or the like.

Johnson-Williams hot wire: No change. Noises spike obfuscate data. LWC values far too high, 0.6 to 0.7 g m<sup>-3</sup> in miniscule scruffs of stratus fractus clouds. May also be due to software problems. The high values we well correlated with the FSSP-100 integrated LWC suggesting that the J-W was responding OK.

PVM-100: Sporadic noise in trace. No sign of a response in-cloud. May need cleaning (at least), or the duct tape that protects it was not removed pre-flight.

No correlation with J-W or FSSP-100 LWCs, which is a deteriorated situation from SAFARI when the PVM LWCs while off, were fairly well correlated with the FSSP-100 LWC.

DMT hot wire: No change, still broke. No detectable response in clouds; no correlation with FSSP-100 (which would have suggested it worked but scaling was off.)

2-D probes: ? Software to display data not yet available.

1-D probe: No particles sensed in narrow droplet spectrum clouds, none expected to be encountered.