Squawk List for Flights 1848 and 1849 which took place on 9-10 January 2000

(UTC dates). The engines start and stop times of the first flight were 1734 and 1316 UTC, respectively. The engines start and stop times for the second flight were 1433 and 0202 UTC, respectively.

Project IMPROVE test flights 3 and 4

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

Flight over the coastal waters of Washington State southwest of Westport with an interim landing at HQM. Two separate rainbands sampled in moving stack strategy on both flights. In the second flight, an Olympic transect was carried out enroute to PAE. The first flight targeted a pre-frontal band, possibly rooted aloft, and the second flight, a surface rooted cold occluded front rainband with a modest surface directional windshift from about 160 to 210°. Extremely strong surface winds and rough seas (20-30 feet swell height estimated by pilots). Surface winds 35-45 kts sustained, and thousand foot winds closer to 50 kts sustained. Moderate turbulence in the sub-cloud layer.

OVERALL ASSESSMENT OF MEAUREMENTS

- Catastrophic failure of radar at startup—arcing noticed. Outage possibly due to very hard, “tire-squashing” landing at the end of the previous flight (1847) which occurred in a airport cross wind condition at PAE (i. e., may have been unavoidable).
- PMS 2-DC did not work again.
- PMS 1-DC appeared to work normally for the first time.
- LWC measurements appear robust.
- Less electrical noise compared with flight 1847.

1. GPS /WINDS/TURBULENCE/AIRSPEED

GPS tans-vector: 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 temperature measurement.

Rosemount TAS: Lots of noise due to dropouts.

BAT: Not working yet.

2. STATE PARAMETERS

Rosemount temperature sensor: The Rosemount-derived static temperature continues 5-10˚ C higher than both the reverse flow temperature (tstatr) and the Shadin Air Computer static temperature. It has been suggested that this is due to a problem with the wiring and/or the Rosemount sensing head. No progress yet in solving this problem.

Reverse flow temperature sensor: The large spikes (electrical noise) in the data have been virtually eliminated, though there were two such periods during this flight.

Ophir hygrometer: The dewpoint temperatures from this device have climbed several degrees above those of the Chilled Mirror and this means it probably should be cleaned.

3. CLOUD PHYSICS

PVM-100: The usual noise spikes are still present, though far less numerous than on flight 1847, the record setter for this sort of thing. Again the spikes seem to be both random but also are triggered when the probe is first beginning to sense LWC and at the end of cloud penetrations as the LWC recedes rapidly to zero. The probe worked very well in noise free regions.

FSSP-100: Looked good but should be calibrated via the DMT micropositioner only soon to verify satisfactory sizing. (Full range bead sizing not needed.)

DMT hot wire: No change, still broke—impacted by a considerable amount of noise, though much of it is not the spikes seen in the PVM. Less noisy in-cloud. LWCs are pretty close to that of other probes much of the time significant LWC is encountered.

J-W: More noise spikes than usual and erratic operation due to drop outs-dead time. LWCs were probably too high in the several >0.5 g m-3 clouds that we intercepted.

2-D cloud probe: Did not work. No time available for problem solving between these flights and the previous flight (1847) due to other high priority work.

1-D cloud probe: Appeared to work. Needs now to be calibrated.

HVPS: Appeared to work, though 25% or more of the data impacted by noise due to condensation on the lens, pressure/temperature changes. These mentioned because it appeared that most of the noise occurred during climbs or descents.

CPI: Not installed, being repaired at SPEC.

Radar: Shorted out. Not likely to be fixed soon.

Pyranometer domes: Both very dirty.