

Middle Latitude Cirrus Cloud Properties Experiment (MACPEX) Flight Summary Report (23 April 2011).

1. Purpose of Mission:

The objectives of this mission were to sample cirrus associated with thunderstorm outflow over NE Texas and to sample stratospheric water vapor in conjunction with the balloon-borne frostpoint hygrometer near Houston.

2. Flight Summary

The WB57 was redirected after 1300 CDT launch to a region of anvil outflow in the vicinity of the Red River bordering Texas and Oklahoma. At that location as series of racetracks were conducted that were sequentially stepped southeastward to keep the aircraft clear of convection. Flight levels of 380 and 360 were maintained during this time. Following 4 racetracks in cloud, the WB57 climbed to max altitude and conducted a spiral from 570 to 420 at 1720 CDT.

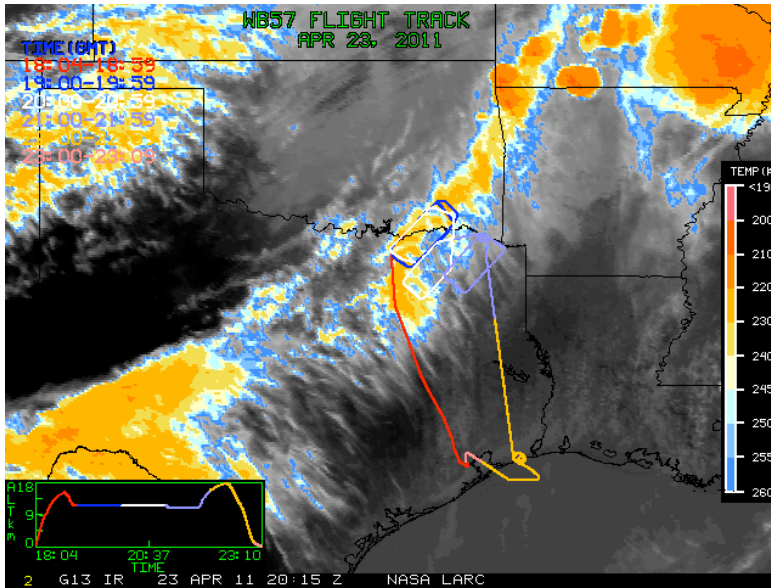


Figure 1. Flight Track overlaid on IR satellite image. Images Courtesy of Minnis Group.

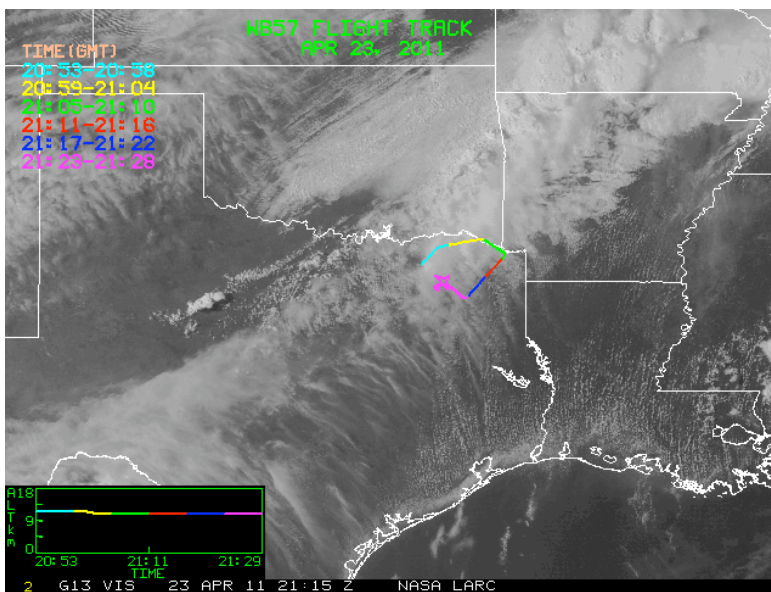


Figure 2. Flight Track overlaid on visible satellite image. Images Courtesy of Minnis Group.



Figure 3. Image captured from cockpit camera showing 22 degree halo in anvil cirrus at approximately 1600 CDT.

3. Instrument Operations Officer Report

Flight date- 23 Apr 2011

Flight duration - 5.3 hours

Crew – Bill Rieke, John Bain

Instruments flown: 2DS, ALIAS, CIMS, CLH, CPI, DLH, FCAS, FCDP, FISH, HARHAL, HARWV, HVPS, JLH, MMS, NMASS, O3, O3LITE, PALMS, SID3, SP2, ULH, VIPS

Flight Log 12:49pm **Takeoff** 13:02pm **Approach** 17:40 pm

Engine Start

Data Rec On 12:52pm **Begin** 17:24 pm **Landing** 18:10 pm

Descent

Gear extension/retractions

Gear Up 13:02pm

Gear Down 18:05pm

layer at 3000 – 4500 ft. During the racetrack patterns we were in continuous clouds at times very thick and also very thin. Even during the thinnest clouds the SID3 was showing particles on the display. When climbed out on the way to the balloon site we exited the cloud layer at FL400 at 16:45pm.

At FL527 at 17:15pm we encountered clear air light turbulence for almost two minutes.

In the spiral descent we passed through a thin cirrus layer at approximately FL420 at 17:37pm. In the approach penetrated the low cumulus layer from 3600ft – 3000ft at 17:59pm. Then again at 2500ft at 18:03pm.

Flight Profile

Enroute to the Arm site we call and were re-directed to two points about 30nmi east of DFW where we flew a racetrack with a 30nmi offset to the SE. We flew two laps on this track at FL380 then were directed to move the race track South. After two laps on the more southern track we were directed to move the track East 40nmi. After one lap on this track at FL360 we performed the MMS Maneuvers at FL360 then started a climb to the Balloon site at 16:45pm. Started the spiral descent at 17:24pm over the balloon point at FL570 down to FL400. Then RTB at 15:48.

Instrument Notes

Palms cloud ON at 13:53pm, OFF at 16:47pm.
 HARVV fail at 13:08PM recovered first try, Fail light again at 14:38pm recovered first try.
 SID3 lost remote terminal two times. 14:00pm and 14:35pm. Recovery required cycling the SID3 power switch.
 HARVV fail light on descent – no action.

4. Preliminary Instrument/Data Status for this flight:

SID3	Little data collected
VIPS	Worked Well
2DS	Worked Well
FCDP	Instruments ran, quality unknown.
HVPS	Worked Well
CPI	Significant Problems
CIN	No Data
NMASS	Little data collected
FCAS	Worked well
PALMS	Instrument Worked Well
MMS	Worked Well
ALIAS	Worked Well
CLH	Worked Well
JLH	Worked well but problems noted.
ULH	Worked Well
DLH	Worked well. Quality improving.
Harvard Water Vapor	Worked, but minor problems noted.
Harvard TDL	Unknown
Harvard Total Water	Not Ready For flight
Harvard Halogen	Major problems
FISH	Worked Well
CIMS	Worked Well
O3	Worked Well
O3Lite	Worked Well