

**Middle Latitude Cirrus Cloud Properties Experiment (MACPEX)
Flight 2 Summary Report (7 April 2011).**

1. Purpose of Mission:

Primary Mission:
Sample high clouds associated with a frontal system over the Mississippi Valley.

Secondary Objective:
Collect cloud properties along the Terra track in support of MODIS, MISR.

Secondary Objective:
Compare measurements of stratospheric water vapor.

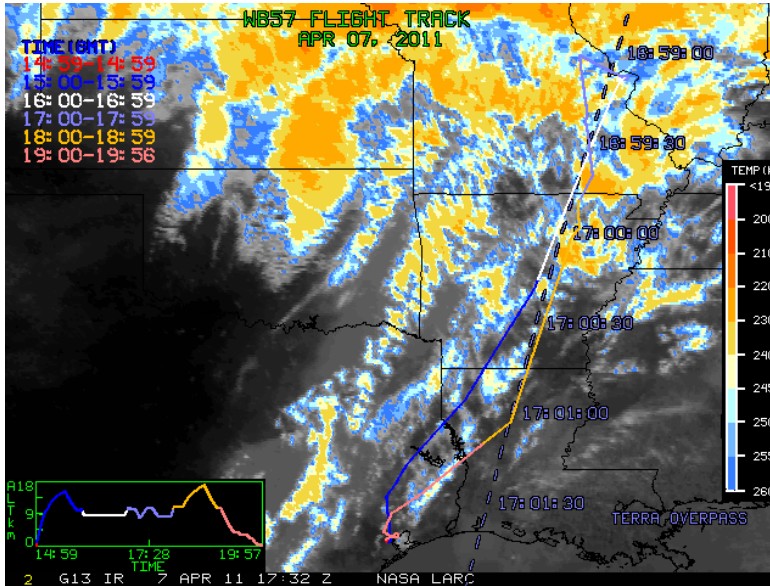


Figure 1. Flight Track overlaid on IR satellite image. Dashed line is Cloudsat track. Images Courtesy of Minnis Group.

2. Flight Summary

The WB57F (926NA) sampled cirrus clouds over the Mississippi associated with aged convective outflow. The track included a 20 minute leg along the Terra suborbital track in support of MODIS, and MISR as shown in figures 1 and 2.

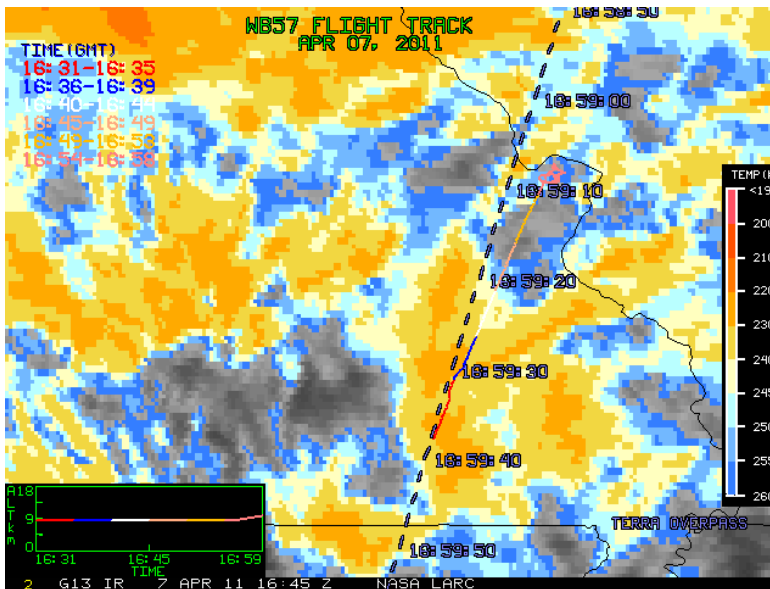


Figure 2. Flight Track image showing Terra Track.

3. Instrument Operations Officer Report:

Flight duration - 5.1 hours

Crew – Bill Rieke, John Bain

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

Flight Log

| | | | | | |
|---------------------|---------|----------------------|-----------|-----------------|----------|
| Engine Start | 9:41 am | Takeoff | 9:58 am | Approach | 14:47 pm |
| Data Rec On | NA | Begin Descent | 13:40` pm | Landing | 14:58 pm |

Gear extension/retractions

| | | | | | | |
|------------------|----------|--|--|--|--|--|
| Gear Up | 9:55 am | | | | | |
| Gear Down | 14:49 pm | | | | | |

Weather Observations

Weather at take off was broken clouds at 2800ft. On climb out penetrated the cumulus layer at 10:06am, 2100 to 3300ft.

Flight Profile

We climbed to 49Kft enroute to point 2.

Began the slow descent at 10:34am. ATC directed FL330 at 10:43am. Noted in the descent that cloud tops were at 35-36K.

Level at FL330 at 10:51am. We were just in or below the cloud tops at this altitude.

Started slow descent for FL280 enroute to point 5. In the cloud.

Reached FL280 at 11:02am 230nmi from point 5 in cloud at or near the cloud bottom.

In-route to point 5 we exited and entered the cloud bottom several times.

Crossed stationary front on GPS display at 11:38am.

Reached point 5 at 11:55am and spiraled up to FL350. Top of the cloud was FL335.

After the spiral climb to FL350 turned toward the amended point 8 and began slow descent to FL260.

Reached FL260 at 12:15pm. Turned toward point 9 at 12:16pm and started climb to FL350.

The top of the cloud was at 34.5Kft then crossed through a cirrus layer above at FL349 at 12:24pm.

Directed by ATC to descend to FL270 at 12:31pm began descent.

Crossed stationary front on GPS display at 12:38pm. Noted forest fires below at 12:49pm.

Reached near point 9 at 12:55pm. Started a climb to FL360 toward point 12.

Started Climb to maximum altitude at 13:13pm. (Above clouds since 13:01)

Reached FL550 at 13:40. Began final descent and RTB.

Penetrated a thin cloud top at FL300 in the descent at 14:04pm.

Penetrated the cumulus layer on approach at 14:47pm from 4500 – 2400ft.

Instrument Notes

- **No unexpected fail lights for the entire flight.**
- Palms cloud switch:
 - 10:48am (37Kft) – On, 11:07am – OFF
 - 11:19 (28Kft) – ON, 11:59am (33.5Kft) – OFF
 - 12:10pm (28Kft) – ON, 12:26pm (35Kft) –OFF

12:31pm – ON, 12:39pm – OFF
 12:50pm –ON, 13:01pm - OFF

- PALMS priority sw was turned on at 55Kft at 13:41pm when the descent to RTB was begun.
- HARHAL fail light on at 10Kft in descent 14:31pm. No action taken.
- HARWV fail light in descent at 7Kft at 14:41pm no action taken.

4. Preliminary Instrument/Data Status for this flight:

| | |
|---------------------|-----------------------------------|
| SID3 | Worked Well |
| VIPS | Worked Well |
| 2DS | Issues with data. |
| FCDP | Instruments ran, quality unknown. |
| HVPS | Worked Well |
| CPI | Worked Well |
| CIN | Instrument Defunct |
| NMASS | Instrument ran. Issues. |
| FCAS | Worked Well |
| PALMS | Worked Well |
| MMS | Worked Well |
| ALIAS | Worked Well |
| CLH | Worked Well |
| JLH | Worked Well |
| ULH | Worked Well |
| DLH | Alignment Issues |
| Harvard Water Vapor | Worked, Issues Noted |
| Harvard TDL | Unknown |
| Harvard Total Water | Not Ready For flight |
| Harvard Halogen | Worked but Issues Noted |
| FISH | Worked Well |
| CIMS | Worked but Issues Noted |
| O3 | Worked Well |
| O3Lite | Worked Well |