On-Board Lead Project Scientist Check List

Date 19980821 H1-LPS Aircraft 42RF Flight ID 980821H

A. Participants:

HRD		AOC	
Function	**Participant**	**Function**	**Participant**
Lead Project Scientist	R. Black	Flight Director	Stan Czyzyk
Cloud Physics	J. Cione	Pilots	Russ Philippsen / Brian Taggart / Jim O'Meara
Radar	F. Marks	Navigator	Dave Rathlesberger
Workstation	R. Leighton	Systems Engineer	Sean McMillan
Photographer		Data Technician	George Gonzalez
GPS Omegasonde	M. Black	Electronics Technician	Jim Barr
AXBT/AXCP	W. Bracken	~~Other~~ Flight Eng.	Rick

Take-Off: 1808Z Location: Barbados Landing: _____ Location: St Croix

B. Past and Forecast Storm Locations:

Date/Time	Latitude	Longitude	MSLP	Maximum Wind
21/1143Z	19.3	64.5	999	55 kt R_{MAX} = 40 nmi
* 21/15Z	19.8	67.4		50 kt
* 21/21Z	20.2	69.5		50 kt

* NHC official forecast

C. Mission Briefing:

Synoptic flow with 3 A/C; 42RF does fig 4 through center, 50 mi legs

E.2 Lead Project Scientist (On-Board)

E.2.1 Preflight

_____ 1. Participate in general mission briefing.

_____ 2. Determine specific mission and flight requirements for assigned aircraft.

_____ 3. Determine from CARCAH or field program director whether aircraft has operational fix responsibility and discuss with AOC flight director/meteorologist and CARCAH unless briefed otherwise by field program director.

_____ 4. Contact HRD members of crew to:

a. Assure availability for mission.
b. Arrange ground transportation schedule when deployed.
c. Determine equipment status.

_____ 5. Meet with AOC flight crew at least 90 minutes before takeoff, provide copies of flight requirements, and provide a formal briefing for the flight director, navigator, and pilots.

_____ 6. Report status of aircraft, systems, necessary on-board supplies and crews to appropriate HRD operations center (MGOC in Miami or FGOC at remote recovery location).

E.2.2 In-Flight

_____ 1. Confirm from AOC flight director that satellite data link is operative (information).

_____ 2. Confirm camera mode of operation.

_____ 3. Confirm data recording rate.

_____ 4. Complete Form E-2.

E.2.3 Postflight

_____ 1. Debrief scientific crew.

_____ 2. Report landing time, aircraft, crew, and mission status along with supplies (tapes, *etc.*) remaining aboard the aircraft to the appropriate HRD operations center (MGOC or FGOC).

_____ 3. Gather completed forms for mission and turn in at the appropriate operations center. [Note: all data removed from the aircraft by HRD personnel should be cleared with the AOC flight director.]

_____ 4. Obtain a copy of the 10-s flight listing from the AOC flight director. Turn in with completed forms.

_____ 5. Determine next mission status, if any, and brief crews as necessary.

_____ 6. Notify the appropriate operations center (FGOC or MGOC) as to where you can be contacted and arrange for any further coordination required.

_____ 7. Prepare written mission summary.

D. Equipment Status

Equipment	Pre-Flight	In-Flight	Post-Flight
Aircraft	✓		
Radar/LF	✓		
Radar/TA (Doppler)	✓		
Cloud Physics	✓		
Data System	✓		
685 Omegasondes	✓		
AXBT/AXCP	✓		
Workstation	✓		
Photography			

REMARKS:

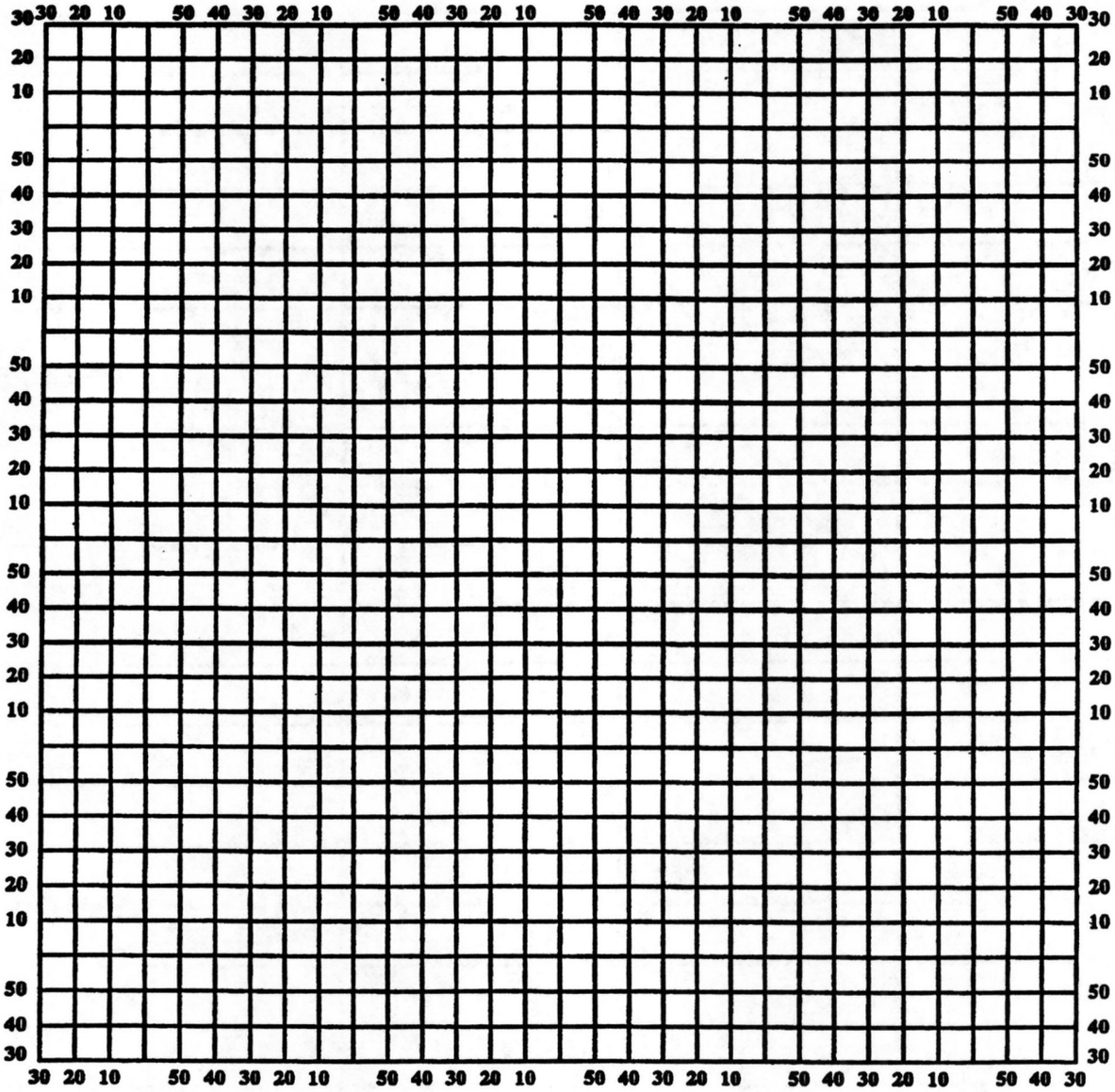
E. (I) **Proposed Flight Pattern** (sketch or designate by number)

E. (II) **Actual Flight Pattern**

Hurricane Recco Plotting Chart

True at 25° Latitude, in Degrees and Minutes

Date _____ Aircraft _____ Observer _____



Note: Label full degrees according to location of flight area.

Lead Project Scientist Event Log

Date ____________________ Flight ____________________ LPS ____________________

Time	Event	Position	Comments

Lead Project Scientist Event Log

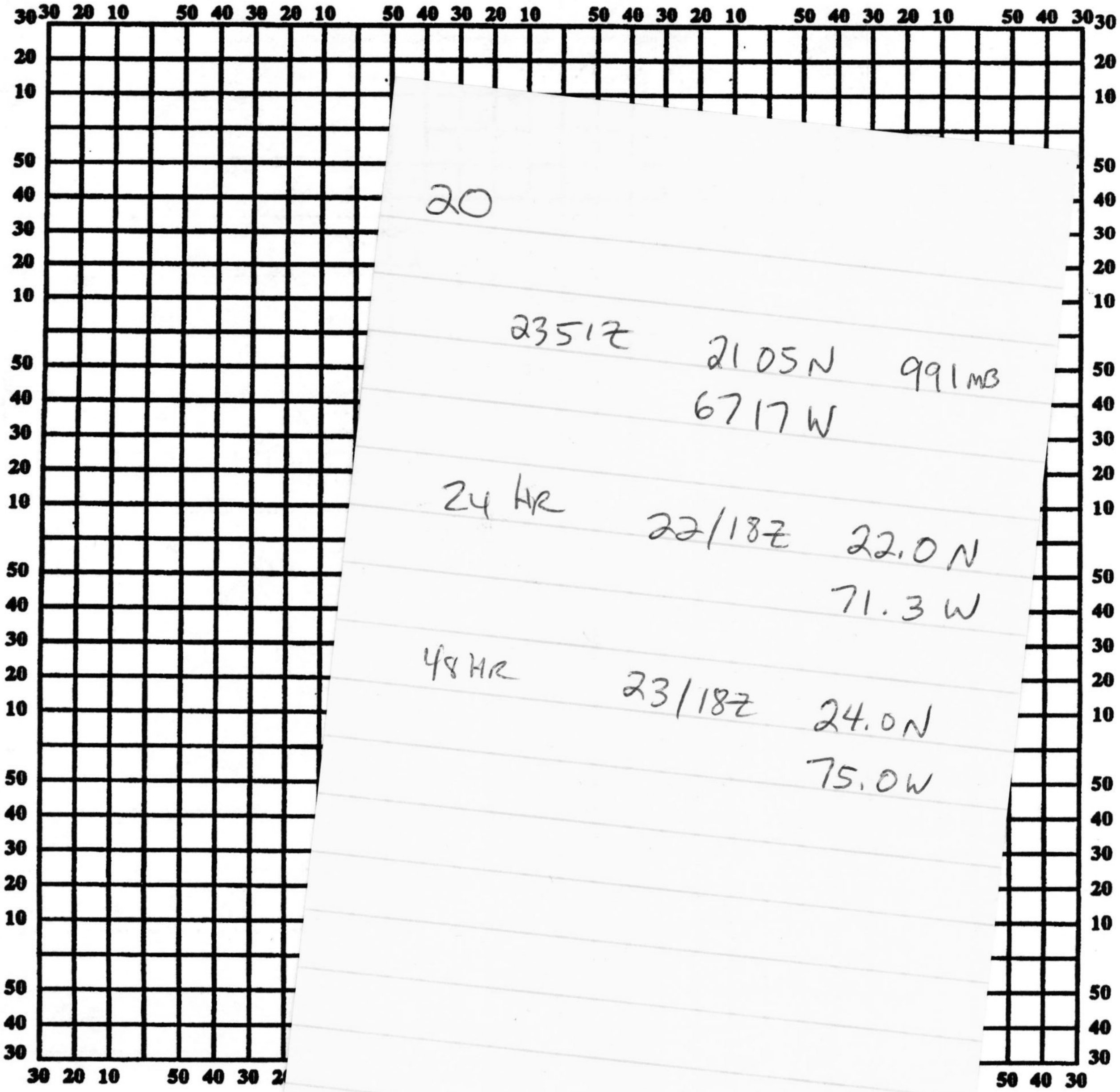
Date ____________________ Flight ____________________ LPS ____________________

Time	Event	Position	Comments

Hurricane Recco Plotting Chart

True at 25° Latitude, in Degrees and Minutes

Date 980821H Aircraft ______________ Observer B. Black



20

2351Z 2105N 991MB
6717W

24 HR 22/18Z 22.0N
71.3W

48 HR 23/18Z 24.0N
75.0W

Note: Label full degrees according to location of flight area.

Lead Project Scientist Event Log

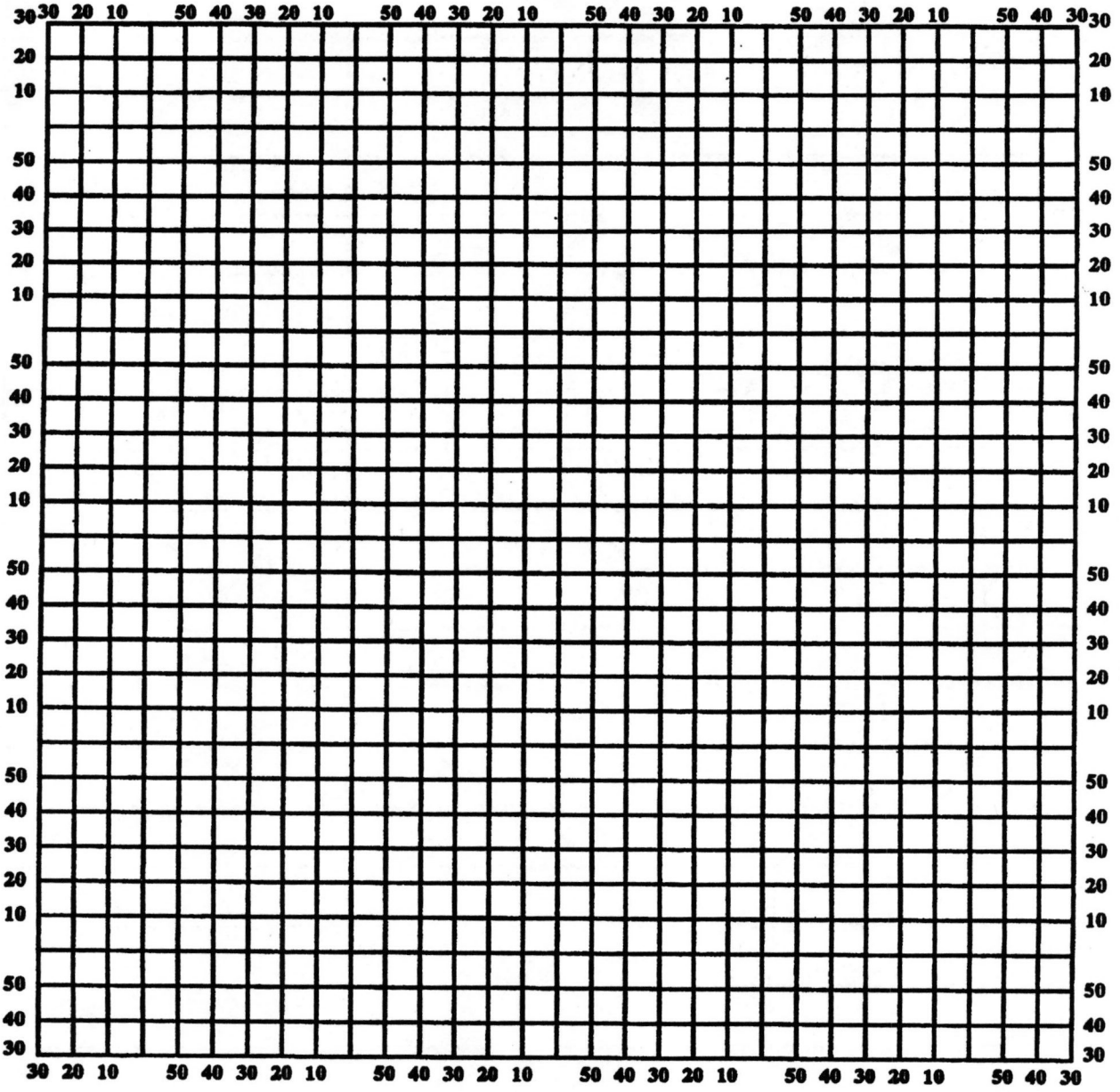
Date ______________________ Flight ______________________ LPS ______________________

Time	Event	Position	Comments

Hurricane Recco Plotting Chart

True at 25° Latitude, in Degrees and Minutes

Date 980821/H Aircraft _____ Observer B. Black



Note: Label full degrees according to location of flight area.

Lead Project Scientist Event Log

Date 980822 H Flight _____ LPS C. Black

Time	Event	Position	Comments
194321	drop [redacted] #1	2001 6105	136/16 kt
2016		2110 6700	possible center
2019	drop # 2	2000 6600	
	BT #1		SST = 29.1
2032	drop #3	2033 6618	
205730	drop #4	2100 6643	just inside SE eyewall
	BT # 2		SST = 29.0
2108		2107 6654	passed center to N
			Doppler TA shows 60kt
			wind max at 6 o'clock from S
210333	drop #5	2122 6707	inside NW eyewall
	BT #3		bad
210921	drop # 6	2133 6729	
212407	drop #7	2027 6725	
2050	passed SW	eyewall ~2 bad sondes run -	
	deployed		
2055		SE cloud center 8 mi ahead	
2[redacted]2133	drop #8	2058 6653	drop over surface swirl
		passed flt level center central press = 988	
213735	drop #9	2110 6637	new eb
	BT #4		SST = 29.0

Lead Project Scientist Event Log

Date _____ Flight _____ LPS _____

Time	Event	Position	Comments
214645	~~drop #10~~ drop #10	2140 6611	drops in clear dot
	BT #5		
215021	drop #11	2158 6618	drops in ~~warm~~ major F-W feeder band
	BT #6	SST = 29.0	FL wind 64 kt
215355	drop #12		
	BT #7	misfire BT didn't go out	
	chute no	2E - perhaps it fell out - got late signal	
215802	drop #13	2233 6632	
	BT #8		
221538	drop #14	2333 6723	pt 9 drop
	BT #9		no winds
221945	drop #15 (backup)	2333 6747	
225440	drop #16	2320 7100	pt 10
231624	drop #17	2129 7106	pt 11
2351	fix	2105 6717	991 mb 8 min ARRIS fix
Z	24 hr	~~22~~ 22,0 71,3	22/18Z
	48 hr	24,0 75,0	23/18Z

Mission Summary
980821H Aircraft 42RF
Bonnie Three-Aircraft Synoptic Flow

Scientific Crew (42RF)

Lead Scientist	P. Black
Radar	F. Marks
Workstation	P. Leighton
GPS sonde scientist	M. Black
AXBT scientist	J. Cione
Observer	W. Bracken

Mission Briefing:

This flight was part of a 3-plane (one NOAA WP-3D Orion aircraft, NOAA G-IVSP Gulfstream jet aircraft and NASA DC-8 aircraft), synoptic-flow mission to drop GPS sondes in the environment around a developing tropical storm. This flight was the second in a series. This mission dropped 4 GPS sonde/AXBT pairs into the developing eyewall. A drop was made in the eye, and 4 additional AXBT/GPS sonde pairs were dropped during transit of a strong feeder band to the northeast of the center. Interesting drops were also obtained in the eye and in the dry slot on the west side between the eyewall and feeder band. The flight was flown at max altitude 500-450 mb, except for the Figure 4 pattern in the inner core which was flown at 550 mb (15 kft). The purpose of the flight was to provide improved initial conditions for track models and to discern the inner core structure of a tropical storm as it develops into a hurricane.

Mission Synopsis

The flight departed Grantly Adams International in Barbados at 1745 UTC, 21 August and landed at St. Croix International (TISX) at 0245 UTC, 22 August. A total of 23 GPS sondes and 9 AXBTs were dropped during this mission, from 20 kft (15 kft in the inner core), 8 of which were coincident. No AXBTs or GPS sondes failed. The Figure 4 legs were oriented SE-NW and SW-NE. Maximum flight-level wind in the inner core was 54 kt, 64 kt in the northern feeder band, 50 kt at the surface and 60 kt at 850 mb. Minimum central pressure was 988 mb and the eye-like diameter was 20 nm. Storm motion was 285° at 11 kt.

A major feeder band consisting of numerous imbedded thunderstorms was observed spiraling into the center from the SE, E, through NE, N and NW as we approached the storm from the east. A prominent clear slot was observed between the eyewall and feeder band on the east side of the storm. Strongest eyewall convective bands, with echo tops extending to 16 km altitude,were on the NW, W and SW sectors of the eyewall, flanked on the outer side by numerous thin convective bands. An eyewall band existed in the east sector but thinner, and flanked only by a sharply defined stratiform circular boundary. A strong CB developed within the clear eye region on the north side as we exited to the NW, rotating around to the SW by the time we flew out of range.

Doppler radar showed a strong low level wind max of over 63 kt on the north side of the center within the eye location at 500 mb. The 500 mb center seemed to be displaced about 12 km north of the surface center, which could be clearly identified by a swirl in the low clouds within the 500 mb eye.

Excellent tail Doppler and lower fuselage radar data were also obtained (3 radar composites were transmitted to NHC in real-time, but no EVTD wind fields were sent). We also collected some

good F/AST data along a N-S line of convection 10 nm W of the west eyewall. Cloud microphysics data were also collected (good ice data in the rainbands W of the center and rain data in the inner core).

The 9 successful AXBT launches reported SSTs between 28.9-29.4C. Estimates of ocean mixed layer depth ranged between 42-70 m. 8/9 AXBTS were launched within the Figure 4 pattern within active regions of convection (in the eyewall and principal feeder band).

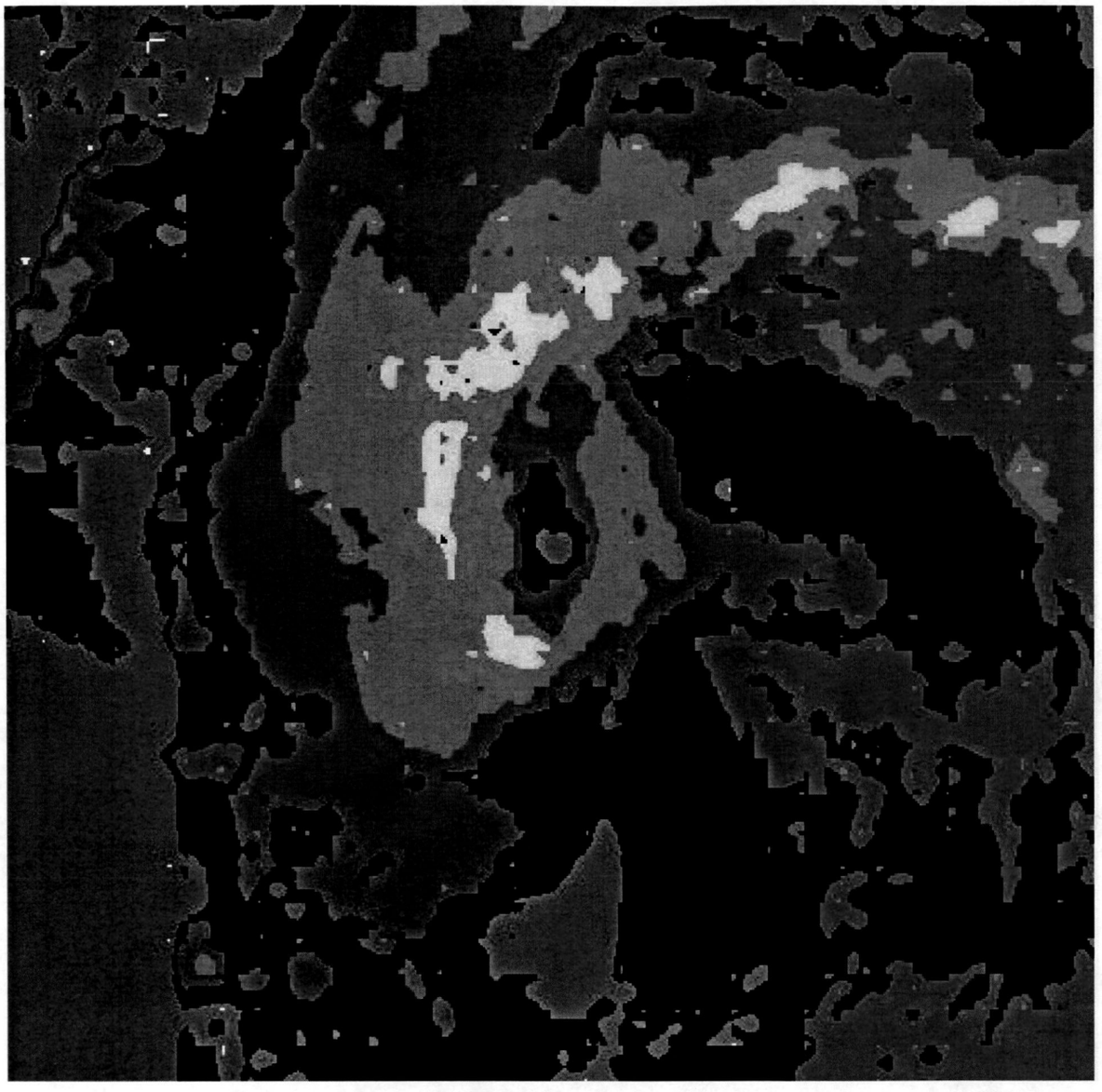
Evaluation:

This flight is part of another landmark 3-plane synoptic flow experiment for determining the environmental flow structure of the atmosphere around a developing TC while also determining the oceanic thermal structure beneath the inner core.

Problems:

Difficulties were encountered in deploying GPS sonde pairs on either side of the convective eyewall during the SW-NE transit due to sonde failure (particularly from the new batch of sondes) in the aircraft and subsequent AVAPS crash. Significant lag times were encountered between launches due to probe problems, which lead to missed drop points in the eyewall. Occasional difficulties were encountered with the operation of the HRD workstation for transmission of GPS sonde data in real time (several sondes could not be transmitted in real time due to acquisition failure by the workstation.

Peter G. Black


980821h1
BONNIE
204602 Z to
210615 Z
48
41
35
28
21
15 Alt 5087 m
dBZ
Slat 20.99 N
Slon 66.84 W
360 X 360 km
produced by
HRD / AOC