E.2 Lead Project Scientist

E.2.1 Preflight

__X__ 1. Participate in general mission briefing.

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

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

__X__ 4. Contact HRD members of crew to:
   a. Assure availability for mission.
   b. Review filed program safety checklist
   c. Arrange ground transportation schedule when deployed.
   d. Determine equipment status.

__X__ 5. Meet with AOC flight director and navigator at least 3 hours before take-off for initial briefing.

__X__ 5. Meet with AOC flight crew at least 2 hours before take-off for crew briefing. Provide copies of flight requirements and provide a formal briefing for the flight director, navigator, and pilots.

__X__ 6. Report status of aircraft, systems, necessary on-board supplies and crews to appropriate HRD operations center (MGOC in Miami).

__X__ 7. Before take-off, brief the on-board GPS dropsonde operator on times and positions of drop times.

__X__ 8. Collect "mess" fee ($2.00) from all on-board HRD flight crew members.

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.

_____ 5. Check in with the flight director to make sure the mission is going as planned (i.e. turns are made when they are supposed to be made).

E.2.3 Post flight

_____ 1. Debrief scientific crew.

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

_____ 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 MGOC as to where you can be contacted and arrange for any further coordination required.

_____ 7. Prepare written mission summary using form E-2 p.3 (due to Field Program Director1 week after the flight).

On-Board Lead Project Scientist Check List

Date 13 September 2003 Aircraft N42RF Flight ID 030913H

A. Participants:

HRD		AOC	
Function	Participant	Function	Participant
Lead Project Scientist	Chang	Flight Director	Mayeux, Shepard
Cloud Physics	—	Pilots	Kennedy, Halverson, Silah
Radar	Leighton	Navigator	Brakob
Workstation	Leighton	Systems Engineer	Peek
Photographer/Observer	—	Data Technician	McMillan, Rogers
Omegasonde	Landsea, Aberson	Electronics Technician	Wade
AXBT/AXCP/Guest	Von Frend, Herndon	Other	McFadden
			Jalenek, Esteban, Kerr

Take-Off: 1510 Location: St Croix

Landing: 2231 Location: St Croix

Number of Eye Penetrations: 6

B. Past and Forecast Storm Locations:

Date/Time	Latitude	Longitude	MSLP	Maximum Wind

C. Mission Briefing:

Ocean winds (eyewall penetrations) for Cat 4 Isabel. Possible contracting eyewall. Fly at 7-8kft. Dropsondes decided in flight

D. Equipment Status (Up, Down, Not Available, Not Used)

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

REMARKS:

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

Eye wedge patterns.

E. (II) Actual Flight Pattern

Lead Project Scientist Event Log

Date 13 September 2003 **Flight** 030913H **LPS** Chang

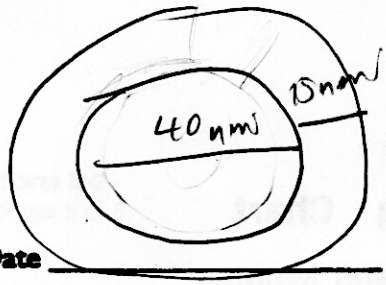
Time	Event	Position	Comments
~1510	Take off	20 minutes after 43	
1623	Restart RADAR,	coming in from	SSW
	Eye about 40 nm	across, decided not to do 8-sonde sequences	
	Hurricane force from SFMR ~30 nm from eyewall		
	Flight level secondary wind max >50 ms^{-1}, none at surface		
(1) 1634-1836	Eyewall 3 drop sequence	76 ms^{-1} flight level, 59 ms^{-1} SFMR very tilted	
	Eye ring of 40 dBz		Eye flattened to NW
	Fast eyewall	into eye.	Got films/one from above plane swirling inward
1653	8 or so inward spikes on fast eyewall, may be more. Storm is just a ring		
	slightly open NW. Can see structures on mace		
1658	NE eyewall, into max wind	flevel > 80 ms^{-1}	(off scale) SFMR 63 ms^{-1} — peak 68 m/s from Danny
1704	Secondary wind max at surface, none at flight level (different!)		
	Surface winds not following flight level like yesterday (less vertical)		
1709	Turn downwind		
1725	Turn inbound		
(2) 1734	W eyewall passage SFMR out max 1/2 way	flevel 73 ms^{-1}, SFMR 56 ms^{-1}, tilted	
	polygonal eyewall, PENTAGON		
1751	Big spoke cutting into eye from E eyewall		Some 45s in eyewall
1752	E eyewall passage.	SFMR following flight level, BUMPY!	SFMR 66 ms^{-1} flevel 77 ms^{-1}
	11 ms^{-1} up, 6 ms^{-1} down, 7 ms^{-1} up		102 ms^{-1} on first drop at some level @ 805 mb

sonde rose ~500 ft
191 kt sent in message
158 kt MBL

Lead Project Scientist Event Log

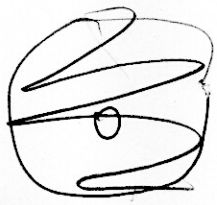
Date _____ **Flight** _____ **LPS** _____

Time	Event	Position	Comments
1802	22°24' 61°57' (1788)	934mb NE fix	
1809	Turn downwind		
1818	Turn in into center reflectivity, none at flight level	outer wind maximum at surface, outside of secondary	
1833	Hook in eyewall in LF just right of track, flew longedge 74 ms⁻¹ flevel, 59 ms⁻¹ SFMR- broad maximum, vertical	double wind max flew	
[illegible]	Still pentagonal eyewall		
(3) 1900	Switch to Land/Sea		
	Heading north - track 350 into North eyewall (were in eye)		
1903	First Drop - SFMR ~ 105 kt, Ft Level 130 kt		
1	Second Drop - SFMR 110 kt, Ft Level 135 kt		
1905	Third Drop - SFMR 110 kt, Ft Level 135 kt		
	Eyewall on N side weakened but broadened - 135 kt for ~6 min		
	Radar has 4 prominent bands	NE eyewall all ~4 mi apart	
1913	Begin 180° turn to go back over 2nd Drop splash point		
	Tracking 170		
1921	Appears to be a bubcloud in eye - nearly in geometric center		
(4) 1925	Back-to RMW	in North eyewall * going over splash location.	
Earlier	Center fix	22°32' 62°19' 1853Z 932 mb	
1932	Turn to Loiter	in eye	
~1800	HAPS disk full - had to delete files to free up space		
1940	Track 210 to SW eyewall		
1943	1st Drop	Ft Level + SFMR ~100 kt	
1944	2nd Drop	Ft Level 120 kt SFMR 110 kt	
1946	3rd Drop	Ft Level 125 kt SFMR 110	
1949	Turn back to	inbound. Track 30°	
1957	Flight RMW		



- most of day

Lead Project Scientist Event Log



Date _____ **Flight** _____ **LPS** _____

Time	Event	Position	Comments
(5) 1959	Back in eye —	— Loitering	
Until 2030.	Still in eye - Visually spectacular,		some clouds meeting
	us at 7000' flight altitude -		prominent hub cloud
2033	Leaving eye on east side —		track 115°
2033	1st Sonde Launched.	Ft. Level	SFMR 120
2034	2nd Sonde	Ft. Level	130 SFMR 120 — No winds
2036	3rd Sonde	Ft Level	140 SFMR out -
2040	Turn back to	go inbound over	drop splashes
2046	Ft. Level RMW	Peak winds ~ SFMR ~	150kt 120kt
(6) 2149.	Entering eye	+ meandering	
2104	Leaving eye on	SW side	
2106	1st Sonde Launched		peak flight winds 140 kt
2107	2nd Sonde Launched		SFMR 110 kt
~1	3rd Sonde Launched — Wedge Sonde		- Terminated
2120	Depressurizing	to allow removal	of wedged sonde
2124	Repressurizing	& headed home	
Overall -	still have sharp	wind gradients	inside RMW,
but that	there is more tilt of RMW with		height today than
yesterday	~		
2231	Landed back	in St Croix	

Subject: Isabel 030913H Mission Summary
Date: Tue, 23 Sep 2003 08:42:03 -0400
From: CHRIS LANDSEA <CHRIS.LANDSEA@NOAA.GOV>
To: Neal M Dorst <Neal.M.Dorst@noaa.gov>, Peter Black <Peter.Black@noaa.gov>, Michael L Black <Michael.Black@noaa.gov>, Paul S Chang <Paul.S.Chang@noaa.gov>, Frank Marks <Frank.Marks@noaa.gov>

030913H - Isabel
Paul Chang - LPS (Chris Landsea reporting)

This mission, in conjunction with NRF43, was an Ocean Winds experiment (main emphasis is to collect SFMR/scatterometer/ GPS winds in high wind/rain regions) that was piggy-backed with some CBLAST work on 43 in their doing a stepped descent. The flights were not coordinated on this day with 43, as this was not a high priority. An in-flight decision was made to not launch the high density (8 sonde sequence) on each leg of the figure-4, as it was thought that the hurricane had weakened some based upon the 45 nmi diameter eye from satellite and radar. This actually was not the case, as we found later in flight.

The flight pattern first consisted of a figure four with passes from south to north and then west to east with three drops launched just inward of the flight level RMW. Then there were four wedge patterns flown, where on an outbound leg three sondes were launched in the eyewall (drops called by the LPS) followed by an immediate inbound leg where the plane was routed over the splash location of the middle drop. (This would allow a direct comparison of SFMR/scatterometer with drop data.) Thus there were a total of 24 sondes lauched and six eye penetrations. Of these 24 sondes, 3 had no data (2 no launch detects and one sonde stuck in the tube). However, only 5 had winds within 15m of the surface. Peak winds recorded: 160 kt flight level (north eyewall ~1700 UTC), 135 kt SFMR (north eyewall ~1700 UTC), 125 kt surface (1700 and 1736 UTC) and 205 kt 805 mb/ 158 kt MBL (1752 UTC).

One perception about Isabel that i wanted to convey is how it classically fits the "annular hurricane" idea that John Knaff has discussed. When we flew the hurricane at 7,000', Isabel had a rather large eye of about 40 nmi diameter with a wide 15 nmi eyewall surrounding it. Aside from a few small mainly stratiform bands, there was essentially no prominent rainbands outside of the eyewall. (The best analogy is that it looked like a big truck tire.) This wasn't to say that the eyewall didn't fluctuate. On the contrary, we saw on the lower fuselage radar filaments from the eyewall being drawn into the eye cyclonically with scales of a couple nmi spacing and in length. These appeared to be connected with enhanced turbulence when we flew through them and may have been instabilities associated with the very sloped wind profile inside the flight level RMW. Additionally, the eyewall went from circular to pentagonal and back to circular during our 6 hours in the storm. Finally, the thick eyewall itself was sometimes a continuous band of 40-45 dbz reflectivities and sometimes fragmented more with the eyewall appearing more as 3 or 4 closely spaced bands. Throughout it all, there was typically only one RMW peak at flight level and at the surface, but that it had a moderate slope (few miles) between the two levels. Perhaps the most surprising thing to me was that we continued to have 160 kt peak flight level winds, 180-200 kt GPS drop data below us and 135 kt peak surface winds (SFMR) despite the significantly larger RMW than on Friday (12th). I was expecting

naively) that the winds would have relaxed some given the larger size. (However, the central pressure was about 10 mb higher.)

****
Chris Landsea
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Miami, Florida 33149 Internet: Chris.Landsea@noaa.gov
http://www.aoml.noaa.gov/hrd/Landsea/landsea_bio.html
****

"Isabel was so shapely and symmetrical in the tropics,
with that perfectly edged 40-mile eye,
but now in the Temperate Zone
she may be turning into a squalid old squall,
arms flailing, eye swollen half-shut
-- a reeling, sloppy, skanky beast of a storm."
- Joel Achenbach, _Washington Post_, September 17, 2003

TAMARIND REEF HOTEL

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EMail-tamarind@usvi.net
Web site-http://www.usvi.net/hotel/tamarind

2600 - Bht	13/09Z	22	60.4	130
	/18Z	22.2	61.6	130
	14/06Z	23.0	63.7	130
	/18Z	23.5	65.5	130
	15/06Z	24.5	67.5	130
	↓			
	18/06Z	32	74.5	105

42 - Uncoordinated with 3X3

IP from South

Figure 4 - 8 sonds if well developed

Wedge pattern

Ensdp eye pattern

---

43 WNW 100 mi

Isabel 030913H

i13h1.raw
i13h1.trk

60008	16:40	cap1	1625_1650	q
63636	17:40	cap2	1725_1750	q
67474	18:44:34	cap3	1830_1900	q
70245	19:30:45	cap4	1915_1945	q
* 72160	20:02:40	cap5	1950_2010	q
75635	21:00:35	cap6	2045_2115	q

030913I

i13i1.raw
i13i1.trk

61728	17:08:48	cap1	1645_1715	q
71773	19:56:13	cap2	1941_2006	q

Hurricane ISABEL

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UPDATE

000
WTNT43 KNHC 132046
TCDAT3
HURRICANE ISABEL DISCUSSION NUMBER 31
NWS TPC/NATIONAL HURRICANE CENTER MIAMI FL
5 PM EDT SAT SEP 13 2003

THERE HAS BEEN A PLETHORA OF WIND DATA FROM BOTH THE AIR FORCE RESERVE AND NOAA HURRICANE HUNTERS THIS AFTERNOON. IN SUMMARY...THE AIRCRAFT FOUND MAXIMUM 700 MB FLIGHT-LEVEL WINDS OF 157 AND 158 KT ...ALONG WITH A DROPSONDE WIND VALUE OF 178 KT...OR 205 MPH...AT 879 MB...ALL OF WHICH CORRESPONDS TO SURFACE WIND ESTIMATES OF 141-142 KT. THEREFORE...THE INITIAL INTENSITY HAS BEEN INCREASED TO 140 KT/160 MPH...SO ISABEL IS A CATEGORY 5 HURRICANE ONCE AGAIN.

THE INITIAL MOTION ESTIMATE IS NOW 285/11. THIS MAY BE A SHORT-TERM ACCELERATION DUE TO THE EYE CONTRACTING DOWN IN SIZE AND RE-ADJUSTING WITHIN THE CENTRAL DEEP CONVECTION. HOWEVER...THE 285 DEGREES MOTION NOW APPEARS TO BE A STEADY TREND. THE NEW 12Z GFS FORECAST TRACK HAS COME IN ALMOST ON TOP OF THE PREVIOUS OFFICAL FORECAST THROUGH 48 HOURS AND THEN IS LEFT OF THE TRACK BY 72 HOURS ...BEFORE HOOKING BACK ACROSS THE PREVIOUS FORECAST TRACK AND ACCELERATING ISABEL NORTHWARD. THIS SCENARIO IS ALSO IDENTICAL TO THE 12Z ETA MODEL RUN. SIMILARLY BUT TO THE RIGHT OF THE PREVIOUS FORECAST ARE THE GFDL...NOGAPS...UKMET...AND CANADIAN MODELS. INTERESTINGLY ENOUGH...ALL OF THE MODELS AGREE ON A SHARP DECREASE IN FORWARD SPEED OR A STALL IN 60-72 HOURS...AND THEN RAPIDLY ACCELERATING ISABEL NORTH OR NORTH-NORTHWESTWARD AFTER 96 HOURS AS THE CYCLONE IS FORECAST TO GET PICKED UP BY AN APPROACHING SHORTWAVE TROUGH FROM THE WEST AND A BUILDING RIDGE TO THE EAST. HOWEVER...THERE IS STILL SOME UNCERTAINTY ON THE CURRENT STRENGTH OF THE SUBTROPICAL RIDGE TO THE NORTH OF ISABEL...SO IT IS PRUDENT TO WAIT UNTIL ALL OF THE NOAA GULFSTREAM-IV DROPSONDE DATA MAKE IT INTO THE 14/00Z MODELS. THE OFFICIAL FORECAST TRACK IS JUST AN UPDATE OF THE PREVIOUS TRACK THROUGH 96 HOURS...WITH A LITTLE MORE NORTHWARD ACCELERATION INDICATED AT 120 HOURS AS A COURSE OF LEAST REGRET. NOTE -- NONE OF THE NHC MODEL GUIDANCE HAS ISABEL OVER LAND BY 120 HOURS.

WHILE SOME SLIGHT STRENGTHENING IS POSSIBLE IN THE NEXT 12 HOURS... THERE IS NO WAY TO REALLY TIME THE DEVELOPMENT OF ANOTHER EYEWALL REPLACEMENT CYCLE. IN THE LONG RUN...UPPER-LEVEL CONDITIONS ARE FORECAST TO REMAIN FAVORABLE FOR AT LEAST THE NEXT 48-72 HOURS... WITH THE HURRICANE ALSO MOVING OVER WARMER WATER. THEREFORE...A STEADY INTENSITY OR ONLY VERY SLOW WEAKENING IS EXPECTED FOR THE NEXT COUPLE OF DAYS. BY 120 HOURS...ISABEL MAY BEGIN TO EXPERIENCING UPPER-LEVEL SOUTH TO SOUTHWESTERLY SHEAR...WHICH SHOULD BRING ABOUT MORE RAPID WEAKENING. HOWEVER...ISABEL IS STILL EXPECTED TO REMAIN A MAJOR HURRICANE THOUGHOUT THE FORECAST PERIOD.

FORECASTER STEWART

Decade
US Strikes by State
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Mission/Vision
Other NCEP Centers
TPC Personnel
NOAA Locator
Visitor Information
NHC Library
WX4NHC Amateur Radio Station
TPC Anonymous FTP Server
Contact Us
Webmaster

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FORECAST POSITIONS AND MAX WINDS

INITIAL      13/2100Z 22.6N  62.6W   140 KT
 12HR VT     14/0600Z 23.0N  64.2W   140 KT
 24HR VT     14/1800Z 23.7N  66.2W   140 KT
 36HR VT     15/0600Z 24.4N  68.0W   135 KT
 48HR VT     15/1800Z 25.2N  69.4W   135 KT
 72HR VT     16/1800Z 26.5N  71.5W   130 KT
 96HR VT     17/1800Z 29.5N  73.0W   125 KT
120HR VT     18/1800Z 33.5N  75.0W   105 KT
```

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National Hurricane Center
Tropical Prediction Center
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