

K. Ryan

Lead Project Scientist

Storm or Project Michael Experiment type EMC-TDR
Flight ID 20181008W1 Mission ID ALH

Preflight

- 1. Participate in general mission briefing.
- 2. Determine specific mission and flight requirements for assigned aircraft from the Field Program Director.
- 3. Contact HRD members of crew to:
 - a. Assure availability for mission.
 - b. Review field program safety checklist
 - c. Arrange ground transportation schedule when deployed.
 - d. Determine equipment status.
- 4. Meet with AOC flight director and navigator at least 3 hours before take-off for initial briefing.
- 5. Determine from AOC flight director the mission designation and whether aircraft has operational fix responsibility
- 6. 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.
- 7. Report status of aircraft, systems, necessary on-board supplies and crews to Field Program Director
- 8. Before take-off, brief the on-board GPS dropsonde operator on times and positions of drops.
- 9. Make sure each HRD flight crew member has a life vest.
- 10. Perform a headset operation check with all HRD flight crew members. Make sure everyone can hear and speak using the headset.

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. Request AOC flight director to leave radar in non-sector mode for initial Figure 4.
- 5. Once at IP, request AOC flight director adjust radar tilt to minimize sea clutter.
- 6. Complete Lead Project Scientist Form.
- 7. Check in occasionally 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).

Post flight

- 1. Debrief scientific crew
- 2. Gather completed forms for mission and turn in to data manager at HRD.
- 3. Obtain a copy of the Dropsonde raw and processed files from the AVAPS operator on thumb drive.
- 4. Obtain a copy of the radar LF files from the radar technician on thumb drive.
- 5. Obtain a copy of the tar'ed radar TA files from the radar scientist on thumb drive.
- 6. Obtain a copy of serial flight data and raw NetCDF file on thumb drive from the data technician.
- 7. Obtain a copy of SFMR data on thumb drive from the data technician.
- 8. Obtain a copy of DMT data on thumb drive from the data technician.
- 9. Report landing time, aircraft, crew, and mission status to the Field Program Director.
- 10. Determine next mission status, if any, and brief crews as necessary
- 11. Prepare written mission summary using **Mission Summary** form.

Lead Project Scientist Check List

Storm or Project Michael Experiment name Ocean-UM TDR-EMC
 Flight ID 2018100841 Mission ID AL14

A. Participants:

HRD		AOC	
Function	Participant	Function	Participant
Lead Project Scientist	<u>Ryan</u>	Flight Director	<u>Holmes</u>
Radar/Workstation	<u>Cione</u>	Pilots	<u>Price Mitchell</u> <u>Rossi</u>
Cloud Physics-		Navigator	<u>Freeman</u>
IWRAP	<u>Sapp</u>	Systems Engineer	<u>Green</u>
Dropwindsonde	<u>Wadler</u>	Data Technician	<u>Mascaro</u>
AXBT/AXCP	<u>Stevenson</u>	Electronics Technician	<u>Mac</u>
Photographer/Observer s/Guests	<u>Stevenson</u>	Other	<u>AVAPS</u> <u>(McAlister)</u>

B. Take-off and Landing Times and Locations:

Take-Off: 2002 UTC Location: Lakeland
 Landing: 0252 UTC Location: Lakeland
 Number of Eye Penetrations: 3

C. Past and Forecast Storm Locations:

Date/Time	Latitude	Longitude	MSLP	Maximum Wind kt
<u>2100Z</u>	<u>22.2</u>	<u>85.2</u>	<u>978 AF</u>	<u>70</u>
<u>9/1600Z</u>	<u>23.7</u>	<u>85.7</u>		<u>85</u>
<u>9/1800Z</u>	<u>25.7</u>	<u>86.4</u>		<u>95</u>
<u>10/0000Z</u>	<u>27.9</u>	<u>86.6</u>		<u>105</u>
<u>10/1800Z</u>	<u>30.2</u>	<u>85.8</u>		<u>100</u>

NE quad not sampled (Cuba)
 update 7pm (75kts)

NHC
 4pm Advisory CDT
 10pm: 80kts 23.2N 85.2W

D. Mission Briefing:

Plan: ocean survey + (TDR butterfly + ocean winds) @ 8kft → for details see attached @ end
 @ 10kft or 8kft depends on AF/Cuba

Michael upgraded to 65kt hurricane this morning & continues to deepen. Eye is becoming visible via satellite, cold cloud tops near center. UL outflow has been improving, but struggles over W side of storm. VWS = moderate, SSTs = warm, however steep gradient between Ventan; obvious inner core (T Forecast calls for RI to major in next 24 hrs; SHIPS: 60% RI, landfall NE gulf coast.

Storm or Project Michael Experiment name TOR

Flight ID 2018100841 Mission ID AL14

E. — Equipment Status (Up ↑, Down ↓, Not Available N/A, Not Used O)

Equipment	Pre-Flight	In-Flight	Post-Flight	# DATs / CDs / Expendables / Printouts
Radar/LF	↑	went ↓ 2x	↑	
Doppler Radar/TA	↑	↑	↑	
Cloud Physics	↑	↑	↑	
Data System	↑	↑	↑	
GPS sondes	↑	↑	↑	
AXBT/AXCP	↑	↑	↑	
Ozone instrument	—	—	—	
Workstation	↑	went ↓ 2x	↑	
Cameras	↑	↑ until sunset	↑	

REMARKS:

Sondes : all 94s

SFMR · no SST data → using previous data to estimate RESOLV

~~REMARKS~~

All workstations crashed 2x (except ~~all~~ C3x)

00:45 Z & 0115 Z

~~REMARKS~~

↓

Mascaro & Green says its MMR

↓

resolved upon landing

Lead Project Scientist Event Log

Date _____ Flight ID 20181008HA LPS Ryan

Time	Event	Position	Comments
2002	takeoff IP-OHC		- impressive satellite representation
2050	freefall BT	GOM 1	- Scattered showers/T-storms - paralleling some convection & adjusting drops - visible white caps on surface ~35kts - 28.92 SST
2055	BT CP CP2	GOM 2	-
2101	BT		Set 5 for weather * CP
2106	BT BT	GOM 3 GOM 4	- 29.2 SST
2107	BT CT	GOM 5	
2112	BT CP	GOM 6	
2118	CP	GOM 7	
2123	CP	GOM 8	
2129	BT	GOM 8	
2134	BT CP CT	GOM 9	I launched this one!
2144	BT/sonde	GOM 10	

2100Z
Carcah: ~~BT~~
22.8 N
85.4 W
350 @ 9kts
for 00Z

Lead Project Scientist Event Log

Date _____ Flight ID _____ LPS _____

Time	Event	Position	Comments
2153	CP	XXXXXXXXXX GOM ¹¹	
2202	CP	GOM ¹² XXXXXXXXXX	
2210	CT	GOM ¹³ XXXXXXXXXX	
2220	BT/sonde	GOM ¹⁴ XXXXXXXXXX	
2229	CP	GOM ¹⁵	
2239	BT/sonde	GOM ¹⁶ XXXXXXXXXX	
2254	climbing to 10 kft for storm (ATC issues)		
2250	IP/combo	N and	SPMR 41 kts FL 50 kts
	XXXXXX		
2304	combo	mid 1 N	SPMR 43 kts FL 55 kts
2306			SPMR 50 kts FL 57 kts

SST 28.6

* Seeing TDR return ~17-18 km!

Lead Project Scientist Event Log

Date _____ Flight ID _____ LPS _____

Time	Event	Position	Comments
2313		N eyewall	SPMR 75 75 kts FL 89 kt SST 27.1
		eye	- spiral clouds below - can see some sky - eyewall open to south
2319	center fix	22°30' N 85°14' W	971 mb * asym. eyewall → strongest on W side
2330	combo SPMR KMW	S eyewall	SPMR 65 kts FL 85 kts SST 28.8
			- sonde did not hit surf
		SE-NW leg	* TDR return ~ 14 km
			* end point sonde just beyond Cuba ! clearance
		SE end	FL 83 kt
		mid center	
0015	22°44' N 85°11' W	center	combo 973 mb asymmetrical
			SPMR

asym eyewall; well organized thro 0018

edge of eye not enough time for back

Continuing log

- * wow, lots of probs, data & science lost power lost TOR/MMR display,
- * Crew miscounted BTS so final leg only has 4 (1 put halfway between NW end & SW end)

Observer's Flight Track Worksheet

Date _____ Flight _____ Observer _____

0054
0106
0114
0118
0138

SW end combo	SST 28.5				
SW mid combo					
center	972.2	27°54'N			(972mb)
		85°20'W			
VMW sonde	SFL 98kt	eyewall super asymmetric			
	SFMR 77kts	sonde: 74kts @ 100°			
	* early & not enough time to backup because				
	lost workstations AGAIN				
	→ MMR problem				
NE mid combo	SFL 88kts				
	↳ sonde fail: (SFMR 60kts)				
NE end sonde					

strongest pro SE side
NW side

Latitude (°)

0144 Still 40kts (SFMR) at surface 23.88 N 83.33 W

Mission Summary

Storm name

YYMMDDA# Aircraft 4¹RF

Scientific Crew (4 RF)

Lead Project Scientist Ryan
 Radar Scientist Cione
 Cloud Physics Scientist _____
 Dropwindsonde Scientist Wadley
 Boundary-Layer Scientist _____
 Workstation Scientist _____
 Observers (affiliation) Stevenson (NHC)

Mission Briefing (include sketch of proposed flight track or page #)

- See attached track
- 2 part mission: ① ocean survey ② TDR-EMC tasking (90nm)
- may have to adjust pattern due to center location & Cuba overflight clearance
- possible Cygnus overpass on SW-NE leg

Mission Synopsis. (include plot of actual flight track)

- Actual track shockingly similar to planned
- Cuba Clearance approved → able to sample SE/NE portion of TC
- Flight ~ 30 min b4 Cygnus overpass during SW-NE leg
- Due to power shutdown(s), 2 TDR analyses transmitted to EMC for OZ
1 transmitted for OZ

Evaluation. (did the experiment meet the proposed objectives?) - YES!

vortex structure very organized, ~~asymmetric~~ asymmetric eyewall w/ open sides → orientation changed throughout mission where strongest wall on each leg was (W, W & NE, NW & SE) as shown via LF radar. Avg SLP = 972mb, pretty steady during flight; TDR returns as high as 17km on N side; SSTs ~ 29C; peak FL ~ 90kts; peak SFR ~ 80kts; satellite structure improving further ~~TC~~ → TC appears to mitigate dry air in MMR caused all workstations except C3X to crash 2x ~~passes~~ passes 2/3 during

VWS remains ~20kts

eye = very large! ~55mi wide!
 AND windfield very large as well

Expendables used in mission.

GPS sondes 19

AXBTs 11

Sonobuoys: _____

BTD = 8

CP: 8

~~CT: 3~~

CT: 3

Cygnus overpass
 oriented SW-NE
 0149-0214

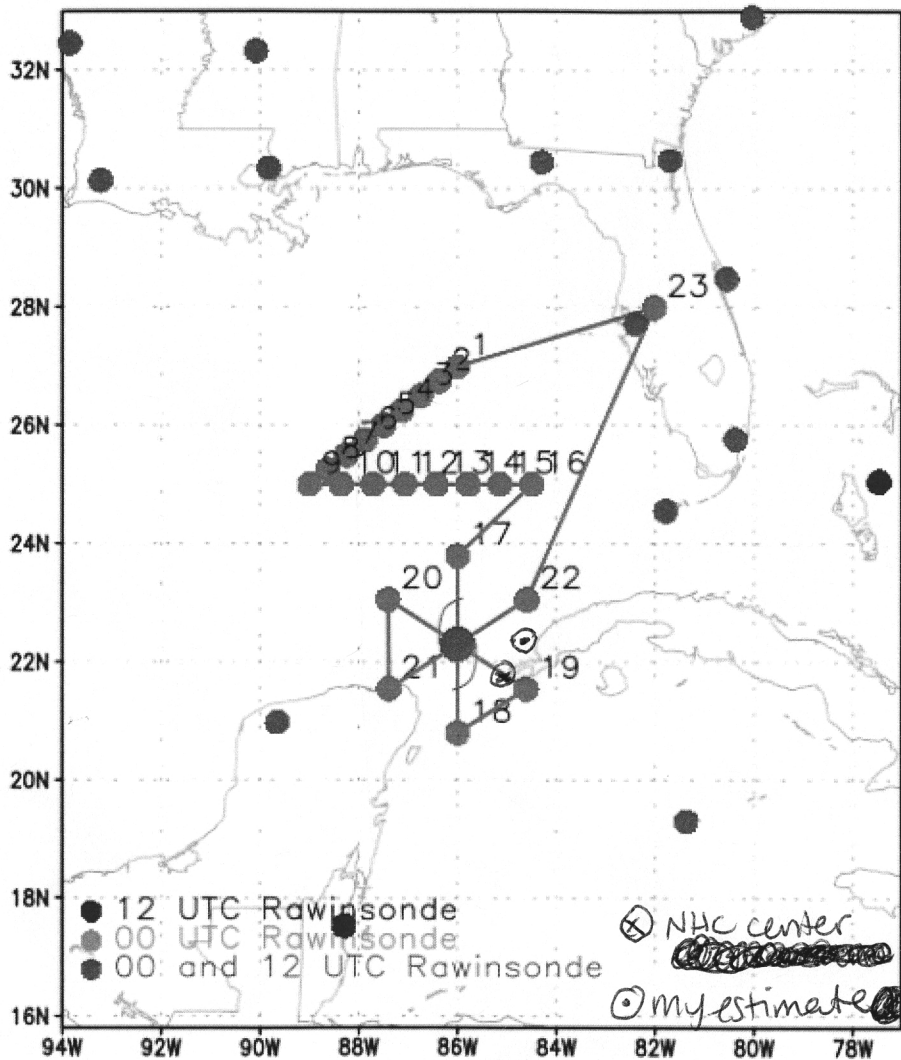
20180301
 Michael

2pm EST
 K. Ryan

Combos

10, 14, 16

+ butterfly ends,
 mids, centers
 + (>1)mmw



position/motion uncertain
 - NHC ~~forecast~~ forecast (IP)
 21.7 N } as of 2pm
 85.1 W } ~~forecast~~
 N @ 6 knots }

Depending on speed/
 location of Michael
 AND
 pending overflight (Cuba)

* if no clearance
 ‡ Michael 2 far S
 (close to coast)
 may start on NE quad
 ‡ end N (switch 17-22)

} for ~ 8pm EST