Lead Project Scientist

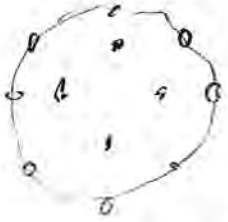
Date 9/20/19 **Flight ID** 19092011

Storm or Project Jerry **Experiment name** TC in shear/AIPEX
Mission ID

Pre-flight

- [x] 1. Participate in general mission briefing.
- [x] 2. Determine specific mission and flight requirements for assigned aircraft.
- [x] 3. Determine from AOC flight director/meteorologist whether aircraft has operational fix responsibility and the mission designation.
- [x] 4. 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.
- [x] 5. Meet with AOC flight director and navigator at least 3 hours before take-off for initial briefing.
- [x] 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.
- [x] 7. Report status of aircraft, systems, necessary on-board supplies and crews to Field Program Director.
- [x] 8. Before take-off, brief the on-board GPS dropsonde operator on times and positions of drop times.
- [x] 9. Make sure each HRD flight crew member has a life vest.
- [x] 10. Perform a headset operation check with all HRD flight crew members. Make sure everyone can hear and speak using the headset.

In-Flight



- [x] 1. Confirm from AOC flight director that satellite data link is operative (information).
- [x] 2. Confirm camera mode of operation.
- [x] 3. Confirm data recording rate.
- [x] 4. Complete Lead Project Scientist Form.
- [x] 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).

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 10-s flight listing from the AOC flight director. Turn in with completed forms.
- [ ] 4. Obtain a copy of the radar DAT tapes. Turn in with completed forms.
- [ ] 5. Obtain a copy of serial flight data on thumb drive. Turn in with completed forms.

[**Note**: all data removed from the aircraft by HRD personnel should be cleared with the AOC flight director.]

- [ ] 6. Report landing time, aircraft, crew, and mission status along with supplies (tapes, *etc.*) remaining aboard the aircraft to Field Program Director
- [ ] 7 Determine next mission status, if any, and brief crews as necessary.
- [ ] 8. Notify Field Program Director as to where you can be contacted and arrange for any further coordination required.
- [ ] 9. Prepare written mission summary using **Mission Summary** form.

Lead Project Scientist Check List

Storm or Project Jerry **Experiment name** AIPEX/TC.nshear

Flight ID 19092011 **Mission ID**

A. Participants:

Function	Participant	Function	Participant
Lead Project Scientist	Rogers	Flight Director	Lundry
Radar	Zawislak	Pilot	Didier, Kahn
Workstation	—	Pilot	
Cloud Physics	—	Navigator	Freeman
Dropsonde	Ryan	Systems Engineer	Peak
Dropsonde		Data Technician	Moscaro
AXBT/AXCP		Electronics Technicians	
Observer/Guest			
Observer/Guest		Flight Engineer	

B. Take-off and Landing Times and Locations:

Take-Off: 1057 UTC Location: St Croix

Landing: 1910 UTC Location: St Croix

Number of Eye Penetrations: 7

C. Past and Forecast Storm Locations:

Date/Time	Latitude	Longitude	MSLP	Maximum Wind
/				
/				
/				
/				
/				

D. Mission Briefing: Perform AIPEX/TC, nshear mission, esp to Hurricane Jerry, a 90-kt hurricane approaching the NE Leeward islands. Jerry is a small storm dealing w/ moderate shear (SHIPS analyses 18kt) from the NW. There is also considerable mid-to upper-level dry air around the storm. Despite these apparently hostile environmental conditions, Jerry has steadily intensified to 90 kt. Sat. animations show convection struggling to persist, suggesting dry air weakening updrafts. Will be good to sample convection w/ TDR to see its structure and how it evolves. 43 will be flying Fig-4 just as we exit the storm, so we'll have continuous inner-core coverage for ~6 h.

FL at Fig-4, 1P on SE side, 105 nm leg lengths. Downwind legs only 90-95 deg, instead of 90 deg. Gondolas at end, mid, 1st center pass. Circle on outbound to E at FMW.

Storm or Project Jerry **Experiment name** AIPEX/TC inshar

Flight ID 190920 H1 **Mission ID**

E. — Equipment Status (Up **U**, Down **D**, Not Available **N/A**, Not Used **O**)

Equipment	Pre-Flight	In-Flight	Post-Flight	# DATs / CDs /Expendables/ Printouts
Radar/LF	U			
Doppler Radar/TA	U			
Cloud Physics	—			
Data System	U			
GPS sondes	U			
AXBT/AXCP	—			
Ozone instrument	—			
Workstation	—			
Cameras	U			

REMARKS:

Lead Project Scientist Event

Date **Flight ID** **LPS**

Time	Event	Position	Comments
1057	takeoff	St Croix	
1214	pattern	at IP on SE	turn back bk storm further west
1217	drop 1	at IP on SE	FL 15, sf 12 m/s
			~85 nm inbound leg
1224	obs	inbound on SE	TDR shows all precip to
		right of ac,	shallow/mid convection w/ strat.
		mixed; shear environment today dominated	
		by SSW flow, weak flow aloft → low-level shear	
		primarily from the NW; storm motion	
		in close to downshear azimuth by	
1228	drop 2	mid pt SE,	FL 17 sf 16 m/s
		~42 nm ctr	
~~obs~~ 1237	obs	in center	unimpressive eye,
		open eyewall mostly W	
1239	center, drop 3	18°38' 59°49'	991 mb, 130/11 at splash, so
			maybe tilted toward lft wl wt.
1252	drop 4	mid pt NW	FL 19 sf 14 m/s
1303	drop 5	mid pt NW	FL 24 sf 12 m/s
1303	pattern	mid pt NW	turn downwind
1316	obs	downwind leg	open, clear on NW
		(upshear) side; convection appears	
	to be collapsing on sat, probably a result of		
	dry air intrusion. Did not see significant echo tops		
	above 10-12 km.		
1319	obs	downwind leg	on 4th SE-NW pass, peak
		FL winds 60 kt, sf 70 kt, both on NW	
1322	drop 6	mid pt W	FL 15 sf 6 m/s

Lead Project Scientist Event

Date 9/20/19 **Flight ID** 190920H1 **LPS** Rogers

Time	Event	Position	Comments
1340	obs	near W mid pt	looked like an outer wind max at 925 mb FL + SF on outbound leg to NW
1341	drop 7	W mid pt	FL 13, SF 17 m/s
1353	center drop 8	18.4 ; 60.84'	994 mb 145/30 → very tilted, SW side w/ drop
1358	drop 9	RMW east	
1405	drop 10	E mid pt	FL 25 SF 18 m/s
	drop 11	E end	
1443	drop 12	NE end	
1456	drop 13	NE mid	FL 28 SF 18 m/s
1506	obs	near NE eyewall shallow/weak convection, ET up to 6-8 km on aft antenna. On fore it's much deeper	in most precip, all
1513	obs	18.96 60.49 → center estimate	
1524	drop 14	SW mid pt	FL 11, SF 15 m/s
1535	obs	past SW mid pt evolution. Pass from NE-SW shows practically no wind peak on SW side, just constant 5-10 m/s winds at FL & SF	interesting structural
1536	drop 15	SW end pt	FL 6 SF 9 m/s
1547	drop 16	S end pt	FL 7 SF 11 m/s
1559	drop 17	S mid pt	FL 9 SF 14 m/s
1613	obs	outside N eyewall FL only 20 m/s on S	peak FL 35 on N side, side, large asymmetry.
		FL winds > SF winds on NE	side, then on S, SW sides
		SF > FL winds; typical of vortices in shear	

18.96 N
60.49 W

17.81 N
60.76 W

Lead Project Scientist Event

Date **Flight ID** **LPS**

Time	Event	Position	Comments
1626	drop 18	N mid pt	FL 24, SF 16 m/s
1631	obs	near Newd pt	now that we're back
	on	N side of storm	(left of shear), we're
	seeing	FL > SF winds	again
1633	drop 19	Newd pt.	ended leg early since
		there are no	retrievals beyond this radius,
		FL 20, SF 12 m/s	
1634	pattern	~100 nm N of center	began ocean winds work
1710	pattern		lost display power,
		turned back	into center of circle
		until we get	back power
1747	drop 20	N of eyewall	OW drop
1748	drop 21		backup
1754	drop 22	N eyewall	OW drop
1810	pattern		science complete, RTB
1909	landing	St Croix	

Mission Summary

Scientific Crew (4ZRF)
Lead Project Scientist Rogers
Radar Scientist Zawislak
Cloud Physics Scientist
Dropwindsonde Scientist R you
Boundary-Layer Scientist
Workstation Scientist
Observers (affiliation)

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

See previous

Mission Synopsis: (include plot of actual flight track) Mission generally flowarcas planned. 43 had mechanical issue, so could not come down to STX, therefore no coord. ration. Instead of doing stack circles, did ocean winds penpies 3 times on the N side. There was a power outage of some equip + computers during this time. Performed 4 passes, though 1 pass (NE/SW) missed center pretty badly, so no profiles.

Evaluation: (did the experiment meet the proposed objectives?) Mission was a success; in that requisite radar analyses were performed and sondes dropped and transmitted. Storm underwent pretty substantial structural evolution → shear and dry air layer caused winds to decrease and pressures to rise markedly, winds on SW + S sides quite weak, highly asymmetric storm. FL/SF comparisons showed typical variations across shear axis, i.e., FL > SF on NS side (left of shear) and SF > FL on S side (right of shear). Very broad circulation esp. on SW side. Interesting thing is that global analyses show that most of shear seems to be confined to lower + mp (due to SE flow at 850 mb), and storm really took a hit. If it can survive until it encounters upper-level shear later, will be interesting to see how it responds to that kind of shear. If it estimate though, only 2 nm, surprising for a storm that looks so bad otherwise. If tilt est is accurate, what does that say about importance of tilt and other structural parameters?

Problems:(list all problems)

No real problems, other than brief power outage.

Expendables used in mission:

	Deployed	Good	Bad
GPS sondes :	22	21 (1 fog/fail)	
AXBTs .	—	—	—
Sonobuoys:	—	—	—
UAVs	—	—	—