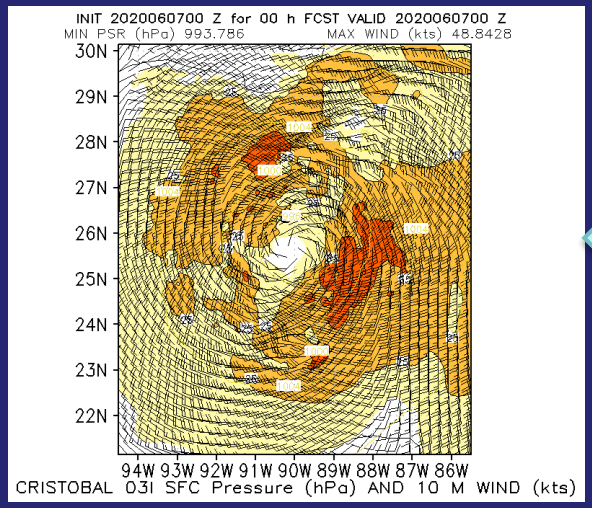
Primary responsibilities of Ground Radar Support:

1) Generate TDR software jobfiles and transmit them to the aircraft
   - Initiates automated TDR data QC/synthesis software
2) Guide aircraft radar support through execution of scripts
3) Ensure TDR data QC/synthesis and transmission
   - Resolve software/transmission issues with aircraft radar support
   - Monitor arrival of files on the ground
4) Look at analyses. Assist LPS with mission science (e.g., pattern modifications)

Additional responsibilities of Ground Radar Support:

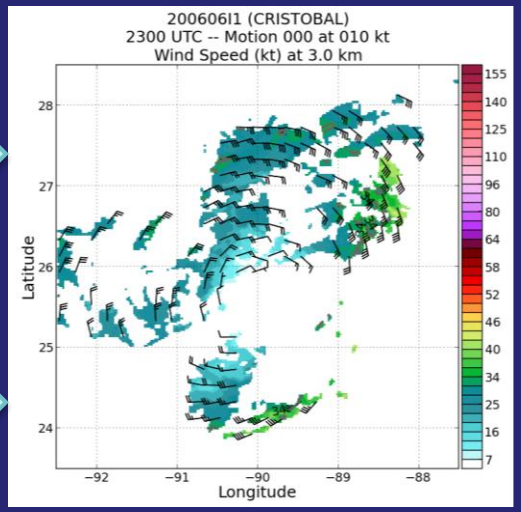
- Ensure Flight Director (FD) is made aware of *mission-critical* issues (via LPS)
- Communicate data/analysis issues to NWS operational partners

Real-time Products

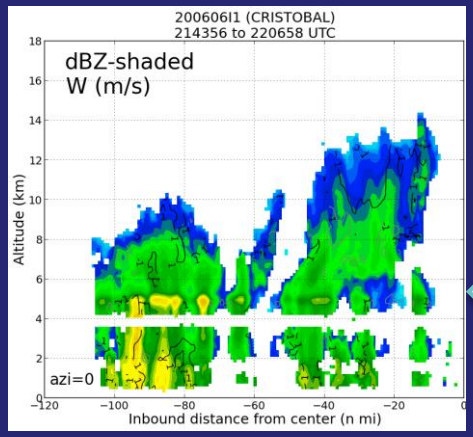


QC'd Doppler radials (target: EMC)
Assimilated into operational HWRF model

"Swath"



"Profile"

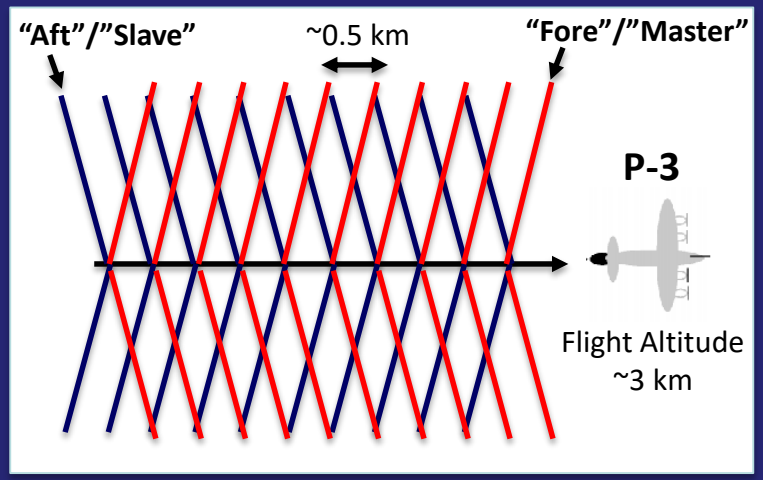


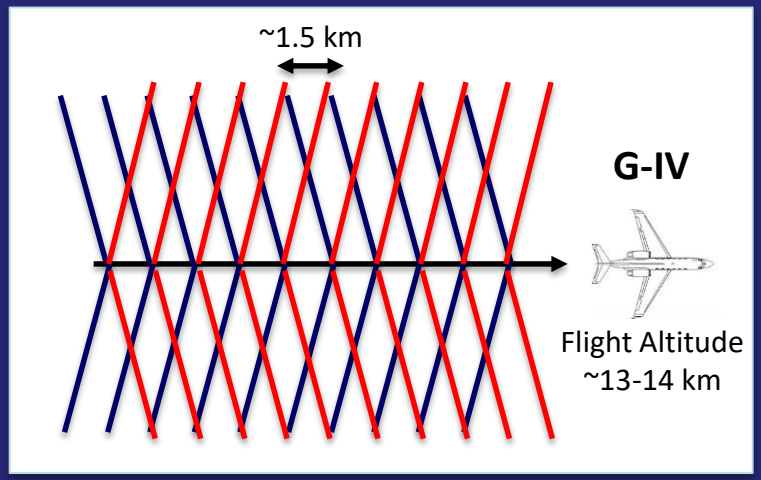
Analysis Data (target: NWS/NHC)
Ingested by AWIPS-II

Analysis Graphics (target: HRD)
Transmitted to AOML ftp

X-Band TDR System

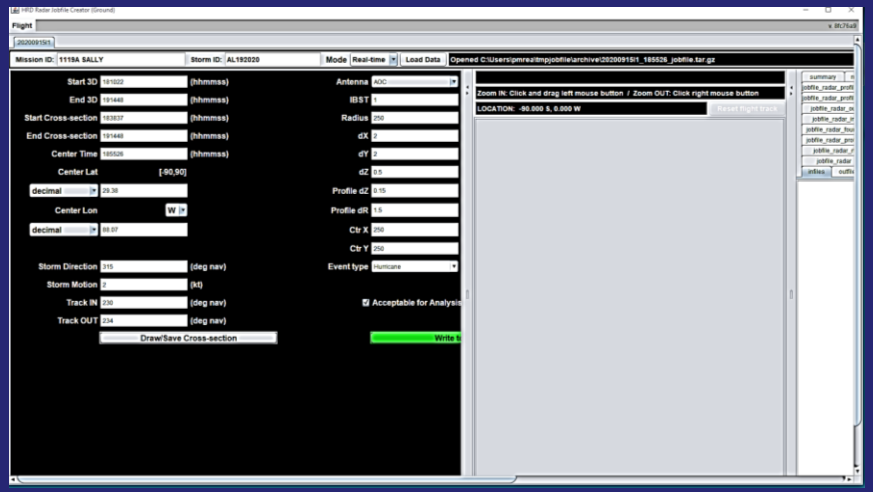
- Dual flat-plate antennas
- Dual solid state transmitter/receiver
- Typical P-3 (G-IV) operating specs:
  - Range gate: 75 (100) m
  - Pulse Repetition Freq: 2770 (3000) Hz
  - Scan rate: 15 (12) rpm
  - Nyquist interval: ± 22 (24) ms^{-1}
  - Max unambiguous range: 54 (50) km
- Short/long pulse (P-3 TDR) to get 1st 3 km



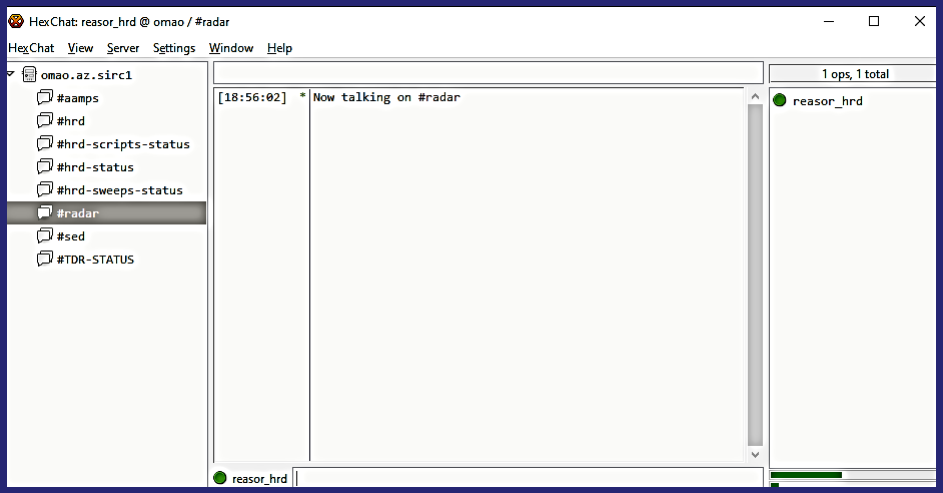


Testing the “Big 4” before the season

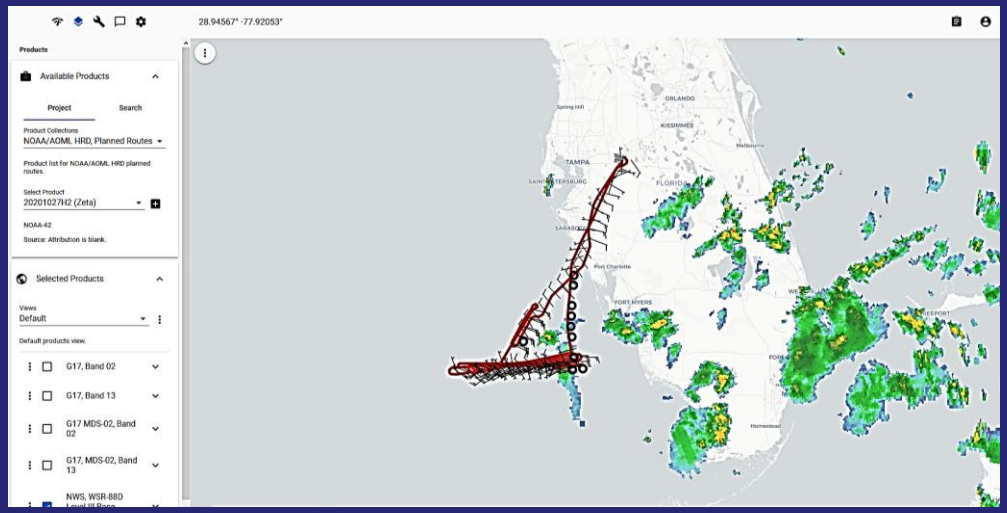
JOBFILE APP



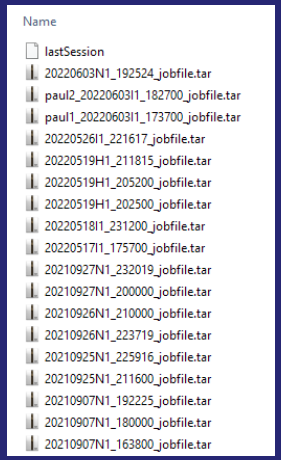
HEXCHAT

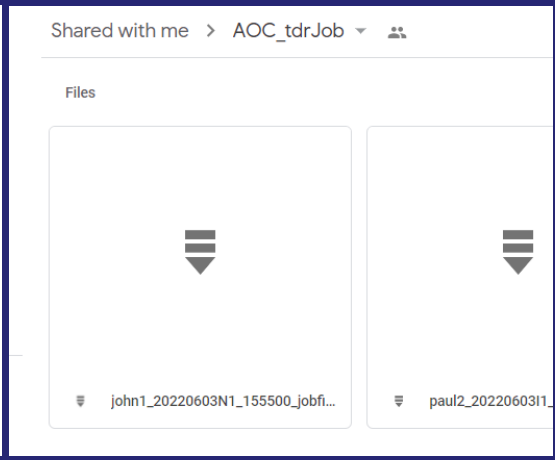


MTS



JOBFILE SUBMISSION





Obtaining key support documents

Drive: HRD/Hurricane Field Program/2022/Training/Radar

(Fillable) Radar Scientist Form

Radar Support Form
(Updated 12 June 2022)

Flight ID _____ **Storm** _____

HRD Radar Support (Aircraft/Ground) _____

AOC Data Tech _____

Ground radar support is responsible for assisting aircraft radar support with preparing the HRD radar workstation for software execution and data transmission. Through various situational awareness tools, they are able to advise the aircraft on issues pertaining to the radar software, scripts, data transmission and instrument function. Chiefly, they are responsible for generating the analysis parameter jobfiles that initiate the aircraft radar software. Specific responsibilities are detailed in the Ground Radar Support Guide located in Google Drive (HRD/Hurricane Field Program/2022/Training/Radar).

***Pre-flight Notes.**

Indicate any existing radar instrumentation issues, pre-flight radar repairs or other issues that might impact radar data collection or analyses. If none, then simply enter NONE below.

***Pre-flight Setup with Aircraft Radar Support.**

Preferably before the planeside briefing, establish Xchat communication with aircraft radar support on #radar. Check off the following tasks.

- ☐ Confirm any pre-flight issues noted above.
- ☐ Confirm latest flight pattern.
- ☐ Go through script execution. [Steps 1-8 (1-9) of P-3 (G-IV) Ground Radar Support Guide]

Ground Radar Support Guide

P-3 Radar Support Guide

On the GROUND (Updated 10 June 2022)

==========

[Check in advance that you have the following: 1) java-ready machine, 2) access to AOC_tdrJob on Google drive, 3) xchat/hexchat (or IRC client), 4) access to mts2.nasa.gov (contact Jason Dunion to set up access), 5) website seb.omao.noaa.gov added to java security exception list, and 6) launch file of java jobfile app from seb.omao.noaa.gov/tdrjob.]

****BEFORE AND SHORTLY AFTER TAKE-OFF...**

Open in web browser the shared Google drive folder: AOC_tdrJob (jobfiles will be placed here)

Establish comms with the aircraft: Xchat (join channels: #hrd and #radar, #carcah for center fix info (don't autojoin), #tdr-status for TDR instrument messages, #hrd-status for HRD radar software status, #hrd-sweeps-status for availability of TDR sweep data, #hrd-scripts-status for data transfer scripts status)

*Note: If the scripts below are not recognized, either the user has selected the wrong login at boot-up on the HRD radar workstation or the user is not at the HRD radar workstation.

On #radar, make sure aircraft radar support does the following *in the order shown* below:

1. **Open Xchat or HexChat at HRD (radar) workstation.** Ensure the following ground situational-awareness channels were autojoined: **#hrd-status, #hrd-sweeps-status, and #hrd-scripts-status**

*Note: If AOC data tech is tunneling to HRD workstation, ensure 'ssh -Y' (*not* 'ssh -X') is executed to open terminals. This will ensure proper script execution.

2. **Run 'diskusage'** (Is there enough disk space for this flight?)
   - On the ground: Check #hrd-status for disk usage in /home. If less than 30GB remaining, advise which old files to remove. Start with oldest thumb*master.tar.gz and thumb*slave.tar.gz files and then corresponding sweep directory (ls -ld YYYY*/).
3. **Run 'updateradar'** (Update the radar repository on the HRD workstation)
4. **Run 'buildradaranalysis'** (Compile the radar analysis code and generate scripts, ~1 minute)
   - On the ground: Check #hrd-status for correct branch/commit info and size of 'listerror' file (should be 20-25K when there are no analysis code compilation errors)
5. **Run 'initialcleanup'** (Start fresh: remove some old files and create a new emcdata/)
   - On the ground: Check #hrd-status for "initial_cleanup finished"

Setting up (before aircraft communication)

1) You'll have an assigned back-up … have their # stored
2) Participate in pre-flight briefing 2 h before take-off, as needed
3) Load MTS to verify connection and aircraft visibility
4) Open the AOC_tdrJob folder on Google Drive
5) On HexChat join: #hrd (general HRD comms), #radar (radar support comms), #tdr-status (TDR instrument), #hrd-sweeps-status (TDR sweep data), #hrd-status (disk usage & radar software), #hrd-scripts-status (EMC/HRD data transmission scripts), #n49-ine-corrections (G-IV INE corrections status)
6) Open browser tabs for
   - Analysis/AWIPS files: https://seb.omao.noaa.gov/pub/flight/radar/
   - EMC files: https://www.aoml.noaa.gov/ftp/pub/hrd/gamache/emclist/
   - Graphics: https://www.aoml.noaa.gov/ftp/pub/hrd/data/RTradar/2022/
7) Connect to Google Meets (*video typically not used*)

Setting up (ideally, before take off)

- Aircraft radar scientist boards ~1 h before take-off
- Set up may be interrupted by planeside briefing

***Pre-flight Notes.**

Indicate any existing radar instrumentation issues, pre-flight radar repairs or other issues that might impact radar data collection or analyses. If none, then simply enter NONE below.

***Pre-flight Setup with Aircraft Radar Support.**

Preferably before the planeside briefing, establish Xchat communication with aircraft radar support on #radar. Check off the following tasks.

- ☐ Confirm any pre-flight issues noted above.
- ☐ Confirm latest flight pattern.
- ☐ Go through script execution. [Steps 1-8 (1-9) of P-3 (G-IV) Ground Radar Support Guide]

#hrd-status

```
Jun 03 10:45:26 <Gabe_TDR>      /dev/mapper/VolGroup-LogVol02  864G  1.9G  862G   1% /home
```

```
Jun 03 10:46:08 <Gabe_TDR>      initial_cleanup beginning
Jun 03 10:46:08 <Gabe_TDR>      useg4number removed if existed
Jun 03 10:46:08 <Gabe_TDR>      blankradius removed if existed
Jun 03 10:46:08 <Gabe_TDR>      corrections.txt removed if existed
Jun 03 10:46:10 <Gabe_TDR>      ine_corrections.dat removed if existed
Jun 03 10:46:12 <Gabe_TDR>      ~/*.w* files removed if existed
Jun 03 10:46:14 <Gabe_TDR>      ~/AL*.txt files removed if existed
Jun 03 10:46:16 <Gabe_TDR>      ~/*.nc* files removed if existed
Jun 03 10:46:18 <Gabe_TDR>      ~/ftpdir/*.nc* files removed if existed
Jun 03 10:46:20 <Gabe_TDR>      ~/ftpdir/AL*.txt files removed if existed
Jun 03 10:46:22 <Gabe_TDR>      ~/ftpdir/EP*.txt files removed if existed
Jun 03 10:46:24 <Gabe_TDR>      ~/ftpdir/CP*.txt files removed if existed
Jun 03 10:46:26 <Gabe_TDR>      ~/ftpdir/*.nc* files removed if existed
Jun 03 10:46:28 <Gabe_TDR>      ~/ftpdir/*.so.gz files removed if existed
Jun 03 10:46:30 <Gabe_TDR>      ~/ftpdir/*.tar files removed if existed
Jun 03 10:46:32 <Gabe_TDR>      ~/jobfiles/* files removed if existed
Jun 03 10:46:34 <Gabe_TDR>      ~/emcdata removed if existed
Jun 03 10:46:36 <Gabe_TDR>      made ~/emcdata
Jun 03 10:46:40 <Gabe_TDR>      initial_cleanup done
```

****BEFORE AND SHORTLY AFTER TAKE-OFF...**

Open in web browser the shared Google drive folder: AOC_tdrJob (jobfiles will be placed here)

Establish comms with the aircraft: Xchat (join channels: #hrd and #radar, #carcah for center fix info (don't autojoin), #tdr-status for TDR instrument messages, #hrd-status for HRD radar software status, #hrd-sweeps-status for availability of TDR sweep data, #hrd-scripts-status for data transfer scripts status)

*Note: If the scripts below are not recognized, either the user has selected the wrong login at boot-up on the HRD radar workstation or the user is not at the HRD radar workstation.

On #radar, make sure aircraft radar support does the following *in the order shown* below:

1. **Open Xchat or HexChat at HRD (radar) workstation.** Ensure the following ground situational-awareness channels were autojoined: **#hrd-status, #hrd-sweeps-status, and #hrd-scripts-status**

*Note: If AOC data tech is tunneling to HRD workstation, ensure 'ssh -Y' (*not* 'ssh -X') is executed to open terminals. This will ensure proper script execution.

2. **Run 'diskusage'** (Is there enough disk space for this flight?)
   - On the ground: Check #hrd-status for disk usage in /home. If less than 30GB remaining, advise which old files to remove. Start with oldest thumb*master.tar.gz and thumb*slave.tar.gz files and then corresponding sweep directory (ls -ld YYYY*/).
3. **Run 'updateradar'** (Update the radar repository on the HRD workstation)
4. **Run 'buildradaranalysis'** (Compile the radar analysis code and generate scripts, ~1 minute)
   - On the ground: Check #hrd-status for correct branch/commit info and size of 'listerror' file (should be 20-25K when there are no analysis code compilation errors)
5. **Run 'initialcleanup'** (Start fresh: remove some old files and create a new emcdata/)
   - On the ground: Check #hrd-status for "initial_cleanup finished"

```
Jun 03 09:08:38 *       Now talking on #hrd-status
Jun 03 10:39:43 *       Gabe_TDR (sysop@chatting.up.a.storm) has joined
Jun 03 10:43:50 <Gabe_TDR>      buildradaranalysis beginning
Jun 03 10:43:50 <Gabe_TDR>      making bin directory if needed
Jun 03 10:43:50 <Gabe_TDR>      compiliations and build started
Jun 03 10:44:38 <Gabe_TDR>      builds and compiles done
Jun 03 10:44:38 <Gabe_TDR>      copying executables into /home/sysop/hrdradar/bin
Jun 03 10:44:38 <Gabe_TDR>      -rw-rw-r-- 1 sysop sysop 22131 Jun  3 14:44 listerror
Jun 03 10:44:38 <Gabe_TDR>      hrdradar: branch 'dev', commit: 081bfe8, 2022-06-02 17:38:46 -0400
Jun 03 10:44:40 <Gabe_TDR>      buildradaranalysis done
```

Setting up (ideally, before take off)

P-3

6. **Run 'checksweeps'** (Monitors TDR data files on HRD workstation - opens 1 window)
   - On the ground: Monitor #hrd-sweeps-status after TDR is turned on.
     - Verify begin/latest fore and aft sweep times. Any gaps in sweep recording will be shown (note: /home/sysop/YYYYMMDDAI should be populated with fore/aft sweep files *TM*/*TS* every 5 to 6 seconds).
     - Verify similar average size of fore and aft sweep files (updated every 3 min).
     - Immediately inform AOC data tech of anomalies in fore/aft sweep recording.
7. **Run 'tdrProcSend'** (Controls EMC radial processing and netman transfer - opens 2 windows)
   - On the ground: Monitor tdrProcSend status in #hrd-scripts-status. Initially, it should remain in an "aircraftTailRadarProcessor: No files in /home/sysop/emcdata; xferTDR: waiting for dat files" status.
8. **Run 'radarsync'** preferably in a new terminal (Controls radar analysis software execution)
   - On the ground: Monitor radarsync status in #hrd-scripts-status. Initially, it should remain in a "radarsync: Checking for new jobfiles; radarsync: NO jobfiles on netman" status.

G-IV

6. **Run 'checksweeps'** (Monitors TDR data files on HRD workstation - opens 1 window)
   - On the ground: Monitor #hrd-sweeps-status after TDR is turned on.
     - Verify begin/latest fore and aft sweep times. Any gaps in sweep recording will be shown (note: /home/sysop/YYYYMMDDAI should be populated with fore/aft sweep files *TM*/*TS* every 5 to 6 seconds).
     - Verify similar average size of fore and aft sweep files (updated every 3 min).
     - Immediately inform AOC data tech of anomalies in fore/aft sweep recording.
7. **Run 'checkcorrections'** (Monitors ine corrections files on HRD workstation - opens 1 window)
   - "0,10,20,30,40,50 * * * * /home/sysop/bin/giv_ine_correction_script 1> giv_scriptoutput 2> giv_scriptoutput_error" will be *uncommented* in HRD sysop crontab
   - Once radar recording begins, 'ine_corrections.dat' is created at the subsequent 10-min mark and then appended to every 10 minutes. 'corrections.txt' containing the ine correction file path is created and triggers use of corrections in the radar analysis software. 'swps_list' lists the radar sweep headers used for the latest corrections and 'ine_corrections.png' displays the most recent 10 minutes of ine corrections.
   - On the ground: Monitor #n49-ine-corrections for current ine_corrections.dat file
8. **Run 'tdrProcSend'** (Controls EMC radial processing and netman transfer - opens 2 windows)
   - On the ground: Monitor tdrProcSend status in #hrd-scripts-status. Initially, it should remain in an "aircraftTailRadarProcessor: No files in /home/sysop/emcdata; xferTDR: waiting for dat files" status.
9. **Run 'radarsync'** preferably in a new terminal (Controls radar analysis software execution)
   - On the ground: Monitor radarsync status in #hrd-scripts-status. Initially, it should remain in a "radarsync: Checking for new jobfiles; radarsync: NO jobfiles on netman" status.

#hrd-scripts-status

```
Jun 03 11:03:22 <Gabe_TDR>      radarsync: Checking for new jobfiles
Jun 03 11:03:24 <Gabe_TDR>      radarsync: NO jobfiles on netman
Jun 03 11:03:31 <Gabe_TDR>      xferTDR: waiting for dat files
Jun 03 11:03:31 <Gabe_TDR>      aircraftTailRadarProcessor: No files in /home/sysop/emcdata
```

Once TDR is turned on (after take-off)

***In-flight Setup with Aircraft Radar Support.**

After radar recording has begun, reestablish Xchat communication with aircraft radar support on #radar. Check off the following tasks.

☐ Verify proper TDR system function as described in Ground Radar Support Guide.

Indicate below any issues identified in #hrd-sweeps-status or any radar instrumentation issues evident in the radar displays. If none, then simply enter NONE below.

- Remind aircraft radar support: Monitor TDR display & relay special wx conditions

#tdr-status

Set visual/audible alerts for this channel!

```
* TDR_3TM (radaropTM@461085C0.9A9FD08E.F03B8575.IP) has joined
* TDR_3TS (radaropTS@7F4A0891.8E59D767.F03B8575.IP) has joined
<TDR_3TM> Bite fault cleared, PARKER SERVO PWR OFF
<TDR_3TS> Bite fault cleared PARKER SERVO PWR OFF
<TDR_3TM> All BITE faults are now cleared
<TDR_3TM> Bite fault cleared, GATE Disabled
<TDR_3TS> All BITE faults are now cleared
<TDR_3TS> Bite fault cleared GATE Disabled
```

#hrd-sweeps-status

```
<Gabe_TDR>      IGAP =                    30
<Gabe_TDR>      CALLING SYSOPCHANGE
<Gabe_TDR>      RETURNED FROM SYSOPCHANGE
<Gabe_TDR>      DIRECTORY IS /home/sysop/20220603N1/
<Gabe_TDR>      FORE SWEEPS BEGIN AT:
<Gabe_TDR>     20220603 144958
<Gabe_TDR>      AFT SWEEPS BEGIN AT:
<Gabe_TDR>     20220603 145130
<Gabe_TDR>      FORE GAP OF                  525  SECONDS ENDING AT:
<Gabe_TDR>     20220603 172356
<Gabe_TDR>      LATEST FORE SWEEP IS:
<Gabe_TDR>     20220603 172356
<Gabe_TDR>      LATEST AFT SWEEP IS:
<Gabe_TDR>     20220603 172757
```

TDR now recording

- On the ground: Monitor #hrd-sweeps-status after TDR is turned on.
  - Verify begin/latest fore and aft sweep times. Any gaps in sweep recording will be shown (note: /home/sysop/YYYYMMDDAI should be populated with fore/aft sweep files *TM*/*TS* every 5 to 6 seconds).
  - Verify similar average size of fore and aft sweep files (updated every 3 min).
  - Immediately inform AOC data tech of anomalies in fore/aft sweep recording.

NEW

9. After TDR is turned on, look at master (fore) and slave (aft) displays (labeled TM and TS) to ensure proper radar functioning (e.g., correct radar altitude and flat surface when straight and level). Make sure they are similar and both show returns from the sea surface.

Once TDR is turned on (after take-off)

- On the G-IV, INE corrections are computed using 10-min blocks of INE and GPS data
- INE corrections must exist for the entire analysis period, so carefully monitor #n49-ine-corrections

- "0,10,20,30,40,50 * * * * /home/sysop/bin/giv_ine_correction_script 1> giv_scriptoutput 2> giv_scriptoutput_error" will be *uncommented* in HRD sysop crontab
- Once radar recording begins, 'ine_corrections.dat' is created at the subsequent 10-min mark and then appended to every 10 minutes. 'corrections.txt' containing the ine correction file path is created and triggers use of corrections in the radar analysis software. 'swps_list' lists the radar sweep headers used for the latest corrections and 'ine_corrections.png' displays the most recent 10 minutes of ine corrections.
- On the ground: Monitor #n49-ine-corrections for current ine_corrections.dat file

#n49-ine-corrections

```
<Gabe_TDR>  -rw-r--r-- 1 sysop sysop 15281350 Jun  3 17:17 /home/sysop/220603N1_ine_corrections.dat
<Gabe_TDR>  -rw-r--r-- 1 sysop sysop       32 Jun  3 18:00 /home/sysop/corrections.txt
<Gabe_TDR>  -rw-r--r-- 1 sysop sysop 23717150 Jun  3 18:00 /home/sysop/ine_corrections.dat
<Gabe_TDR>  -rw-r--r-- 1 sysop sysop    77075 Jun  3 18:00 /home/sysop/ine_corrections.png
<Gabe_TDR>  -rw-r--r-- 1 sysop sysop 15281350 Jun  3 17:17 /home/sysop/220603N1_ine_corrections.dat
<Gabe_TDR>  -rw-r--r-- 1 sysop sysop       32 Jun  3 18:00 /home/sysop/corrections.txt
<Gabe_TDR>  -rw-r--r-- 1 sysop sysop 23717150 Jun  3 18:00 /home/sysop/ine_corrections.dat
<Gabe_TDR>  -rw-r--r-- 1 sysop sysop    77075 Jun  3 18:00 /home/sysop/ine_corrections.png
<Gabe_TDR>  -rw-r--r-- 1 sysop sysop 15281350 Jun  3 17:17 /home/sysop/220603N1_ine_corrections.dat
<Gabe_TDR>  -rw-r--r-- 1 sysop sysop       32 Jun  3 18:10 /home/sysop/corrections.txt
<Gabe_TDR>  -rw-r--r-- 1 sysop sysop 25433000 Jun  3 18:10 /home/sysop/ine_corrections.dat
<Gabe_TDR>  -rw-r--r-- 1 sysop sysop   105224 Jun  3 18:10 /home/sysop/ine_corrections.png
<Gabe_TDR>  -rw-r--r-- 1 sysop sysop 15281350 Jun  3 17:17 /home/sysop/220603N1_ine_corrections.dat
<Gabe_TDR>  -rw-r--r-- 1 sysop sysop       32 Jun  3 18:10 /home/sysop/corrections.txt
<Gabe_TDR>  -rw-r--r-- 1 sysop sysop 25433000 Jun  3 18:10 /home/sysop/ine_corrections.dat
<Gabe_TDR>  -rw-r--r-- 1 sysop sysop   105224 Jun  3 18:10 /home/sysop/ine_corrections.png
<Gabe_TDR>  -rw-r--r-- 1 sysop sysop 15281350 Jun  3 17:17 /home/sysop/220603N1_ine_corrections.dat
<Gabe_TDR>  -rw-r--r-- 1 sysop sysop       32 Jun  3 18:20 /home/sysop/corrections.txt
<Gabe_TDR>  -rw-r--r-- 1 sysop sysop 27131250 Jun  3 18:20 /home/sysop/ine_corrections.dat
<Gabe_TDR>  -rw-r--r-- 1 sysop sysop    78159 Jun  3 18:20 /home/sysop/ine_corrections.png
<Gabe_TDR>  -rw-r--r-- 1 sysop sysop 15281350 Jun  3 17:17 /home/sysop/220603N1_ine_corrections.dat
<Gabe_TDR>  -rw-r--r-- 1 sysop sysop       32 Jun  3 18:20 /home/sysop/corrections.txt
<Gabe_TDR>  -rw-r--r-- 1 sysop sysop 27131250 Jun  3 18:20 /home/sysop/ine_corrections.dat
<Gabe_TDR>  -rw-r--r-- 1 sysop sysop    78159 Jun  3 18:20 /home/sysop/ine_corrections.png
<Gabe_TDR>  -rw-r--r-- 1 sysop sysop 15281350 Jun  3 17:17 /home/sysop/220603N1_ine_corrections.dat
<Gabe_TDR>  -rw-r--r-- 1 sysop sysop       32 Jun  3 18:30 /home/sysop/corrections.txt
<Gabe_TDR>  -rw-r--r-- 1 sysop sysop 28828550 Jun  3 18:30 /home/sysop/ine_corrections.dat
<Gabe_TDR>  -rw-r--r-- 1 sysop sysop   108659 Jun  3 18:30 /home/sysop/ine_corrections.png
```

1810 means corrections are available for ~1800-1810
…but not exactly… so caution is advised

If the analysis period ends at 1809, it is best to wait for the 1820 corrections to show up

Before IP…

Still collecting TDR data?
Data transfer scripts running?

****BEFORE REACHING IP…**

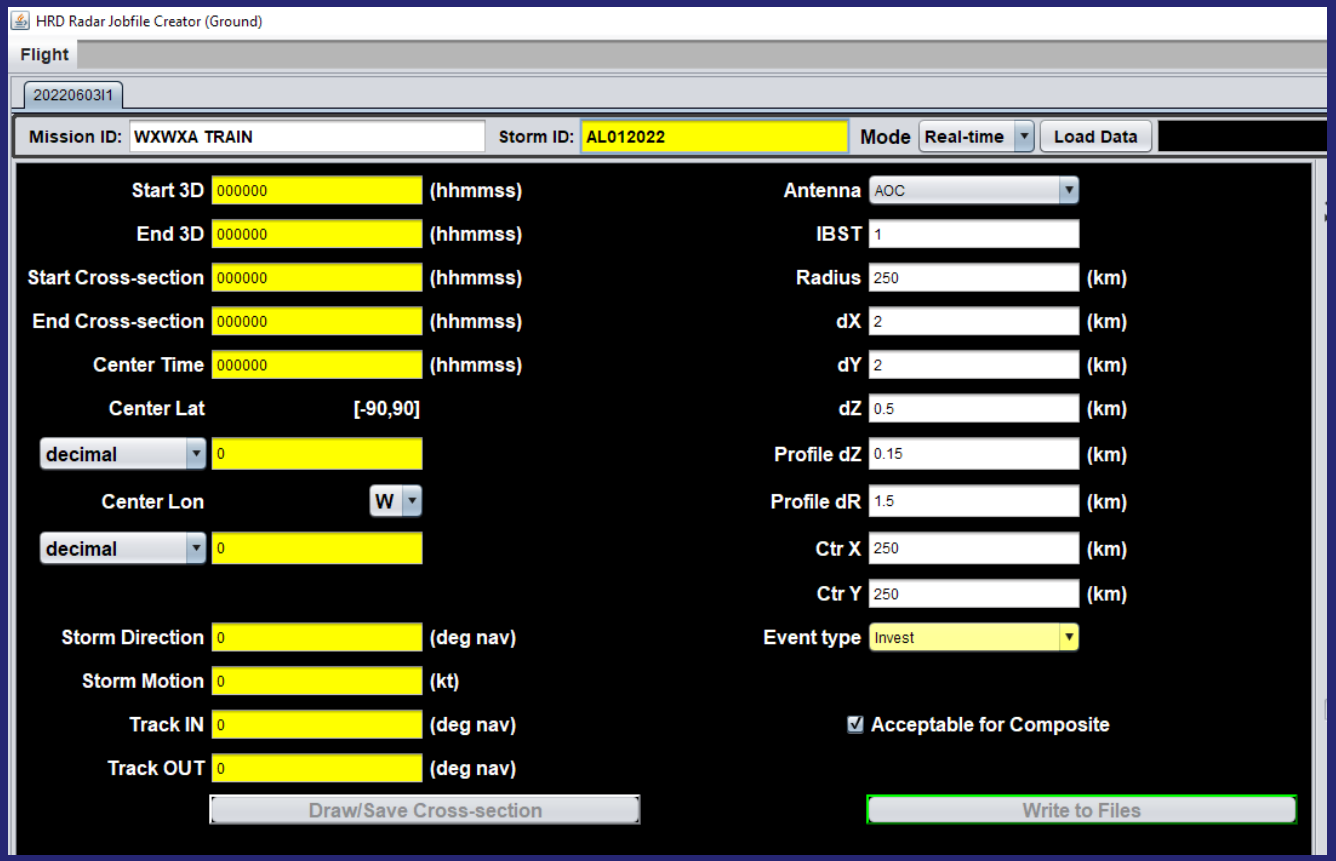
Verify current radar recording and similar fore/aft file size in #hrd-sweeps-status as in (6) above. **Verify** in #hrd-scripts-status that the **radarsync status** is "radarsync: Checking for new jobfiles"

Monitor flight track: mts2.nasa.gov

- (If no track data is showing up, first verify that aircraft has turned on iwg1 … then, communicate with Jason Dunion to see if it is an MTS2 issue)
- Get time/lat/lon along flight track via waypoints (turn off barbs and swaths to access)

- Join #carcah now for future Vortex Data Messages (VDMs)

Before IP…



Open jobfile creator by clicking on java app. (This can be done before takeoff, but make sure Flight Director has first entered a Mission ID. If you see no value in that field, close the app and wait a bit longer. It will be populated before takeoff.)

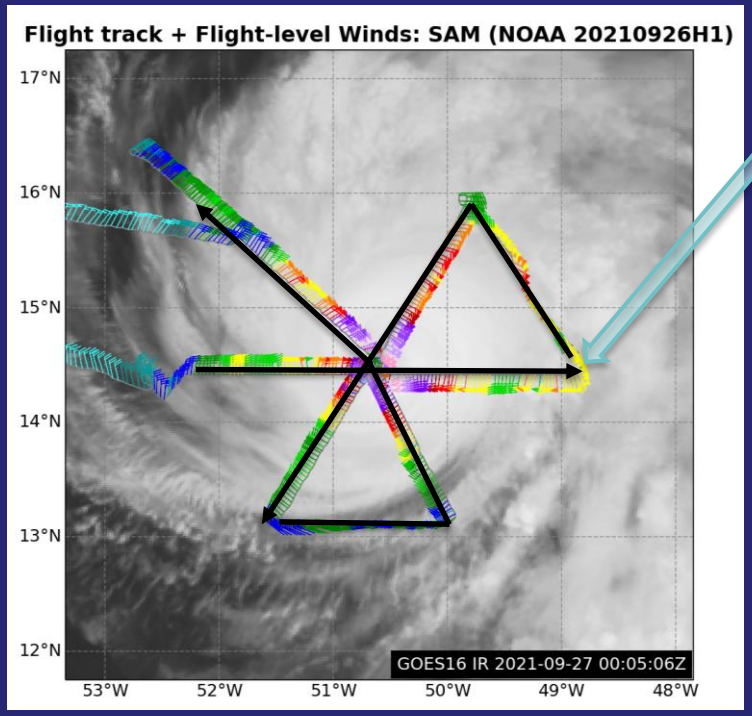
- **Select** 'Flight' and 'Add from AOC'. Choose the current flight. Enter the values of the fields with yellow background.

- If there is not an appropriate value already in the **Storm ID** field, enter one in the form ALxxYYYY, EPxxYYYY or CPxxYYYY, where xx is the TD number or 90-99 for an invest—in a tasked mission (note: a recent NHC storm discussion will have the correct ID).

- Uncheck the '**Acceptable for Composite**' box if present analysis should not to be included in the real-time graphics composite (radials and analysis will still be transmitted to EMC and AWIPS-II, respectively). Paul Reasor can advise if unsure, but the default is box checked.

Before IP… Developing an Analysis Strategy

Routine TDR Pattern

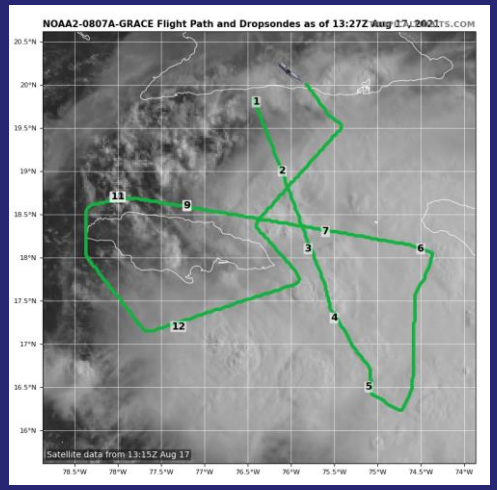


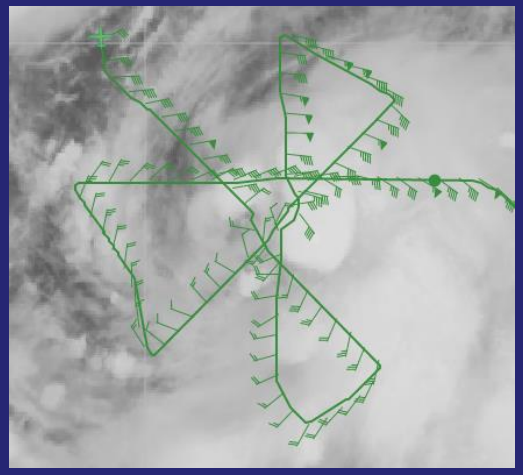
- Always end an analysis period before turn downwind (goal: minimize lag between center fix and transmission to AWIPS)
- Data beyond r=250 km won't be included, so end analysis period accordingly
- If precip. ends well before end of final radial leg, you can end analysis period early.
- If precip. extends beyond IP (or end point) and is within 250 km of expected center, analyze it.

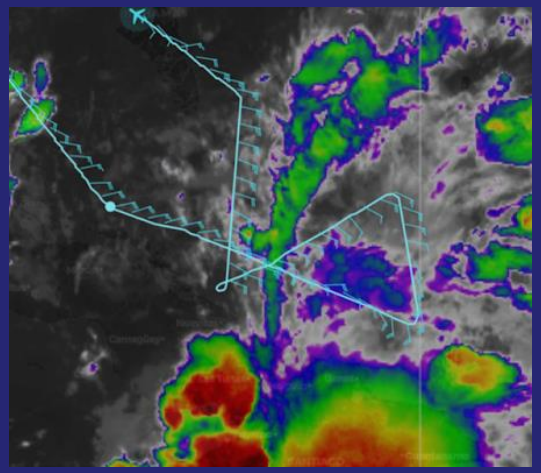
Complication: If targeting EMC data assimilation cycle T, and end of leg runs up against collection window T+3h, the *entire pass* may not be processed and transmitted in time for cycle T (receipt cutoff ~T+3.5h). In this case, plan to end the analysis period early enough to meet receipt cutoff.

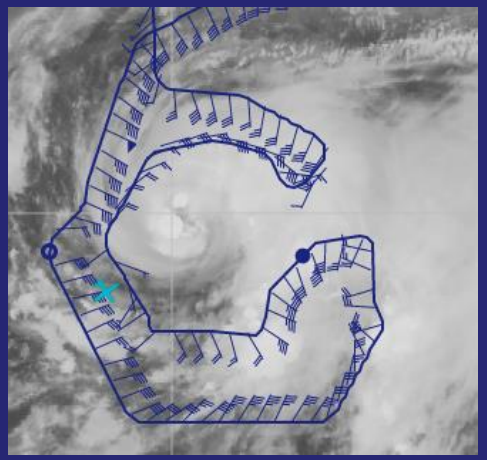
Before IP… Developing an Analysis Strategy

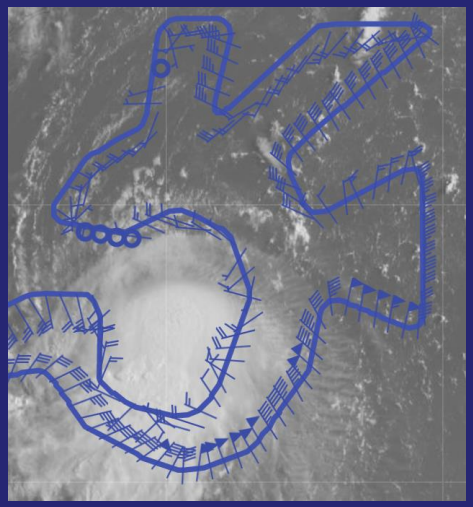
What would you do?
Consider your strategy

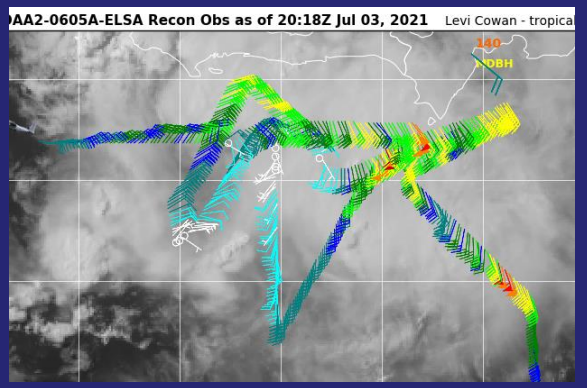




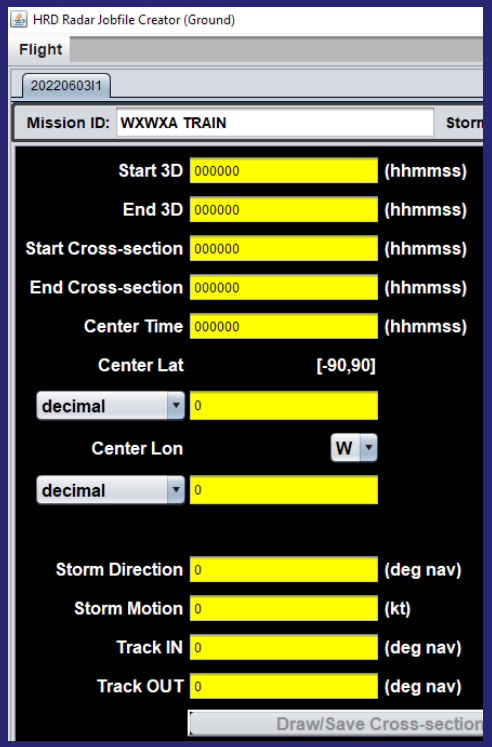








While in Pattern: Populate Jobfile App



Get from MTS: **Start/End 3D** and **Start/End Cross-section** times. For a penetration + downwind leg, one could set: Start 3D = Start Cross-section (inbound leg), End Cross-section = end time of out outbound leg, End 3D = end time of downwind leg.

Get via Xchat: **Center Time, Center Lat/Lon** (in decimal, as reported in #carcah Vortex Data Message, VDM). Center Time and Center Lat/Lon from a *fix* VDM take precedence over an estimate from HRD scientists. In any event, make sure it is a good circulation center estimate.

Frequently used back-up: Estimate **Center Time** and **Lat/Lon** from MTS flight-level wind shift.

Get the **Storm Direction/Motion** (met heading/kt) from NHC website. If actual motion based on center fixes appears significantly different from NHC estimate, you can modify the motion value during the flight. ONLY do this if you are sure the difference is not the result of transient track "wobbles". For systems with an ill-defined center, it is best to use the NHC estimate.

Click 'Draw/Save Cross-section' to **set** the **Track IN/OUT** after Start/End Cross-section and Center fix info are filled. This plots the flight track through the End Cross-section time. ALWAYS do this step since it bundles flight track data with the jobfile for use in real-time radar graphics applications. It also serves as a check on the accuracy of the storm Center Time and Lat/Lon as well as the Start/End times of a Cross-section.

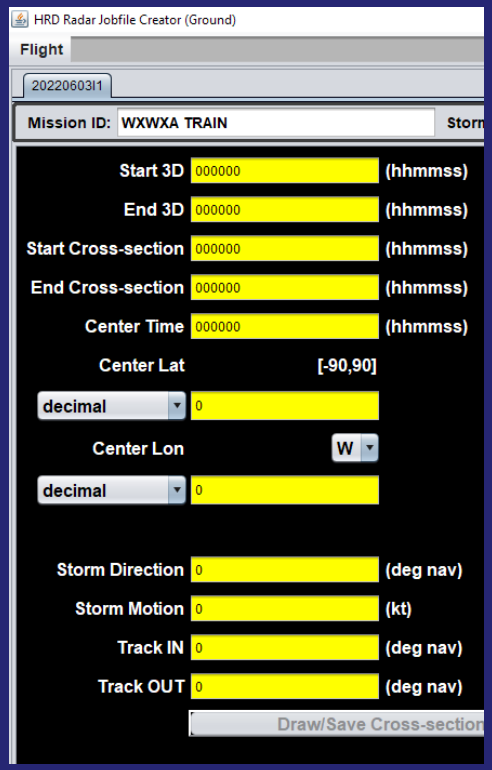
Select the **Event type**: 'Invest' for invest, 'Tropical Storm' for TD or TS, 'Hurricane' for Cat 1-2, and 'Major Hurricane' for Cat 3-5 hurricane.

Time (HHMMSS)	Event (Radar or Weather)
0751Z	TDR up
	Use NHC 9Z motion: 320 @ 13 kt
1007Z	W-SE pass: VDM 19.94,81.53
	Kind of an odd "capping" of DBZ at ~5.5 km in profile analysis
1106Z	N49 and N43 next to each other ... good opportunity for TDR analysis intercomparison
1126Z	NE-SW pass: VDM 20.19,81.57
	Had to estimate Track In/Out since no IWG1 transmitting at the time
1232Z	S-N pass: MTS center est 20.34,81.76 (late VDM was consistent)
1400Z	W-E pass: Way to S of center ... Best guess based on FL wind
	For Level 2 include data from downwind turn (>1420Z) to Cuba coast
	Scientifically, an interesting case of vortex restructuring. Possible diabatically driven
	advection of LLC toward convection between LLC and MLC?

For G-IV circumnavigations: Based on the sampled winds. For 180 n mi and beyond, 'Invest' or 'Tropical Storm'. For 90 n mi, 'Hurricane' is used if sampling the large gradient region of hurricane winds.

While in Pattern: Populate Jobfile App

What if the aircraft significantly misses the flight-level center?



(If a pass is *not close to the center*, use either the time of closest center approach or the midpoint time of the **Start/End 3D** times as the **Center Time**, and set the **Start/End Cross-section** times 2 seconds before/after **Center Time**. Best practice is to center an analysis on the storm, so use best estimate of center in this case. For large-scale patterns like a lawnmower pattern, it may be preferable to center analyses on the various segments of the pattern.)

If a *center pass is done* (penetration), **Center Time** MUST be your best estimate of when the aircraft passed closest to storm center … otherwise inbound and outbound profiles may fail.

(The G-IV flight track will likely not pass close to the center. It is best for the QC method, especially if analyzing the inner 90-n-mi circumnavigation or a center overflight, to center the analysis on your estimate of circulation center *during the analysis period*. **Center Time** would correspond to your center estimate. For flight segments further away from the circulation center, you may center the analysis on those segments and use the midpoint time as the **Center Time**. Set the **Start/End Cross-section** times 2 seconds before/after the **Center Time**.)

Note: Start/End Cross-section Times & Track In/Out are only needed for **profile analyses**.

If a pass is not close to the center, set **Start/End Cross-section Times 2 seconds before/after Center Time** and leave **Track In/Out equal to 0**.

While in Pattern: Populate Jobfile App

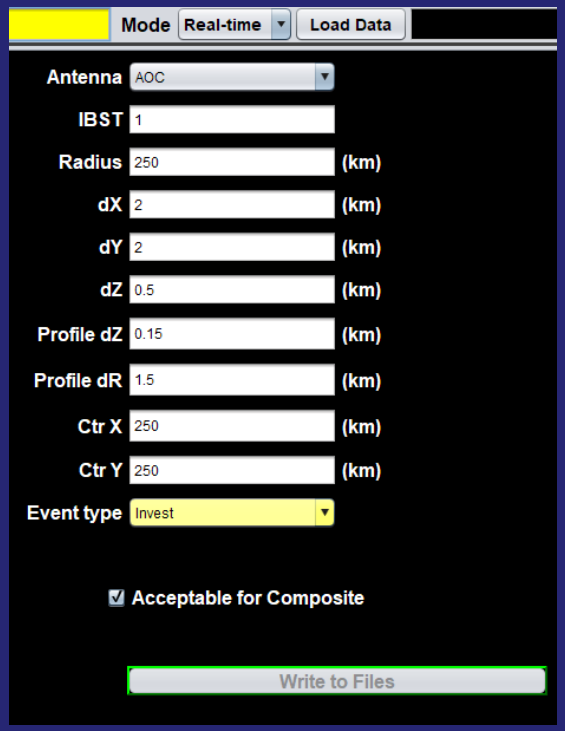
Is data available for analysis period?
Data transfer script still running?

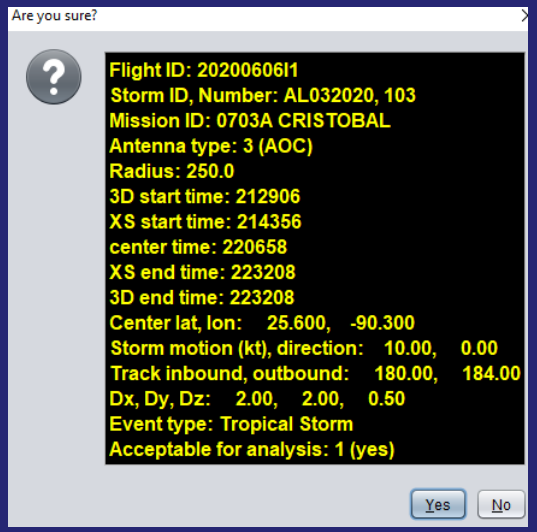
****AFTER COMPLETION OF FLIGHT SEGMENT FOR ANALYSIS…**

Verify valid radar sweeps past the End 3D time in #hrd-sweeps-status as in (6) above. **Verify** in #hrd-scripts-status that the **radarsync status** is "radarsync: Checking for new jobfiles"

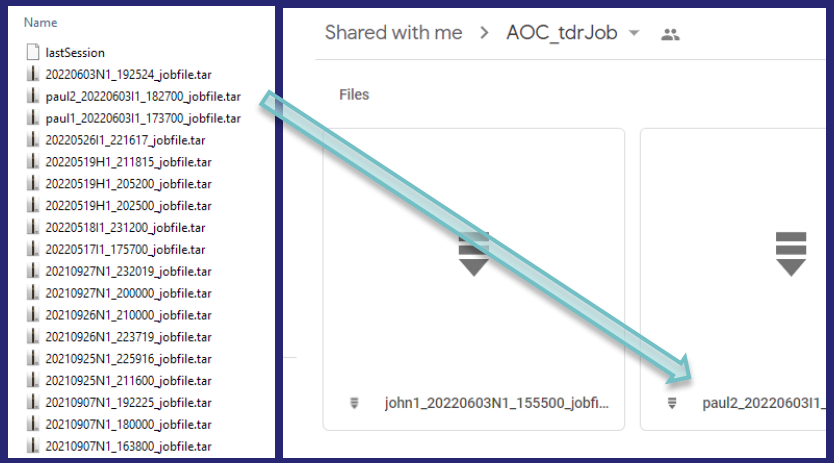
Click 'Write to Files' - creates *.tar.gz file of jobfiles. Carefully review the summary information presented and **click** 'Yes' if correct. Path to jobfile will be shown in top-right field.

Note 'tmpjobfile' path





Submit Jobfile and Confirm Transmission



Upload *.tar.gz file to AOC ground server:

1. Rename YYYYMMDDAI_HHMMSS_jobfile.tar.gz in your local 'tmpjobfile' directory userX_YYYYMMDDAI_HHMMSS_jobfile.tar.gz, where 'user' is your first name and 'X' indicates which jobfile in the sequence (e.g., '1' for the first jobfile submitted).
2. Place userX_YYYYMMDDAI_HHMMSS_jobfile.tar.gz into AOC_tdrJob on Google drive

Communicate to aircraft radar support via Xchat that jobfile has been sent.

Check #hrd-scripts-status for **jobfile message** "radarsync: start analysis with /home/sysop/*_jobfile.tar.gz". While the software is running, there will be no radarsync messages. Afterwards, it should return to "radarsync: Checking for new jobfiles" status.

Check #hrd-status for **software status** (review summary info, 1st pass, 2nd pass, 3rd pass, superobbing, EMC data dumped, 3D solution, listing of files, then job done). Note: The 1st pass software is not run under the "major hurricane" setting.

Check #hrd-scripts-status for **processing and transmission of EMC radials messages** "aircraftTailRadarProcessor: *_radials.txt.gz has size #; aircraftTailRadarProcessor: Processing *_radials.txt.gz; xferTDR: *.dat sent to netman; xferTDR: Transfer to netman complete"

(Leave app open to build future jobfiles. If closed, launch again and select 'Load Last Session'. Don't forget to reset 'Acceptable for Composite' as needed.)

Monitoring Software Status

#hrd-status

```
<HRDWS_N43>     Analysis job beginning
<HRDWS_N43>     at time
<HRDWS_N43>     Thu May 26 20:18:40 UTC 2022
<HRDWS_N43>     summary test follows
<HRDWS_N43>     Flight ID: 20220526I1
<HRDWS_N43>     Storm ID, Number: AL892022, 189
<HRDWS_N43>     Mission ID: WXWXA TRAIN
<HRDWS_N43>     Antenna type: 3 (AOC)
<HRDWS_N43>     Radius: 250.0
<HRDWS_N43>     3D start time: 182100
<HRDWS_N43>     XS start time: 182100
<HRDWS_N43>     center time: 182601
<HRDWS_N43>     XS end time: 183100
<HRDWS_N43>     3D end time: 183100
<HRDWS_N43>     Center lat, lon:     28.430,    -79.810
<HRDWS_N43>     Storm motion (kt), direction:     0.00,     0.00
<HRDWS_N43>     Track inbound, outbound:      70.00,     70.00
<HRDWS_N43>     Dx, Dy, Dz:     2.00,     2.00,     0.50
<HRDWS_N43>     Event type: Invest
<HRDWS_N43>     Acceptable for composite: 0 (no)
<HRDWS_N43>     at time
<HRDWS_N43>     Thu May 26 20:18:43 UTC 2022
<HRDWS_N43>     checking whether files exist beyond end time
<HRDWS_N43>     checking
<HRDWS_N43>     checking
<HRDWS_N43>     first pass of interpolation starting
<HRDWS_N43>     at time
<HRDWS_N43>     Thu May 26 20:18:54 UTC 2022
<HRDWS_N43>     finished first pass of interpolation
<HRDWS_N43>     at time
<HRDWS_N43>     Thu May 26 20:19:12 UTC 2022
<HRDWS_N43>     second pass of interpolation starting
<HRDWS_N43>     at time
<HRDWS_N43>     Thu May 26 20:19:16 UTC 2022
<HRDWS_N43>     finished second pass of interpolation
<HRDWS_N43>     at time
<HRDWS_N43>     Thu May 26 20:19:36 UTC 2022
<HRDWS_N43>     third pass of interpolation started
<HRDWS_N43>     at time
<HRDWS_N43>     Thu May 26 20:19:46 UTC 2022
<HRDWS_N43>     third pass of interpolation finished
<HRDWS_N43>     at time
<HRDWS_N43>     Thu May 26 20:20:22 UTC 2022
<HRDWS_N43>     superobing wind solution and inbound and 3D wind solutions started
<HRDWS_N43>     at time
<HRDWS_N43>     Thu May 26 20:20:29 UTC 2022
<HRDWS_N43>     EMC data dumped to directory emcdata
<HRDWS_N43>     at time
<HRDWS_N43>     Thu May 26 20:20:31 UTC 2022
<HRDWS_N43>     total 728
<HRDWS_N43>     -rw-rw-r-- 1 sysop sysop 743330 May 26 20:20 220526I1_1821_1831_radials.txt.gz
<HRDWS_N43>     drwxrwxr-x 2 sysop sysop      6 May 26 17:09 harvest
<HRDWS_N43>     3D wind solution started
<HRDWS_N43>     at time
<HRDWS_N43>     Thu May 26 20:20:34 UTC 2022
<HRDWS_N43>     superobing finished
<HRDWS_N43>     3D wind solution finished
<HRDWS_N43>     at time
<HRDWS_N43>     Thu May 26 20:27:58 UTC 2022
<HRDWS_N43>     -rw-rw-r-- 1 sysop sysop  1686 May 26 20:20 220526I1_1826_vert_inbound.w.gz
<HRDWS_N43>     -rw-rw-r-- 1 sysop sysop  1696 May 26 20:20 220526I1_1826_vert_inbound_fall.w.gz
<HRDWS_N43>     -rw-rw-r-- 1 sysop sysop  1690 May 26 20:20 220526I1_1826_vert_inbound_rel.w.gz
<HRDWS_N43>     -rw-rw-r-- 1 sysop sysop  1516 May 26 20:28 220526I1_1826_vert_outbound.w.gz
<HRDWS_N43>     -rw-rw-r-- 1 sysop sysop  1521 May 26 20:28 220526I1_1826_vert_outbound_fall.w.gz
<HRDWS_N43>     -rw-rw-r-- 1 sysop sysop  1520 May 26 20:28 220526I1_1826_vert_outbound_rel.w.gz
<HRDWS_N43>     -rw-rw-r-- 1 sysop sysop 63943 May 26 20:27 220526I1_1826_xy.w.gz
<HRDWS_N43>     -rw-rw-r-- 1 sysop sysop 130 May 26 20:20 220526I1_1821_1831_radials.so.gz
<HRDWS_N43>     -rw-rw-r-- 1 sysop sysop 204800 May 26 20:28 220526I1_1821_1831_analysis.tar
<HRDWS_N43>     Job done
<HRDWS_N43>     at time
<HRDWS_N43>     Thu May 26 20:28:08 UTC 2022
```

#hrd-scripts-status

```
<hrdworkstation>        xferTDR: waiting for dat files
<hrdworkstation>        aircraftTailRadarProcessor: 220519H1_2113_2123_radials.txt.gz has size 3564883
<hrdworkstation>        aircraftTailRadarProcessor: 220519H1_2113_2123_radials.txt.gz has size 3564883
<hrdworkstation>        xferTDR: waiting for dat files
<hrdworkstation>        aircraftTailRadarProcessor: No files in /home/sysop/emcdata
<hrdworkstation>        aircraftTailRadarProcessor: Processing 220519H1_2113_2123_radials.txt.gz
<hrdworkstation>        xferTDR: waiting for dat files
<hrdworkstation>        aircraftTailRadarProcessor: No files in /home/sysop/emcdata
<hrdworkstation>        xferTDR: 20220519H1189-2113.dat sent to netman
<hrdworkstation>        xferTDR: 20220519H1189-2118.dat sent to netman
<hrdworkstation>        xferTDR: 20220519H1189-2123.dat sent to netman
<hrdworkstation>        xferTDR: Transfer to netman complete
<hrdworkstation>        aircraftTailRadarProcessor: No files in /home/sysop/emcdata
<hrdworkstation>        xferTDR: waiting for dat files
```


- Rule of Thumb: “Job done” in ~1/3 data collection period

Checking File Transmission

https://seb.omao.noaa.gov/pub/flight/radar/YYYYMMDDAI/

Index of /pub/flight/radar/20220603N1

Name	Last modified	Size	Description
Parent Directory		-	
220603N1_1550_1559_analysis.tar	2022-06-03 17:05	190K	
220603N1_1550_1559_radials.so.gz	2022-06-03 17:05	50	
220603N1_1555_vert_inbound.nc.gz	2022-06-03 17:09	2.5K	
220603N1_1555_vert_inbound.w.gz	2022-06-03 18:07	1.4K	
220603N1_1555_vert_inbound_fall.nc.gz	2022-06-03 17:09	2.5K	
220603N1_1555_vert_inbound_fall.w.gz	2022-06-03 18:07	1.4K	
220603N1_1555_vert_inbound_rel.nc.gz	2022-06-03 17:09	2.5K	
220603N1_1555_vert_inbound_rel.w.gz	2022-06-03 18:08	1.4K	
220603N1_1555_vert_outbound.nc.gz	2022-06-03 17:09	2.4K	
220603N1_1555_vert_outbound.w.gz	2022-06-03 18:08	1.4K	
220603N1_1555_vert_outbound_fall.nc.gz	2022-06-03 17:09	2.4K	
220603N1_1555_vert_outbound_fall.w.gz	2022-06-03 18:09	1.4K	
220603N1_1555_vert_outbound_rel.nc.gz	2022-06-03 17:09	2.4K	
220603N1_1555_vert_outbound_rel.w.gz	2022-06-03 18:09	1.4K	
220603N1_1555_xy.nc.gz	2022-06-03 17:09	238K	
220603N1_1555_xy.w.gz	2022-06-03 18:10	62K	
AWIPSMaxdb_220603N1_1555z.nc.gz	2022-06-03 17:09	3.8K	
AWIPSWindComponents_220603N1_1555z.nc.gz	2022-06-03 17:09	60K	
john1_20220603N1_155500_jobfile.tar.gz	2022-06-03 17:09	1.6K	

(On the aircraft files retrieved from ~/ftpdir)

https://www.aoml.noaa.gov/ftp/pub/hrd/gamache/emclist/

- 202205171553_189_42.list.gz
- 202205171558_189_42.list.gz
- 202205171603_189_42.list.gz
- 202205182307_189_43.list.gz
- 202205182312_189_43.list.gz
- 202205182338_189_43.list.gz
- 202205182343_189_43.list.gz
- 202205182348_189_43.list.gz
- 202205192020_189_42.list.gz
- 202205192025_189_42.list.gz
- 202205192049_189_42.list.gz
- 202205192054_189_42.list.gz
- 202205192113_189_42.list.gz
- 202205192118_189_42.list.gz
- 202205192123_189_42.list.gz
- 202205261821_189_43.list.gz
- 202205261826_189_43.list.gz
- 202205262214_189_43.list.gz
- 202205262219_189_43.list.gz
- 202206021630_191_42.list.gz
- 202206021631_191_42.list.gz
- 202206031550_101_49.list.gz
- 202206031555_101_49.list.gz
- 202206031732_101_43.list.gz
- 202206031737_101_43.list.gz
- 202206031820_101_43.list.gz
- 202206031825_101_43.list.gz
- 202206031830_101_43.list.gz
- archive/

(On the aircraft source files retrieved from ~/emcdata)

Checking Analyses

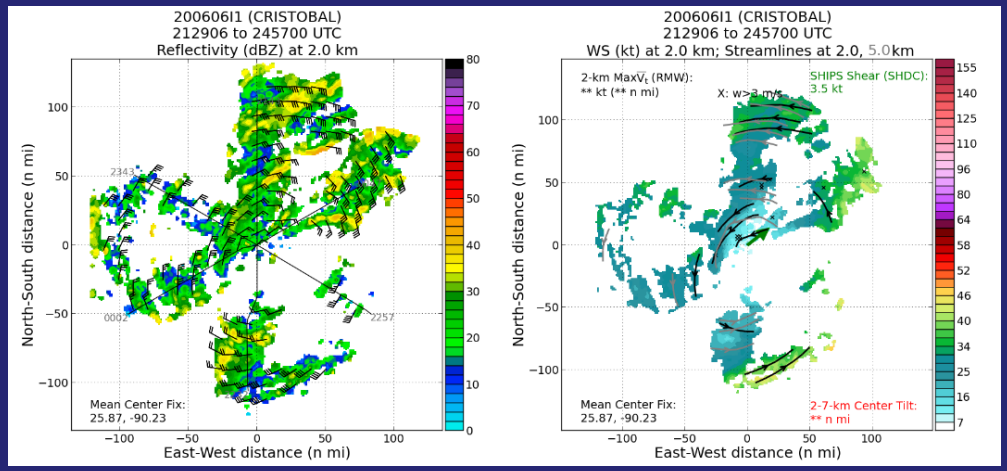
https://www.aoml.noaa.gov/ftp/pub/hrd/data/RTradar/YYYY/YYYYMMDDAI

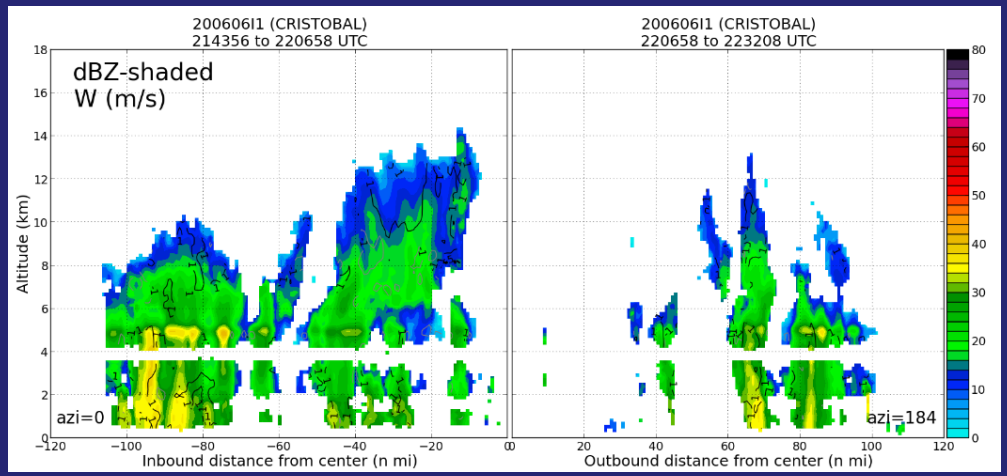
File: 200606I1_CRISTOBAL_2129_2457_ws_dbz_planview.png
File: 200606I1_CRISTOBAL_2129_2457_ws_dbz_upper_planview.png
File: 200606I1_CRISTOBAL_2129_2457_ws_nhc_planview.png
File: 200606I1_CRISTOBAL_2206_dbz_profile_00_184.png
File: 200606I1_CRISTOBAL_2206_dbz_ws_1.0km.png
File: 200606I1_CRISTOBAL_2206_dbz_ws_10.0km.png
File: 200606I1_CRISTOBAL_2206_dbz_ws_11.0km.png
File: 200606I1_CRISTOBAL_2206_dbz_ws_12.0km.png
File: 200606I1_CRISTOBAL_2206_dbz_ws_13.0km.png
File: 200606I1_CRISTOBAL_2206_dbz_ws_14.0km.png
File: 200606I1_CRISTOBAL_2206_dbz_ws_15.0km.png
File: 200606I1_CRISTOBAL_2206_dbz_ws_16.0km.png
File: 200606I1_CRISTOBAL_2206_dbz_ws_17.0km.png
File: 200606I1_CRISTOBAL_2206_dbz_ws_18.0km.png
File: 200606I1_CRISTOBAL_2206_dbz_ws_2.0km.png
File: 200606I1_CRISTOBAL_2206_dbz_ws_3.0km.png
File: 200606I1_CRISTOBAL_2206_dbz_ws_4.0km.png
File: 200606I1_CRISTOBAL_2206_dbz_ws_5.0km.png
File: 200606I1_CRISTOBAL_2206_dbz_ws_6.0km.png
File: 200606I1_CRISTOBAL_2206_dbz_ws_7.0km.png
File: 200606I1_CRISTOBAL_2206_dbz_ws_8.0km.png
File: 200606I1_CRISTOBAL_2206_dbz_ws_9.0km.png
File: 200606I1_CRISTOBAL_2206_vr_rel_profile_00_184.png
File: 200606I1_CRISTOBAL_2206_vt_BLprofile_00_184.png
File: 200606I1_CRISTOBAL_2206_ws_profile_00_184.png
File: 200606I1_CRISTOBAL_2319_dbz_profile_119_297.png

composites

levels

profiles





Documenting Analysis/Transmission Issues

Highlight here anything that should be considered in Level 2 reprocessing (e.g., failed or deficient Level 1b analyses, additional data that could be analyzed, parameters that might need to be adjusted). Please be as specific as possible. If none, then simply enter NONE below.

Fifth analysis—fourth pass—will need to be done for the first time. Otherwise analyses are fine. There are two more convective module passes that could also be done.

This was a tough circulation to center on given the current lack of organization. Given that a well-defined earth-relative circulation could not be identified, there is probably no reason to re-center. There may be an opportunity to extend the final E-W portion through western cloud region, if deemed relevant. TDR was turned off after edge was reached.

After looking at the 2nd analysis wind speed more carefully, the across-track structure seems off. Indeed, an across-track cross-section of reflectivity shows a sloped melting band, suggesting a potential issue with the azimuth correction (determined during test a test flight a couple weeks ago).

We recommend a quick stratiform analysis before next flight's IP. If still sloped, then do not transmit data to EMC. This can only be resolved by looking at the raw data once N43 is back in Lakeland.

Don't forget to upload a screenshot of flight track overlaid on satellite imagery from MTS as soon as the science portion of the flight is completed! If there is a flight LPS, they should do this.

Highlight here any radar data transmission issues. If none, then simply enter NONE below.

EMC files weren't showing up at gateway for N49. And we suspected the same would be true for N43. Dana was contacted:

<charlesl_N49> dana_macc, thanks for MikeM we switched to use the relay servers and files are showing up as "sent" now but they are not seeing them where they need to on the ground
<dana_macc> ok
<dana_macc> I am looking no
<dana_macc> is 43 files having issues as well
<MikeM> yes
<MikeM> had to goto 1 on relaymode
<MikeM> both 43 and 49 dana_macc
<charlesl_N49> ours started at 1817z
<charlesl_N49> sorry, should have said it stopped at 0817z

Finishing up radar duties

***End-of-Flight Shutdown with Aircraft Radar Support.**

Once the aircraft exits the system, reestablish Xchat communication with aircraft radar support on #radar. Check off the following tasks.

☐ Go through "NEAR END OF FLIGHT" Steps 1-4 of Ground Radar Support Guide.

****NEAR END OF FLIGHT...**

---

1. Once the aircraft reaches the end point of the pattern and/or mission science is complete, notify AOC data tech that they can **end TDR recording.**

2. Once you verify in #hrd-scripts-status that radarsync has returned to "radarsync: Checking for new jobfiles" status, aircraft radar support can **Ctrl-C 'radarsync'**, and close its terminal.

3. Once you verify in #hrd-scripts-status that the latest EMC files have transferred to netman, aircraft radar support can **close tdrProcSend** windows. All other scripts can be closed as well.

4. Have aircraft radar support **run: './makearchive'.** The file thumbYYMMDDAI_products.tar.gz will be uploaded by AOC to seb.omao.noaa.gov/pub/acdata/YYYY/RADAR_TDR/ with the TDR product-raw files. A zip archive of MMR CfRadial files will be uploaded by AOC to seb.omao.noaa.gov/pub/acdata/YYYY/RADAR_MMR/.

- Upload Radar_Scientist_Form_YYYYMMDDAI -> Mission reports TDR folder on Drive
- If no LPS, final flight track overlaid on satellite -> Mission reports TDR folder on Drive
- Record # of TDR analyses and Level 1b-related notes in TC Flight Summary spreadsheet

	A	B	C	D	E	F	AC	AD	AE	AF	AG	AH	AI	AJ	AK
1	Storm Name	Mission ID	Flight ID	Take-off Time (UTC)	Landing Time (UTC)	Tail #	# TDR Analyses	Reprocess TDR?	TDR products.tar	TDR aft.tar	TDR fore.tar	MMR CfRadials	AXBT	DMT	Notes
2	AL91/PTC01	01AAA	20220602U1	1558Z	2337Z	AF305									
3	AL91/PTC01	0201A	20220603U1	0334Z	0902Z	AF305									
4	AL91/PTC01	0301A	20220603U2	0918Z	1809Z	AF307									
5	AL91/PTC01	WXWXA T	20220603N1	1348Z	2006Z	N49	1*	N	not created	seb	seb				(Test TDR data, not in storm)*
6	AL91/PTC01	WXWXA T	20220603I1	1711Z	2003Z	N43	2*	N	seb	n/a	seb	n/a			(No Aft TDR data, so wind analyses not possib
7	AL91/PTC01	0401A	20220603U3	2137Z	0505Z	AF307									

What could possibly go wrong?

>>SHOULD THE WORKSTATION GO DOWN<<

If the workstation power is interrupted or the workstation needs to be restarted, then after the workstation is restarted have aircraft radar support:

1. Run 'tdrProcSend'

2. Run 'radarsync'

3. Run 'checksweeps'

If the software had been in the middle of execution, it should restart from the beginning once radarsync is executed again: In any event, ensure that all EMC files and HRD radar product files have been transmitted off the aircraft.

>>SHOULD RADAR ANALYSIS PRODUCTS NOT FULLY TRANSMIT<<

If a glitch should ever happen where analysis products are not fully transmitted from the aircraft, the following should be done:

In a terminal, **run: resendradar** (note: you can leave radarsync running while you do this)

>>SHOULD COMMUNICATIONS ON THE AIRCRAFT DROP OUT<<

Wait until comms are reestablished and then submit any outstanding jobfile. If comms goes down while the software is running (so that you cannot see its status in #hrd-status), ask the radar operator to provide the last status update in the radarsync terminal when comms are reestablished. (Currently, it is not possible to execute runJobFileApp on the aircraft when comms are down. In the future, we want this capability so that the software could run at the HRD radar workstation while waiting for comms to be reestablished.)

>>SHOULD AN ANALYSIS END TOO SOON OR A JOBFILE ERROR IS QUICKLY DISCOVERED<<

If an analysis completes in far less time than "Rule of Thumb", a common reason is a substantial error in the jobfile (e.g., longitude on the wrong side of the earth), or an issue with the fore or aft antenna. In the former case, analysis files may not be transmitted at all. In the latter case, files void of wind data may still be transmitted. If the issue can be resolved with a new jobfile,

- Correct any jobfile errors (if an analysis was transmitted to the ground, it may be best to alter MM in Center Time (HHMMSS) to distinguish it from the bad analysis
- Submit corrected jobfile (with new 'userX_' prefix) to restart the process

If a jobfile error is discovered as the summary information is being presented in #hrd-status, have aircraft radar support quickly Ctrl-C in the radarsync terminal, then

- Correct any jobfile errors
- Have aircraft radar support move the bad jobfile in /home/sysop on the HRD workstation to ~/tdr/fail
- Run 'radarsync'
- Submit corrected jobfile (with new 'userX_' prefix) to restart the process

Happened during 2022 G-IV test flight

Happened during 2022 P-3 test flight … but hopefully resolved

Will probably happen at some point

Happened during 2022 test flights

- Wrong longitude entered in jobfile
- Non-functioning aft antenna went unnoticed
- Incomplete INE corrections for analysis period when G-IV jobfile was submitted