| **MISSION PLAN** | | | |
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| **FLIGHT ID** | 20231021H1 | **STORM** | AL20 / TAMMY |
| **MISSION ID** | 1120A | **TAIL NUMBER** | NOAA 42 |
| **TASKING** | EMC-NHC TDR | **PLANNED PATTERN** | Rotated Figure-4 |
| **MISSION SUMMARY** | | | |
| **TAKEOFF [UTC]** | 2104 | **LANDING [UTC]** | 0411 |
| **TAKEOFF LOCATION** | Barbados | **LANDING LOCATION** | Barbados |
| **FLIGHT TIME** | 7.1 | **BLOCK TIME** | 7.3 |
| **TOTAL REAL-TIME RADAR ANALYSES**  **(Transmitted)** | 6 (6) | **TOTAL DROPSONDES Deployed (Transmitted)** | 26 (24) |
| **OCEAN EXPENDABLES (Type)** | 2 (0) AOC/HRD AXBTs | **sUAS (Type)** | n/a |
| **APHEX EXPERIMENTS / MODULES** | VAM, Dry air entrainment module planned if time (not flown) | | |
| **HRD CREW MANIFEST** | | | |
| **LPS ONBOARD** | Hazelton | **LPS GROUND** | None |
| **TDR ONBOARD** | Hazelton | **TDR GROUND** | Gamache |
| **ASPEN ONBOARD** | Sellwood | **ASPEN GROUND** | n/a |
| **NESDIS SCIENTISTS** | Chang, Jelenak, Sapp | | |
| **GUESTS (Affiliation)** | n/a | | |
| **AOC CREW MANIFEST** | | | |
| **PILOTS** | Compare/Gaston/Palmer | | |
| **NAVIGATOR** | Utama | | |
| **FLIGHT ENGINEERS** | Stokes/Kiddo | | |
| **FLIGHT DIRECTOR** | Kalen/Englert | | |
| **DATA TECHNICIAN** | McAlister | | |
| **AVAPS** | WarneckeKeller | | |

| **PRE-FLIGHT** | |
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| **Flight Plan** | *Rotated Figure 4, with possible add on of a dry air entrainment module at the end of the pattern.* |
| **Expendable Distribution** | *28 dropsondes and 2 BTs during the rotated figure 4, with a possible 5 additional in the dry air entrainment module.* |
| **Preflight Weather Briefing** | *Tammy is a Category 1 hurricane moving north near the Leeward Islands. The system has been pulsing up and down with convection, with some shear and potentially dry air still affecting it. Earlier missions still showed tilt to the NE, in fact a little bit more tilt than previous missions. This has prevented thunderstorm activity from being able to wrap all the way around the SW side, and the eyewall has been consistently open there.* |
| **Instrument Notes** | *Instruments appear to be functioning properly* |

| **IN-FLIGHT** | |
| --- | --- |
| **Time [UTC]** | **Event** |
| 2104 | Take-off from Barbados |
| 2146 | Combo drop, Sonde 1, BT 1 |
| 2158 | Mid point 2, Sonde 2 |
| 2158 | Midpoint Sonde 3 (backup) |
| 2206 |  |
| 2208 | RMW SE Sonde 4 |
| 2213 | RMW NW Sonde 5 |
| 2216 | This appears to be another case where the SFMR winds drop out as the rain rate spikes |
| 2226 | Midpoint Sonde 6 |
| 2235 | Endpoint NW Combo Drop, Sonde 7, BT 2, turning downwind |
| 2300 | Pretty shallow vortex w/ the strongest winds (really drops off ~5km and ~2km on the NW quad) |
| 2310 | Endpoint SW Sonde 8 |
| 2320 | Going to 12 kft for terrain concerns |
| 2322 | Midpoint SW sonde 9 |
| 2328 | Tiny elliptical eye |
| 2332 | Center sonde 10 |
| 2333 | RMW sonde 11 |
| 2348 | Midpoint sonde 12 |
| 2357 | Endpoint sonde 13 |
| 0000 | ~18 UTC - 00 UTC (through 1st 2 center passes of the pattern |
| 0006 | RGB airmass - there was a large blowup of convection near the center ~1h earlier. Now there’s some sort of boundary propagating southward away from the center that’s apparent. Is it from a downdraft? Not sure, it's hard to say since no visible imagery anymore and it's propagating through the already somewhat clear area but definitely some sort of outward propagating feature and there’s some pronounced clearing behind it. |
|  |  |
|  | Lightning with inner core blow up preceding the S’ward propagating feature |
|  | Somewhat drier on SW side. End point sonde SW and midpoint |
| 0019 | Endpoint N Sonde 14 |
| 0028 | Midpoint N Sonde 15 |
| 0038 | RMW N Sonde 16 |
| 0039 | Eye is a bit ragged/open |
| 0043 | Center sonde 17 |
| 0045 | RMW S sonde 18 |
| 0052 | Audibled from dry air module back to VAM on the east side due to concerns with icing at night if we go above 12 kft |
| 0054 | Endpoint Sonde 19 |
| 0055 | Endpoint Sonde 20 backup |
| 0058 | Descending to 8 kft |
| 0125 | Endpoint E Sonde 21 |
| 0138 | Midpoint E Sonde 22 |
| 0148 | RMW E Sonde 23 |
| 0149 | No center sonde since the center is over the island of Barbuda |
| 0154 | RMW W Sonde 24 |
| 0157 | Turning back to head outbound E for VAM |
| 0205 |  |
| 0232 | Midpoint W sonde 25 |
| 0245 | Endpoint W Sonde 26 |
| 0411 | Landed at Barbados |
| Notes on why we went with the VAM instead of the dry air module | They don't feel confident going up above the freezing level with what's there right now  [18:31] ahazelton\_N42\_LPS At night  [18:34] **ahazelton\_N42\_LPS** Sorry for the confusion treya\_hrd  [18:35] treya\_hrd Hmmm  [18:35] ahazelton\_N42\_LPS Yeah it's tricky  [18:36] treya\_hrd And I'm assuming they're not confident going above frz level even if farther south?  [18:36] treya\_hrd I'd maybe lean towards VAM in that case? |

| **POST-FLIGHT** | |
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| **Mission Summary** | *We flew a successful TDR mission into Hurricane Tammy in the Lesser Antilles.*  *The storm had a very small eye but some ongoing vortex tilt. Therefore, we executed the vortex alignment module in the Eastern side of the storm.*  *The storm appeared to be impacting the island of Barbuda as we flew through it.* |
| **Actual Standard Pattern Flown** | *Rotated Figure-4* |
| **APHEX Experiments / Modules Flown** | *Vortex alignment module (VAM)* |
| **Plain Language Summary** | 1. We flew a successful pattern to record radar data in Hurricane Tammy. 2. We made several passes across the center, including a module to study how the storm was attempting to align vertically. |
| **Instrument Notes** | *The MMR appeared to have an issue with an offset between the land shown on the map and the actual land (as detected by surface roughness mode).* |
| **Final Mission Track** |  |