| **MISSION PLAN** | | | |
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| **FLIGHT ID** | 20230910I2 | **STORM** | AL13/LEE |
| **MISSION ID** | 1413A | **TAIL NUMBER** | NOAA-43 |
| **TASKING** | EMC-NHC | **PLANNED PATTERN** | Butterfly |
| **MISSION SUMMARY** | | | |
| **TAKEOFF [UTC]** | 2028 | **LANDING [UTC]** | 0409 |
| **TAKEOFF LOCATION** | STX | **LANDING LOCATION** | STX |
| **FLIGHT TIME** | 7.7 | **BLOCK TIME** | 7.9 |
| **TOTAL REAL-TIME RADAR ANALYSES**  **(Transmitted)** | 5 (5) | **TOTAL DROPSONDES Deployed (Transmitted)** | 37 (24) |
| **OCEAN EXPENDABLES (Type)** | 3 (3) AXBT | **sUAS (Type)** | n/a |
| **APHEX EXPERIMENTS / MODULES** | Surface Wind and Wave Validation (dropsonde overflights) | | |
| **HRD CREW MANIFEST** | | | |
| **LPS ONBOARD** | Hazelton | **LPS GROUND** | Rogers |
| **TDR ONBOARD** | Hazelton | **TDR GROUND** | Gamache |
| **ASPEN ONBOARD** | Sellwood | **ASPEN GROUND** | Hathaway |
| **NESDIS SCIENTISTS** | Jelenak | | |
| **GUESTS (Affiliation)** | n/a | | |
| **AOC CREW MANIFEST** | | | |
| **PILOTS** | Doremus/Rannenberg/Palmer | | |
| **NAVIGATOR** | Hough | | |
| **FLIGHT ENGINEERS** | Stokes/Gee | | |
| **FLIGHT DIRECTOR** | Zawislak/Parrish | | |
| **DATA TECHNICIAN** | McAlister | | |
| **AVAPS** | Santoni/Waggoner | | |

| **PRE-FLIGHT** | |
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| **Flight Plan** | Butterfly with possible add ons of surface wind validation  *Because of a failure of the MMR on N42, this mission is now being flown on N43. Since there are no Ocean Winds instruments on N43, that module will not be flown. However, FLAIMS and the surface wind/wave validation are still candidate modules.*  *There is a glider just beyond the NW leg. N43 will extend its NW leg to overfly the glider. No sonde is requested there, however.* |
| **Expendable Distribution** | *Dropsondes endpoints, midpoints, 3X RMW, Centers, and for overflights. BTs Endpoints and Center along final leg.* |
| **Preflight Weather Briefing** | *Lee continues to be dealing with moderate southwesterly shear. The storm is situated along a sharp shear gradient, with strong shear further northeast of the storm center. Over the center itself there appears to be about 20 kt of shear.*    *There also appears to be substantial mid- to upper-level dry air surrounding Lee.*    *Despite these inhibiting factors, Lee appears to be trying to re-strengthen after completing an eyewall replacement cycle. The eye appears to be popping back out and convection is wrapping around most of the eyewall. The Air Force plane just exiting the storm found winds over 100 kt again, and the pressure is starting to fall.*      *Most recent microwave overpass shows an inner eyewall open on the southeast side and multiple bands wrapping from the west clockwise around toward the north and east sides. Appears that they connect to the primary eyewall in the downshear left quadrant, as expected. Greatest amount of ice scattering, indicative of deep convection, is on the upwind (east) end of the outer band, becoming higher brightness temperature, suggesting a transition to more stratiform precipitation, on the downwind end of the band (north and northwest). Again, this is expected in a southwesterly shear environment.* |
| **Instrument Notes** | *Instruments appear to be working normally.* |

| **IN-FLIGHT** | |
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| **Time [UTC]** | **Event** |
| 2028 | Take-off from STX |
| 2128 | Sonde 1, SW endpt, at IP |
| 2139 | *IR animation during inbound leg shows structure very similar to yesterday – bursting of convection starting downshear, broad shield of cold cloud tops on southwest side (upshear). Shield may be a bit more expansive and persistent today than yesterday.* |
| 2140 | On inbound leg, onboard LPS says wind field clearly has expanded since yesterday, encountering 30 m/s winds beyond 50 nm from center. More rain on the SW side than yesterday, suggesting shear has relaxed a bit. Also consistent with IR animation showing more expansive and persistent shield upshear. |
| 2141 | Sonde 2, SW midpt |
| 2148 | Visible animation shows convective bursts erupting on the west and southwest sides. Perhaps some mesovortices as well, but radar will give a better indication of that. |
| 2152 | Sonde 3, 1st SW RMW |
| 2153 | Sonde 4, 2nd SW RMW |
| 2154 | Sonde 5, 3rd SW RMW |
| 2156 | Sonde 6, center |
| 2200 | Sonde 7, 1st NE RMW |
| 2200 | Sonde 8, 2nd NE RMW |
| 2201 | Sonde 9, 3rd NE RMW |
| 2210 | Sonde 10, NE midpt |
| 2210 | Limited lightning seen on MTS and visually, a single flash reported by aircraft |
| 2216 | Flight-level wind peak reported near the midpoint on the NE |
| 2218 | Ending outbound leg early to avoid a band, turning downwind, ended leg at about 100 nm |
| 2218 | Sonde 11, NE endpt |
| 2232 | On downwind leg, reporting 70 kt FL |
| 2242 | Sonde 12, N endpt |
| 2254 | On inbound leg, multiple local wind maxima indicative of lots of banding |
| 2255 | Sonde 13, N midpt. Big flight-level wind spike. |
| 2303 | Profile analysis from the first leg (SW-NE) shows a broad wind field on NE side. Radial flow features show mid- to upper-level inflow, and lower-level outflow on the SW side. Classic signature of a vortex in shear (SWerly shear) |
| 2304 | RMW Sonde 14 |
| 2305 | RMW Sonde 15 |
| 2305 | RMW Sonde 16 |
| 2308 | Center Sonde 17 |
| 2311 | RMW Sonde 18 |
| 2312 | RMW Sonde 19 |
| 2313 | RMW Sonde 20 |
| 2321 | Midpoint Sonde 21 |
| 2322 | Midpoint Sonde 22 (Backup) |
| 2333 | Endpoint Sonde 23, turning downwind |
| 2353 | Endpoint Sonde 24, inbound SE |
| 0000 | Taking some bumps in an outer band |
| 0005 | Midpoint Sonde 25, Combo Drop |
| 0012 | RMW Sonde 26 |
| 0013 | RMW Sonde 27 |
| 0013 | RMW Sonde 28 |
| 0014 | Center BT Released |
| 0018 | Center Sonde 29 |
| 0021 | RMW Sonde 30 |
| 0021 | RMW Sonde 31 |
| 0022 | RMW Sonde 32 |
| 0033 | Midpoint Sonde 33, Combo Drop |
| 0046 | Endpoint Sonde 34 |
| 0053 | Noticed an SFMR rain spike with slight wind dropout in an outer band |
| 0056 | Turning back inbound to do some overflight module action |
| 0059 | Overflew drifter |
| 0115 | Analysis of tilt from first two passes shows vortex is aligned, with tilt values < 10 km up to 12 km altitude. Slight anticylonic rotation with height, DSL. |
| 0125 | Eye has been contracting over the course of the mission, now a 20 nm diameter |
| 0138 | RMW sonde 35 for overflight |
| 0213 | Heading downwind in a moat region to set up a 170 inbound for next overflight |
| 0219 | Turning inbound 170 for 2 more sondes for overflight |
| 0229 | RMW sonde 36 for overflight |
| 0229 | RMW sonde 37 for overflight |
| 0251 | Heading west for 2nd drifter overflight then RTB |
| 0258 | Second drifter overflight |
| 0302 | Science Complete |
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|  | << INSERT ADDITIONAL ROW AS NEEDED >> |

| **POST-FLIGHT** | |
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| **Mission Summary** | *We completed a successful mission into Hurricane Lee. The storm appeared to be strengthening some during the mission, although there were still some shear-relative asymmetries apparent.*  *We also did an overflight of a drifter in the NW quadrant on the way out NW after the initial TDR pattern, and another one heading out west after completion of inner core modules.*  *We did two sonde overflights for surface wind validation, one in the NE and one in the NW quadrants.* |
| **Actual Standard Pattern Flown** | *Butterfly* |
| **APHEX Experiments / Modules Flown** | *Surface winds validation with sonde overflights* |
| **Plain Language Summary** | 1. *We flew a successful mission into Hurricane Lee during a strengthening phase.* 2. *We collected radar data for model assimilation and also performed science modules to study surface wind measurements.* |
| **Instrument Notes** | *Instruments seemed to work normally* |
| **Final Mission Track** |  |