

# 2019 NOAA/AOML/HRD Hurricane Field Program - IFEX

## EARLY STAGE EXPERIMENT *Flight Pattern Descriptions*

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**Experiment:** Airborne Doppler Wind Lidar (DWL) Module

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**Requirements:** TD, TS, Category 1

### **Early Stage Science Objective(s) Addressed:**

- 1) Collect datasets that can be used to improve the understanding of intensity change processes, as well as the initialization and evaluation of 3-D numerical models, particularly for TCs experiencing moderate vertical wind shear [*IFEX Goals 1, 3*]
- 2) Test new (or improved) technologies with the potential to fill gaps, both spatially and temporally, in the existing suite of airborne measurements in early stage TCs. These measurements include improved three-dimensional representation of the TC wind field, more spatially dense thermodynamic sampling of the boundary layer, and more accurate measurements of ocean surface winds [*IFEX Goal 2*]

### **P-3 Pattern 1:**

**What to Target:** Sample the inner core region of a TC with an asymmetric precipitation distribution

**When to Target:** Every 12 h [*optimal*] or every 24 h [*minimal*]

**Pattern:** P-3 circumnavigation with single or rotated Figure-4

**Flight altitude:** Figure-4: [*optimal*] 10-12 kft (5 kft is minimum altitude for dropsonde launches). Circumnavigation: [*optimal*] 20 kft or as high as possible.

**Leg length or radii:** 105 n mi (195 km) leg length. Radius of circumnavigation is preferably as close to the inner-core precipitation shield as safety allows.

**Estimated in-pattern flight duration:** ~4-6.5 hours

**Expendable distribution:** P-3 circumnavigation and single/rotated Figure-4

**Instrumentation Notes:** Use straight flight legs as safety permits. Dropsondes should not be released in precipitation. The DWL should be operated in a conically scanning pattern 20° off nadir. During Figure-4, DWL should alternate pointing both up and down in the presences of upper-level aerosols. The DWL should be pointed down only if there is a lack of upper-level aerosols. During the high-altitude circumnavigation, the DWL should only be pointed downward.