

2020 NOAA/AOML/HRD Hurricane Field Program - IFEX

MATURE STAGE EXPERIMENT *Flight Pattern Descriptions*

Experiment/Module: Eye-Eyewall Mixing Module

Investigator(s): Sim D. Aberson (PI)

Requirements: Categories 2–5

Mature Stage Science Objective(s) Addressed:

- 1) Collect observations targeted at better understanding internal processes contributing to mature hurricane structure and intensity change [*IFEX Goals, 1 3*]

P-3 Pattern 1:

What to Target: This module requires a category-4 or category-5 TC with a clearly defined, visible eye, closed eyewall, and inversion and an eye diameter of at least 25 n mi.

When to Target: The module should only be attempted during daytime missions. It can be included within any missions during aircraft passage through the eye.

Pattern: This is a break-away pattern that is compatible with any standard pattern with an eye passage (all P-3 patterns except the Square spiral or Lawnmower). The eye must be ≥ 25 n mi in diameter, and for asymmetric or non-circular eyes, the narrowest cross section from eyewall to eyewall must be 25 n mi. Additionally, a 2-n mi standoff distance should be maintained from the radar displayed inner eyewall. The P-3 will penetrate the eyewall at the standard-pattern altitude. Once inside the eye, the P-3 will maintain the flight level of the main mission and perform a single orbit of the eye with a separation distance of 2 n mi from the edge of the eyewall. The flight level of the orbit and 2 n mi minimum distance from the edge of the eyewall can be adjusted for safety considerations at the pilot's discretion. For non-circular eyes, maintaining a circular orbit is preferred (i.e., portions of the orbit could be >2 n mi from the eyewall).

Flight altitude: The flight altitude will largely be the same as the standard pattern altitude, but can be adjusted for safety reasons.

Leg length or radii: The P-3 will circumnavigate the eye about 2 n mi from the edge of the eyewall.

Estimated in-pattern flight duration: Depending upon the size of the eye, this pattern should take between 0.25 and 0.5 h.

Expendable distribution: No expendables required.

Instrumentation Notes: No special instructions for operation.

P-3 Pattern 2:

What to Target: Any category-4 or category-5 hurricane with a well-defined eyewall.

When to Target: During any transit across what is believed to be the strongest region of the eyewall.

MATURE STAGE EXPERIMENT
Flight Pattern Descriptions

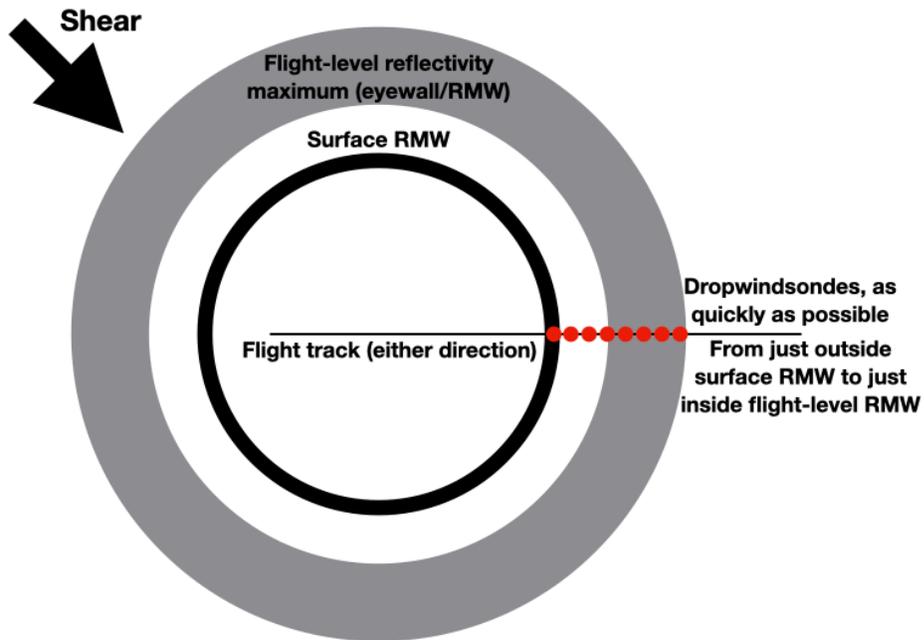
Pattern: The pattern will not deviate from the regular eyewall penetration during any mission.

Flight altitude: A regular altitude for the main purpose of the flight.

Leg length or radii: N/A

Estimated in-pattern flight duration: This module does not add any time to the mission.

Expendable distribution: 8 dropwindsondes will be dropped as quickly as possible across the wind speed maximum of the eyewall. The sondes should be spaced as close together as possible. The goal is to have the second-outermost sonde to be coincident with the flight-level radius of maximum wind speed, and the second-innermost sonde to be coincident with the surface radius of maximum wind speed.



Instrumentation Notes: The goal is to have as many sondes as possible in the air at the same time to investigate the structure of an individual miso- or meso-scale vortex.