

2021 NOAA/AOML/HRD Hurricane Field Program - APHEX

MATURE STAGE EXPERIMENT *Flight Pattern Description*

Experiment/Module: NESDIS Ocean Winds

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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 [*APHEX Goals, 1 3*].
- 2) Collect observations targeted at better understanding the response of mature hurricanes to their changing environment, including changes in vertical wind shear, moisture and underlying oceanic conditions [*APHEX Goals 1, 3*].
- 3) Test new (or improved) technologies with the potential to fill gaps, both spatially and temporally, in the existing suite of airborne measurements in mature hurricanes. These measurements include improved three-dimensional representation of the hurricane wind field, more spatially dense thermodynamic sampling of the boundary layer, and more accurate measurements of ocean surface winds [*APHEX Goal 2*]

P-3 Pattern #1

What to Target: The entire storm.

When to Target: Hurricane wind conditions with rain. Tropical cyclone conditions are still useful but not preferred.

Pattern: Figure-4, Rotated Figure-4, or Butterfly

Flight altitude: 7 - 10 kft radar altitude. Constant radar altitude is strongly preferred.

Leg length or radii: 50nmi from the storm center

Estimated in-pattern flight duration: 1 – 1.5 hours

Expendable distribution: Dropsondes preferred at the RMW and center, but only at the PI's discretion if not already prescribed.

Instrumentation Notes: Straight and level flight with a 2° nominal pitch offset required to maintain radar altitude and consistent speed. Maintain consistent ground speed as safety permits.

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P-3 Pattern #2

What to Target: The highest wind **or** rainy areas of the storm.

When to Target: Hurricane wind conditions with rain.

Pattern: Flight legs performed to and from the storm center radially. The PI will typically call the turns. Loitering may occur at the furthest point from center or in the eye.

Flight altitude: 7 - 10 kft radar altitude. Constant radar altitude is strongly preferred.

Leg length or radii: Any length of legs from the storm center, but typically 50 n mi from the center **or** until the surface winds are at least 50% of the peak winds observed during the leg (at PI's discretion).

Estimated in-pattern flight duration: 10 – 30 minutes per radial.

Expendable distribution: Dropsondes at the PI's discretion; often in the highest wind conditions **or** where there is both significant rain and strong winds.

Instrumentation Notes: Straight and level flight with a 2° nominal pitch required to maintain radar altitude and consistent speed. Maintain consistent ground speed as safety permits.