Experiment/Module: Gravity Wave Module

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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 [IFEX Goals, I 3]

P-3 Pattern 1 (Internal Processes):

What to Target: Sample the inner core and near environments of the TC

When to Target: Any strength TC; no land restrictions. This module ideally should be conducted in quadrant with the least rainband activity, typically the upshear right or right-real quadrant. The best opportunity is at the end of a standard Figure-4 pattern, when the last leg terminates in a quadrant with less rainbands.

Pattern: Any standard P-3 pattern that provides symmetric coverage (e.g. Rotated Figure-4, Figure-4 Butterfly, etc.). At the end of the last leg, continue outward to distance of 160 n mi (295 km) from the center, or further if possible (see Fig. MA-1). Then turn the P-3 around and head directly back to the eye, retracing the previous leg in the opposite direction.

Figure MA-1. Depiction of the Gravity Wave module in which the P-3 flies an extended leg [160 n mi (295 km), red path] and reverses course along the same azimuth back to the eye
Flight altitude: 10–12 kft or as high as possible

Leg length or radii: Leg lengths should extend to at least 160 n mi (295 km) from the center, or further if time permits, including the turn leg back the center.

Estimated in-pattern flight duration: ~40 min – 1 hr

Expendable distribution: Dropsonde and AXBTs are not a requirement

Instrumentation Notes: Use TDR defaults. Use straight flight legs as safety permits.

P-3 Pattern 2 (Internal Processes):

What to Target: Sample the inner core and near environments of the TC

When to Target: Any strength TC; no land restrictions. This module ideally should be conducted in quadrant with the least rainband activity, typically the upshear right or right-real quadrant. The best opportunity is at the end of a standard Figure-4 pattern, when the last leg terminates in a quadrant with less rainbands.

Pattern: Any standard P-3 pattern that provides symmetric coverage (e.g. Rotated Figure-4, Figure-4 Butterfly, etc.). At the end of the last leg (outbound or downwind leg), continue outward to distance of 90 n mi (165 km) from the end point, or further if possible (see Fig. MA-2). Then turn the P-3 around and head directly back to the eye, retracing the previous leg in the opposite direction to the end point before starting next radial leg or downwind leg.

Figure MA-2. Depiction of the Gravity Wave module in which the P-3 flies an extended leg (90 n mi) (red path) and reverses course along the same azimuth back toward the storm center.
Flight altitude: 10–12 kft or as high as possible

Leg length or radii: Leg lengths should extend to at least 90 n mi from the end point, or further if time permits, including the turn leg back the previous end point.

Estimated in-pattern flight duration: ~40 min – 1 hr

Expendable distribution: Dropsondes and AXBTs are not a requirement

Instrumentation Notes: Use TDR defaults. Use straight flight legs as safety permits.