2020 NOAA/AOML/HRD Hurricane Field Program - IFEX

EARLY STAGE EXPERIMENT
Flight Pattern Descriptions

Experiment/Module: Gravity Wave Module

Investigator(s): Jun Zhang, David Nolan (co-PIs)

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*].

P-3 Pattern 1:

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 from the center, or further if possible (see Fig. EA-1). Then turn the P-3 around and head directly back to the eye, retracing the previous leg in the opposite direction.

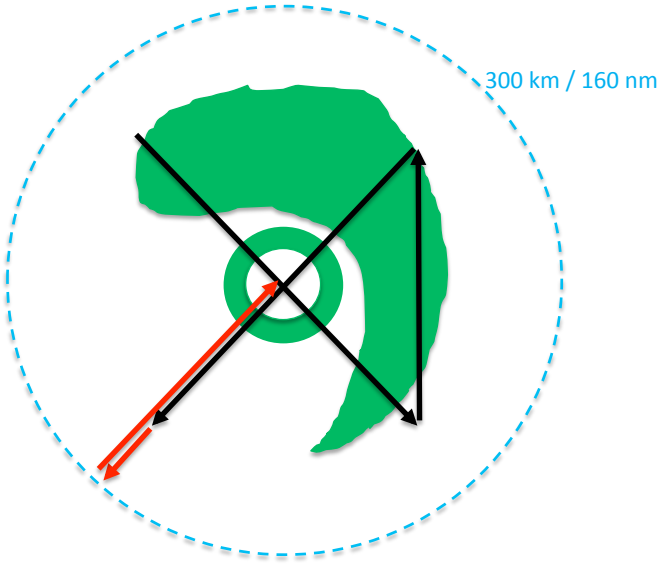

Figure EA-1. *Depiction of the Gravity Wave module in which the P-3 flies an extended leg [160 n mi (295 km), red path] and reverses course along the same azimuth back to the eye.*

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:

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. EA-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.

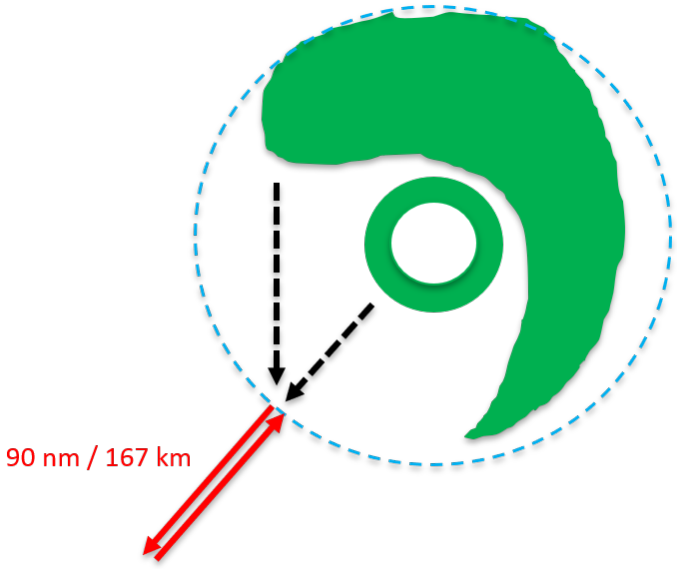

Figure EA-2. *Depiction of the Gravity Wave module in which the P-3 flies an extended leg [90 n mi (165 km, red path] and reverses course along the same azimuth back toward the storm center.*

EARLY STAGE EXPERIMENT
Flight Pattern Descriptions

Flight altitude: 10–12 kft or as high as possible

Leg length or radii: Leg lengths should extend to at least 90 n mi (165 km) from the end point, or further if time permits, including the turn leg back the turn point

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.