2018 NOAA/AOML/HRD Hurricane Field Program - IFEX

GENESIS STAGE EXPERIMENT
Pattern and Module Descriptions

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Requirements: Pre-genesis disturbances (pre-TDs), including NHC-designated "Invests"

SCIENCE OBJECTIVE #1: *To investigate the precipitation modes that are prevalent during the genesis stage and the response of the vortex to that precipitation organization*
[Precipitation Mode, PMODE]

P-3 Pattern #1: PMODE

What to Target: Sample the mesoscale convective burst area and/or mid-level circulation of a pre-TD or "Invest"

When to Target: Every 12 h, preferably in coordination with a corresponding G-IV mission flying the surrounding environment (for other Genesis Stage objectives)

Pattern: Standard Single (repeated), or Rotated Figure-4

Flight altitude: 10–12 kft

Leg length or radii: 105 n mi (can be adjusted for the size of the precipitating area)

Estimated in-pattern flight duration: ~ 5 h [for repeated Single-4, or Rotated Fig. 4]

Expendable distribution: Standard dropsonde locations

Instrumentation Notes: Use straight flight legs as safety permits. Inbound-outbound passes should be uninterrupted. DWL should be downward looking, 20° off nadir.

G-IV Pattern #1: PMODE

What to Target: Sample the mesoscale convective burst area and/or mid-level circulation of a pre-TD or "Invest"

When to Target: Every 12 h, when P-3 not available and G-IV not fulfilling other Genesis Stage objectives

Pattern: Standard Single Figure-4 (repeated), or Rotated Figure-4

Flight altitude: 40–45 kft

Leg length or radii: 105 n mi (can be adjusted for the size of the precipitating area)

Estimated in-pattern flight duration: ~ 5 h [for repeated, Single-4, or Rotated Fig. 4]

Expendable distribution: Standard dropsonde locations

Instrumentation Notes: None

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SCIENCE OBJECTIVE #2: *To investigate the importance of the pouch, including the shear sheath, which tends to indicate a tropical storm, and its relationship to a low-level circulation and organized deep convection within the pouch* [Pouch]

P-3 Pattern #1: Pouch

What to Target: The wave-pouch exhibiting scattered convective activity without much organized convective activity. This would the ideal mission investigating the wave pouch, until the center is defined.

When to Target: Every 12 h

Pattern: Standard Lawnmower; extend east-west legs an additional degree longitude (~5 deg. longitude total)

Flight altitude: 20,000 ft

Leg length or radii: 300 n mi east-west legs (modified from standard)

Estimated in-pattern flight duration: ~ 5 h

Expendable distribution: Modify standard dropsonde locations for Lawnmower by having 6 drops equally spaced on each east-west leg (~1 deg. spacing) for 24 total drops in the Lawnmower; also 3 drops, one every 1 deg., inbound prior to arrival at IP and heading outbound after exiting the pattern.

Instrumentation Notes: None

P-3 Pattern #2: Pouch

What to Target: The wave-pouch of the disturbance, when the center is better defined

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

Pattern: Standard Square-spiral

Flight altitude: 20,000 ft

Leg length or radii: N/A

Estimated in-pattern flight duration: ~ 5 h 50 min

Expendable distribution: Modify standard dropsonde locations for the Square-spiral by having a dropsonde at ~1 deg. spacing, for 26 total drops in square-spiral; also 3 drops, one every 1 deg., prior to arrival at IP and after exiting the pattern.

Instrumentation Notes: None

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G-IV Pattern #1: Pouch

What to Target: The wave-pouch exhibiting scattered convective activity without much organized convective activity. This would the ideal mission investigating the wave pouch, until the center is defined.

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

Pattern: Standard Lawnmower; extend east-west legs an additional degree longitude (~5 deg. longitude total)

Flight altitude: 40–45 kft

Leg length or radii: 300 n mi east-west legs (modified from standard)

Estimated in-pattern flight duration: ~ 3 h

Expendable distribution: Modify standard dropsonde locations for Lawnmower by having 6 drops equally spaced on each east-west leg (~1 deg. spacing) for 24 total drops in the Lawnmower; also 3 drops, one every 1 deg., inbound prior to arrival at IP and heading outbound after exiting the pattern.

Instrumentation Notes: None

G-IV Pattern #2: Pouch

What to Target: The wave-pouch of the disturbance, when the center is better defined

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

Pattern: Standard Square-spiral

Flight altitude: 40–45 kft

Leg length or radii: N/A

Estimated in-pattern flight duration: ~ 3 h 20 min

Expendable distribution: Modify standard dropsonde locations for the Square-spiral by having a dropsonde at ~1 deg. spacing, for 26 total drops in square-spiral; also 3 drops, one every 1 deg., prior to arrival at IP and after exiting the pattern.

Instrumentation Notes: None

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SCIENCE OBJECTIVE #3: *To investigate the favorability in both dynamics (e.g., vertical wind shear) and thermodynamics (e.g., moisture) for tropical cyclogenesis in the environment near a pre-TD, especially the downstream environment* [Favorable Air Mass, FAM]

G-IV Pattern #1: FAM

What to Target: The environment west/northwest of an easterly wave, especially if dry air is detected

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

Pattern: Standard Lawnmower (see Fig. GN-1)

Flight altitude: 40–45 kft

Leg length or radii: Long legs modified to be 600 n mi (or greater if time, resources available), short legs to 150 n mi

Estimated in-pattern flight duration: ~ 5 h

Expendable distribution: Standard Lawnmower, with drops every 150 n mi

Instrumentation Notes: None

P-3 Pattern #1: FAM

What to Target: The environment west/northwest of an easterly wave, especially if dry air is detected

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

Pattern: Standard Lawnmower

Flight altitude: 20,000 ft

Leg length or radii: Standard Lawnmower

Estimated in-pattern flight duration: ~ 4 h 20 min

Expendable distribution: Standard dropsonde locations

Instrumentation Notes: None

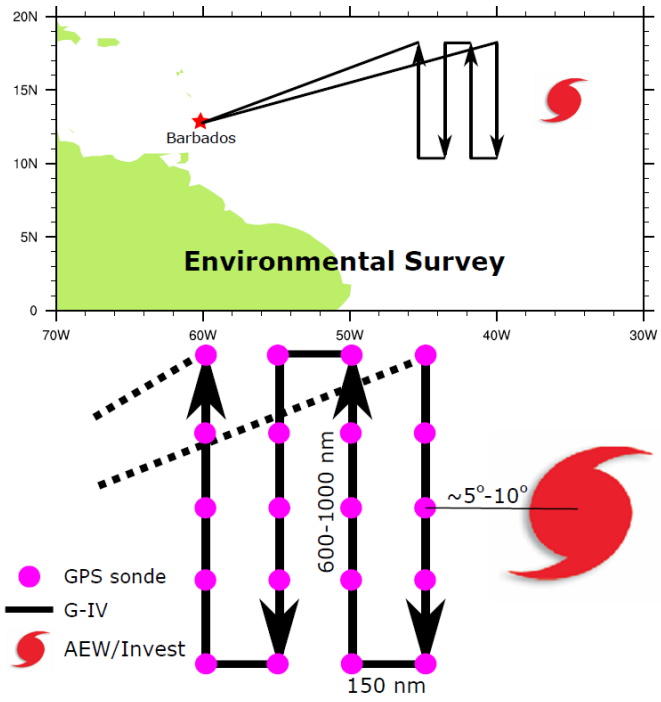

Figure GN-1. *Example lawnmower pattern to be flown (track in black) by the G-IV, dropsonde locations within the pattern (purple), and the relative location of the AEW/Invest center (hurricane symbol)*