

Utilizing Unmanned Aircraft to Probe Tropical Cyclone Outflow Jets

James D. Doyle
Naval Research Laboratory, Monterey, CA

New insight into the structure and dynamics of upper-level outflow jets in tropical cyclones (TCs) is attained from observations from a multiyear NASA field campaign aimed at observing hurricanes from 60,000 feet above the Atlantic, an altitude not previously attainable by hurricane research aircraft. The Hurricane and Severe Storm Sentinel (HS3) mission utilized a pair of NASA Global Hawk unmanned aircraft equipped with remote and in-situ meteorological instrumentation. Probing both the outflow layer and near-surface inflow layer simultaneously provided an unprecedented opportunity to unravel the complex relationship between these key regions leading to tropical cyclone intensity change. Global Hawk observations and the Navy's Coupled Ocean/Atmosphere Mesoscale Prediction System for Tropical Cyclones (COAMPS-TC) model results suggest that the outflow layer may play an important role in tropical cyclone intensification and structural changes. In addition, early results will be shown from the ONR Tropical Cyclone Intensity experiment that utilized a NASA WB-57 to observe Hurricane Patricia, the strongest TC on record in the Western Hemisphere, and Hurricane Joaquin, the strongest Atlantic TC in the last 5 years.