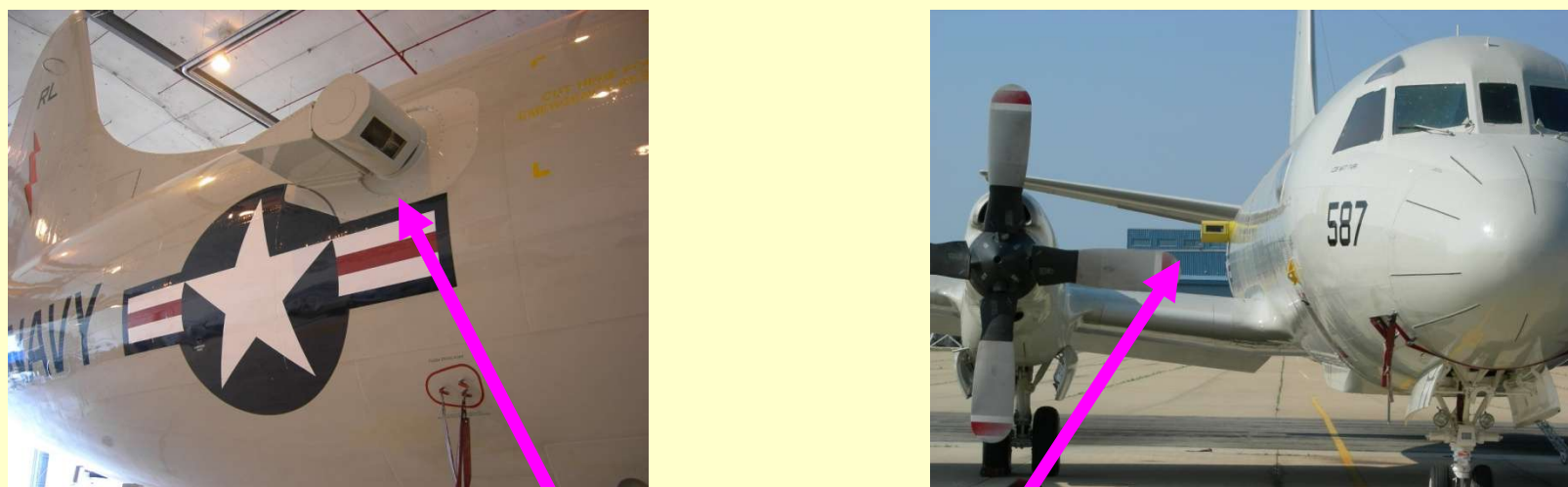


Preliminary Look at Boundary Layer Doppler Wind Lidar Wind Profiles From The Tropical Cyclone Structure, 2008 (TCS-08) Experiment

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- TCS-08 (Tropical Cyclone Structure) experiment was part of T-PARC in Summer, 2008
- NRL P-3 studied airflow in and around incipient and developing tropical cyclones in the Pacific Ocean
 - P-3 instrumentation
 - ELDORA Doppler Radar
 - P3DWL Doppler Wind Lidar
 - Drop Sondes
 - Flight level instrumentation
 - Other aircraft
 - Air Force C-130 (drop sondes, SFMR)
 - DLR Falcon (DIAL & DWL Lidars, drop sondes)
 - Taiwan DOTSTAR (dropsondes)
 - ONR supported installation of P3DWL on P-3



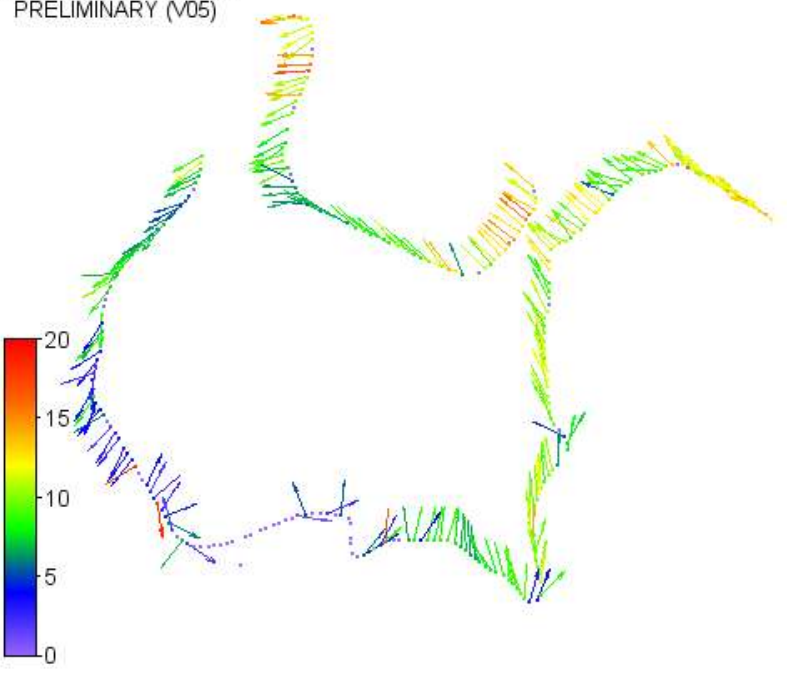
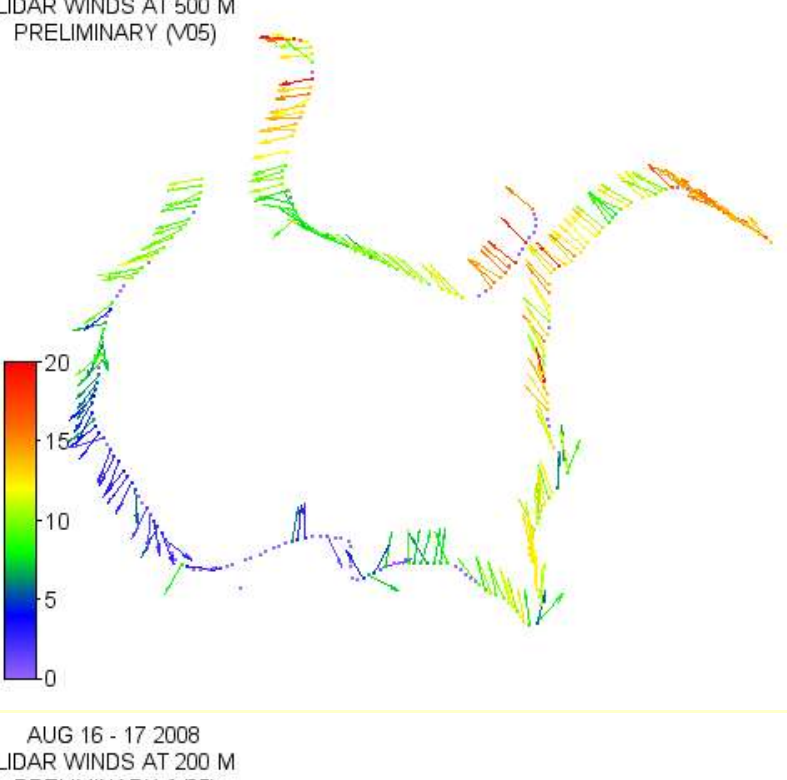
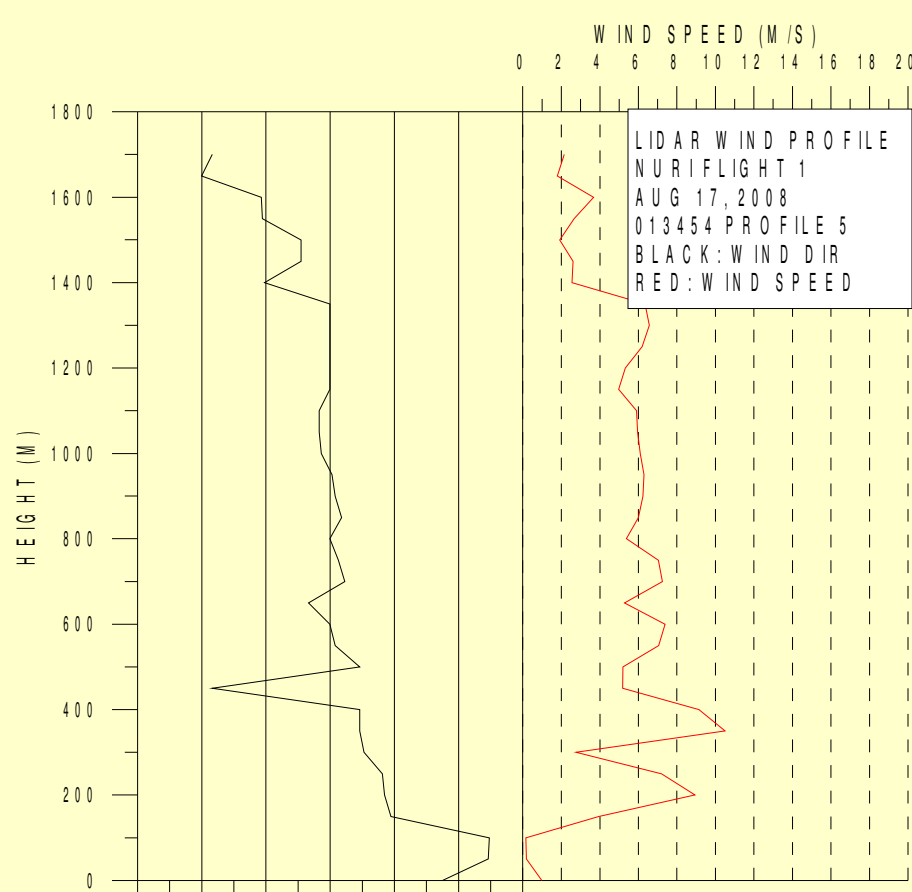
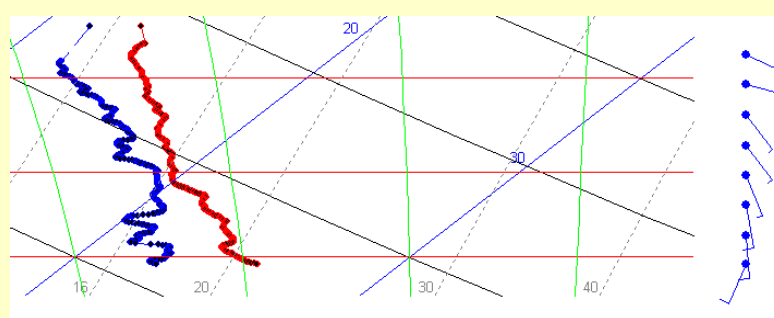
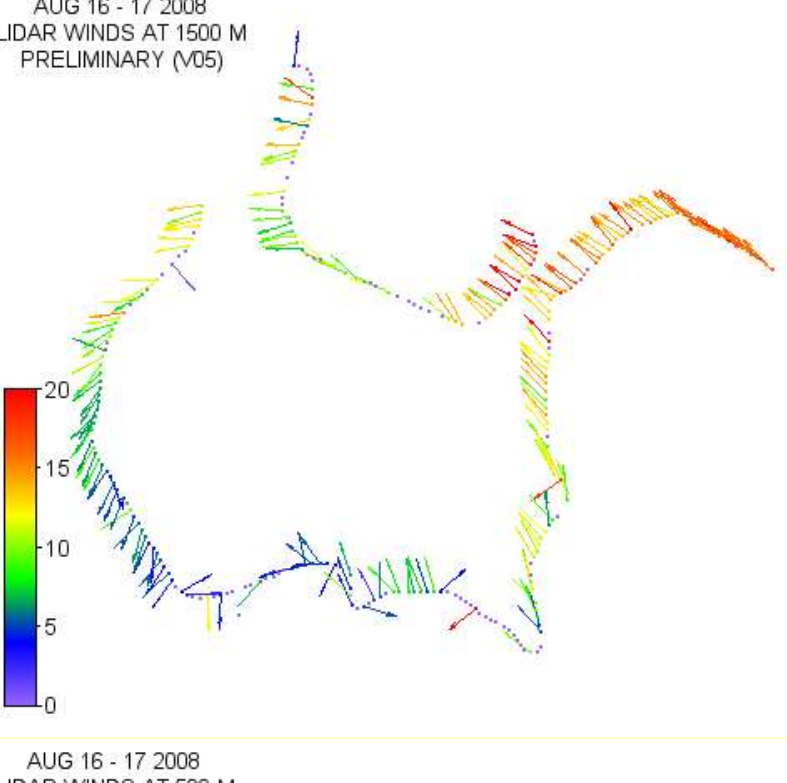
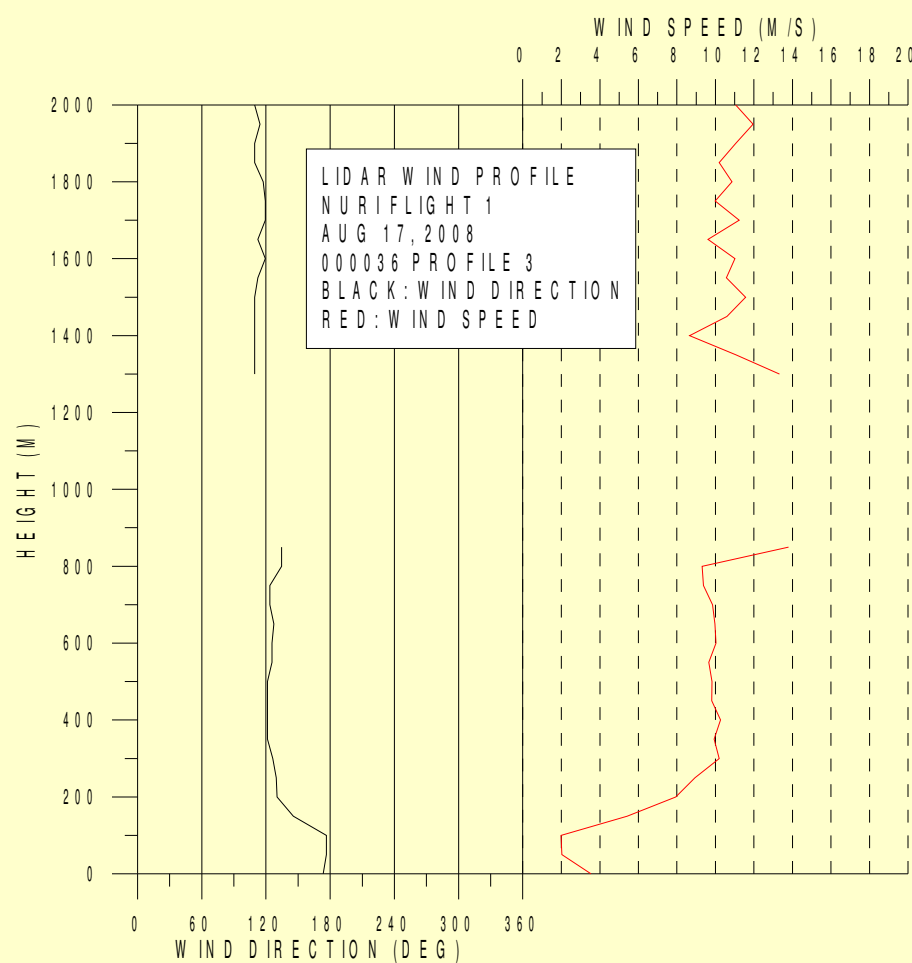
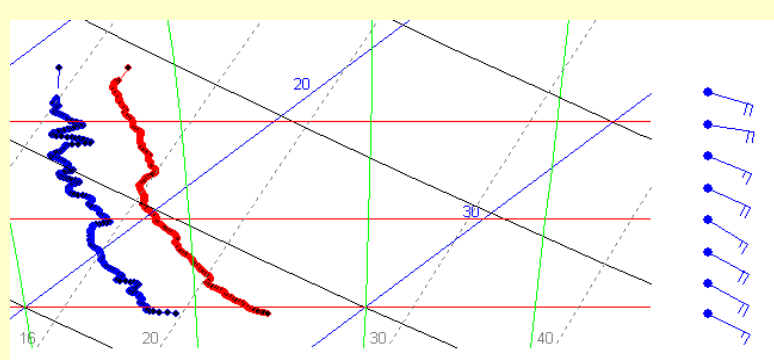
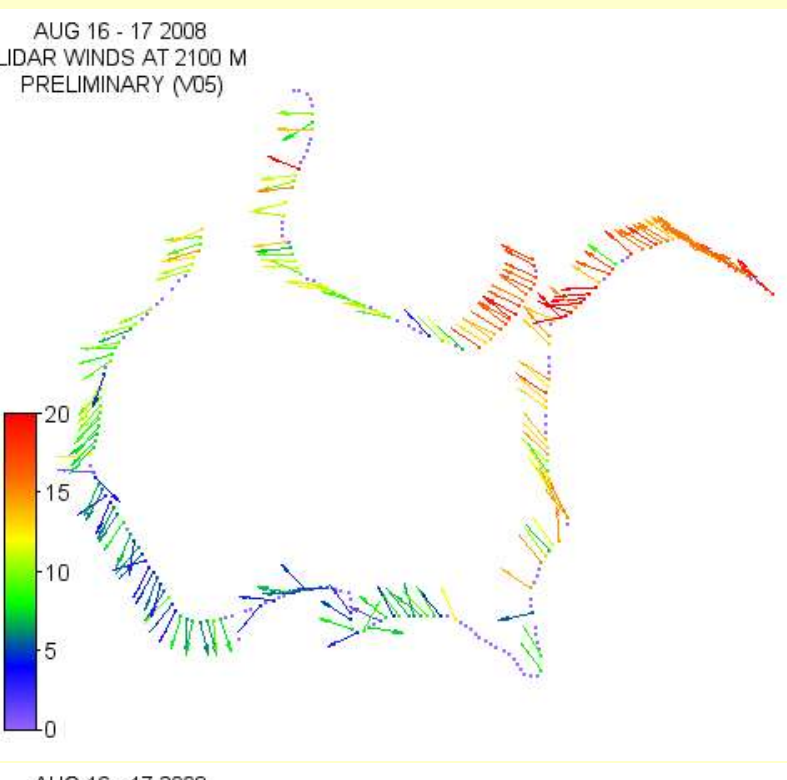
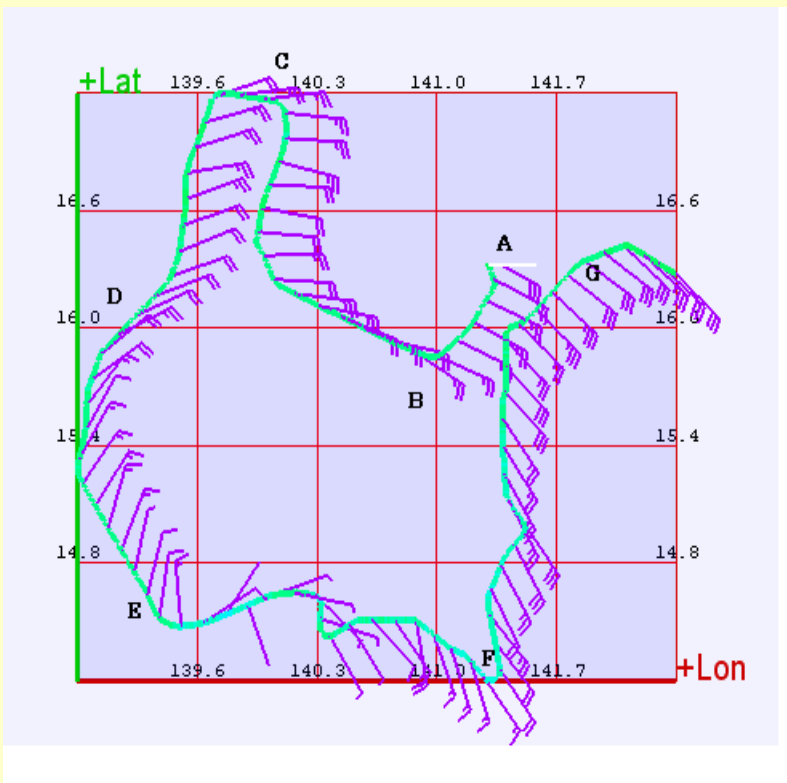
Two-axis scanner

- 1.6 μ m coherent detection
- 1 mJ
- 2000 Hz
- 10 cm two axis scanner, side mounted
- Range: 3 – 20 km depending upon aerosols
- Weight: <200lb Power: 300 watts
- GUI with real time instrument control and data display
 - Real time display and control
 - Pre-programmed scanning modules
 - VAD for vertical wind profiles
 - Roll “prospecting”

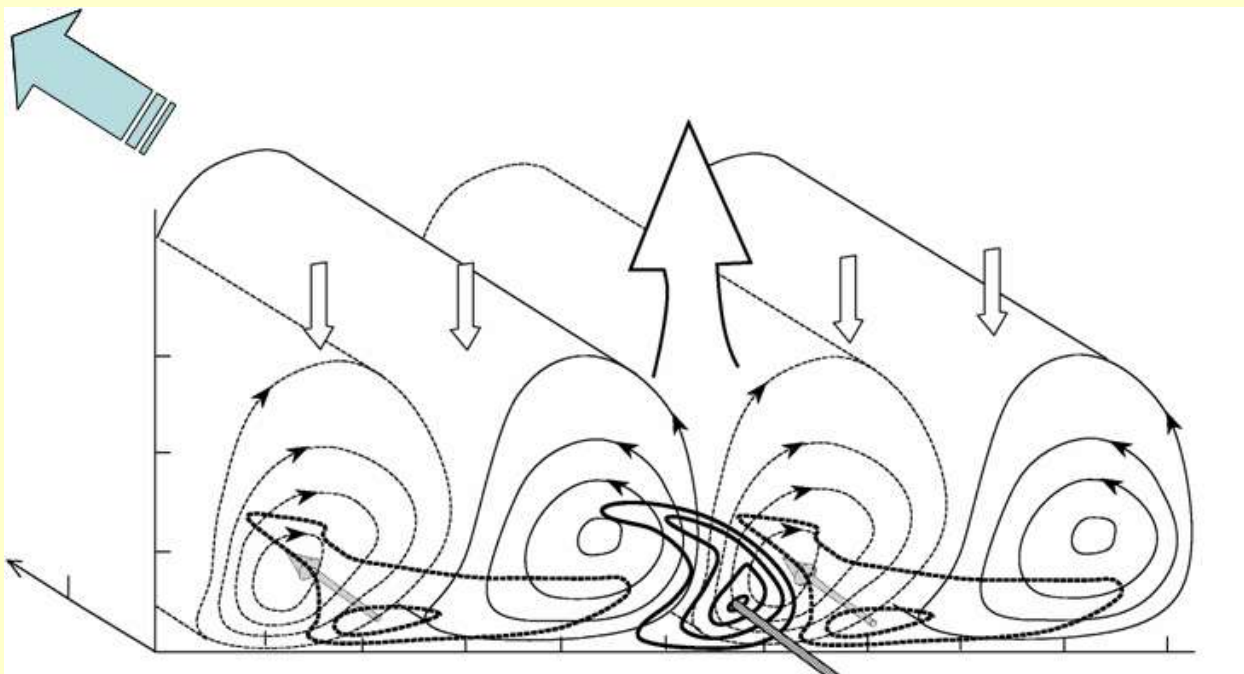


- P3DWL in the field from August 4 to October 8, 2008
- Total data (ground and airborne) = 171 hours
 - Flew 18 missions with Tropical Cyclones as target (118 hours)
 - Ferry flights between TCS-08 bases (Guam, Japan)
 - Ferry flights (USA → Guam → USA; ~2000 km)

Vertical Wind Profiles from Tropical Cyclone Nuri (16-17 Aug. 2008) Flight Level is 3000 m



Investigate Organized Roll Vortices in TC Boundary Layer



Wavelength: Larger-scale structures ~ 700 to 5000 m
Smaller-scale structures ~ 300 to 700 m

Velocity Perturbations: +/- 7 m s⁻¹ typical
DOW +/- “10s of” m s⁻¹

Orientation: Typically along-mean TCBL wind, wide variability

Prevalence: Larger-scale structures ~ unknown, (35% to 70%)
Smaller-scale structures: **Always Present**



Data from Monterey, CA

