Mission Summary Report

Author of report: Andre Pattantyus, Mark Bauman, Annette Foerster  
Team: KDP (Andre Pattantyus, Mark Bauman, Annette Foerster), Prof. Michael Bell  
Support Team: Wen-Chau Lee, Kelly Lance, Matthew Foster, Yu Du  
Mission Number: 1  
Start of Mission (UTC): 24 October 2013 1510  
End of Mission (UTC): 24 October 2013 2040  
Submitted at (UTC): 26 October 2013 0314

Summary:

1. Scientific Background
Mission forecast called for weak trade wind regime with little synoptic forcing and lower than average boundary layer moisture. Chance of precipitation was best early morning and would most likely result from topographical forcing on the windward coast with a chance of land breeze trade wind convergence resulting in showers offshore.

2. General Description of the Mission
   Radar was deployed to Kahalu’u Regional Park on the windward coast. Radar location was 21°27.573N -157°50.389W and orientation was approximately 347°. Some blockage occurred due to proximity to ridge to the south and trees to the north, but good view offshore and towards the Ko‘olau. Most of the ground clutter disappeared above elevation angles of 20°. The meteorological mast was deployed at 1545 UTC to a height of approximately 10m.
   Upon arrival there was a band of precipitation to offshore of Kaneohe and Kailua with overcast skies along the windward coast and shallow trade cumulus further offshore. The wind direction from the mast showed westerly winds suggesting downslope flow. Showers developed anchored to the mountain summits producing locally heavy rain early on. Shower intensity abated and then became scattered. The rain band near Kaneohe remained stationary for some time. Near the end of the mission isolated echoes from the central valley appeared.

   Problems with the truck GPS system delayed the start of the mission by 30 minutes. Scanning started at 1552 UTC. The first scan mode used was D. For the PPI scans, elevation angles of 2° to 35° at varying increments were used. From these scans the areas of precipitation were identified and RHI scans were set-up accordingly. The scans continued with this combination of PPIs and RHIs for the remainder of the mission with additional, higher PPI elevation angles added and RHI scan adjustments to focus on precipitation. We also added a vertical ZDR calibration scan to the scan list. Additional scan modes were tested such as DH, B, EH, E. Time series data was collected starting at 1902 UTC. An example reflectivity and velocity image from 1908 UTC is shown in Figure 1. Before shutting down the radar a solar scan was done to verify our orientation.
Transmitter problems occurred due to over-heating. A fan was purchased to combat this problem which will have to be tested in future missions.

4. Report on the Radiosonde System
Due to problems with the radiosonde system laptop, no sounding was launched.

Figure 1. Radar Reflectivity and Doppler velocity at 19:08:35 UTC. A convective echo is evident above the terrain, with a divergent signature aloft.