

Atmospheric Winds and Rain Obs - Coming to Your Neighborhood Soon!

OUTLINE

- | *Problem Definition*
- | *ABL and Surface Wind Fields*
- | *Precipitation*
- | *Next Steps*

Acknowledgements:
NOAA AOC (Sean McMillan)

60th IHC – Mobile, Alabama
20 – 24 March 2006



Remote Sensing
SOLUTIONS

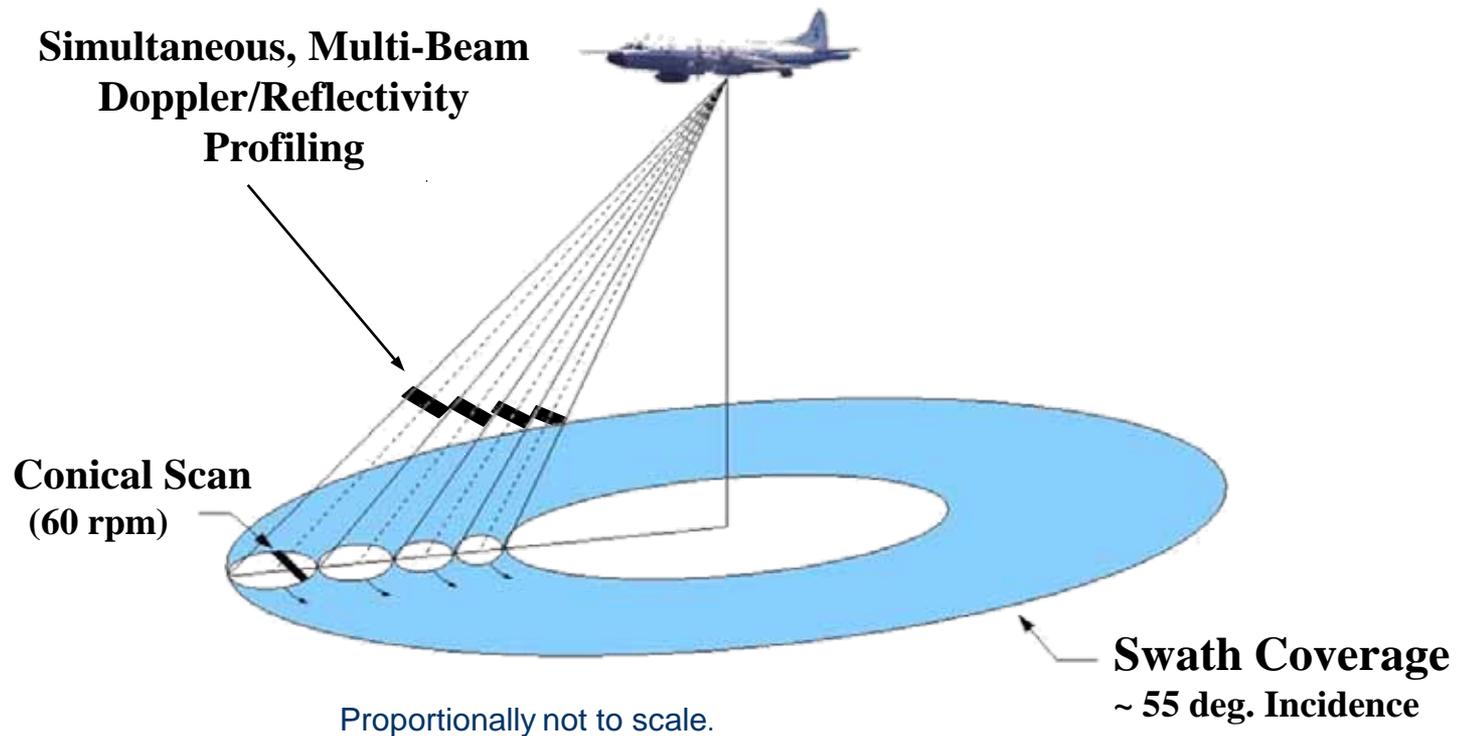
Project Objectives

Develop an operational system for continuously mapping:

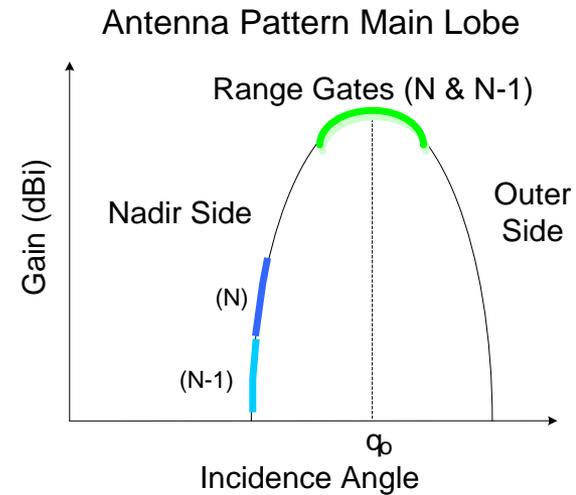
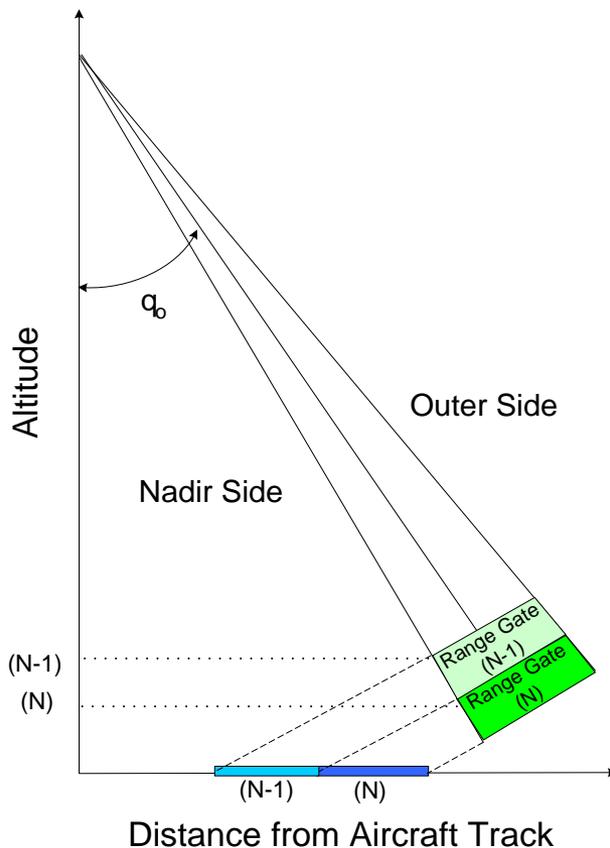
- | Lower ABL wind field.
- | Ocean surface wind field.
- | Precipitation field.

Within tropical cyclones and rain bands.

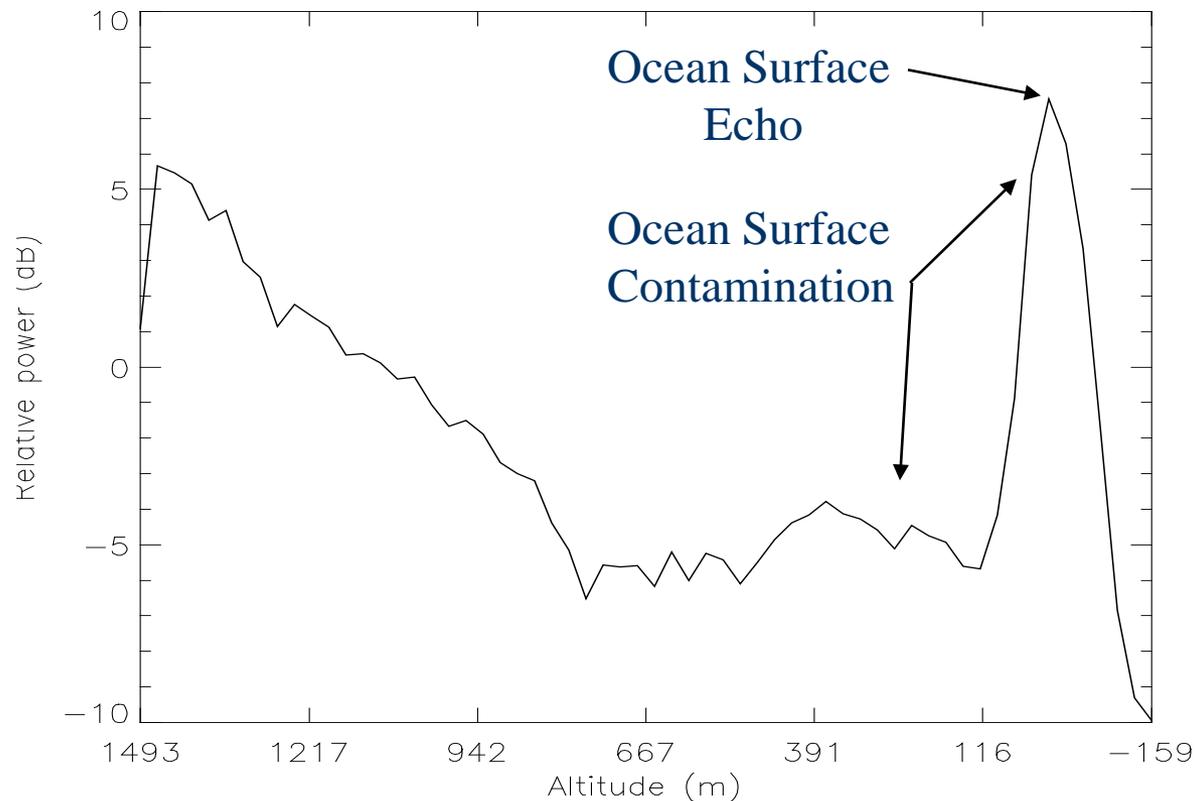
IWRAP Measurement Technique



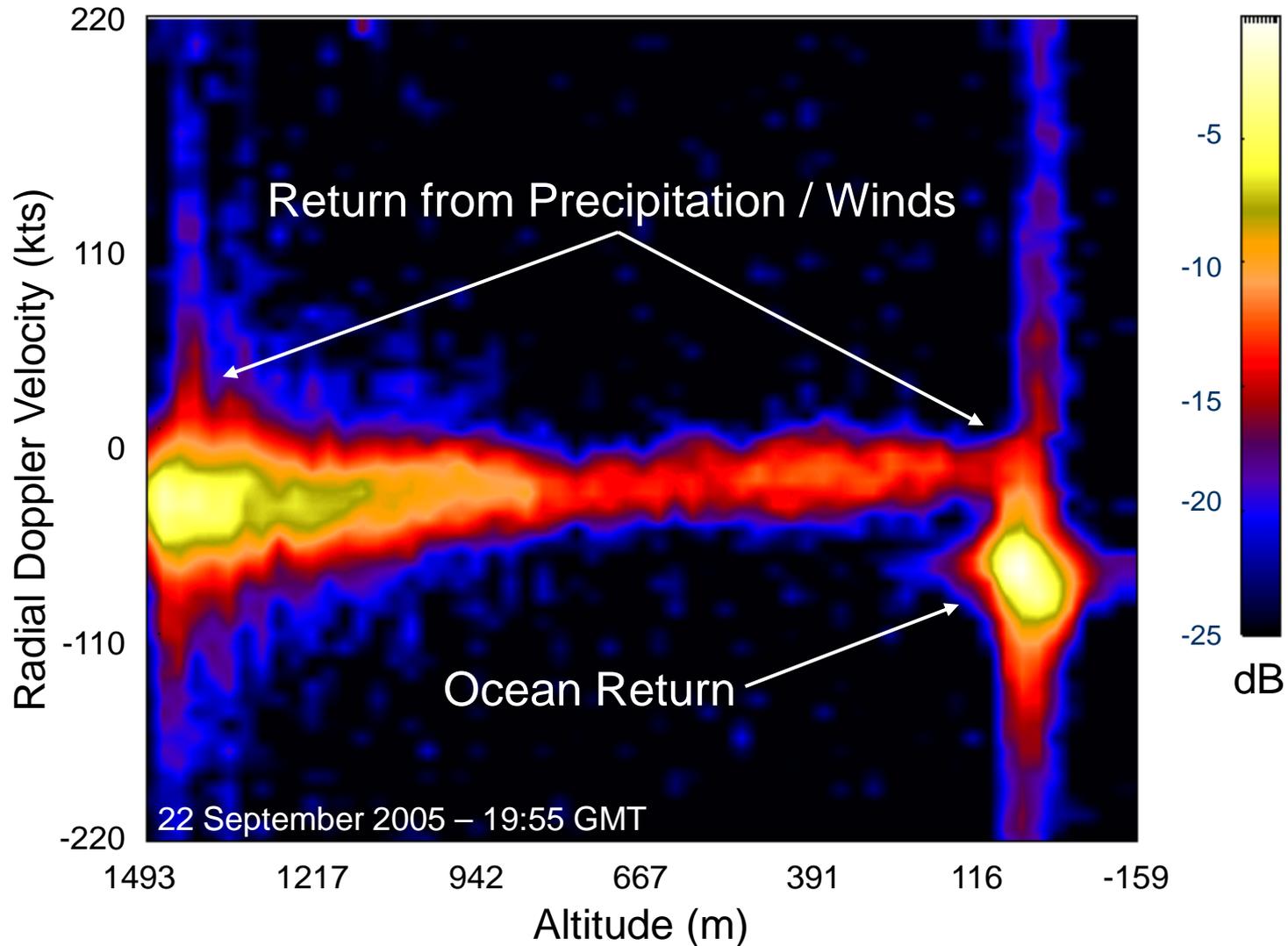
Volume Backscatter Profiles: - Ocean Surface Backscatter Contamination



Volume Backscatter Profile (with Surface Contamination)

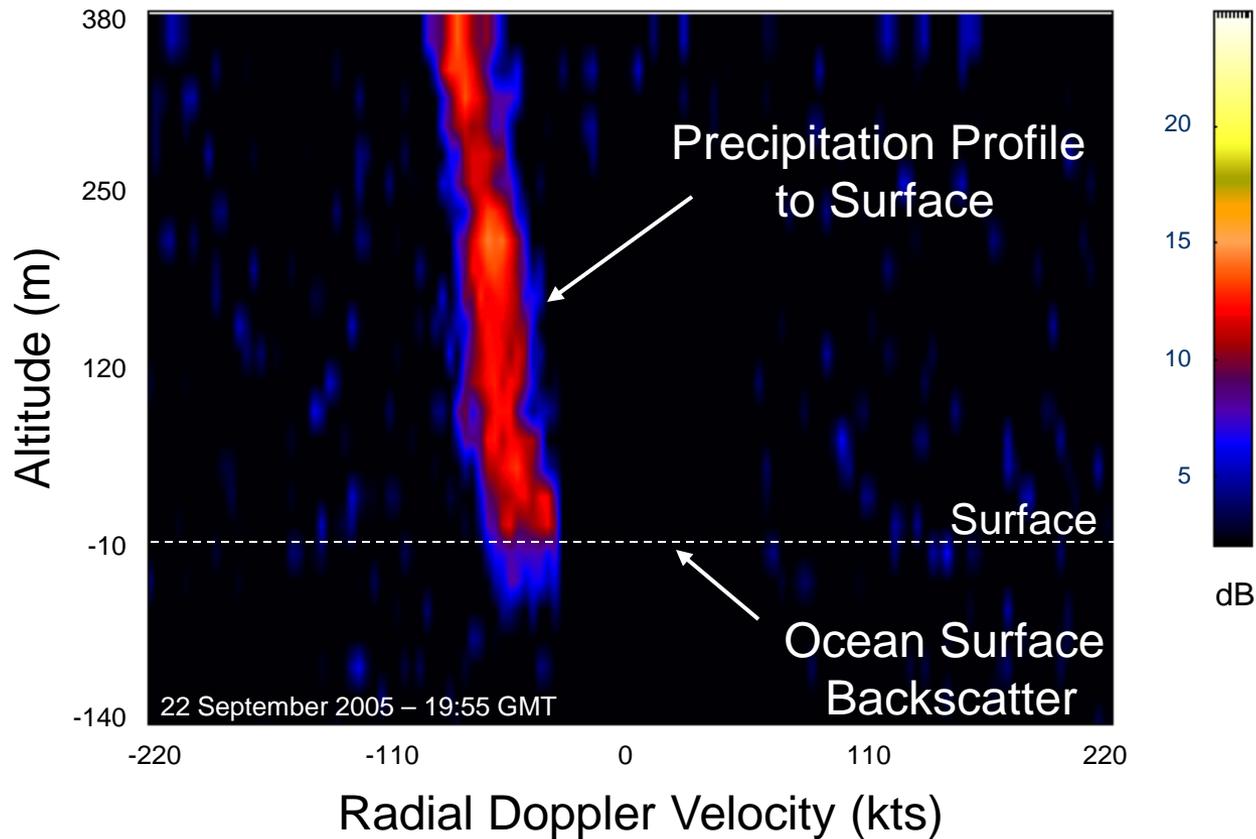


Doppler Spectral Profile

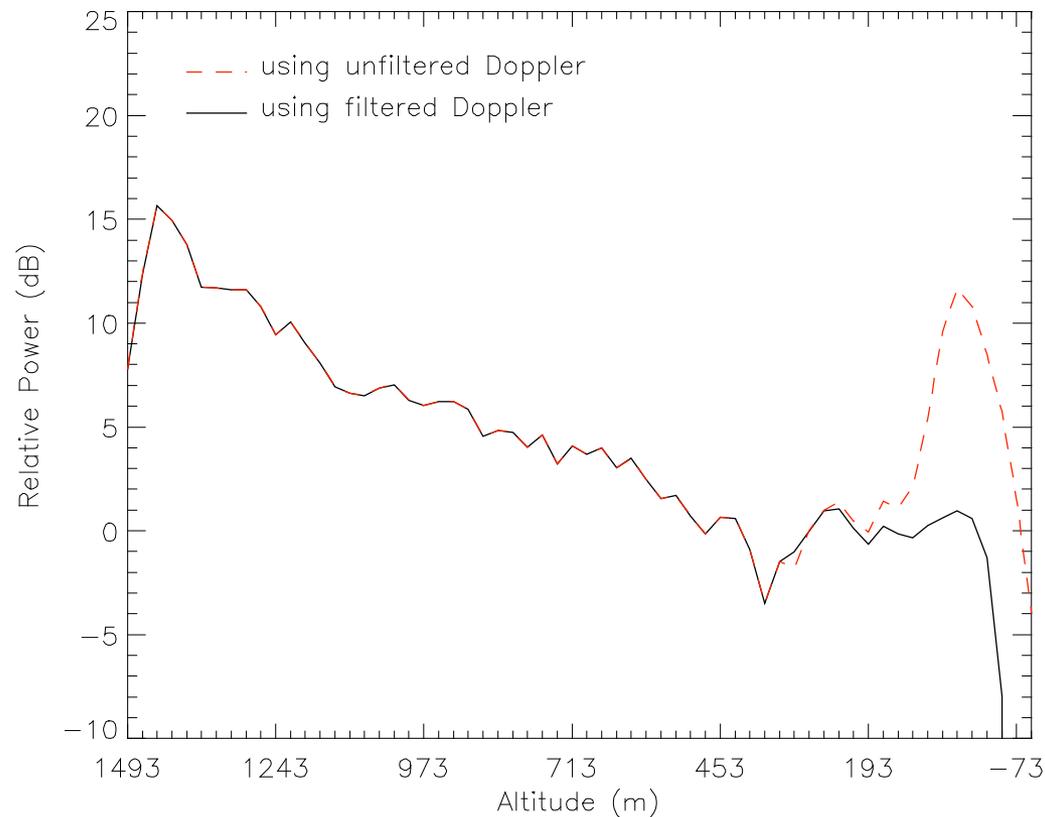


Lower Atmospheric Boundary Layer

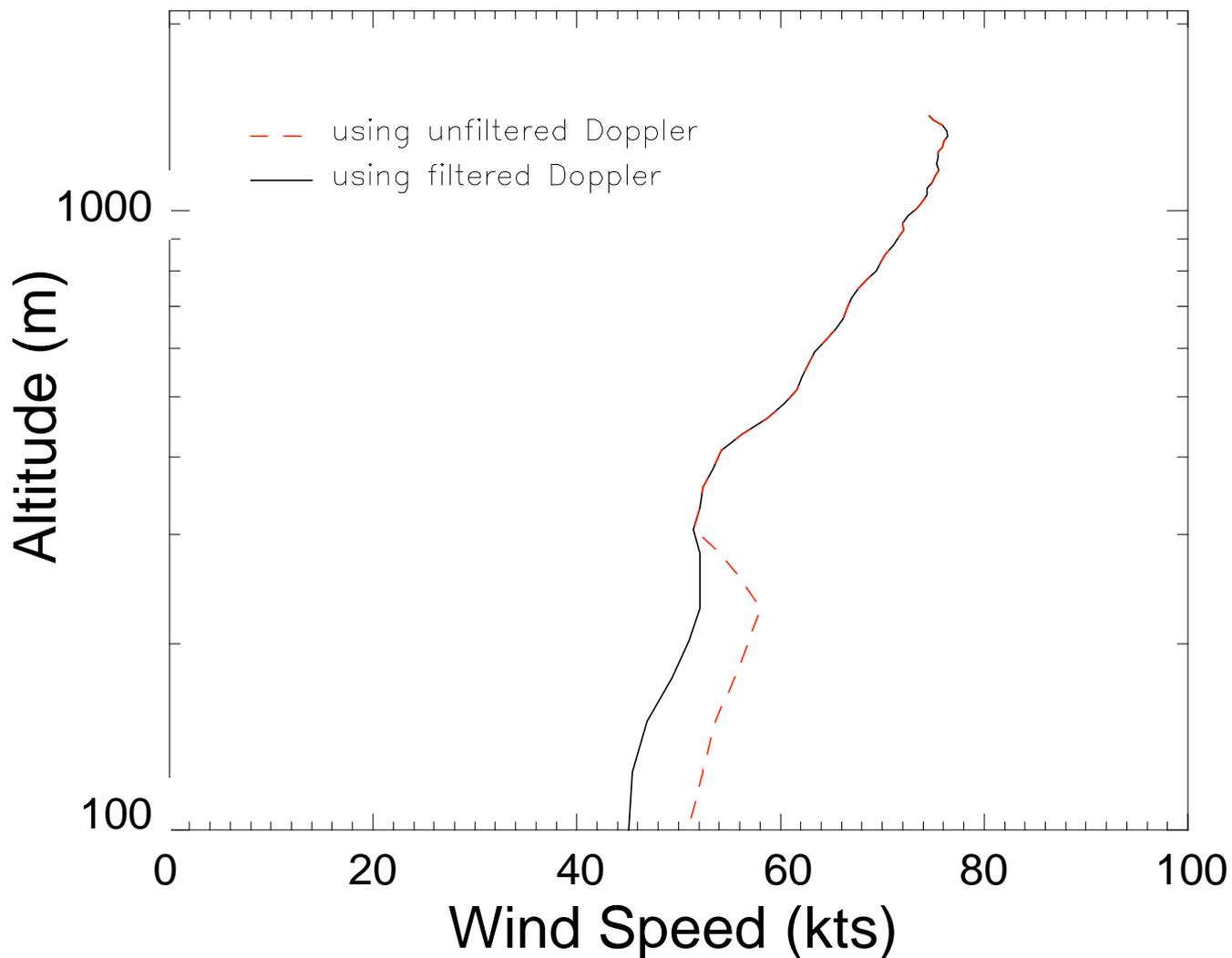
Spectral Filtering Algorithm



Volume Backscatter Profile - Spectral Filtering Applied



ABL Profile with Spectral Filtering



Further Improvements:

- Leading to an Operational Solution

- I More efficient antenna design
 - ~15 % reduction in beamwidth
 - 4 db gain improvement
- I Unique Single RF Channel Design
 - 10 dB improvement in sensitivity.
 - Smaller, lighter and less expensive.
- I Frequency Diversity Doppler technique
 - Decouples range and Doppler ambiguities.

Next Step:

- Advanced Wind and Rain Airborne Profiler

Proposed SBIR Phase II

- | Develop AWRAP system
 - Real-time spectral processor
 - | Map **ABL winds** to within ~ **50 m** of surface.
 - | Map **ocean surface wind field** in the presence of precipitation.
 - New transceiver & antenna
 - | 15 dB more sensitive (~15 dBZ minimum reflectivity)
 - | One-third the components.

Our Mission Statement

A Happier, Smarter, Better World !

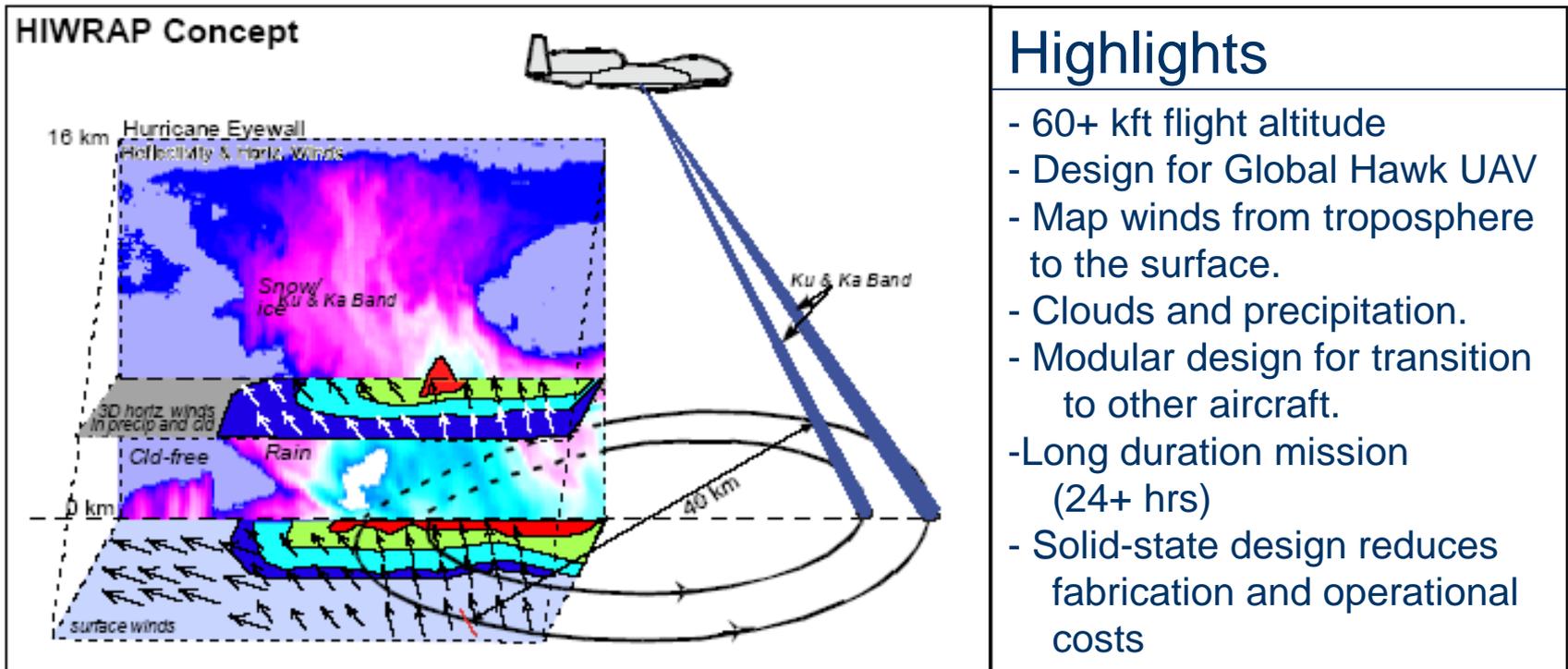
Advances in technology are, and will continue to, bring the research, forecast, emergency management and operational communities closer together.

The end result, we all become smarter quicker and the public receives better and better and better forecasts !!!



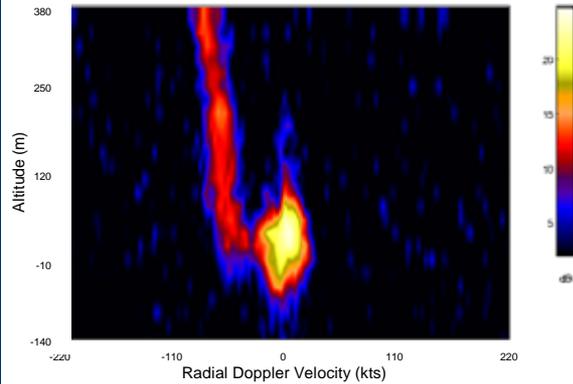
NASA IIP HIWRAP

NASA High Altitude Wind and Rain Profiler

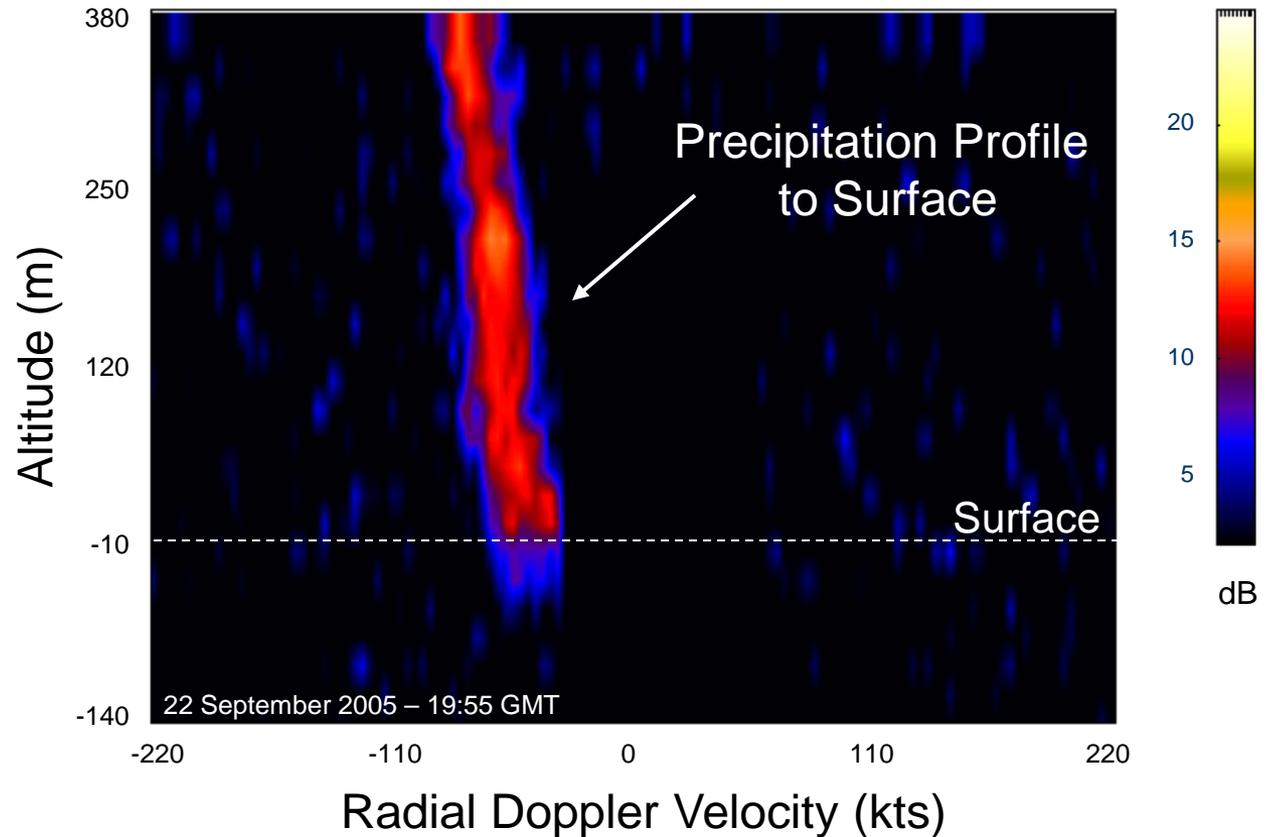


Lower Atmospheric Boundary Layer

Original Measurements

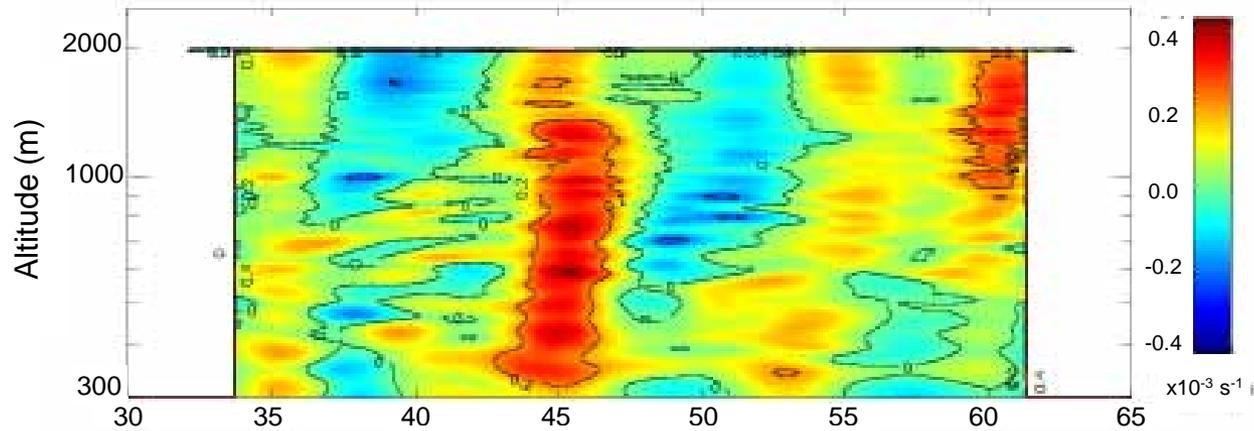


Spectral Filtering Algorithm

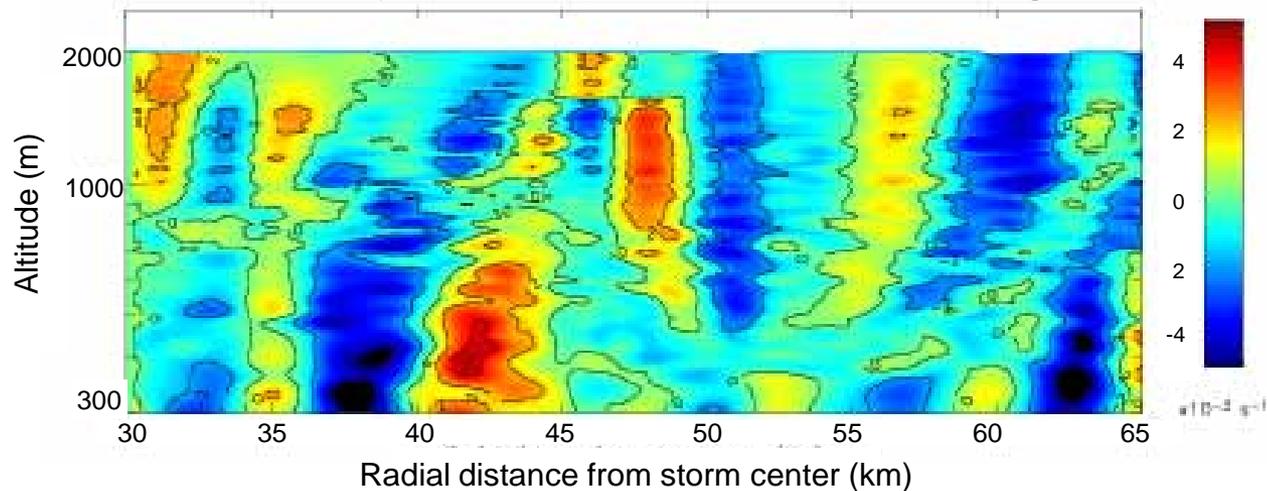


IWRAP Wind Products (cont.)

Divergence – 13 Sept. 2003, Inbound Leg



Vorticity – 13 Sept. 2003, Inbound Leg



Precipitation Retrievals

