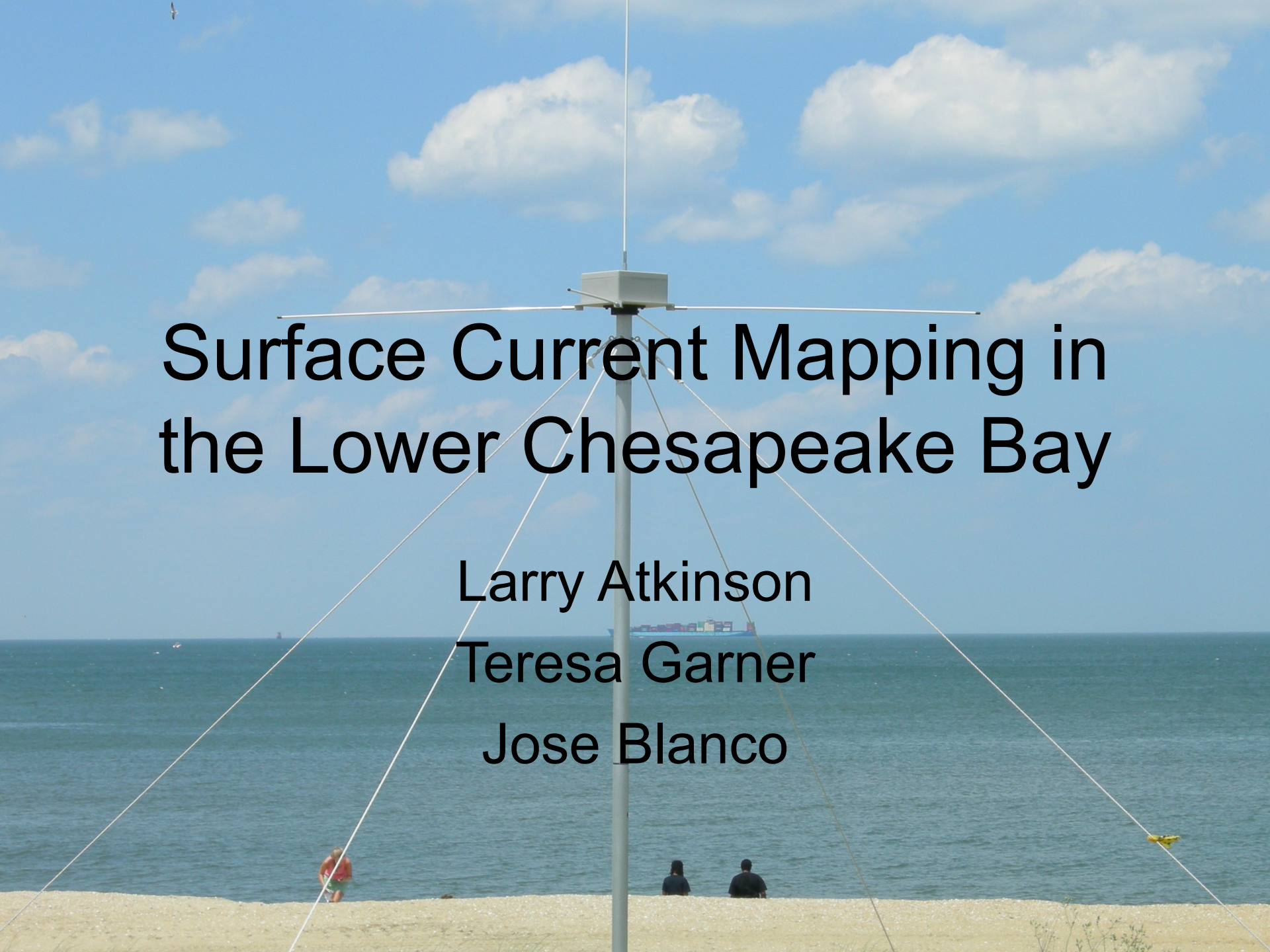


Surface Current Mapping in the Lower Chesapeake Bay

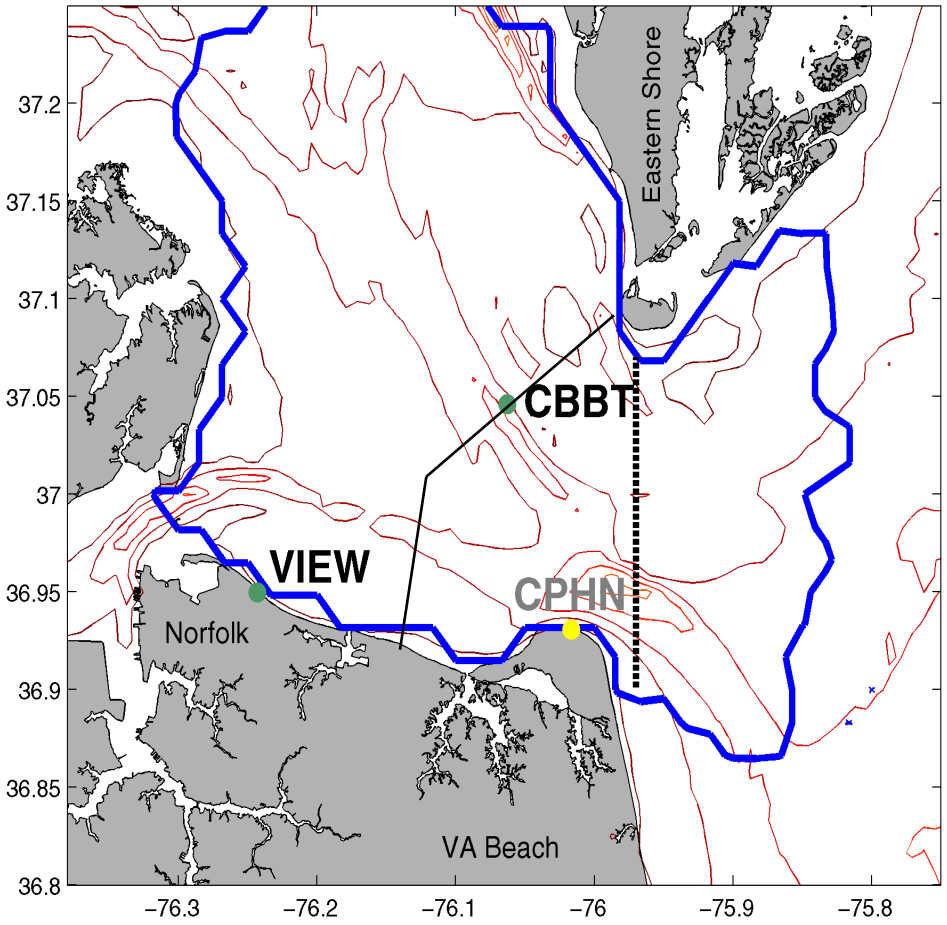
Larry Atkinson

Teresa Garner

Jose Blanco

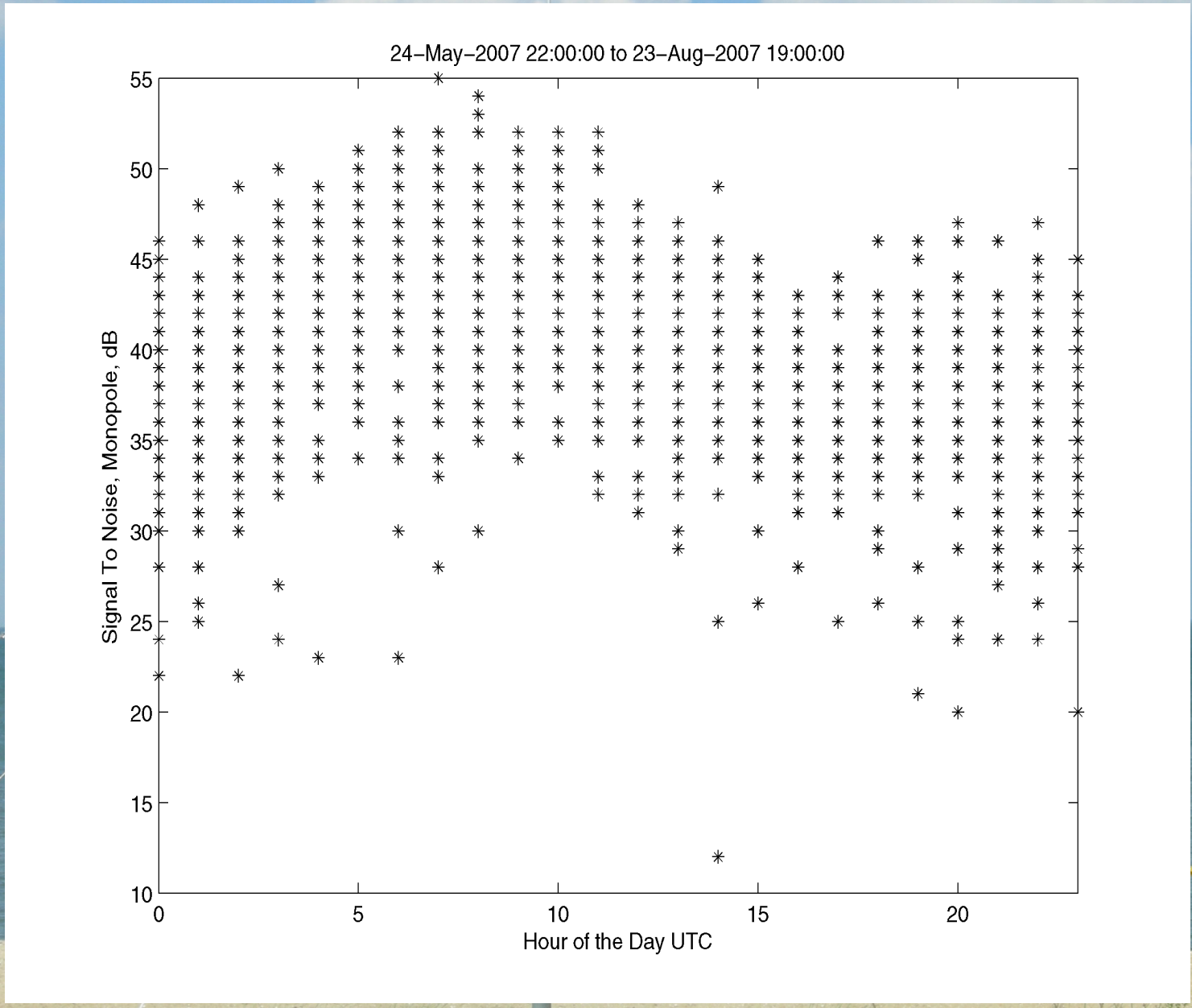
Two sites - one at Norfolk City beach and one at Bay Bridge Tunnel Island #4

The whole lower Bay is covered. An additional NOAA site at CPHN will provide coverage offshore and redundancy inshore

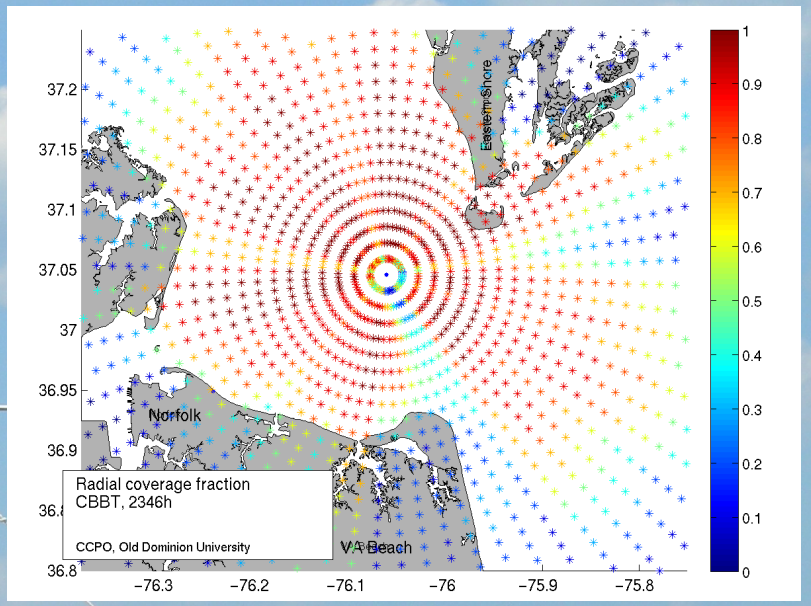


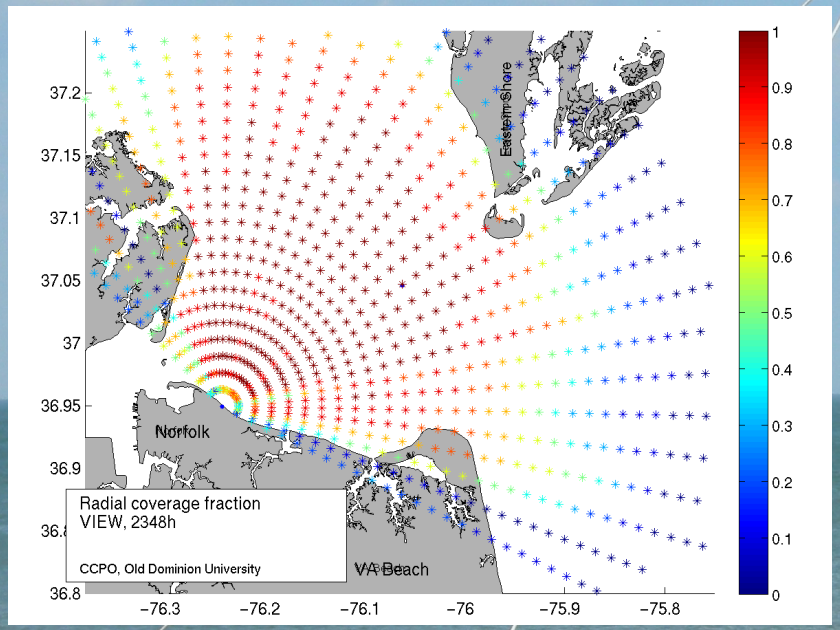
Average for Time period: May 24 22:00 – Aug 23 19:00 (2007)	CBBT	VIEW
Range (km)	29.5	34.2
Noise Floor, Monopole (dBm)	-130.2	-143.1
Signal To Noise, Monopole (dB)	32.4	39.5
Radial Vector Count (measured pattern)	686	417

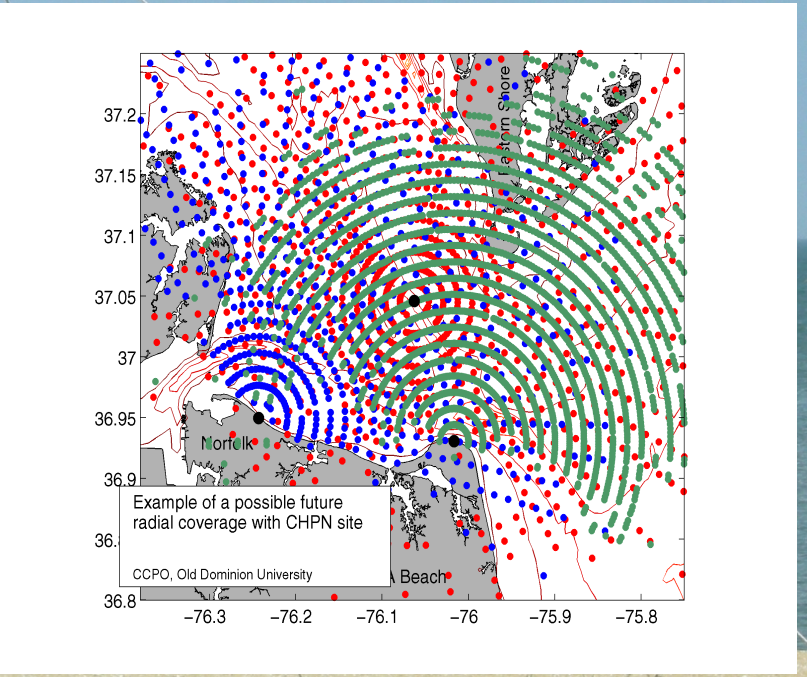
S/N varies diurnally



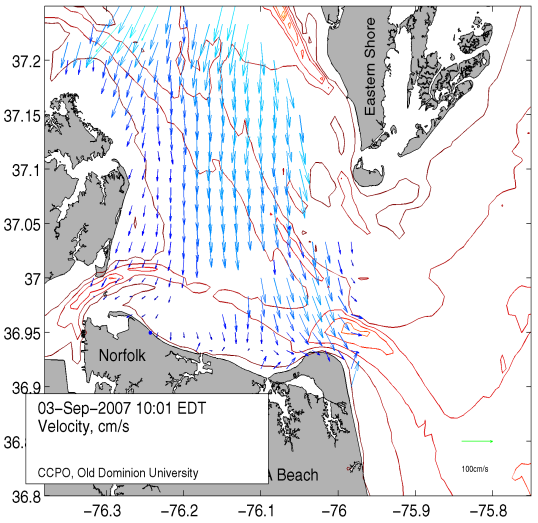
Current and Future Data Coverage

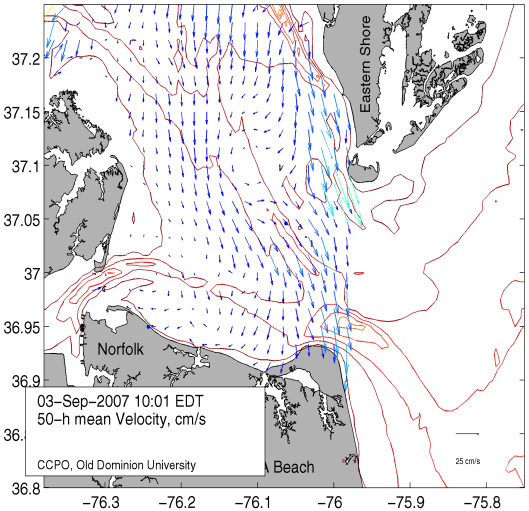


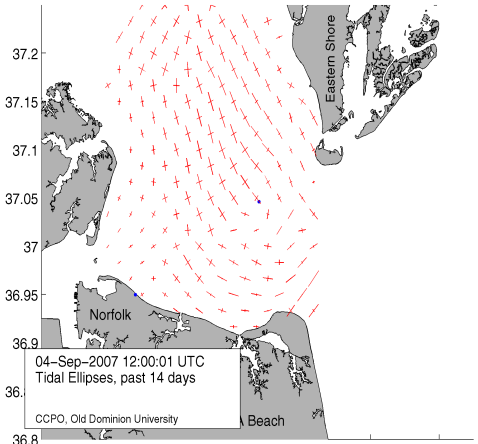


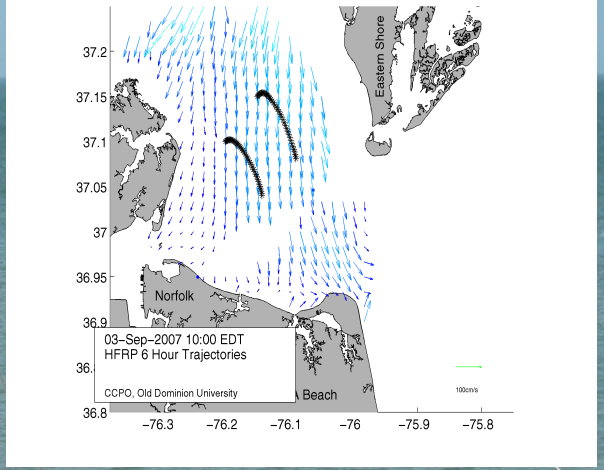


Initial Products - Hourly vectors, 50 hour subtidal means, tidal ellipses, 6 hour trajectory



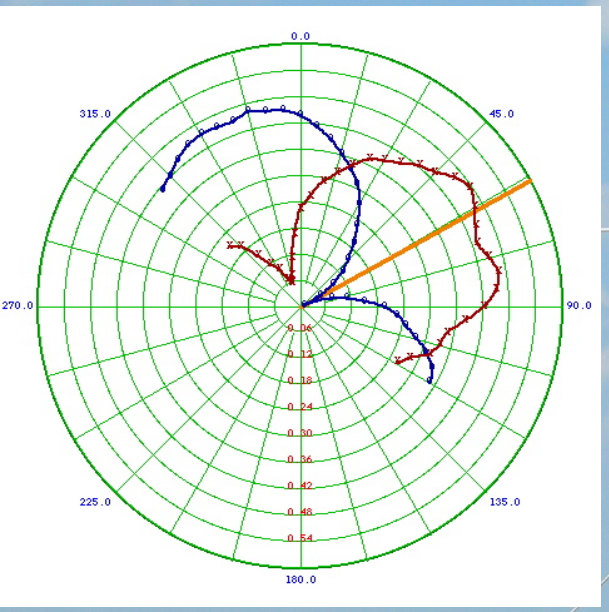




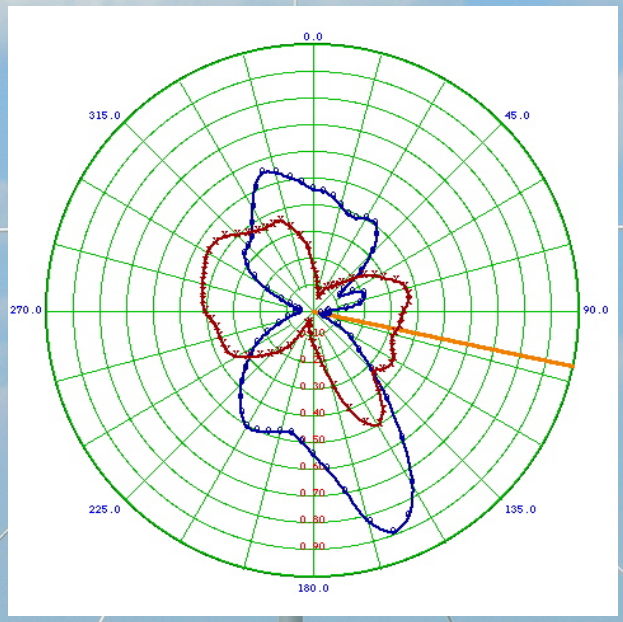


Data Quality and Validation

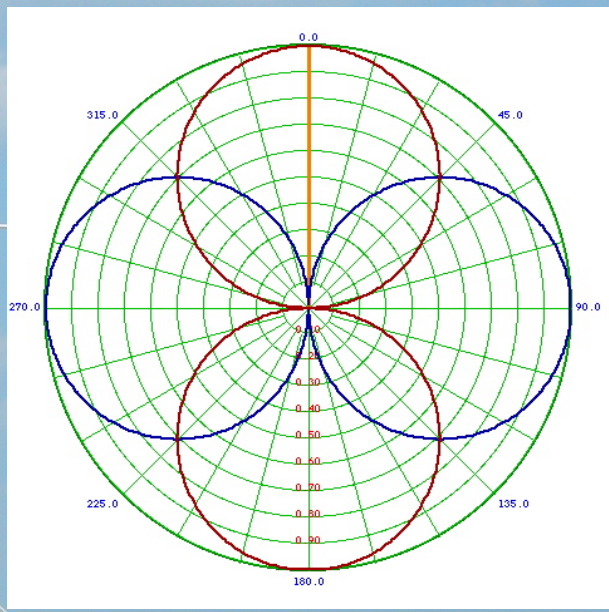
Measured and Ideal Beam Patterns



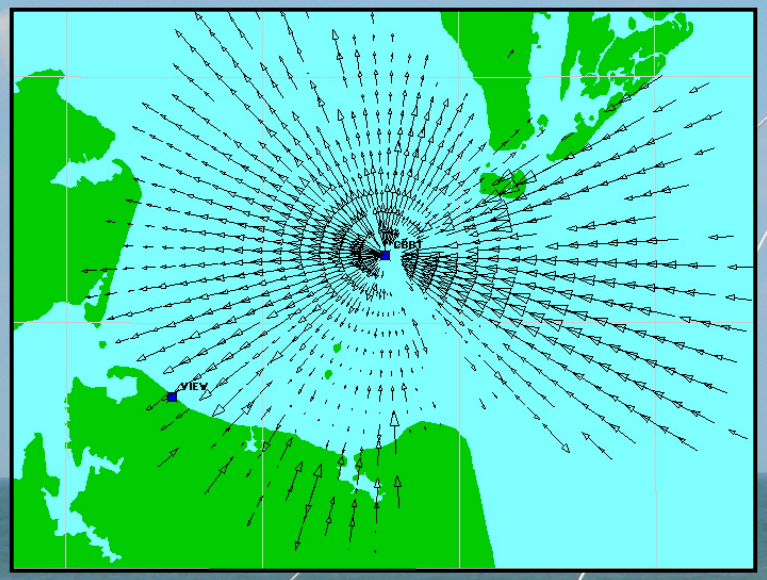
View – On Beach

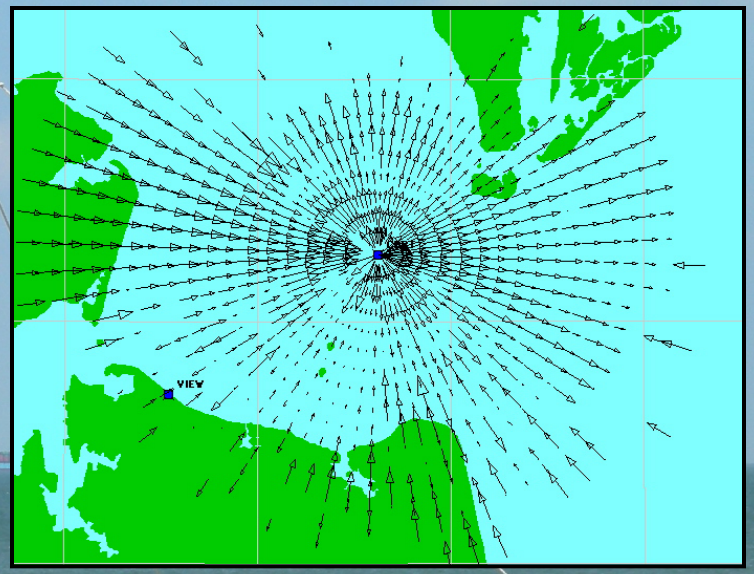


CBBT – on Island

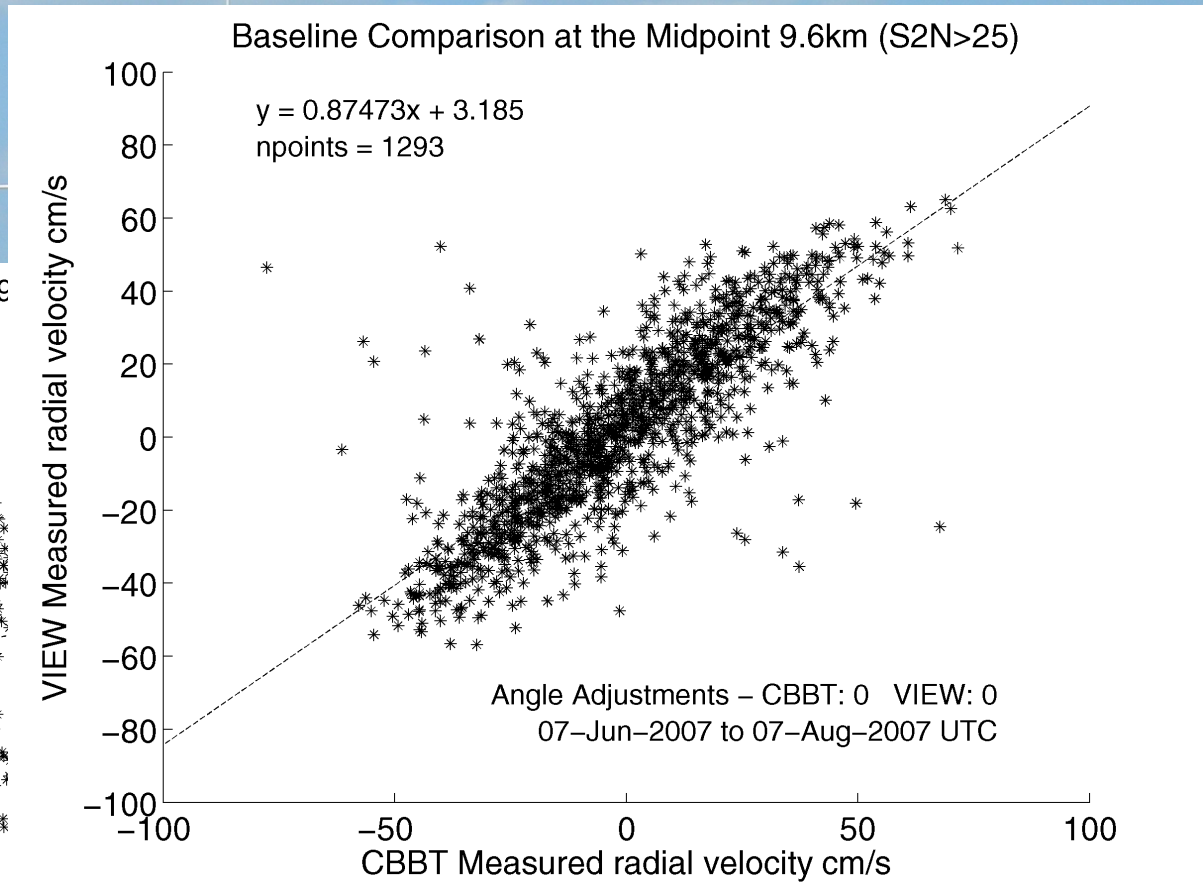


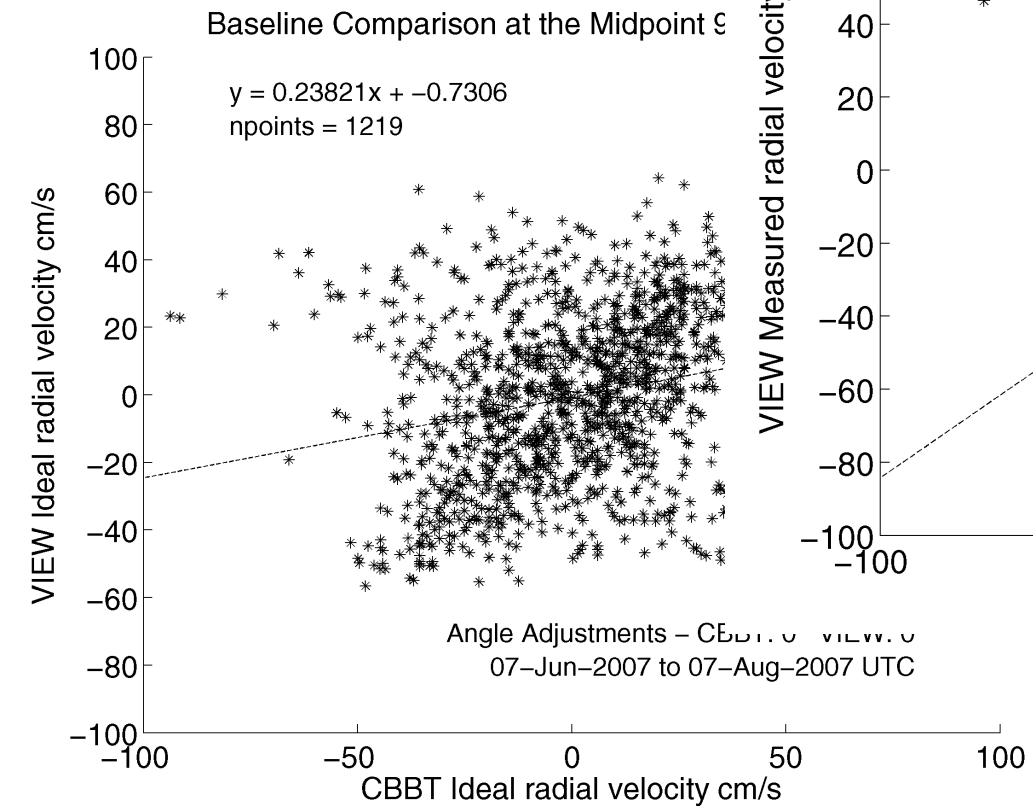
Ideal


VIEW

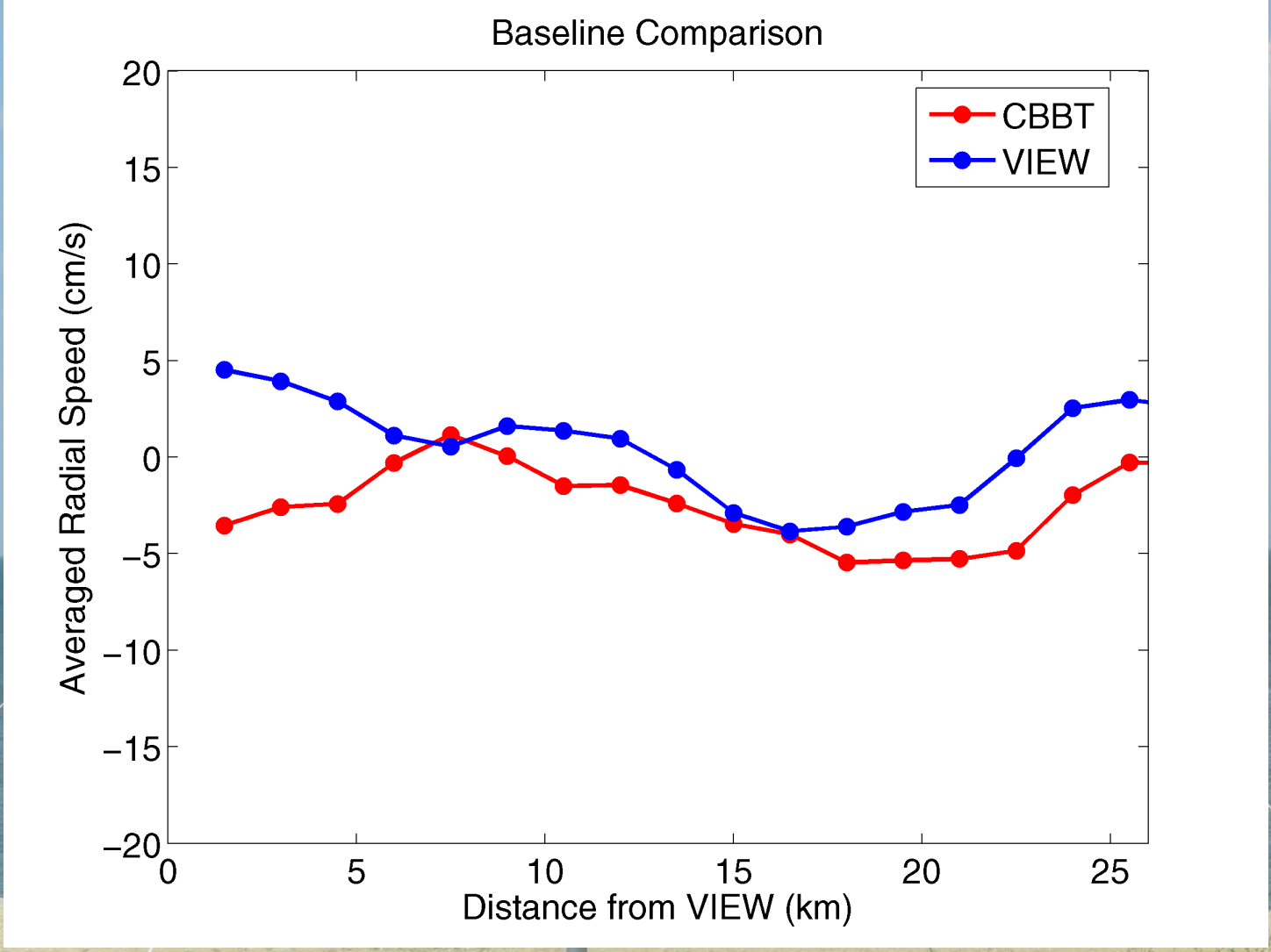

VIEW

Baseline comparisons improved significantly using the measured beam patterns

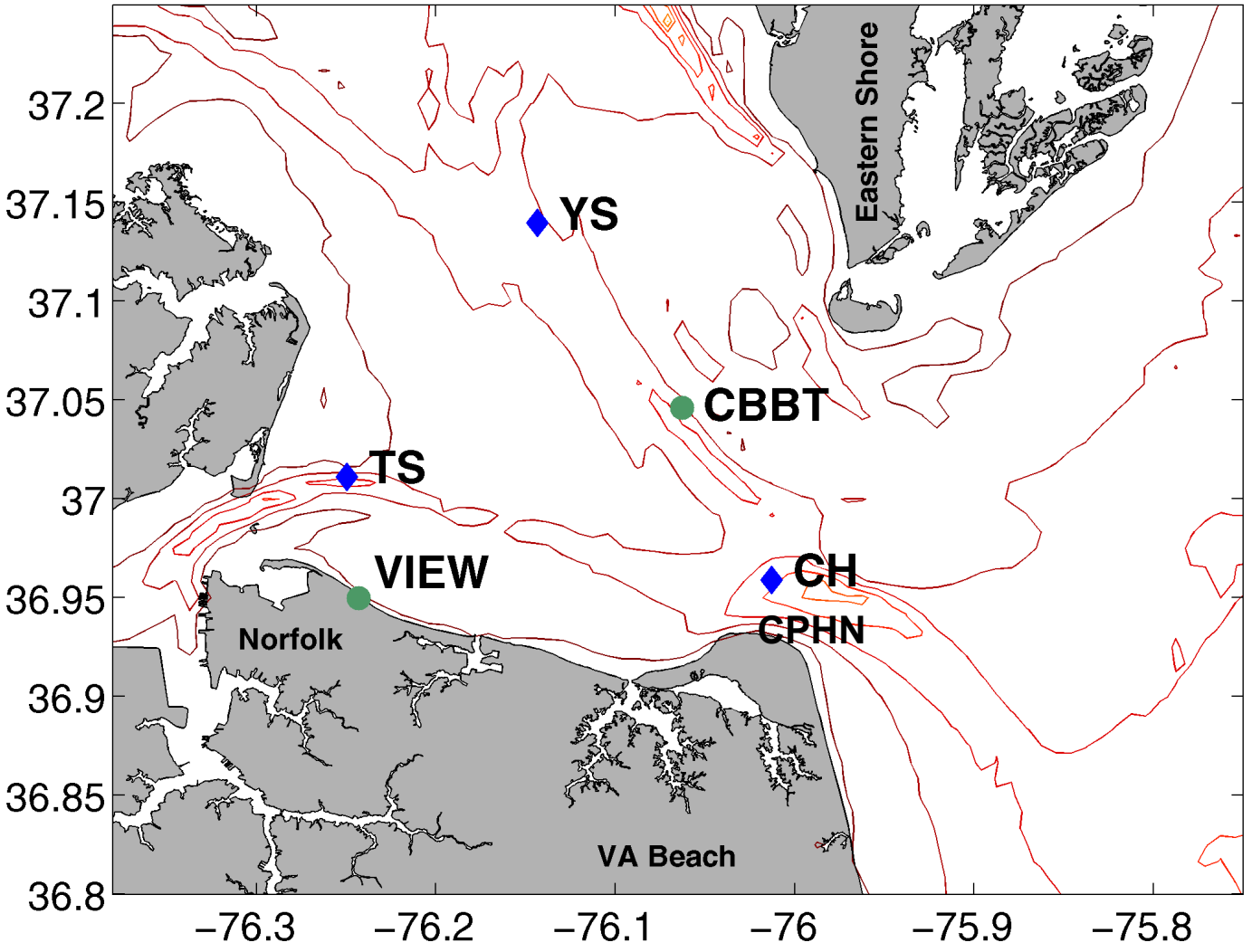




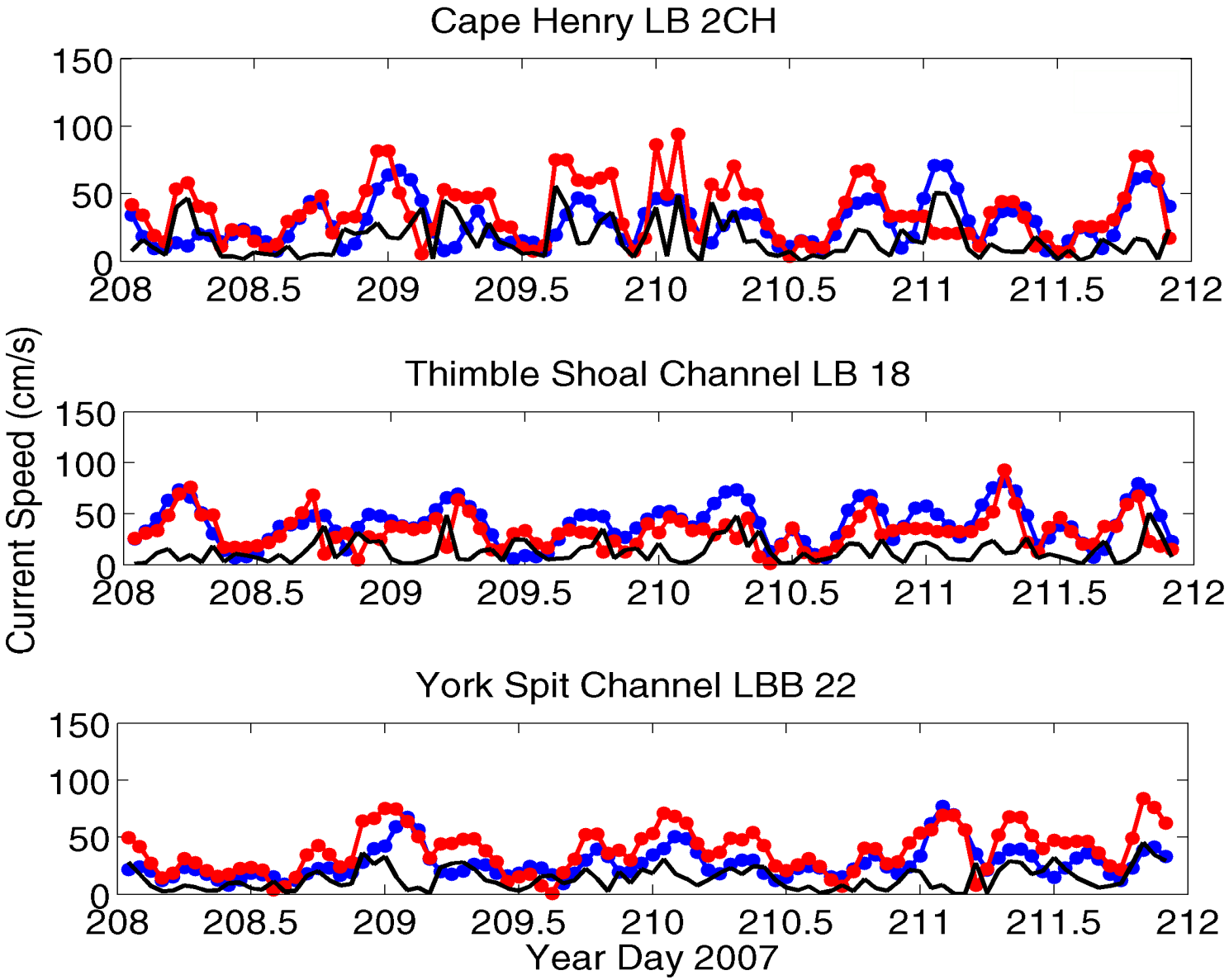
The radial speed should be the same from each antenna at the middle of the baseline.



NOAA PORTS has 3 ADCP's on Coast Guard ATON buoys in the area



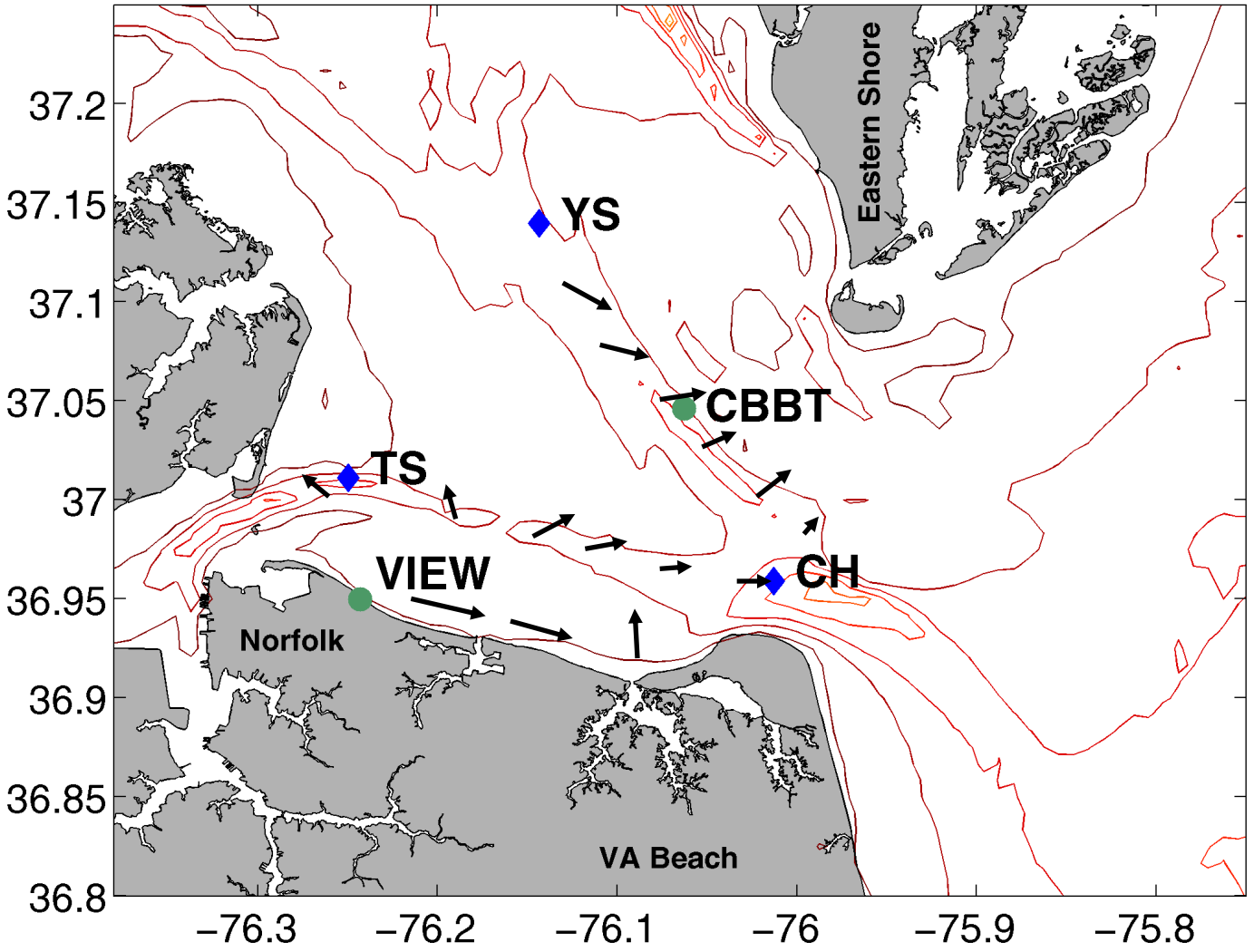
Time series of absolute speed for hourly averaged NOAA ADCP data (blue) and CODAR data (red) and their difference (black line).



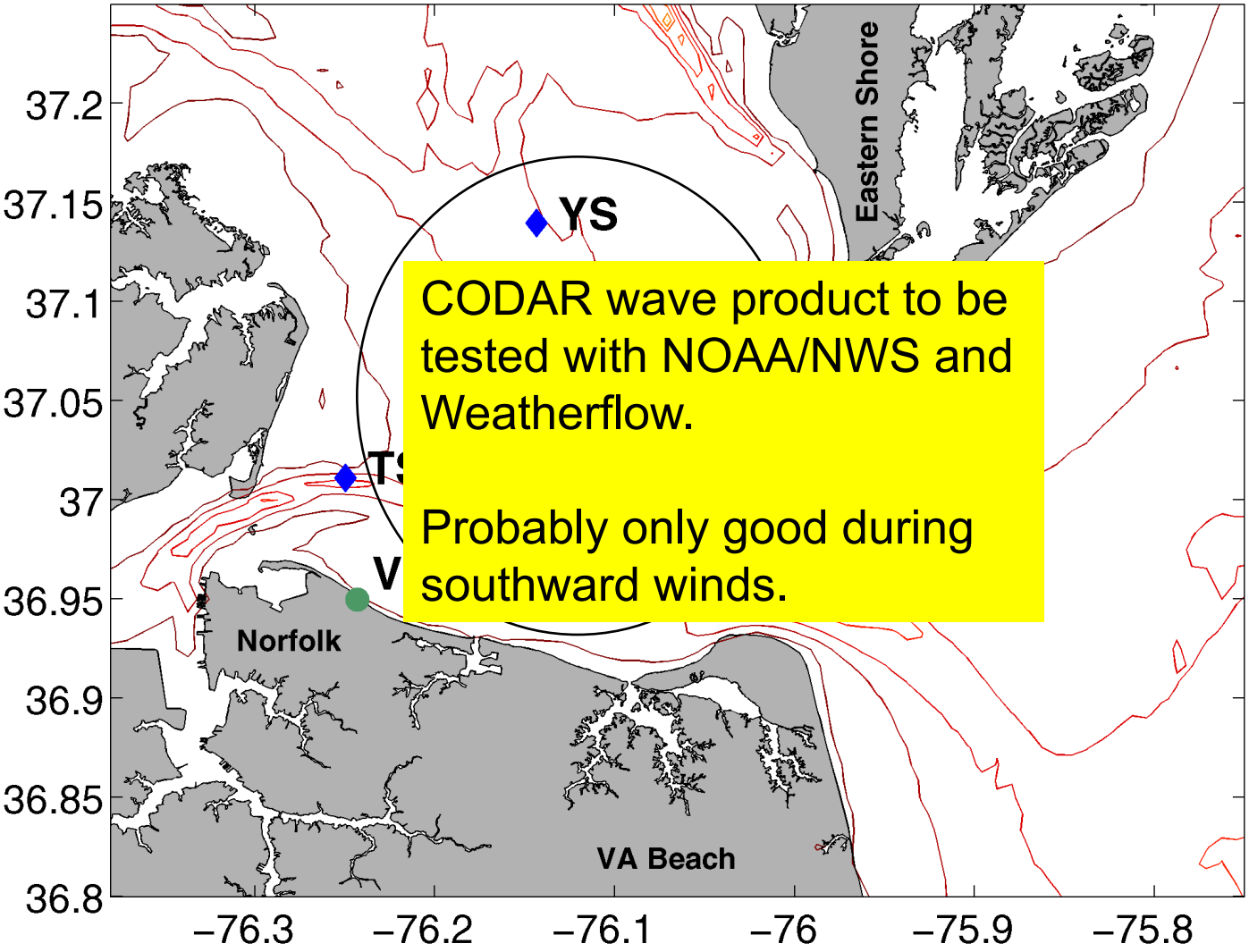
Means and standard deviations of the speed differences (absolute value of ADCP data – CODAR data).

Site	Mean (cm/s)	Standard Deviation (cm/s)	Search Radius (km)
Cape Henry	16.2	14.0	2
Thimble Shoals	13.2	11.2	1
York Spit	13.9	10.0	1.25

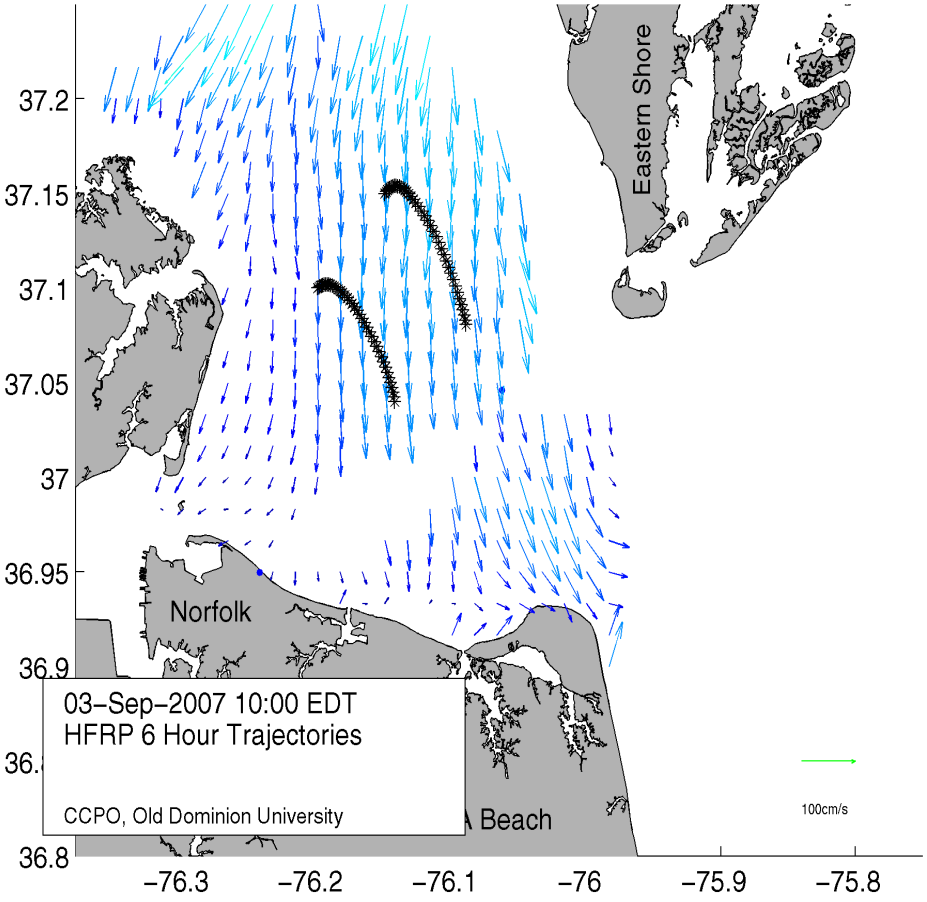
Product development for specific users – Navigation channels, sewage effluent, Navy special ops.



Wave and wave steepness – NWS and Weatherflow.

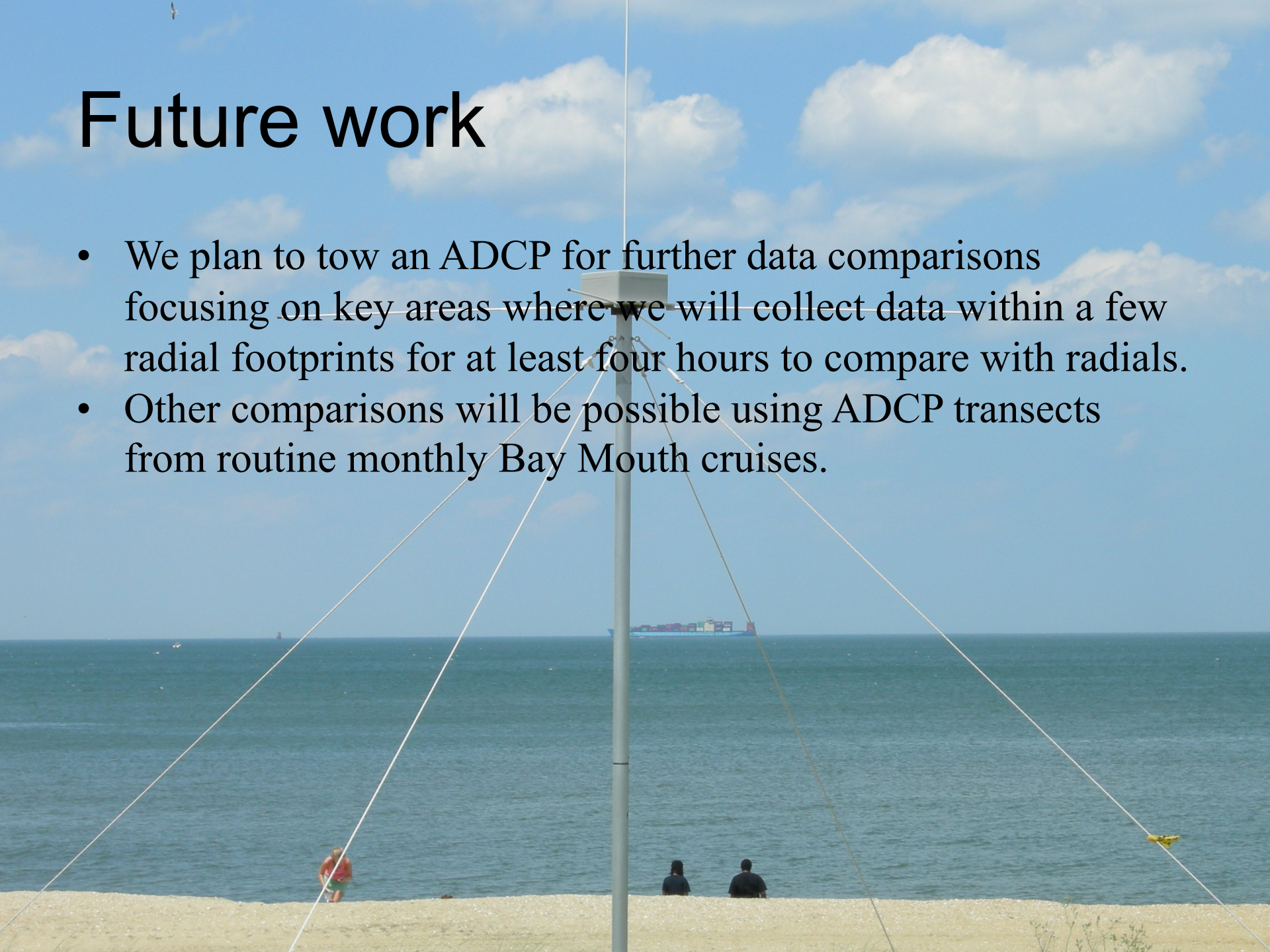


Trajectory mapping and optimal interpolation for hazmat



Future work

- We plan to tow an ADCP for further data comparisons focusing on key areas where we will collect data within a few radial footprints for at least four hours to compare with radials.
- Other comparisons will be possible using ADCP transects from routine monthly Bay Mouth cruises.



Comments

- ROW-G is critical to success of this RESEARCH to OPERATIONS program
- Creating products users can use is critical – this is usually not a vector map.

Contacts and Information

Project website: www.lions.odu.edu/org/cbc

National HFRADAR Network Gateway:
http://cordc.ucsd.edu/projects/mapping

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Larry Atkinson (latkinso@odu.edu)

References

- Lipa, B.J., B.Nyden, D.S. Ullman, and E. Terrill, “SeaSonde Radial Velocities: Derivation and Internal Consistency,” *IEEE J. Ocean. Eng.*,vol. 31, no.4, pp. 850-861, Oct. 2006.
- NOAA Ocean Systems Test and Evaluation Program (OSTEP), "Test, Evaluation, and Implementation of Current Measurement Systems on Aids-To-Navigation", NOAA Technical Report NOS CO-OPS 043, Silver Spring, MD, 2005.
- Yoshikawa,Y., A. Masuda, K. Marubayashi, M. Ishibashi, and A Okuno, “On the accuracy of HF radar measurement in the Tsushima Strait,” *J. Geophys. Res.*, 111, C04009, doi:10.1029/2005JC003232.