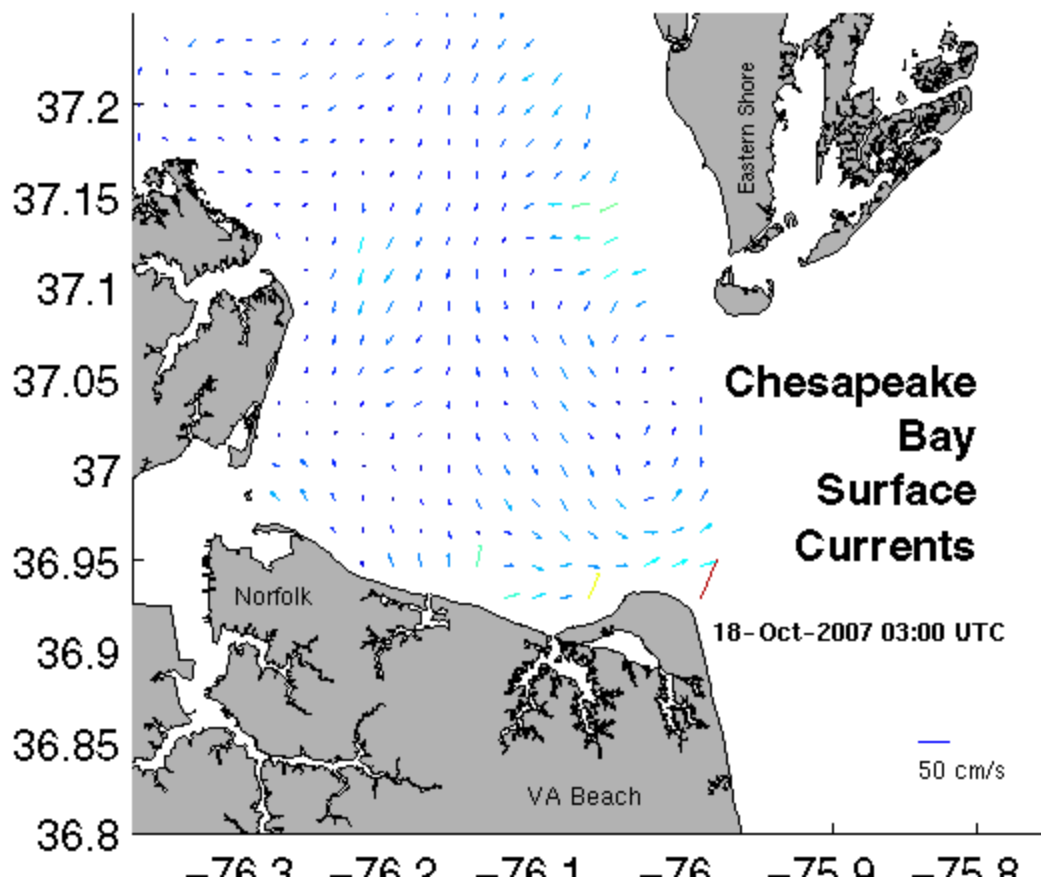
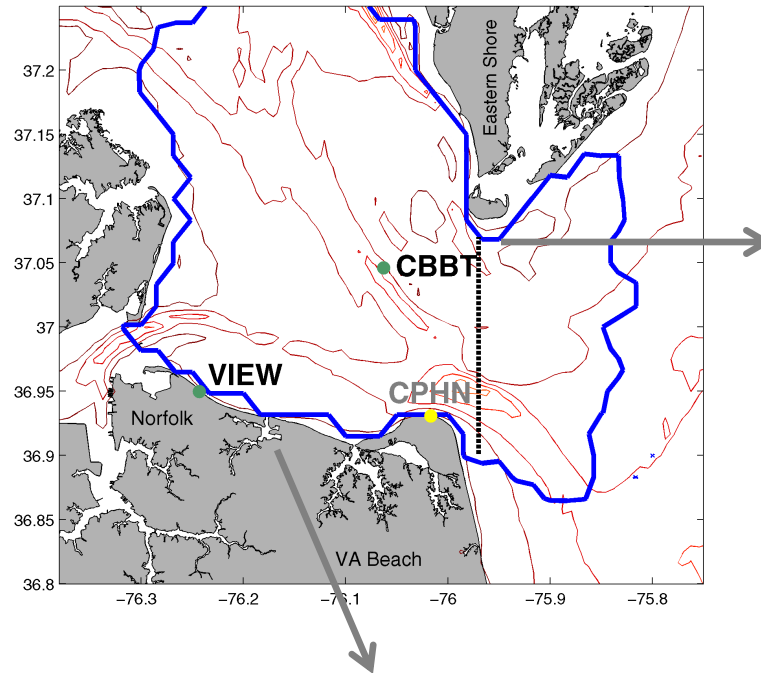
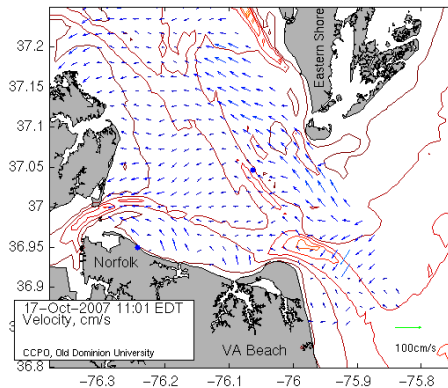
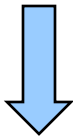
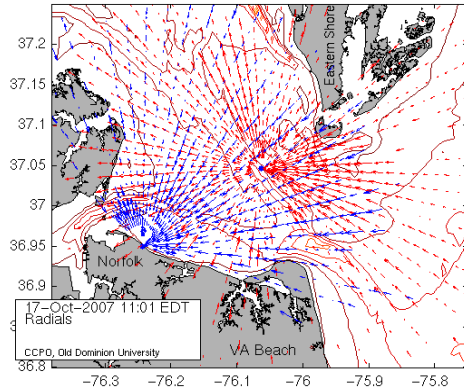


# Surface Current Mapping in the Lower Chesapeake Bay



# Study Area & Antenna Sites





# AT OUR FIELD SITES

25.4 MHz CODAR Standard Range

Antennas with co-located Tx/Rx

MiniMac Field Computers

Cell phone/Cable modem connections

## Chesapeake Bay Bridge Tunnel (CBBT)

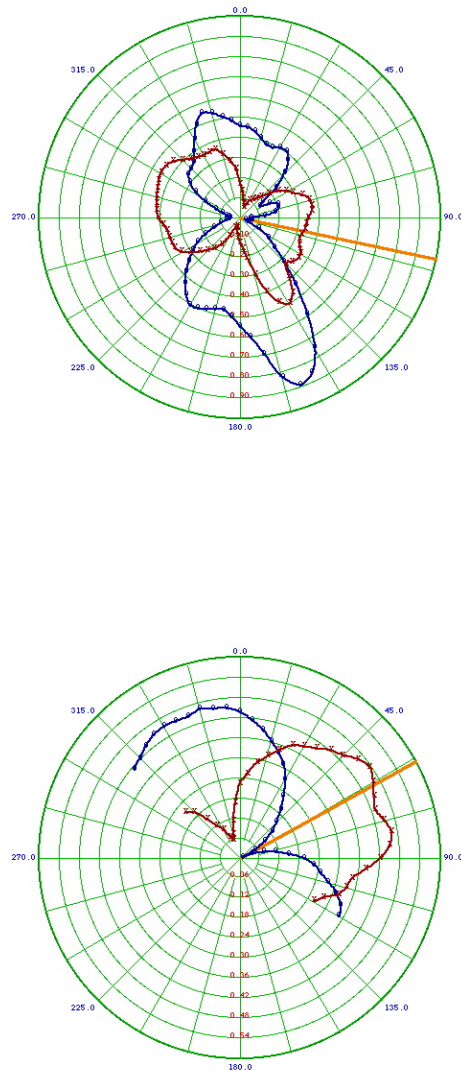


## Ocean View Community Beach (VIEW)

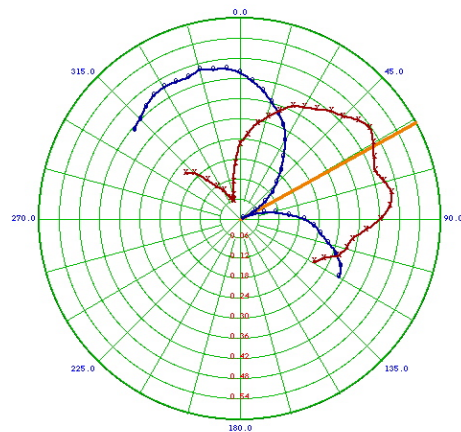


# Antenna Patterns

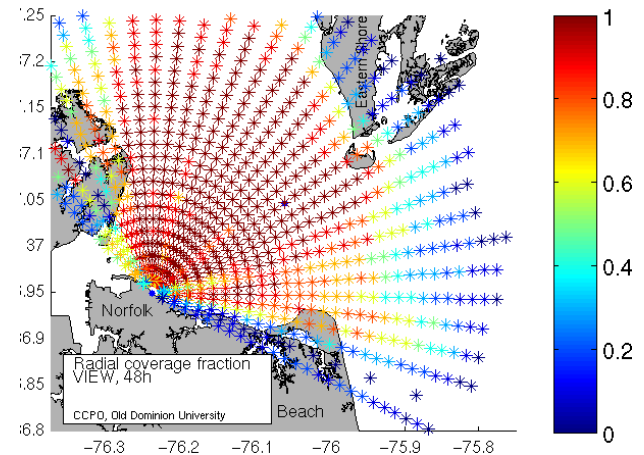
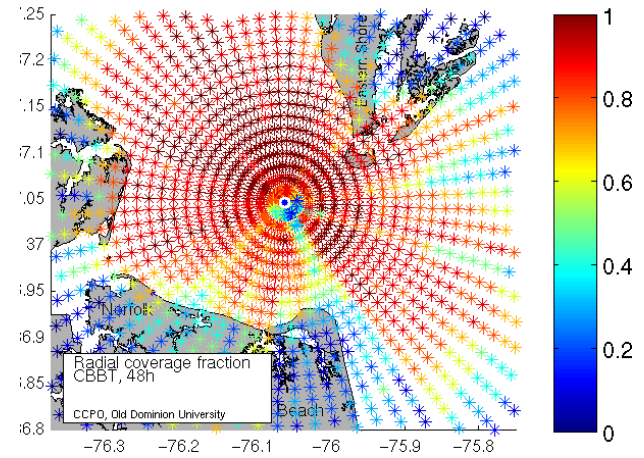
## CBBT



## VIEW

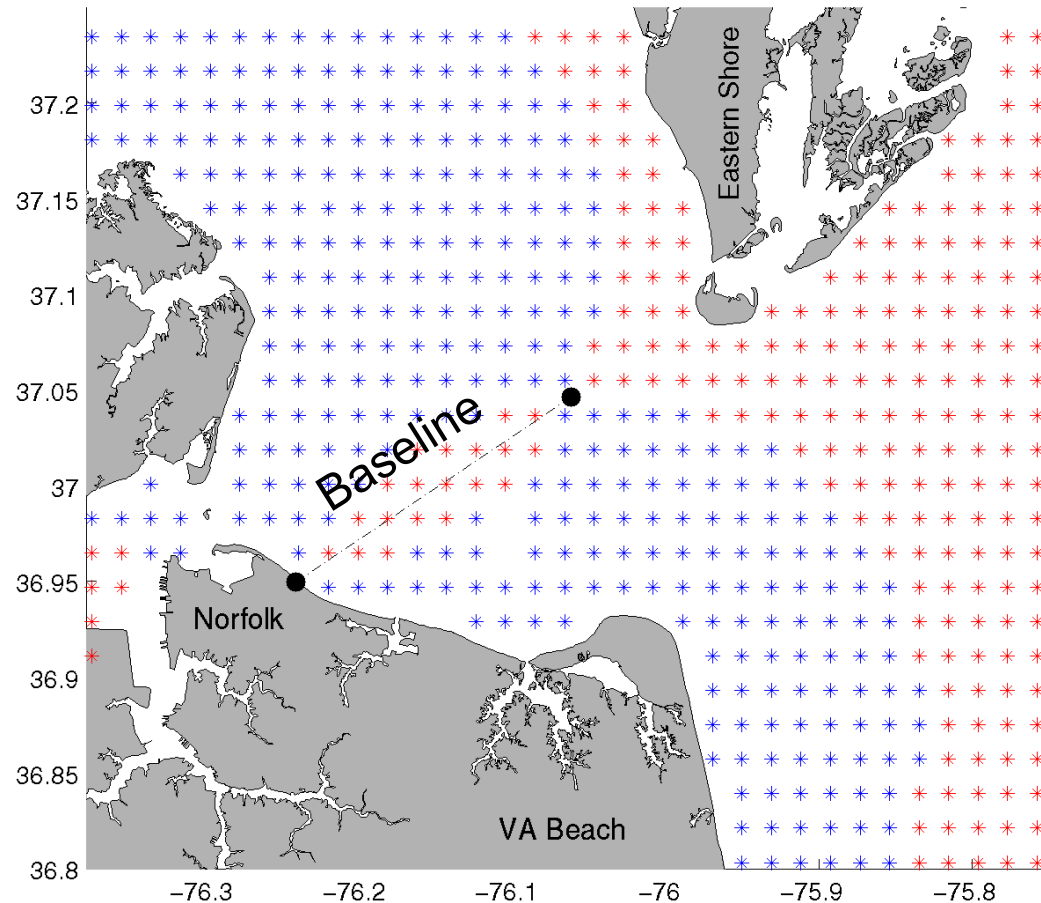


# Radial Coverage





# Grid for Total Current Vectors



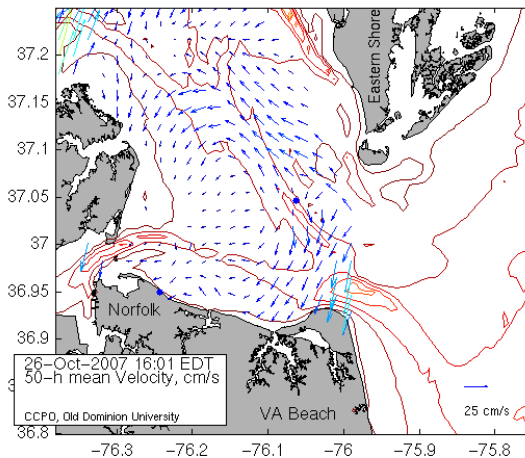
2 km Grid courtesy of  
CORDC National Network

Preserves orthogonality

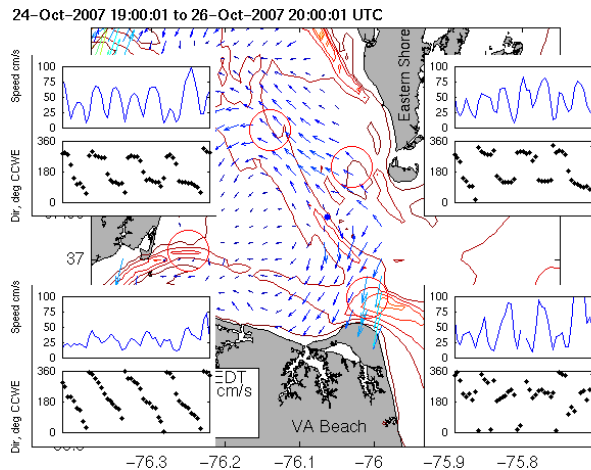
Red points fail stability  
angle requirements

# Data Products Updated Hourly

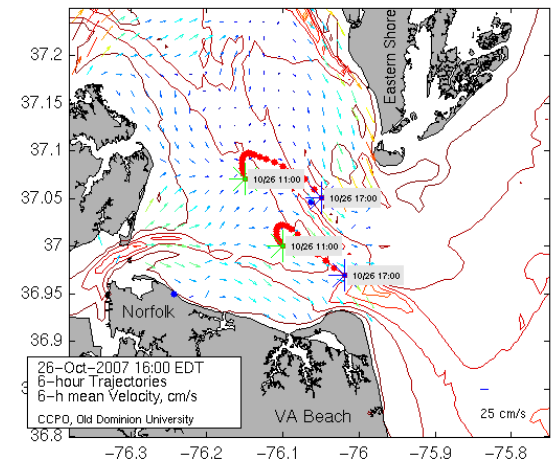
(<http://www.lions.odu.edu/org/cbc>)



Sub-tidal Flow



Time Series



Trajectories

# Some Q/C Considerations

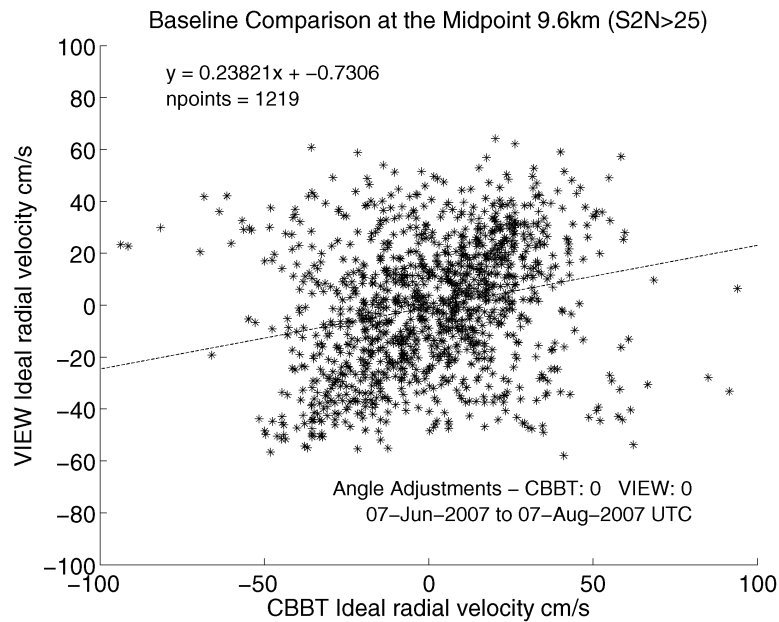
- Totals
  - GDOP/HFR-Progs Matlab toolbox error estimates
- Radials
  - Codar spatial and temporal variability statistics within the radial file
- Both
  - Visual outliers (check neighboring vectors / apply filter)



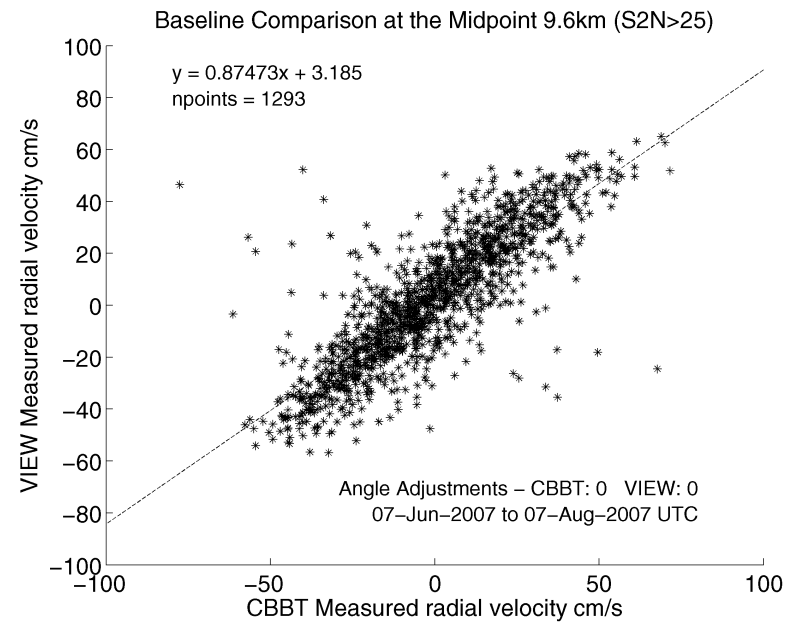
# Data Validation by Comparison

- Baseline (consistency check)
- Tide
- Moored ADCP
- Towed ADCP

# Baseline Comparisons

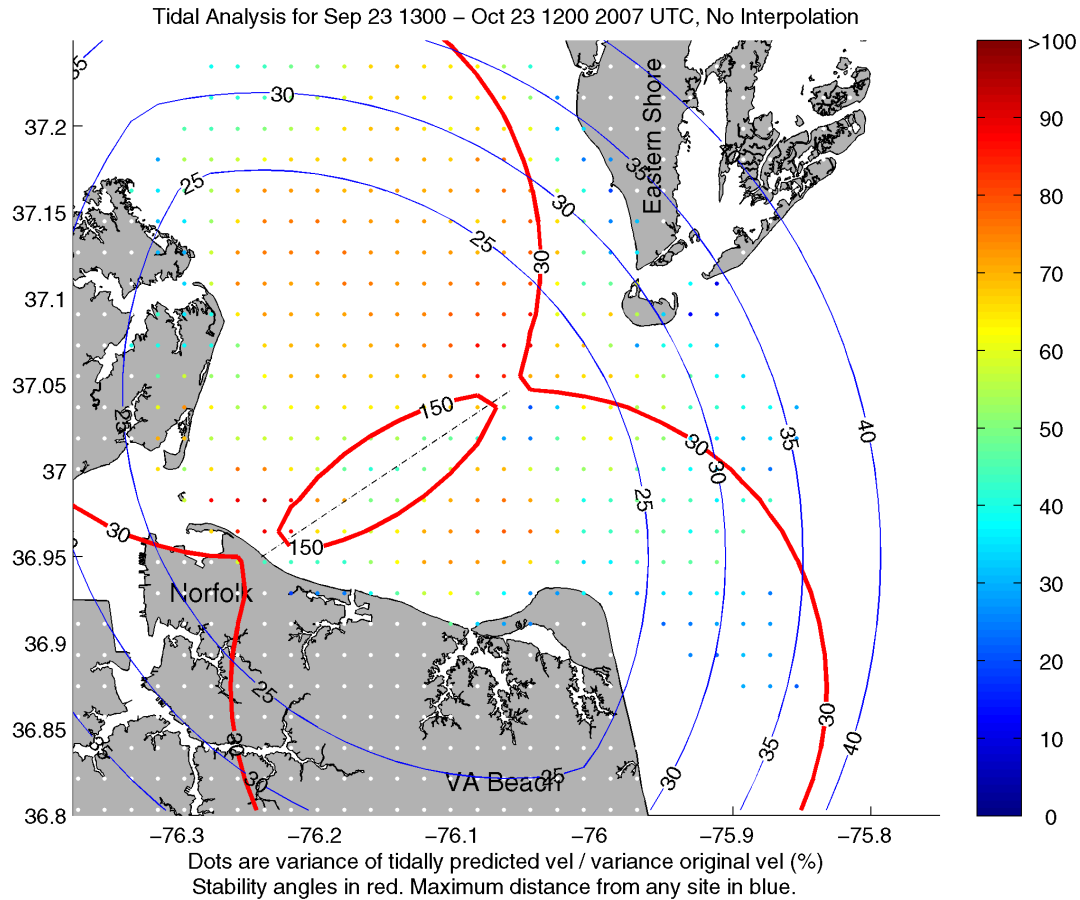


Ideal antenna patterns



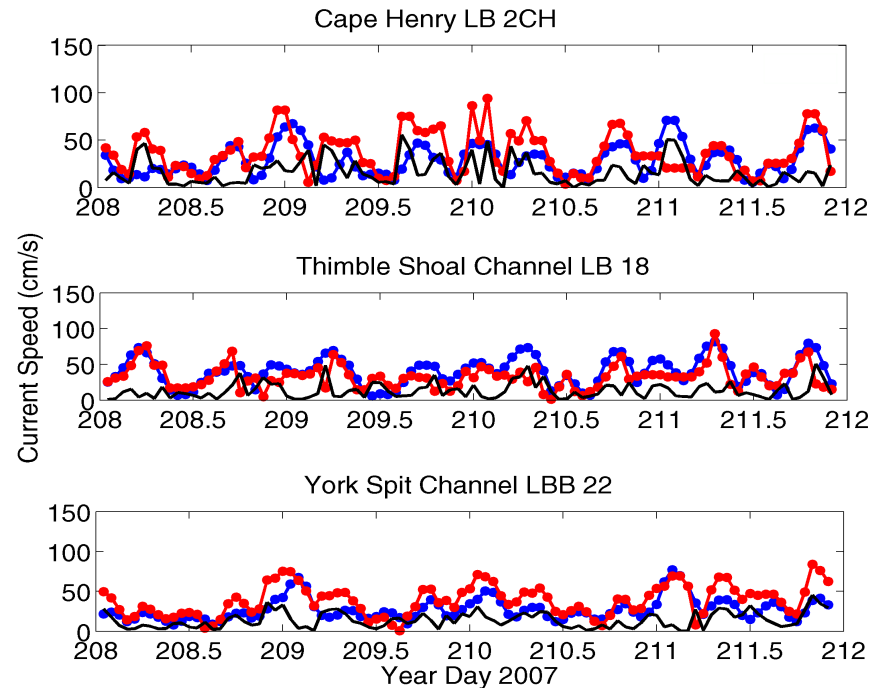
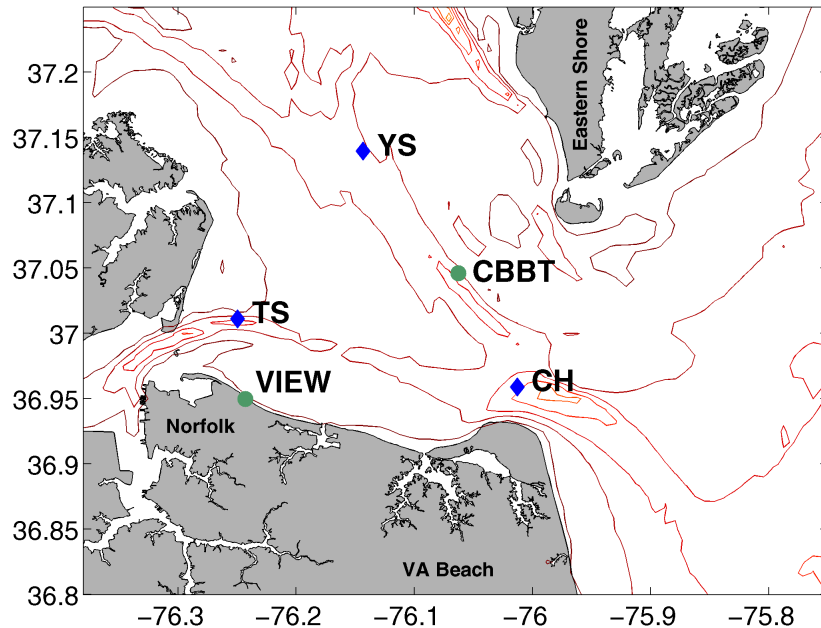
Measured antenna patterns

# Tidal Analysis





# Moored ADCP Comparison

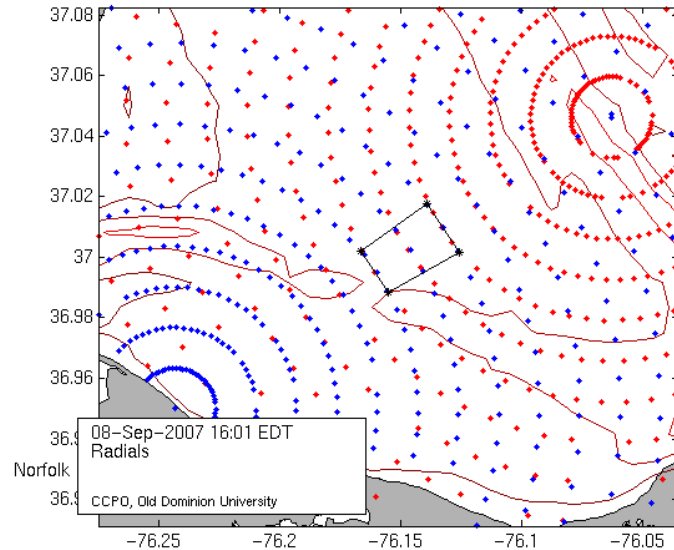


## Difference Statistics

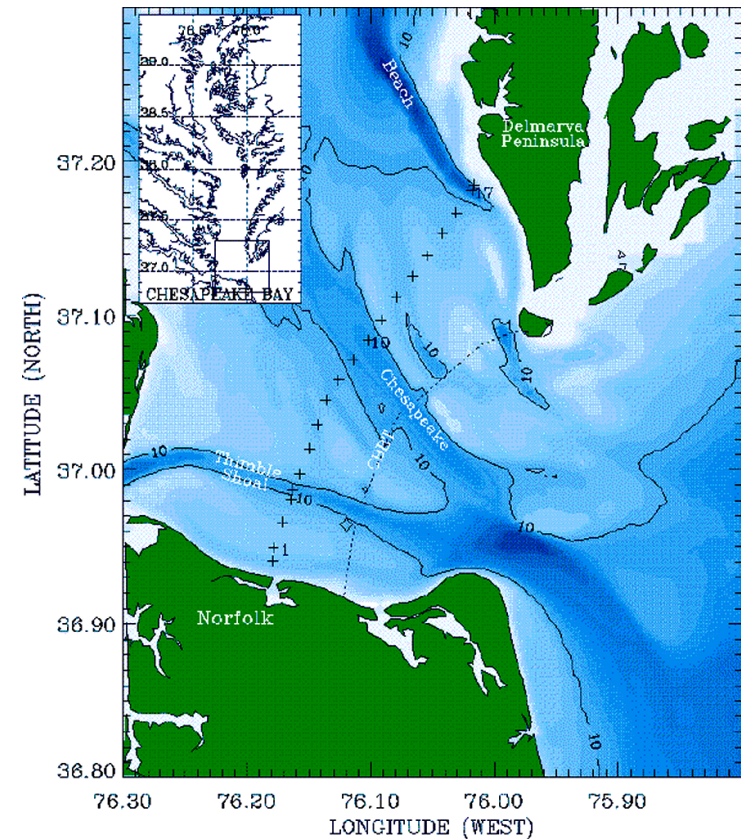
<u>Site</u>	<u>Mean</u>	<u>S.Dev</u>
Cape Henry	16.2	14.0
Thimble Shoals	13.2	11.2
York Spit	13.9	10.0

Red line = CODAR  
 Blue line = NOAA ADCP  
 Black =  $|NOAA-CODAR|$

# Towed ADCP Comparisons



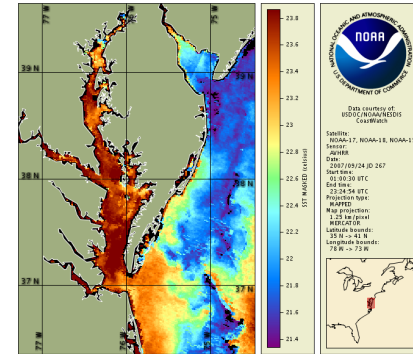
Intensive study at the baseline



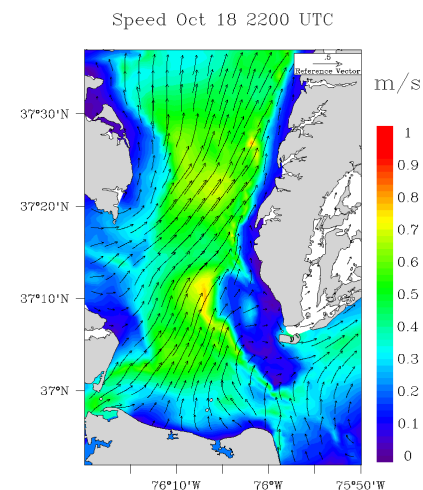
& comparison with monthly Bay Mouth cruises

# Future Plans

- Incorporate data into GIS; map with other regional spatial data
- Normal Mode Analysis
- Continue to work with trajectories/ plume tracking
- Model comparisons
- Web page development where totals and time series are freely available for download
  - Shipping channels
  - Ocean View beaches



AVHRR SST Daily Composite, September 24, 2007  
from NOAA Coastwatch



ChesROMS model output



# Acknowledgements

- Larry Atkinson and Jose Blanco
- CIT, MACOORA, NOAA
- CODAR support
- Advice and assistance from numerous other HF RADAR operators