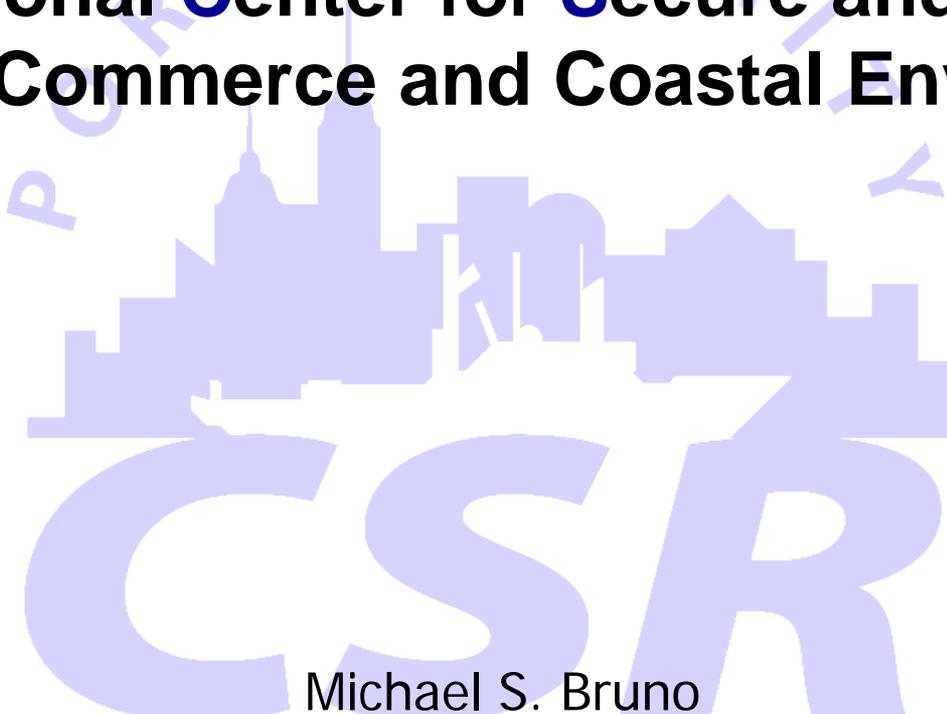




The National Center for Secure and Resilient Maritime Commerce and Coastal Environments



Michael S. Bruno
Stevens Institute of Technology



Presented at
2009 University Programs Summit



Mission: Through advancement of the relevant sciences and development of the new workforce, the CSR team will support the DHS member agencies to achieve the goals of:

- **Improving port security and the security of coastal and offshore (EEZ) operations;**
- **Improving emergency response to events in the maritime domain; and**
- **Improving the resiliency of the MTS, offshore operations, and our nation's coastal environments.**

CSR Primary Activities

- **Basic research in support of technology development for **Maritime Domain Awareness****
- **Basic research in support of **Resiliency****
- **Education, Training, and Outreach**

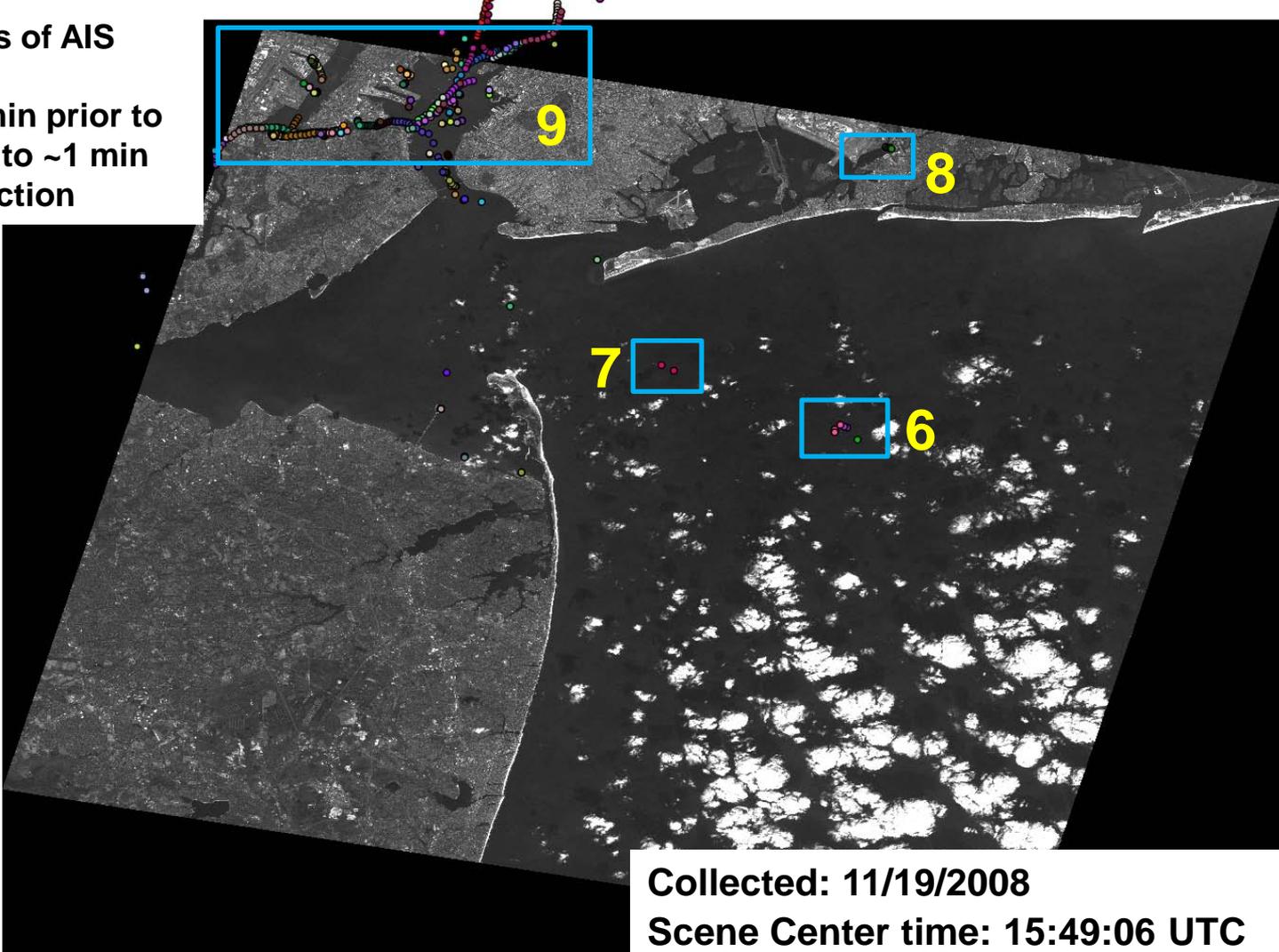
CSR Primary Activities

- **Old axiom: publish or perish**
 - **Rationale – if nobody knows about it, it was never discovered**
- **New axiom: develop new knowledge that leads directly to new technologies to support security and resiliency**
 - **Rationale – if nobody uses it, it was never developed**
- **Keys to success:**
 - **partner with the end user to understand their needs;**
 - **partner with industry and universities to understand technology gaps and to work toward filling those gaps.**

SPOT-4 – 10 m panchromatic

Collected on November 19, 2008

- 10 minutes of AIS data used
- From ~9 min prior to collection to ~1 min after collection



Collected: 11/19/2008
Scene Center time: 15:49:06 UTC

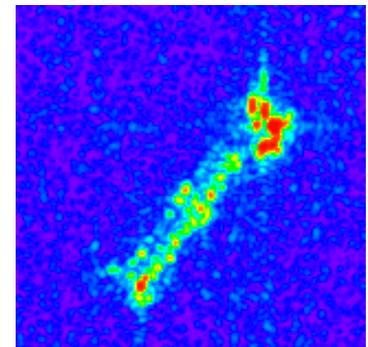
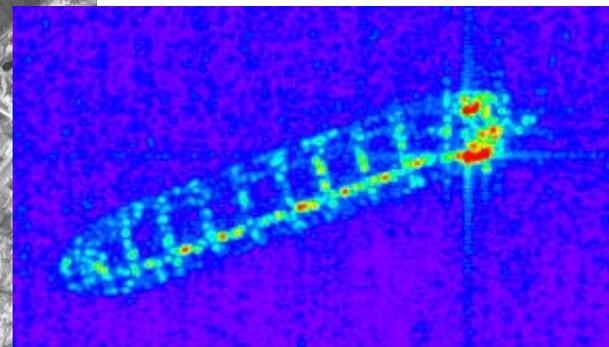
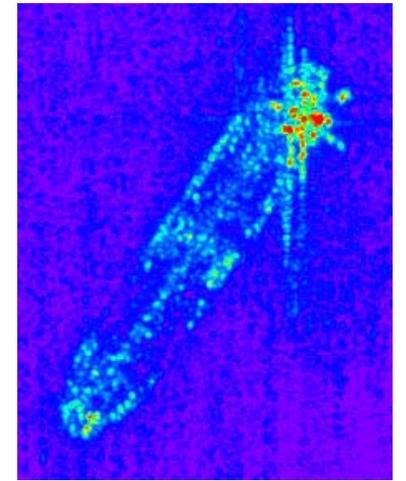
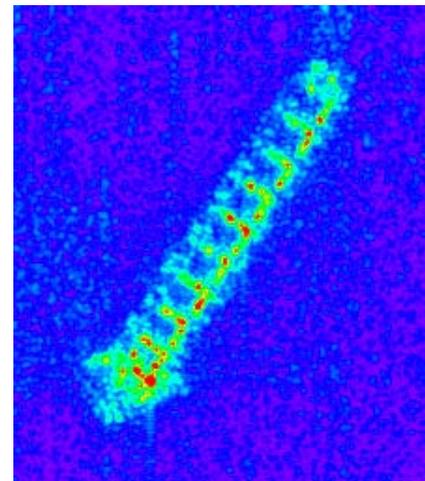
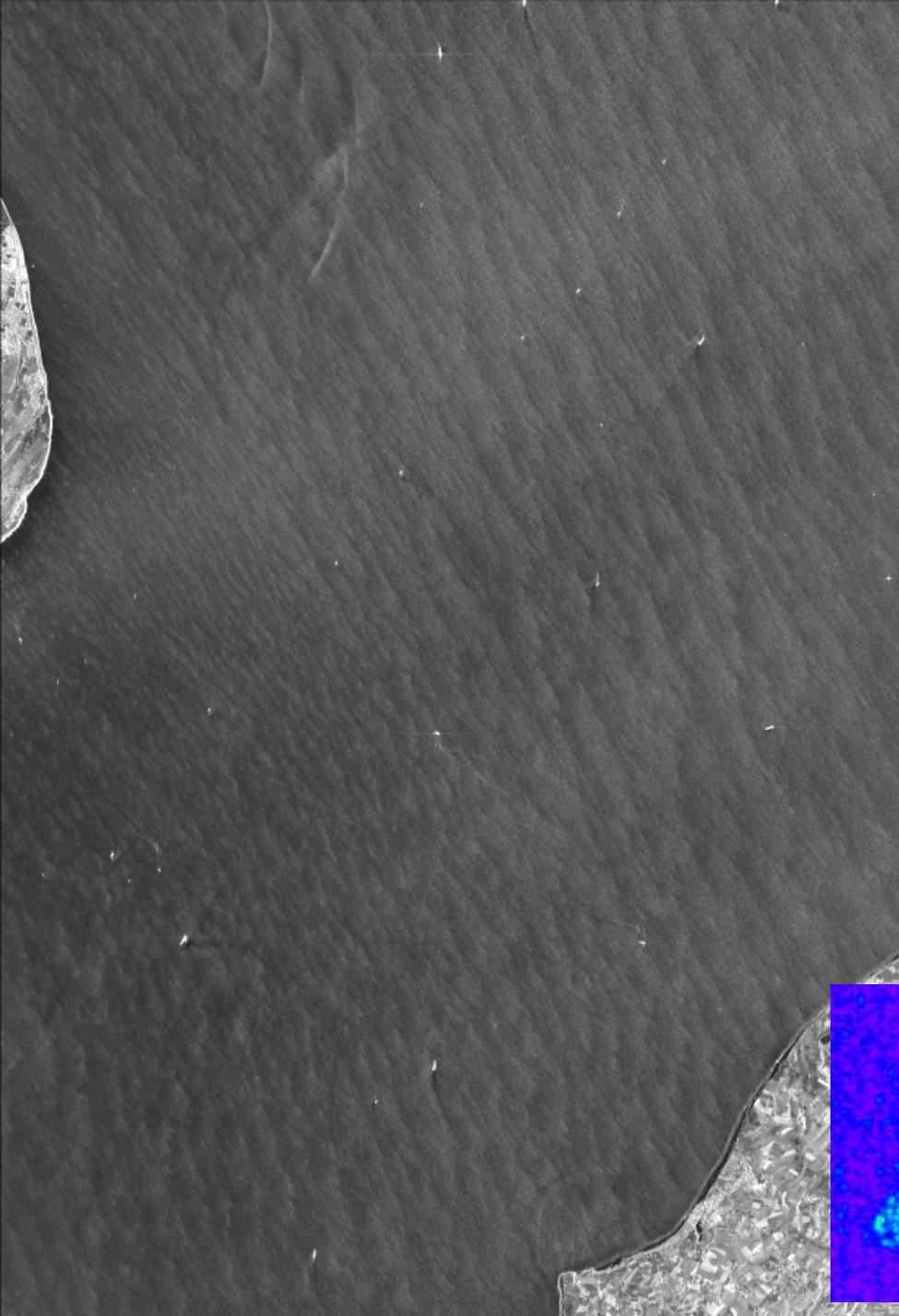
SYNTHETIC APERTURE RADAR

Space-based, cloud penetrating surveillance

Day and night and all weather

High resolution ~1 m

Multi-polarization

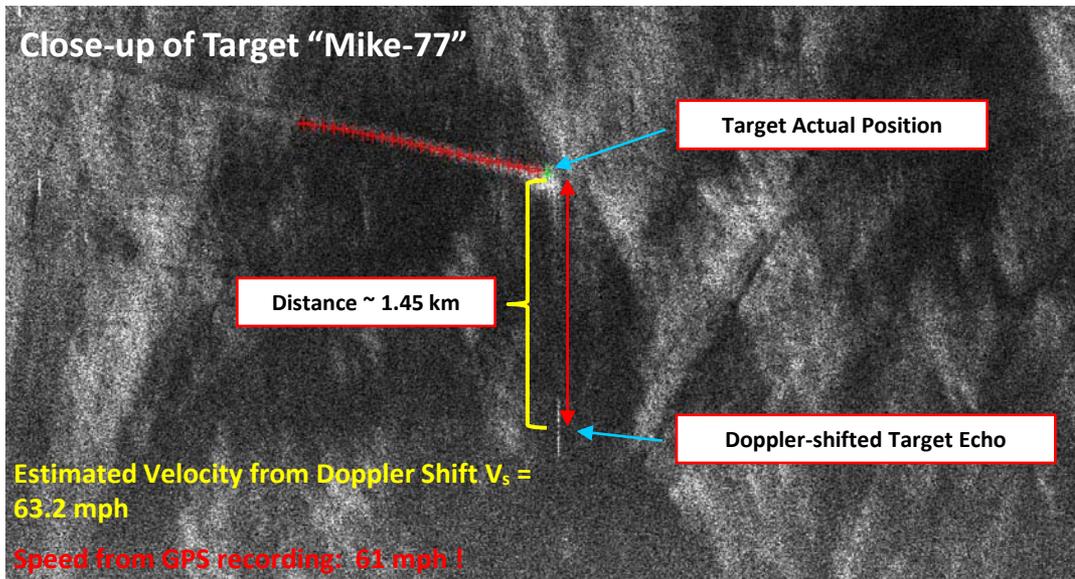
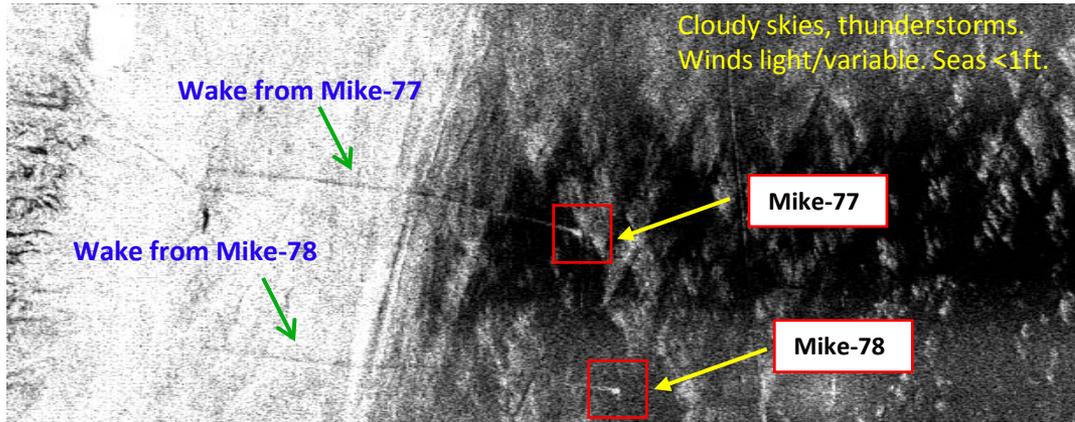


RADARSAT-2 GO-FAST TESTS

21 June 2008 @ 23:18:36 UTC

Duration of image take: 1.4 seconds

Beam mode: SpotLight – 3m resolution (SLA76, Asc, HH)

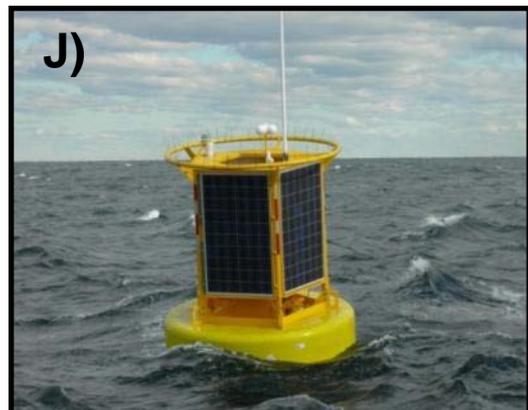
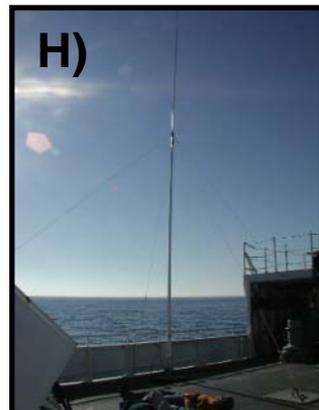
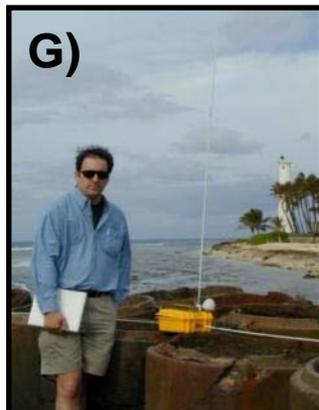
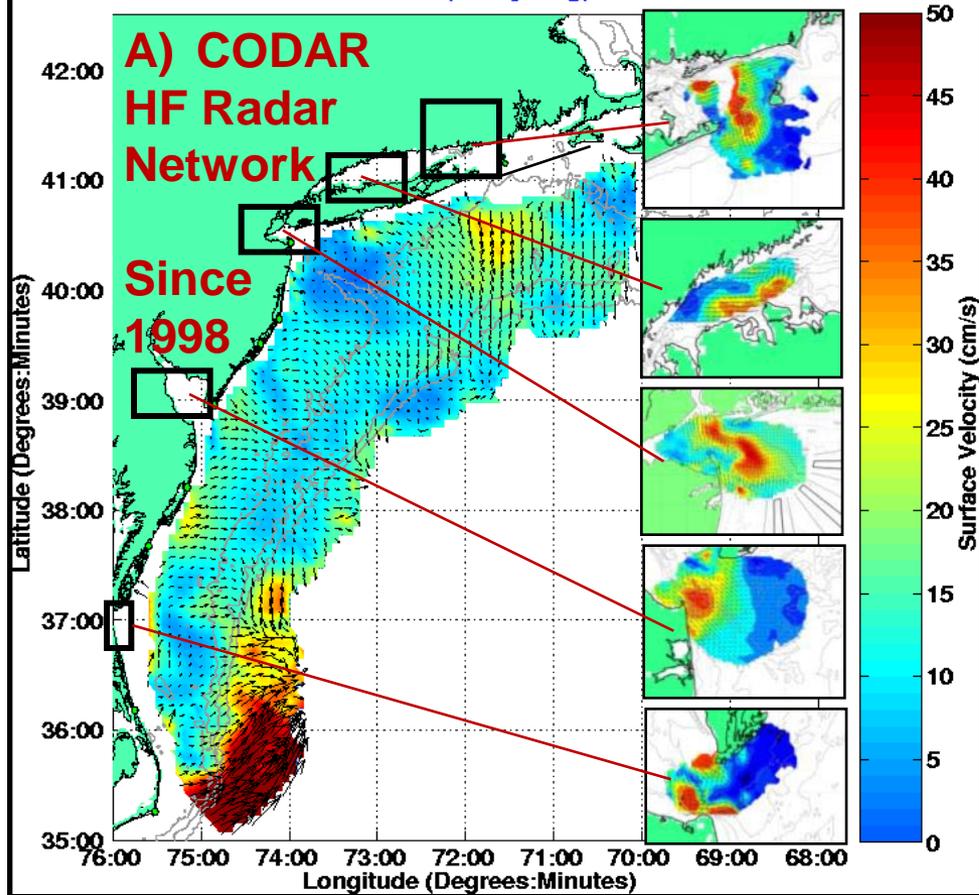


Type:	Midnight Express
Length:	39'
Engines:	4
HP/Engine/Type:	225/Mercury Optimax V-6 Outboard
Total Power:	900 HP
Blades/Propeller:	4 / Outer Prop RH Spin Inner Prop LH Spin
POC:	Marty Wade; ICE/CBP Miami Air & Marine Branch



CSTARS - 31 AUGUST
2008

Mid-Atlantic Raw Velocities (1 Day Avg) 2007/05/26 0500 GMT



Success Stories – Making a Difference

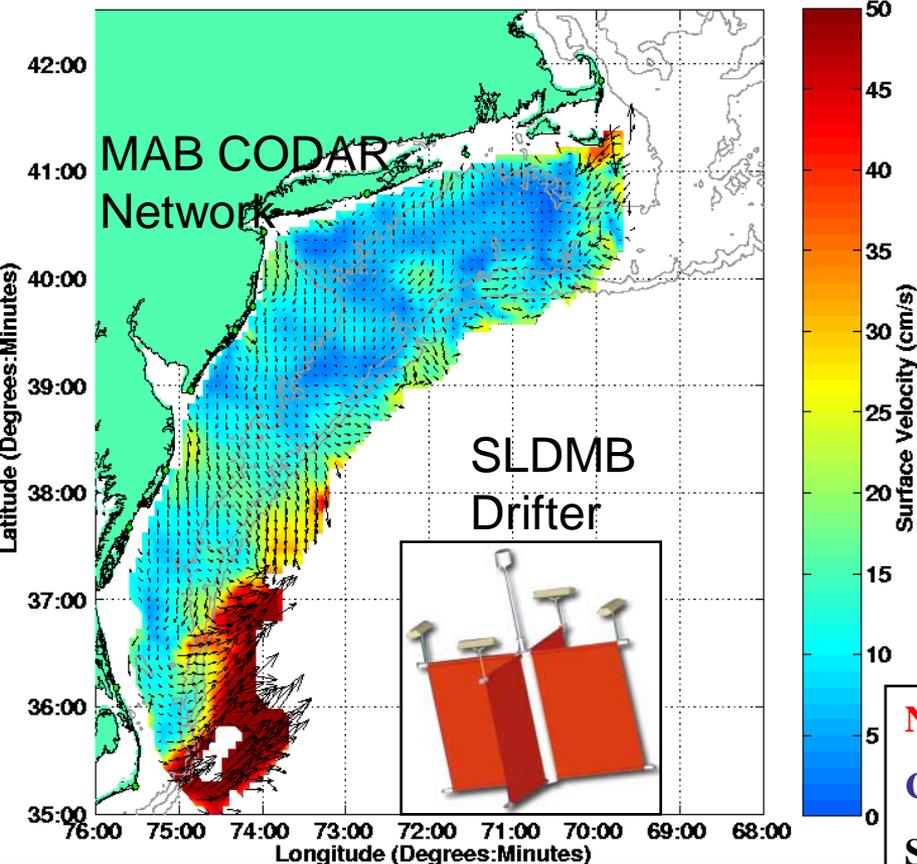
Optimizing HF Radar for SAR using USCGC Surface Drifters



Art Allen
U.S. Coast Guard

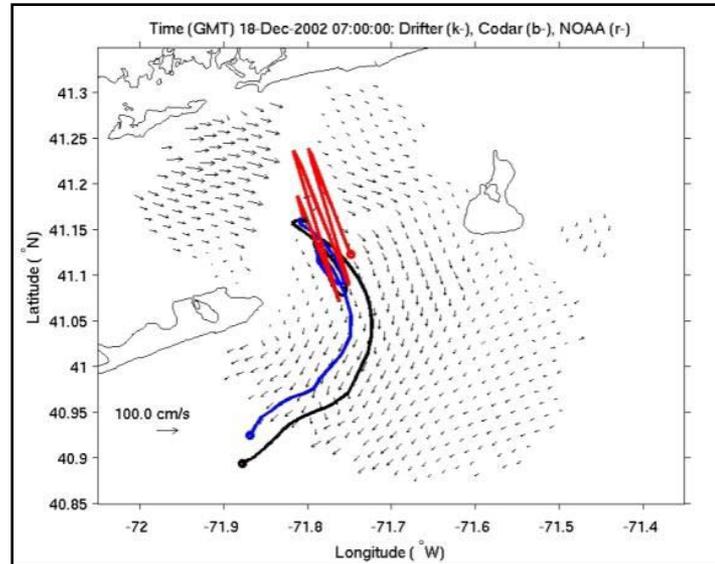
Scott Glenn
Rutgers University



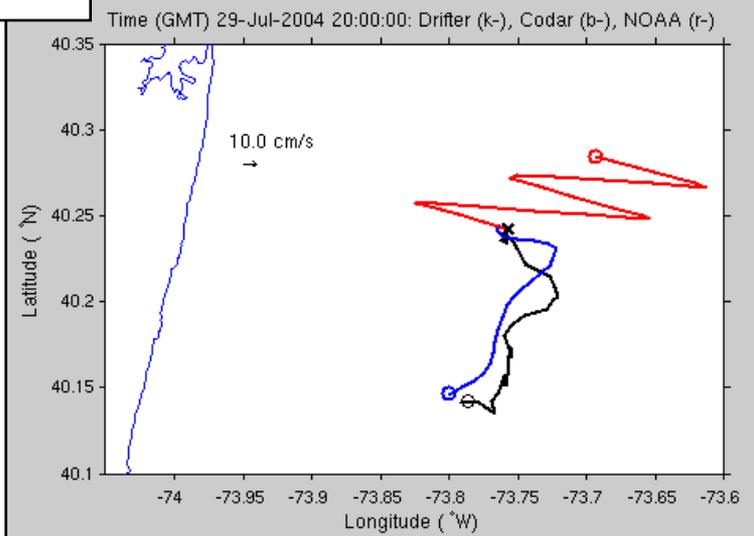


NOAA Coastal Site
 CODAR Currents
 SLDMB Drifter

UConn



Rutgers

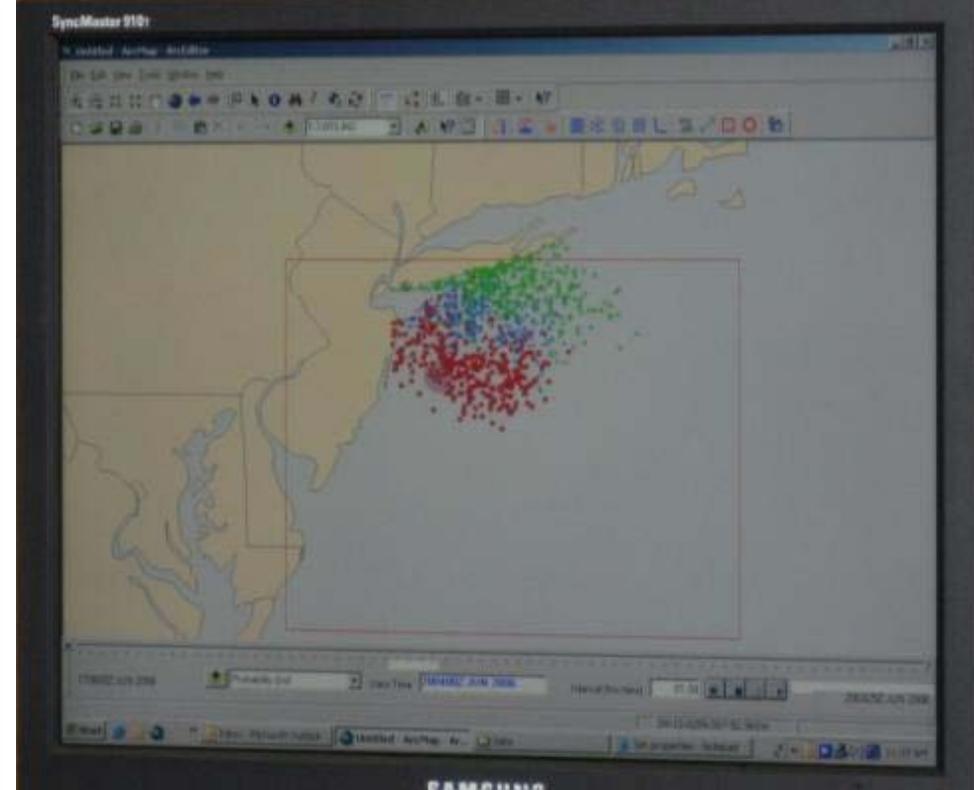
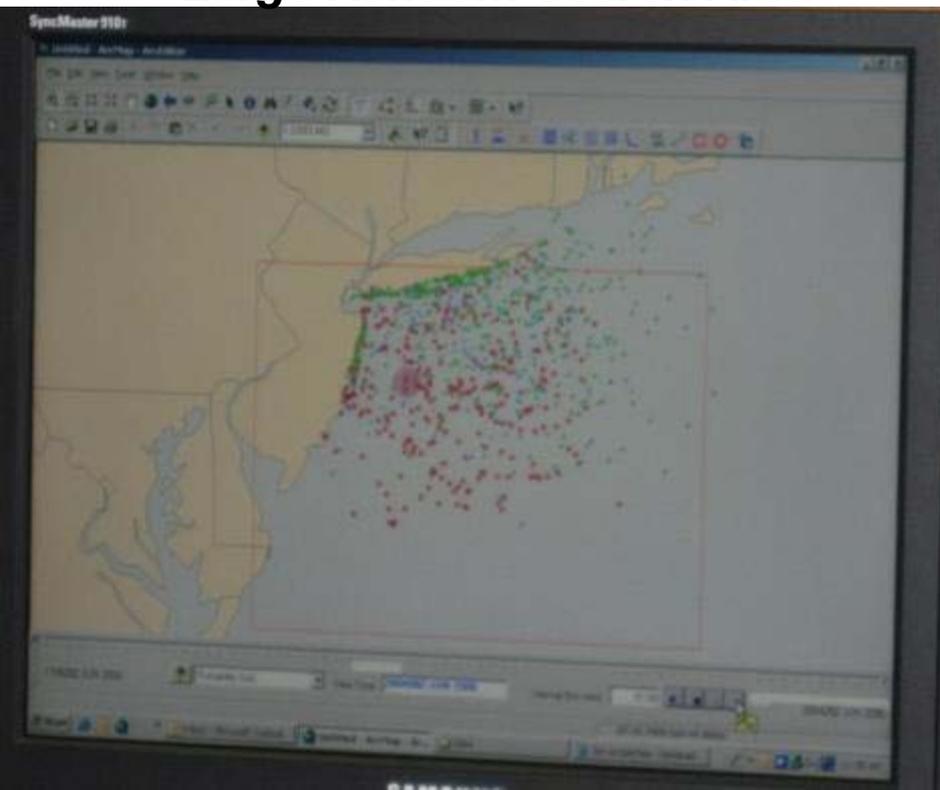


**Drifter Test Results –
 CODAR Exceeds
 Present Methodology**



**SAROPS Before CODAR –
*Large Random Search Area***

**SAROPS After CODAR – *Small
Stratified Search Areas***



Operational Ocean Observation and Forecast System



Coastal Instrument Network

CMN - Ocean Grove

CMN - Sea Girt

CMN - LBI

CMN - Atlantic City

CMN - Avalon

Image © 2007 NASA
Image © 2007 TerraMetrics

©2007 Google™

Forecasts out to 48 hours

Stevens Maritime Center: Urban Ocean Observatory - Microsoft Internet Explorer

Address: http://hudson.dl.stevens-tech.edu/NYHOPS/PRESENT/index.shtml

Urban Ocean Observatory at the Center for Maritime Systems

STEVENS Institute of Technology

NY/NJ Harbor
NJ Coast

Present Conditions in selected region:
Winds Water Temp Salinity Water Level Currents

CMN NYHOPS Home Surge Warnings Wave Forecast NYHOPS Forecast

NY/NJ Estuary Surface Salinity(psu) 20 April, 2007, 09:45 EDT

Parameter:
Salinity

Plot or query data by parameter
 Plot or query data by location
 Show the station information

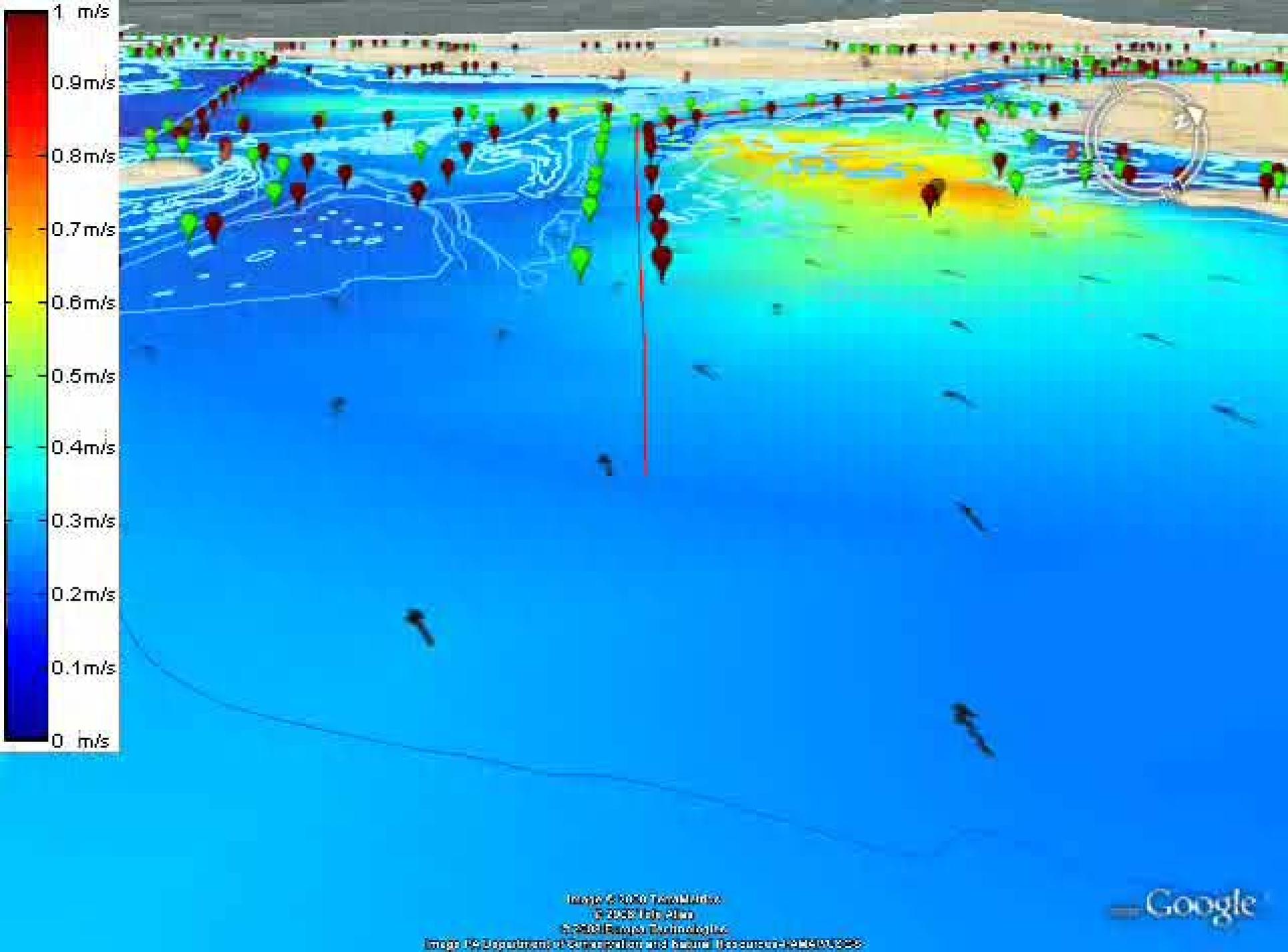
[Plot description](#) | [Acknowledgements](#) | [Help](#)

DISCLAIMER: This observing and forecast system is a research product and is presently under detailed evaluation. No warranty is made, expressed or implied at this stage, regarding the accuracy or validity of the model results, or regarding the suitability of the model output for any particular application.

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Question: does this fill an information gap?
Is it useful (useable) by the stakeholders?

Internet



1 m/s
0.9 m/s
0.8 m/s
0.7 m/s
0.6 m/s
0.5 m/s
0.4 m/s
0.3 m/s
0.2 m/s
0.1 m/s
0 m/s

Image © 2010 TerraMetrics
© 2008 Tele Atlas
© 2008 Europa Technology

Image PA Department of Conservation and Natural Resources - HMASW, 2009

Google

US Airways flight 1549



Photo: Brendan Mcdermid/Reuters



Real-Time Data

- Weather
- Currents
- Water Level
- Salinity
- Temperature
- Waves

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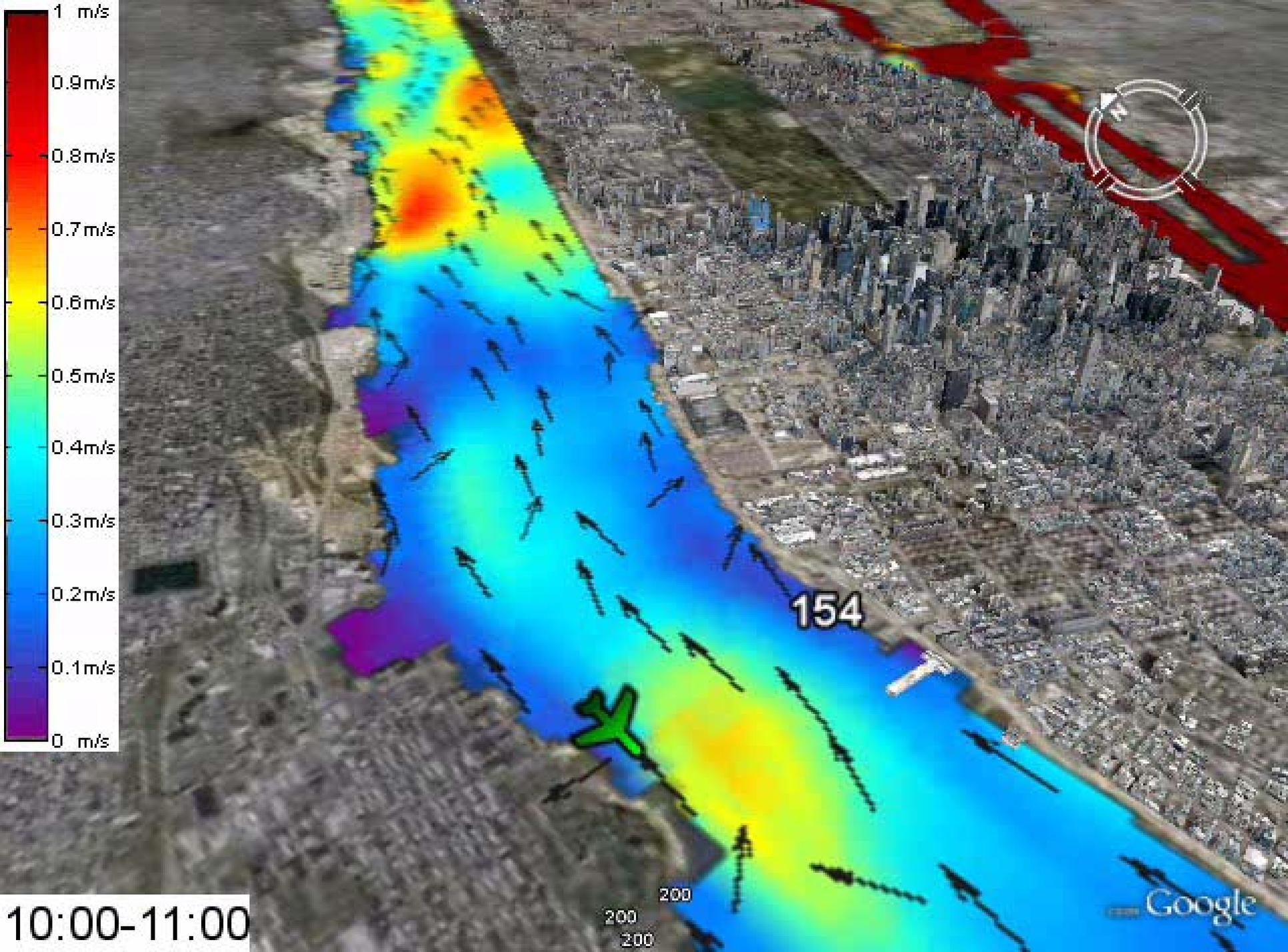
© 2007 Europa Technologies
Image © 2007 DigitalGlobe
Image © 2007 Sanborn
© 2007 Sanborn



Pointer 40°43'11.10" N 74°01'29.74" W elev 0 ft

Stream

ft



10:00-11:00

154

Google



January 15, 2009, 4:29pm

Thank you Professor,

...I have forwarded your email and followed up with our Watch Command Supervisor via telephone regarding this information. As always, we are very appreciative of your continued assistance and support.

Michael Lee

Director of Watch Command

NYC Office of Emergency Management



Photo: AP



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RSMAS
UNIVERSITY OF Miami
ROSENSTIEL SCHOOL
OF MARINE & ATMOSPHERIC SCIENCE

 THE PORT AUTHORITY OF NY & NJ

RUTGERS
School of Environmental
and Biological Sciences

MG
THE MATTINGLEY GROUP, LLC



LOCKHEED MARTIN
We never forget who we're working for™



URBAN COAST INSTITUTE
MONMOUTH UNIVERSITY
where leaders look forward™

Partnerships for a Safer World

More than 20
add'l industry
collaborators

UNIVERSITY
of HAWAII
MĀNOA

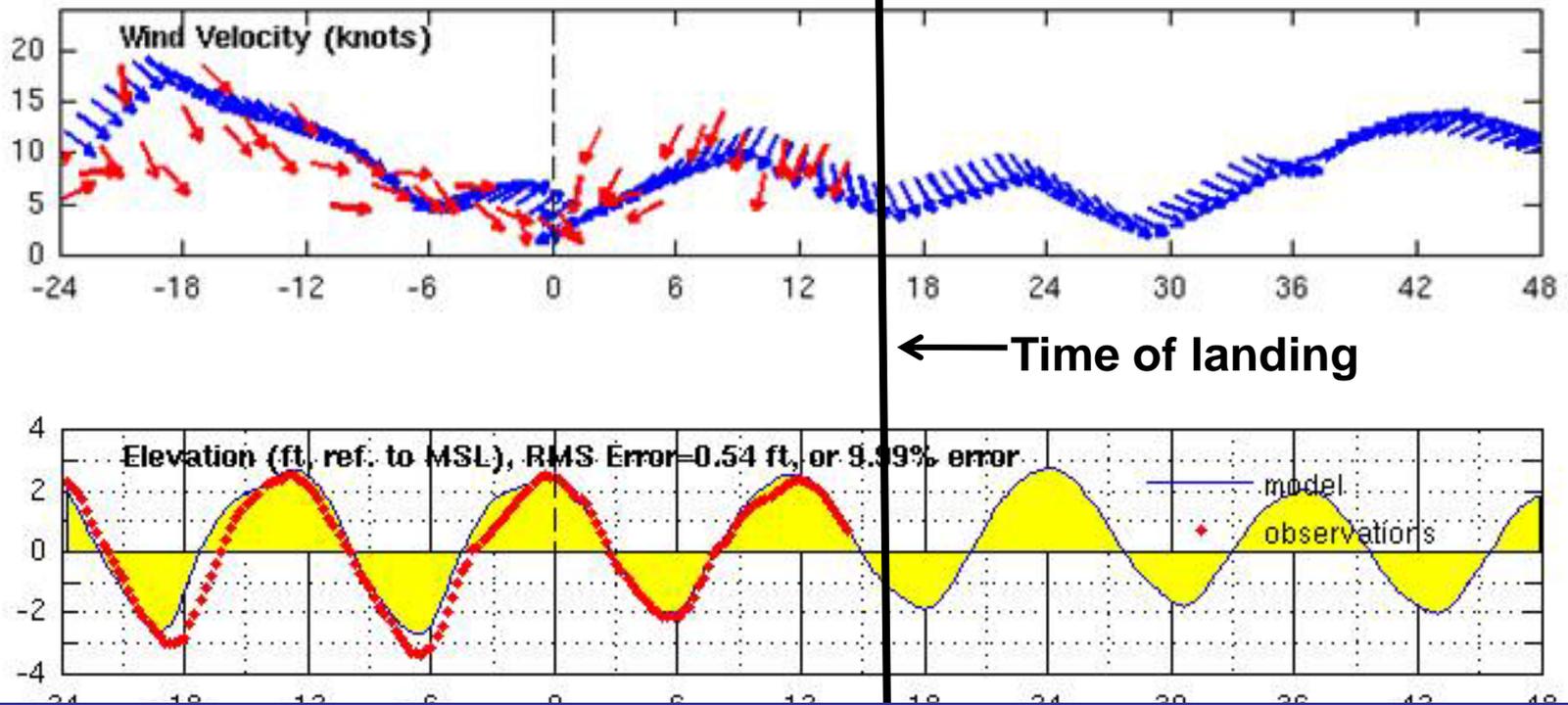
 MIT CENTER FOR TRANSPORTATION & LOGISTICS

NAVSEA
WARFARE CENTERS



OEM NEW YORK CITY
Office of Emergency Management

CSR – A Department of Homeland Security National Center of Excellence for Port Security



January 15, 2009, 4:29pm

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As always, we are very appreciative of your continued assistance and support.

Michael Lee

Director of Watch Command

NYC Office of Emergency Management

flightpath.wmv

TIME	Lat.	Long.	Speed knots	Altitude feet	
03:26PM	40.48	-73.52	151	1800	→
03:27PM	40.50	-73.52	174	2800	↗
03:27PM	40.52	-73.53	194	3200	↗
03:28PM	40.53	-73.54	202	2000	↘
03:28PM	40.52	-73.56	215	1600	↘
03:29PM	40.50	-73.57	194	1200	↘
03:29PM	40.49	-73.58	191	1300	↗
03:30PM	40.47	-74.00	189	400	↘
03:31PM	40.45	-74.01	153	300	↘



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3:26 pm takeoff from
LaGuardia Airport
150 passengers
5 crew members

3:31 pm water landing
into Hudson River

US Airways Flight 1549
January 15, 2009