XM Satellite Marine Weather - The successful result of Stennis Space Center's technology cluster

Pat Fitzpatrick and Yongzuo Li
GeoResources Institute
Mississippi State University

Elizabeth Valenti
WorldWinds Inc.

I. Background on cluster
II. Storm surge modeling
III. XM Satellite Marine Weather
IV. IP issues
Enterprise for Innovative Geospatial Solutions
Enterprise for Innovative Geospatial Solutions

I. Partnership among NASA, State of Mississippi, and universities to develop the geospatial industry in Mississippi (includes 35 companies).

II. WorldWinds, Inc., was one of the 7 charter members when cluster formed in 1997.

III. Collaboration with WorldWinds, Inc. since 1997 through several funded EIGS grants
IV. R&D work on:

A. Mesoscale models -- MM5, COAMPS
B. Ocean wave model – Wavewatch
C. Inland Lake model – WindWave
D. Storm surge and hydrodynamic model – ADCIRC
E. Assimilation of NASA and NOAA satellite data through 4DVAR, MVOI, and nudging techniques.
F. MODIS landuse data in mesoscale models
SBIR Phase II research

Storm surge simulations

“Maximum of Maximums”
Storm size influence
Katrina simulation
Katrina storm surge at 5AM

Katrina storm surge at 7AM

Katrina storm surge at 9AM

Katrina storm surge at 11AM
Timing of wind versus surge
Hurricane Katrina (Adcirc Simulation)

TimeSeries for August 29th 10Z through 18Z

Lon=89.190, Lat=30.185
Bay_St.Louis (East_Gulf)

- Wind Speed
- Water Elevation

Product of Mississippi State University, GeoResources Institute, Stennis Space Center.
XM Satellite Radio
I. In 2003, WxWorx Inc. was established as an affiliate of Baron Services. Working in conjunction with XM Satellite Radio Inc., XM WX Satellite Weather was created to provide up-to-date weather information for boat owners. XM WX Satellite Weather uses the XM Radio satellites and signal quality to deliver specific weather-related data.

II. One WxWorx product is marine data. WorldWinds provides:
   A. COAMPS output
   B. Wavewatch and WindWave
   C. Buoy data
   D. High-resolution Coastwatch SST
III. WxWorx then adds the following information to the product:

   A. Radar
   B. Severe storm tracks
   C. Satellite
   D. Country warnings
   E. Inland surface data
   F. City forecasts
   G. Hurricane track
   H. Lightning
   I. Marine Zone forecasts
Forecasts for XM Satellite Radio

WORLDWINDS

Stennis Space Center

(Weather, SST, and Wave Data)

Baron Services

(Weather Graphics and NEXRAD)

XM Satellite Radio

Maritime vessel

Data displayed on laptop or Garmin unit

See www.wxworx.com or www.xmradio.com/weather
Laptop hooked to satellite antenna
SURFACE CONDITIONS

- Sea temperatures
- Winds at the surface
- Pressure

COAMPS Output,

SST data from NOAA's Office of Satellite Data Processing and Distribution
OCEAN WAVE INFORMATION

- Wave heights
- Wave period
- Wave direction

Wavewatch Output
INLAND LAKE WAVE INFORMATION

Zoom in
On a lake

Windwave Output
Buoy 46028

Time = 2/4/2005 02:00 pm CST
Loc = 35:44:24 N, 121:53:24 W
Water = 58 F, Air = 55 F
Winds = NW (310°) 10 kts (11 mph) (G 14)
Wave height = 4.6 ft
Dominant wave period = 12 secs
Pressure = 30.17" (0.00" S)
LIGHTNING and RADAR
OVERLAY of DATA
Garmin alternatives to laptop software
Garmin handheld!

By the way, both play XM Satellite radio music and news as well
Issues involving intellectual property rights

The current dilemma:

When software was partially funded by the state and NASA, with matching funds from the company, over a 7-year period, and the professor has been employed by two universities, who owns what?

Currently an issue. Probably other researchers, who collaborate with companies, may be encountering similar issues.

I fear it’s a disincentive for companies to work with universities.
Conclusions

I. This NASA incubator concept, in which universities and companies interact, has overall been a positive experience, and I recommend the AMS and NOAA formally endorse a similar methodology for “NOAA incubators.”

II. Innovative storm surge modeling and atmospheric Modeling R&D resulted at WorldWinds, Inc., resulting in timely Katrina work and a cutting edge mobile weather appliance.

III. Intellectual property issues require further clarification and advanced planning.