**VIMS-Industry Partnership Meeting**
**July 23, 2010**
**Notes**

Present:   Scott Alwine, Jennifer Barker, Bill Bean, John Brubaker, Russell Burke, Ben Francisco, Jim Golden, Tom Harris, Troy Hartley, Hans Kohnle, Jen Kostyniuk, Jane Lopez, Doug Meredith, Dan McGhee, Dennis Manos, Ron Monark, Darryl Nixon, Paul Panetta, Mark Patterson, Tucker Pierce, Joe Rose, Matt Schaeffer, Leonard Sledge, David Spencer, Mark Todero, Mike Unger, Lyle Varnell, John Wells

Notes from our meetings and some presentations are posted at:
http://www.wm.edu/offices/economicdevelopment/regionalprojects/chesapeakebay/vimsinduspartner/index.php . The following presentations from the July 23 meeting have been posted:

Tom Harris:      Algal Toxins of the Chesapeake Bay
David Spencer:  Mapping Coastal Dead Zones Through Collaborative
                        Remote Sensing and *In Situ* Observations
Tucker Pierce:  Chesapeake Bay Interpretive Buoy System

1. **VIMS Update - John Wells**

    a. John reported meeting with Jim Cheng, the Commonwealth's Secretary of Commerce and Trade. They discussed the VIMS-Industry Partnership Committee, and Secretary Cheng was very interested. We will follow up.
    b. Senator Mark Warner visited VIMS. He was particularly interested in the oyster industry.
    c. A delegation from the Federal Reserve Bank of Richmond visited VIMS to discuss economic development links.
    d. John and others at VIMS have been involved in issues concerning the Gulf of Mexico. John is one of 10 members of a board established to address environmental preservation there in the wake of Katrina. The board meets quarterly and last met in June. The group discussed other current and potential projects concerning the Gulf.
        i. Mike Unger is partnering in a grant submission led by LSU to BP for a study of the impacts of pollutants on oysters over time.
        ii. Paul Panetta has a project to use sonar records to track pollutants.
        iii. Mark Patterson mentioned a potential NSF project with the Georgia Institute of Technology to use AUV's as surface vehicles to expand sampling capabilities in marsh areas.
        iv. Tucker Pierce noted that he has a project (described below) to record dissolved oxygen levels in the Gulf.

2. **Coastal Pre-Cast Systems (CPS) – Russell Burke**

a. Russell Burke (VIMS Ph.D. '10) has been studying oyster reef substrates. He has done some work with CPS. He provided a brief overview of the company's interests in using applied reef technology in shoreline protection and shellfish restoration.

b. He introduced Dan McGhee and Joe Rose of Coastal Pre-Cast Systems (CPS, www.cpsprecast.com ) and Darryl Nixon of Getting It Done, who is a consultant to CPS. Dan will present an overview of the company in more detail at our next meeting.

3. **Real time marine toxin detection – Tom Harris**

a. Tom is a former deputy director of the National Institute of Environmental Health Sciences (NIEHS) Center at Vanderbilt and now an adjunct professor at VIMS, working with Steve Kaattari and others on proposals to examine harmful algal bloom toxins.

b. Tom reviewed the history of "harmful algal bloom" (HAB) research, including pfisteria studies. He noted that VIMS work led by Wolf Vogelbein had demonstrated that fish kills associated with pfisteria were not caused by toxins. He explained, however, that other HAB organisms do produce toxins, and VIMS is currently focusing on those toxins.

c. He noted that every summer at the end of August in the southern part of the Bay there are blooms of Alexandrium monilatum with its "Goniodomin A" toxin. VIMS proposes to research how the toxin might migrate through the food chain, to determine whether or not it is a teratogen (that might affect fetus development), and to determine if the oysters are safe.

d. He discussed various assay approaches that might be apply the VIMS technique for developing antibodies in mice and then using the antibodies in sensors to detect the presence of the toxin. In this case, the toxins might be strong enough to kill the mice, so an alternative approach might be used by developing protein conjugates with portions of the toxin molecule. The assays might use miniaturized sensor boxes on buoys near aquaculture projects for continuous monitoring, or they might use a low-tech method in which a strip is applied directly to oysters.

e. VIMS is applying for funding for the development of a real-time biosensor for the detection of marine toxins in VASG and NIH proposals.

4. **Chesapeake Bay Interpretative Buoy System (CBIBS) update – Tucker Pierce**

a. Tucker is the CEO of Tellus Applied Sciences, www.tellusappliedsciences.com , which is involved with CBIBS through a contract with NOAA.

b. With two new buoys CBIBs will now have nine deployed. The latest one is at Gooses Reef thanks to support from Dominion. Sensors on each buoy now generate 22 parameters.

c. Tucker described the current buoy data collection and transmission, the shore-side PC's, and the data management middleware. They have increased redundancy with back-up shore side PC's and with separated operational and developmental systems to test new components. Tucker is now concentrating on providing easier access to metadata and developing better quality assurance/quality control (QA/QC) routines. Another key issue

will be to explore cost reduction by reviewing the variety of sensors. CBIBS will expand into estuaries using smaller platforms.

    d. Tucker noted that he is involved in another project in the Gulf of Mexico to record dissolved oxygen levels with subsurface scans. He would appreciate help in identifying individuals to work on the project, which will involve 11-day rotations on ships with the sensors.

5. **Mapping Coastal Dead Zones through Collaborative Remote Sensing and In Situ Observations – Dave Spencer**

    a. Dave is a Professor of the Practice in Aerospace Engineering at Georgia Tech at who is spending the summer at NASA Langley doing research on collaborative observations from remote sensing platforms (aerial vehicles) and in situ assets (underwater vehicles) to trace chemical distributions in the coastal oceans. He would like to work with LaRC and VIMS on an eventual NASA Venture-class mission proposal related to the measurement of the spatial distribution of dissolved oxygen in the Chesapeake Bay.

    b. The summer research to map coastal dead zones includes system architecture, system modeling, instrument selection and system performance evaluation. Components include aerial remote sensing of dissolved oxygen using a Raman scattering pulse laser (based on measurement of the inelastic scattering of photons), in sutu measurement with a network of underwater vehicles using a chemical film that fluoresces based on oxygen level, and a network control strategy implemented by the AUV's.

    c. Dave envisions a proposal under NASA Earth Venture Missions for $30M-class airborne missions as part of the Earth System Science Pathfinder program to determine seasonal variations and long-term trending of dead zone evolution in coastal oceans. The proposal might have Bob Diaz of VIMS as the PI, LaRC providing project management, and Georgia Tech providing system engineering with assistance from Mark Patterson at VIMS.

    d. Discussion including comments about the schooling and flocking of the AUV's and a question about why there were so few hypoxic zones off India.

6. **Short Introduction to EM Solutions – Ben Francisco and Matt Shaffer**

    a. EM Solutions has about 150 employees. It specializes in software technologies and enterprise management solutions. The company has been in the classified DOD market and is seeking to diversify. They have done a good deal of work in the areas of radar, sensors and modeling and simulation. They are interested in partnering on STTR and SBIR proposals.

    b. They cited one project in which they helped GM organize preproduction engineering data for multiple production lines. They are good at streamlining data and dynamic process modeling.

7. **Notes.**

    a. Troy Hartley thought partnership members might be interested in NSF's GOALI, Grant Opportunities for Academic Liaison with Industry:

http://www.nsf.gov/pubs/2010/nsf10580/nsf10580.pdf . These are focused on "faculty, postdoctoral fellows, and students to conduct research and gain experience in an industrial setting; industrial scientists and engineers to bring industry's perspective and integrative skills to academe; and interdisciplinary university-industry teams to conduct research projects.

b. Mark Patterson reported that the Association for Unmanned Vehicle Systems International (AUVSI) college-level surface competition will now become an annual event at the Founders Inn. The next event will be in mid-June in 2011.

**Next meeting – Friday, October 29, 10-noon.** Agenda tentatively includes presentations by Steve Kaattari (sensors), Ron Monark (new entrepreneurship center in the School of Business), introductions to Coastal Pre-Cast Systems (Dan McGhee) and EM Solutions (Matt Shaffer), and an update on the Chesapeake Bay Algae Project.