MISSISSIPPI GULF COAST ALLIANCE
FOR ECONOMIC DEVELOPMENT

Alliance INSIGHT

Volume 1, Issue 111 | aerospace – advanced materials – shipbuilding – geospatial | July 2007

Inside this issue:

Welcome to *Alliance Insight*, your source for information on the Mississippi Gulf Coast's growing science and technology economy.

Alliance Insight is underwritten by the Mississippi Gulf Coast Alliance for Economic Development, a group of economic development officials representing six counties in South Mississippi. It's partly funded by the Mississippi Development Authority.

The Mississippi Gulf Coast Alliance was established in 2002 and includes the coastal counties of Hancock, Harrison and Jackson and the three counties to their north, Pearl

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Research

Leveraging intellectual capital

Scientific, business and news organizations from New York to Beijing wrote about the discovery. Researchers from the University of Southern Mississippi found a way to coat surgical devices with antibiotics to prevent infection.

Big news for the medical field. Big, too, for economic developers.

Mississippi has a powerful resource and economic development tool that's sometimes taken for granted if not overlooked. It's a $353 million economic enterprise that produces intellectual property that could lead to the next "next big thing." And by and large, the state's research universities seem interested in doing more in South Mississippi.

UM LYCEUM. *TCP IMAGE*

The Southern Miss researchers are part of a cadre of professionals who represent a large part of Mississippi's intellectual capital. These innovators from USM, Jackson State, Mississippi State and Ole Miss attract millions of outside dollars for research that can lead to the creation of intellectual property and, as a result, licensing fees,

(Continued on page 2)

Geospatial

Methodically building a niche

That South Mississippi is a player in the geospatial industry is not a matter of debate – it has been since the early '70s. But what other areas of the country have a dog in the hunt, so to speak, and how does South Mississippi stack up?

Data shows that the industry is widely dispersed, but there are a few areas that are leaders in the field. And while Mississippi is not the largest, it has a few things going for it that make it unique. In fact, one observer thinks the approach Mississippi has taken could let it take off.

Competition

The geospatial technology field is one of America's critical technologies, particularly for the nation's defense industry. Imaging and sensor systems play a crucial role in cutting-edge weapons systems, and their role in

(Continued on page 3)

Intellectual (cont.)

products, services, startups and jobs. They are also magnets for high-tech companies.

MSU President Robert Foglesong considers it the university's mission to be a force in the state's economic development. A university's basic research can lead to the products and services that can help a community. A key to that is "operational" research – picking the most promising research and turning that into something commercially useful.

"That is the connective tissue, if you will, between basic research and a production facility," said Foglesong, a former Air Force general who said MSU is starting to do more of the operational side.

The University of Mississippi chancellor agrees.

"Because our society elected to turn over a great deal of research responsibilities to universities … funding has been flowing into universities to provide the research component of research and development," said Robert Khayat. "So if you just put the pencil to the bottom line, research is an economic development activity. And it also, of course, enriches life through the development of knowledge."

The R&D enterprise

The nation's R&D effort is huge. According to the National Science Foundation, R&D in the United States was a $342.9 billion enterprise in 2006. It involves the federal government, academia, industry and non-profits.

Seven Mississippi universities spent $353.2 million on research in 2005. MSU alone had $179.8 million in expenditures, more than Florida State, Tulane and Auburn. But the state didn't always have such high numbers.

Although none of the state's research universities is based in the six counties of South Mississippi, they do have research operations here. USM, not surprisingly, has the largest footprint, followed by Mississippi State. Both Ole Miss and Mississippi State have expressed interest in increasing their profile in South Mississippi, in part because of the growth of this area, in part because of its pivotal position along a multi-state technology corridor.

"Our obligation is to serve across the state and one of the areas that has great growth potential is the southern part of the state. There's already heavy investment down there in the aerospace business and we see our role as offering our basic research expertise and our operationalizing that research expertise to enhance the opportunities in the southern part of the state," said Foglesong. "We can be incredibly helpful."

Khayat finds it encouraging that organizations like the Mississippi Gulf Coast Alliance for Economic Development are focusing on the research and the science and technology fields they support. But he doesn't think it's that important for the general public to understand the value.

"I think if we were able to reach a point where people accepted it as truth, that research programs at the universities make a difference in the quality of our lives, they impact the economy, they're very positive forces, then that's about as far as we need to go with it," said Khayat. – T*cp*

Mississippi university R&D expenditures

Institution	*2004*	*2005*
Mississippi State University	$191,352,000	$179,825,000
University of Mississippi, all	$79,867,000	$91,913,000
University of Southern Mississippi	$35,908,000	$37,881,000
Jackson State University	$31,641,000	$35,876,000
Alcorn State	$7,622,000	$6,256,000
Tougaloo College	$889,000	$938,000
Mississippi Valley State University	$493,000	$606,000
Totals	*$347,772,000*	*$353,259,000*

Source: National Science Foundation

Bayh-Dole

Before 1980, the government, rather than inventing university or contractor, held title to inventions created through government-funded research. The result: fewer than 5 percent of the government's 28,000 patents were licensed to industry for development of commercial products. Congress passed the Patent and Trademark Law Amendments Act – the Bayh-Dole Act – to allow universities and commercial companies to profit from the technology they developed from federal dollars. The result was a rapid increase in the number of university tech transfer departments.

EPSCoR

The Experimental Program to Stimulate Competitive Research, or EPSCoR, became law in 1978 to help states that historically did not receive a fair portion of federal research dollars. It's based on the premise that universities are valuable resources that can influence a state's development. After the National Science Foundation launched its program, the Defense Department, EPA, Department of Energy, Department of Agriculture, National Institutes of Health and NASA began similar programs. About two dozen states, including Mississippi, participate in EPSCoR.

Niche (cont.)

non-military systems is increasing.

Considering its importance, it's surprising little has been done to quantify the centers.

In some industries it's relatively easy to determine clusters. The Aerospace Industries Association knows the states and metro areas with significant aerospace activities (*Alliance Insight, Q4 2006*), and the American Shipbuilding Association and Maritime Administration can pinpoint areas with high concentrations of shipbuilders (*Alliance Insight, Q1, 2007*).

But tracking the geospatial industry is more difficult.

One magazine, *Geospatial Solutions*, mapped the industry through an analysis of subscribers. The January 2005 series, "Mapping the Geospatial Community," found geospatial technology firms are widely distributed. California has nearly twice the number of geospatial firms as second-ranked Colorado, which has nearly double the number of firms as third-ranked Texas. Virginia, Georgia and Florida each has more than 5 percent of the total number of geospatial firms.

Federal geospatial-related research

Area	*Labs*
Maryland-Virginia-Washington D.C.	13
San Francisco Bay, Calif.	3
Huntsville, Ala.	3
Cleveland, Ohio	2
Cambridge, Mass.	2
Albuquerque-Los Alamose, N.M.	2
New Jersey	2
Source: Department of Commerce	

The magazine found a correlation between the clusters and the presence of university research.

Mapping the location of federal geospatial research labs is another way to determine possible clusters. In October 2006, the Department of Commerce's Defense Industrial Base Assessment about the U.S. imaging and sensors industry had an appendix listing 43 federal labs and research centers that perform geospatial-related RDT&E: California has eight; Maryland six; Virginia five. Ohio and Alabama three each; and Massachusetts, New Jersey, New Mexico and Washington, D.C., each have two. Mississippi is among 11 states with one federal geospatial RDT&E facility.

But that is just a sampling, and Mississippi has more.

Mississippi's foothold

Mississippi got a toehold in the industry thanks to Stennis Space Center. Established in the early 1960s, the Mississippi Test Facility was responsible for testing Saturn rockets. But in 1970 NASA announced its Earth Resources Laboratory would locate at MTF, with the mission of finding applications for data acquired from remote sensing equipment and invited other government agencies to use the site for research operations. The Department of Commerce's National Oceanic and Atmospheric Administration and the Navy both set up geospatial-related activities.

Mississippi Gulf Coast geospatial RDT&E

Center of Higher Learning and University Research
Engineering Research Center – GeoResources Institute
Engineering and Science Directorate, Science and Technology Division
Enterprise for Innovative Geospatial Solutions, Stennis Office
Gulf Coast Geospatial Center
Hydrographic Science Research Center
Institute for Technology Development
Joint Airborne Lidar Bathymetry Technical Center of Expertise
Mississippi Enterprise for Technology
Mississippi Laboratory, Southeast Fisheries Science Center
Mississippi Laboratory, Pascagoula Facility
National Data Buoy Center
Naval Oceanographic Office
Naval Research Laboratory, Detachment Research Site
Source: Mississippi Gulf Coast Geospatial Sector

The state decided in the 1990s to take steps to nurture the growth occurring at Stennis. In 1994 the Mississippi Enterprise for Technology was established to serve as an incubator for technology start-ups. In 1998 the state established the Mississippi Space Commerce Initiative to make the state a leader in remote sensing. In 2003 MSCI became part of the University of Mississippi's Enterprise for Innovative Geospatial Solutions.

While Mississippi may not have the largest cluster, it may be unique. South Mississippi has several universities involved in the field and a state that has made it a goal to become a leader. Mississippi has systematically put together a geospatial cluster that one observer thinks is about to take off.

"What we are seeing here is unprecedented," said Carl Schramm, president of the Kauffman Foundation. "This industry cluster has been methodically put together piece by piece. When the market forces kick in, this cluster is going to take off faster than others created by chance." – T*cp*

Research

Seizing the moment: Joint R&D center

It's an opportunity that's unlikely to come again – at least not in the immediate future.

The University of Southern Mississippi soon will be building a new campus on a 1,700-acre site in Harrison County near Interstate 10. And University of Mississippi Chancellor Robert Khayat sees an opportunity at the sister university campus: an R&D center for all the state's research universities.

"I would build a university center and I would have it managed by USM but I would have Mississippi State and Ole Miss and Jackson State, for sure, bringing their special programs," he said during an interview in May.

Khayat has been a proponent of the university-center concept since 1995. It's one of the first things he began discussing when he took the job in Oxford.

"Everybody understands that Hattiesburg south is Southern Miss territory," Khayat said. "But Ole Miss, State, Jackson State all have wonderful things to bring to the table that Southern doesn't do and they have wonderful things to bring to the table that we don't do."

A campus with a center where the state's four research universities could combine brainpower would be a major economic engine for South Mississippi. The synergistic expertise could turn the site into an innovation powerhouse.

Each university has its own strength and they are not interested in duplicating each other. As Khayat put it, USM has staked out polymers, MSU engineering and Ole Miss pharmaceuticals and acoustics. Jackson State, the only urban university in the state, has its own unique portfolio.

"We're going to collaborate. That's a big issue. We're all committed to that," Khayat said.

Khayat is not the only one seeing the potential.

Not long after the board made the decision on the site, Robert Foglesong, president of Mississippi State University, told *The Sun Herald* he believes a university-center approach could work on the coast. He said MSU's strength is engineering, and that's what it would bring to the table.

"We have the expertise to help them out, but the IHL will decide ultimately how to construct what goes on down here relative to academics, but I would think our contribution would be an engineering school," he said.

"The idea is that we all have things that we can bring to any community, and the Gulf Coast offers and opportunity for us to galvanize those relationships," said Alice Clark, vice chancellor for research and sponsored programs for the University of Mississippi.

OLE MISS CHANCELLOR ROBERT KHAYAT. *OLE MISS IMAGE*

That the campus will be something different has already been brought up by at least one USM official. Jay Grimes, former USM provost, told *The Sun Herald* the it still must be decided what they want. But he added: "We don't want another Hattiesburg campus."

The universities do have a long track record of working together. Two of the research universities work together as part of the Center for Higher Learning and University Research, and all the state's research universities are part of the Mississippi Research Consortium.

So what now?

"We would work with Tom Meredith, the commissioner of higher education. We would have conversations that involve the four research universities – State, Jackson State, Southern and Ole Miss, and the Medical Center, probably," said Khayat.

"What we would do, is we would pursue a conversation with the four research universities and the commissioner and the board leadership about this university centers concept, because we think it has lots of merit," Khayat said.

"It's just a matter of people keeping the rivalries to the athletics field and trying to bring the academic strengths together. And the deal is, just provide the services needed on the coast that we can afford to provide," said Khayat.

"But I do think the universities centers idea is a great concept." – T*cp*

Research

National lab coming up with some sound ideas

It's something of an idea factory, if you will. Consider these current efforts:

- A portable high-frequency ultrasound device that can be used to stop bleeding;
- Water superheated by acoustic fusion as an alternative fuel;
- The use of sound waves to modify the behavior of insects.
- An all-composite flying wing that utilizes new concepts to suppress sound.

As disparate as these projects seem, they are all part of the wide-ranging research being conducted by the National Center for Physical Acoustics at the University of Mississippi campus in Oxford.

The common factor is the use of sound waves to find solutions to problems.

Established in 1989, the Jamie Whitten National Center for Physical Acoustics is a highly regarded national facility engaged in some $17.8 million in sponsored research. Clients include federal agencies and private industries, including small businesses.

With more than 50 fulltime employees and nearly 40 graduate and undergraduate students, NCPA's expertise is in acoustics, a branch of physics that involves the study of sound waves and their interaction with solids, liquids and gases. It has 78,000 square feet of office and lab space, which includes an anaechoic chamber, Mach 5 jet test facility, card-coded secure labs, a classified facility, and an in-house machine shop.

At the heart of what it does is basic research. NCPA has active basic research programs in atmospheric acoustics, materials science and thermoacoustics. It's work in atmospheric acoustics earned it a position in 2002 in the U.S. Army Center of Excellence in Acoustics, with the mission to carry out basic research in outdoor sound propagation.

NCPA is also involved in applied research, which involves the development of prototype systems. The applied programs translate the concepts and ideas from basic research into solutions to specific problems. As such, it offers ample opportunities for technology transfer and new businesses.

One of the biggest pushes is in aeroacoustics research, which is concerned with noise and vibration from aircraft and missiles. The aim is to reduce the impact of noise in the environment and to minimize the degradation of aircraft or missiles through vibration and noise. Research into aeroacoustics is aided by a supersonic nozzle to test designs and a 12" by 12" hypersonic wind tunnel.

NATIONAL CENTER FOR PHYSICAL ACOUSTICS IN OXFORD. *TCP IMAGE*

Lab tests are supplemented by engine test stand tests and full flight tests.

Future plans include the design of an advanced airframe and engine to guide the design of future commercial aircraft and airports. This Blended Wing Body, all-composite aircraft with a 26-foot wingspan will be used to test sound-suppression concepts.

Another push in applied research is in insect acoustics, which seeks to use acoustics to detect insects and modify their behavior. The primary focus has been towards termites and fire ants, both of which cause large economic losses in the Southeast.

Insects use acoustics to communicate and produce sound during their normal activities. Early research at NCPA led to the use of synthesized sound to cause female crickets to enter a funnel and water trap, eliminating the pest from golf courses without insecticides.

The use of acoustics to modify insect behavior offers tantalizing possibilities. Insects that fly at night, for example, in many cases stop flying and fall to the ground when they are exposed to bat ultrasound. That could lead to some interesting devices to put up a barrier that would stop flying insects.

Within the NCPA are three in-house organizations: The Institute for Humanitarian Demining, the Army Center of Excellence in Acoustics and the FAA/NASA Center of Excellence in Noise and Emission Research. – T*cp*

Shipbuilding

Exploring the "next next generation" warship

While shipbuilders start producing the next generation of warships, work is well underway to perfect systems that will go into the "next next generation."

These warships will be stealthy and quiet and armed to the teeth with an array of highly efficient and powerful electricity-based weapons, including energy beam and rail guns straight from the script of a science fiction movie.

And Mississippi is immersed in that work.

Mississippi State University is a member of the Electric Ship Research and Development Consortium, which brings together programs of leading electric power research institutions to explore electric ship concepts.

Created in 2002 and managed by the Office of Naval Research, the consortium was funded through a $52 million ONR grant. In addition to MSU, members include Florida State, MIT, Purdue, University of South Carolina, University of Texas-Austin and the Naval Academy.

Commercial applications show electric ship technology provides significant advantages in speed, maneuverability and space utilization, according to MIT's Center for Ocean Engineering. It is more fuel-efficient and will require less manpower.

That, combined with the increasing electrical load required for communications and control in a modern warship, makes electric ships the architecture of choice. It also allows for the possible addition of new capabilities, such as electromagnetic launch and laser weapons.

Current warships are built with propulsion systems separate from their auxiliary systems and weapons. Power locked in the mechanical propulsion train is not available for other uses. All-electric warships will release large amounts of energy for pulsed power weapons and sensors. The move to integrated all-electric designs will significantly improve efficiency and reduce costs. But all that requires a lot of research, thus ESRDC.

ESRDC is identifying promising technologies for power trains; developing ways to reconfigure and transfer power to vital loads under disruptive conditions; identifying novel future control and protection strategies; developing and applying advanced simulation capabilities; and developing methods to assess the thermal impact of advanced technology concepts on power, propulsion and thermal management systems.

Dr. Noel Schulz, an associate professor in the Department of Electrical and Computer Engineering at Mississippi State and holder of the TVA Endowed Professorship in Power Systems Engineering, said MSU is doing research in three broad areas: power systems applications, power electronics and high voltage engineering.

133-FOOT ADVANCED ELECTRIC SHIP DEMONSTRATOR. *US NAVY IMAGE*

MSU is using various software to analyze different shipboard power system layouts to determine which configuration provides the most flexible system to reconfigure during different missions and to recover if damaged by enemy fire, thus increasing the ship's survivability.

MSU has a wealth of research knowledge in the field of power electronics, which utilizes cutting-edge technology to convert electric power into readily useable forms. The university's High Voltage Laboratory, the largest high voltage test facility in a university in North America, can generate lightning bolts of up to three million volts.

Among other things, MSU is looking at the aging of cables and insulation. Because of the proposed capability of moving around power as needed, it's expected to have an impact on cables because of the varying loads that will pass through cables.

MSU is also helping to retool the shipbuilding work force with updated and new knowledge in electrical engineering. MSU's recently approved Masters of Engineering program lets shipbuilding personnel pursue a graduate degree in electrical engineering and learn about recent developments in power systems, power electronics and high voltage engineering. Through the ESRDC, MSU has small fellowships for shipbuilding personnel who return to school for professional enhancement or to pursue a graduate degree. – T*cp*

Second Quarter regional news headlines

Aerospace

- Cargo plane to be built in Jacksonville (Mobile Press-Register, 06/14/07)
- Fort Walton Beach recognized (Northwest Florida Daily News, 06/12/07)
- Army equips first unit with Lakota (06/05/07)
- Palm Bay police hope to use UAVs (Florida Today, 05/29/07)
- GoldenEye 50 gets certification (PRNewswire, 05/23/07)
- Northrop gets Global Hawk deal (AP, 05/18/07)
- Team chosen for Eglin research park project (Commercial Property News, 05/18/07)
- Billionaire tours aviation institute (Northwest Florida Daily News, 05/18/07)
- NASA to build second stand at Stennis to test Ares I engines (NASA, 05/08/07)
- Stennis union accepts contract (Sun Herald, 05/02/07)
- Aviation group moving conference (Times Picayune, 05/02/07)
- Cost analysis favors keeping wing at Eglin (Northwest Florida Daily News, 04/26/07)
- Air Force draws fire in bid to control UAVs (Army Times, 04/24/07)
- School district to establish engineering program (Pensacola News Journal, 04/19/07)
- EADS breaks ground on hangar (Mobile Press-Register, 04/18/07)
- State's financial commitment to Michoud revealed (Baton Rouge Advocate, 04/13/07)
- Northrop, Boeing submit bids (Multiple, 04/12/07)
- AIA: Aerospace industry booming (Aerospace Industries Association, 04/06/07)
- Analysts: DoD to continue funding aircraft (Aerospace Daily & Defense Report, 04/05/07)

Materials

- Hybrid Plastics gets contract to increase capacity (Hybrid Plastics, 06/18/07)
- ThyssenKrupp eyeing U.S. Steel? (Mobile Press-Register, 06/09/07)
- Degussa plans $10M plant (Mobile Press-Register, 05/31/07)
- GE announces Mississippi engine parts plant (Multiple, 05/29/07)
- Plan moves closer for Berg steel pipe plant (Mobile Press-Register, 05/26/07)
- German steelmaker picks Alabama over Louisiana (Multiple, 05/11/07)
- Groundbreaking for national formulation lab (University of Southern Mississippi, 05/10/07)
- Swedish company buys IPSCO (Mobile Register, 05/04/07)
- Pipe plant to bring 300 jobs to South Mississippi (WLOX-TV, Sun Herald, 05/03/07)
- Russian steelmaker in talks to purchase IPSCO (Mobile Press-Register, 04/13/07)
- Researcher working on plastic that dissolves in seawater (Science Friday, 04/03/07)

Shipbuilding

- Union keeps eyes on Austal (Mobile Press-Register, 06/13/07)
- Northrop wins new contract (Senator Trent Lott, 06/05/07)
- Aker Kvaerner gets $14 million contract (Mobile Press-Register, 06/05/07)
- Navy given $2.4 billion deal (The Sun Herald, 06/02/07)
- Coast Guard to seek money recoup (New Orleans Times Picayune, 05/23/07)
- Trinity Yachts eyes expanding services (The Sun Herald, 05/19/07)
- LCS back on track (Defensenews.com, 05/08/07)
- Lack of workers concerns Northrop (The Sun Herald, 04/25/07)
- MSU distance-learning engineering degree offered (MSU, 04/18/07)
- Justice probing Coast Guard project (AP, 04/18/07)
- Coast Guard to take over Deepwater (Washington Post, 04/17/07)
- Navy cancels Lockheed Martin's LCS (Mobile Press-Register, 04/13/07)
- Strikes ends at Northrop Grumman (Multiple, 04/05/07)
- Northrop offers new proposal (The Sun Herald, 04/03/07)

Geospatial

- NVision, two French companies sign pact (NVision Solutions, 06/15/07)
- General Dynamics gets $12 million contract for Stennis work (PR Newswire, 05/07/07)
- DoD turns to venture capitalists (New York Times, 05/07/07)
- Stennis Technology gets first tenant (The Sun Herald, 04/10/07)

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Welcome (cont.)

River, Stone and George. While each county takes care of its own economic development effort, the group was formed in recognition of the fact that in today's global world the way to attract attention is through regional groups.

The organizations represented by the Alliance are the Hancock County Port & Harbor Commission, Harrison County Development Commission, Jackson County Economic Development Foundation, Partners for Pearl River County, Stone County Economic Development Foundation, George County Economic Development Foundation and Mississippi Power.

Last year the Alliance began a long-range project to compile detailed information on the science and technology sectors that operate in South Mississippi. That research determined that aerospace, advanced materials, shipbuilding, geospatial technologies and marine science are fields that will play a huge role in South Mississippi's economic future. The Alliance maintains Web sites focusing on each sector and produces annual sector reference books. It also maintains this newsletter.

Alliance Insight, produced by Tortorano Commissioned Publications of Gulf Breeze, FL, is a quarterly newsletter designed to highlight the activities in South Mississippi in those targeted fields. The feature stories are designed to give our readers a better understanding of the importance of science and technology to this area's economy.

We hope you'll find this publication valuable and that you'll make it a regular part of your reading. We welcome your feedback.

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