

Mississippi Enterprise for Technology

John C. Stennis Space Center



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BUILDING WORKFORCE, BUILDING BUSINESS

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Themis Vision Systems

Seeing a future in the past

SSC spin-off's imaging products being sold to growing list of customers around the world...

Gazing upon the 2,000-year-old Terra Cotta Army – created to accompany China's first emperor in the afterlife – is remarkable in itself. But getting a chance to show off a modern scanner to find ancient paint invisible to the naked eye was a rare marketing opportunity.

And that's precisely what Themis Vision Systems did recently.

CEO Mark Allen Lanoue was in Xi'an, China, as part of a marketing trip to Asia. The recent trip was designed to establish a relationship with a distributor, as well as meet with representatives of several market sectors.

It was in Xi'an that Lanoue had an opportunity to use one of the company's hyperspectral imaging systems on an artifact from the Terra Cotta Army collection. The images revealed spectral characteristics of ancient paints, including Han Purple.

Lanoue said he believes it's the first hyperspectral image of the Terra Cotta statues.

But it's not the first time Lanoue has used the equipment on artwork to look for what eyes can't see. Back in 2007,



Photo by Mark Lanoue

The Terra Cotta Army was created to accompany China's first emperor to the afterlife. No two statues are alike.

Lanoue scanned a painting that the owner believed to be a previously unknown work by Spanish painter Diego Valazquez. He found a partial signature that may reinforce the claim.

Themis Vision Systems, a member of the Mississippi Enterprise for Technology at NASA's John C. Stennis Space Center, is in a full court press to expand its customer base. It has distributors for its hyperspectral imaging systems in Japan, China and Canada, and now has its sights set on Europe.

"We are entering into an exciting time in our growth as a global provider of hyperspectral imaging systems and services,"

said Lanoue, who was inducted into the NASA "Space Technology Hall of Fame" in 2005.

The company

Themis Vision Systems has nine workers, distributors in Japan, China and Canada and 39 hyperspectral systems in place worldwide. It has a corporate office in Delaware and an administrative office in Richmond, Va., but manufacturing and all the company's research and development work is done at Stennis Space Center.

(Themis continued on Page 2)



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Themis Vision Systems, which targets industry, government and academia for its hardware and software systems and algorithm development, was established in 2008 but traces its roots to an earlier time. It was born out of years of product development and research that grew out of the NASA Commercial Space Program, which had a center at Stennis through the Institute for Technology Development. Themis Vision Systems' predecessor companies were ProVision Technologies and Photon Industries.

Themis Vision Systems opened at MsET and the Center of Excellence in Geospatial Technologies in January 2009. In March 2009 it joined the Oxford-based Enterprise for Innovative Geospatial Solutions, which nurtures the growth of Mississippi's geospatial cluster.

Lanoue, a graduate of the University of Southern Mississippi, designed and built a one of a kind hyperspectral forensic imaging workstation for the U.S. Justice Department, and managed several forensic imaging projects in areas such as counterfeit documents, chemical agent detection, and ink analysis. That led to the establishment of the first hyperspectral imaging laboratory at the FBI laboratories in Quantico, VA.

"Our team at Themis Vision Systems has taken the original technology developed through NASA Commercial Space to new heights by reducing the size, and cost, while retaining the high quality data that our clients expect," Lanoue said.

System usage

Hyperspectral imaging is the collection and processing of information from across the electromagnetic spectrum. Unlike the



Themis Vision Systems photo

Short-wave hyperspectral imaging system

human eye, which just sees visible light, hyperspectral imaging can also see the ultraviolet to infrared range. To the human eye it would appear as the same color. Certain objects leave unique "fingerprints" across the electromagnetic spectrum. The fingerprints are known as spectral signatures and enable identification of the materials that make up a scanned object.

Customers are using the imaging systems for research in a variety of fields, including forensics. Hyperspectral imaging is used in the agricultural, mineralogy, physics and surveillance industries. Among other things, the technology can be used to find harmful organisms in food or provide answers in forensic applications.

Themis Vision Systems products are also being used for artwork discovery, pigment analysis, preservation analysis, signature and authenticity analysis. Imaging research includes obliterated writing, ink analysis, pigment analysis, layer analysis, and chemical analysis to name a few.

The hyperspectral imaging systems built by Themis Vision Systems at Stennis are portable so that they can be used on tripods, copy stands, specialty medical devices and microscopes. Lanoue used the company's VNIR hyperspectral imaging systems on the Terra Cotta warrior.

Eyes on growth

Themis has been working for most of 2009 and 2010 on its global presence, in light of a volatile global economy. Multiple travels to Asia, Europe, Canada and numerous locations in the United States have stimulated the sale of systems worldwide and the establishment of key partners and meetings with government, academic and commercial entities.

Themis Vision Systems in June 2009 announced it was installing its first system in China, a UV hyperspectral imaging system that will be used by a forensics institute in China. The system will be used to help with studies in forensic science, including fingerprint analysis.

Lanoue's recent travels to Asia included a visit with its newest distributor in China, Wisdom Technologies. The Asian campaign was spread across 15 days



Themis Vision Systems photo

Visible near-infrared hyperspectral imaging system released this year.

through Shanghai, Chongjing, Xi'an and Beijing in China, followed by a trip to Osaka, Japan, to meet clients of Themis' distributor in Japan, the Argo Corp.

Lanoue said the visit to China included meeting with prospects in the medical, geological sciences, archaeology, art and conservation, airborne imaging, and biological imaging fields.

"The Chinese prospects are very impressed by the systems' capability and flexibility for different applications," said Lin Tang, CEO of Wisdom Technologies, who sees uses both in the lab and field. He sees China as a market with great potential. "It is a great pleasure for us to establish a strategic, long-term partnership with Themis Vision Systems."

March and April will be key months for 2010. Meetings with multibillion-dollar agencies and companies in Europe and the United States will shape how Themis Vision Systems global presence will look in the near future, Lanoue said.

The CEO is particularly happy with the role MsET has played in the company's development.

"MsET has been an important partner in the growth of our company, our product presence in the global marketplace and in the establishment of international relationships," said Lanoue, who credits MsET with providing business services and stimulating new business relationships for MsET companies.

"The future is looking bright for Themis Vision Systems. We are broadening our global presence and introducing our technology to new markets through new distributors/partnerships," said Lanoue.

— David Tortorano



The MsET story



Tortorano Publications photo

The Mississippi Enterprise for Technology Inc. at John C. Stennis Space Center is a nonprofit created in 1994 as a business incubator and technology transfer office. The joint effort of the Mississippi Development Authority, NASA and the state's universities was designed to spawn the development of high-wage, high-skill technology jobs.

MsET evolved into one of the first state groups to focus on leveraging the presence of federal geospatial activities, the gathering, interpretation and distribution of geographic data acquired with satellites and aircraft to provide a picture of the world. That's no small matter considering it's a key technology of the 21st century. It remains a key area for MsET, but by far not the only one.

The beginning

The state's interest in leveraging federal technologies at Stennis – then called the Mississippi Test Facility – began in 1964 with creation of the Mississippi Research and Development Center. State officials knew they had a jewel in the facility designed to test rockets for NASA.

In 1970 NASA located its Earth Resources Laboratory to MTF to find applications for data acquired from remote sensing equipment. At NASA's invitation, the departments of Commerce, Interior, Transportation, Army, Navy and EPA eventually set up operations at the facility that would be

renamed John C. Stennis Space Center.

In 1994 MsET was established to fulfill the role first envisioned 30 years earlier: leveraging the research, development, test and evaluation taking place at Stennis Space Center.

MsET today

MsET is headquartered in the 56,000-square-foot Mississippi Technology Transfer Center, designated the Center of Excellence in Geospatial Technologies. Building 1103 is also occupied by universities, nonprofits and commercial companies. MsET also has space in Building 1210 for a total of 15,000 square feet.

Its mission as an incubator and tech transfer office is to provide an environment where start-ups can turn technologies into products and services. It's a means to leverage Stennis Space Center as a catalyst to facilitate commerce, create job opportunities and improve the quality of life.

As a technology transfer office, MsET is a clearinghouse where research at SSC, whether from federal or state labs, can be converted into products and services for the general public.

As a business incubator, MsET is a member of the National Business Incubation Association and provides an environment where technology start-ups stand a better chance at surviving through providing business and technology-related services, opportunities for joint ventures, entrepreneur

training and access to state and federal technology portfolios. It helps a startup in the critical early stages.

MsET works with a statewide network of offices to offer technology forecasts, business plans, market research, sources of financing/marketing strategies, patent searches and vendor sources.

MsET does not limit itself to a particular type of technology, and the current list of tenants includes companies involved in everything from software development to computer security systems. Long-range plans call for exploring the growth of alternative technology areas.

MsET is also currently applying additional focus on the economic development of Stennis Space Center. The incubator and technology transfer function will remain the focal point, but MsET will partner with local, state and federal organizations for the economic development of Stennis Space Center.

MsET already has a track record of getting directly involved in the economic development of Stennis. MsET in the past was instrumental in helping Stennis win the Shared Services Center in a NASA-wide competition. It wound up creating some 500 high-paying jobs.

"We need to position ourselves to be able to take advantage of opportunities," said Charles Beasley, president of MsET, "and we are now well on our way towards doing that."

Demographics

The John C. Stennis Space Center is a key location for three of five science and technology sectors likely to play a growing role in South Mississippi's future.



South Mississippi science & technology sectors

Sector	Primary centers
Aerospace	Stennis Space Center; Moss Point
Advanced materials	Hattiesburg; Bay St. Louis; Gulfport
Shipbuilding	Gulfport; Pascagoula
Geospatial technologies	Stennis Space Center, Ocean Springs
Marine science	Stennis Space Center, Ocean Springs

Source: Mississippi Gulf Coast Alliance for Economic Development/Tcp

Stennis tenant MsET, an incubator and tech transfer operation, has a membership list of technology companies involved in a variety of fields. The companies focus on everything from providing business services to making products.

Current MsET companies

Company	Field
3 Rivers Visual Communications	Business services
DQSI Corporation	GIS support
DigitalGlobe	Imagery products
Digital Quest	Education products
Geocent	Geospatial
Helios Systems	Digital media
Innovative Imaging and Research Corp.	Illumination; agr.
Melcorp	UAV products
Mississippi Global Technologies	Navigation; security
MSU/Geosystems Research Institute	Research
Northrop Grumman Information Technology	Emergency mgmt
Prototyping Solutions	3D printing
Radiance Technologies	Geospatial
Rockwell Collins	Geospatial; UAV
Skylla Engineering	Engineering
Themis Vision Systems	Imaging
USM Height Modernization Project	Geoinformatics
WorldWinds	Weather modeling

Source: Mississippi Enterprise for Technology

MsET tenant residency

St. Tammany Parish	20%
Harrison County	19%
Hancock County	16%
Pearl River County	15%
Other Mississippi counties	12%
Other Louisiana parishes	12%
Other states	6%

MsET tenant education

Bachelors	52%
High school	19%
Masters	13%
Associates	11%
PhD	5%

MsET Profile

Most MsET tenant workers live in Mississippi, but 32% are from Louisiana. Seventy percent have college degrees; add associates and it's 81%. Source: MsET

South Mississippi federal/state geospatial research

Organization	Location
Center of Higher Learning/University Research (Consortium)	Stennis
Engineering & Science Directorate (NASA)	Stennis
Enterprise for Innovative Geospatial Solutions (UM)	Stennis, Oxford, Jackson
Gulf Coast Geospatial Center (USM)	Gulfport
Hydrographic Science Research Center (USM)	Stennis
Joint Airborne Lidar Bathymetry Technical Center (NOAA)	Kiln
Mississippi Enterprise for Technology (Mississippi)	Stennis
Mississippi Laboratory/Southeast Fisheries Science Center (NOAA)	Stennis
Mississippi Laboratory, Pascagoula Facility (NOAA)	Pascagoula
National Data Buoy Center (NOAA)	Stennis
Naval Oceanographic Office (Navy)	Stennis
Naval Research Laboratory, Research Site (Navy)	Stennis
Northern Gulf Institute (Consortium)	Stennis

Source: Mississippi Gulf Coast Alliance for Economic Development/Tcp