



NASA Technology Development and Transfer Office *John C. Stennis Space Center*

REACT **REAL-TIME EMERGENCY ACTION** **COORDINATION TOOL**



ST. Tammany Parish Emergency Mgmt. Control Room

Recently the Emergency Management Operations Center (EMOC) of St. Tammany Parish turned to the Technology Development and Transfer Office (TDTO) of NASA's Stennis Space Center (SSC) for help in combating the problems associated with water inundation. Working through a Dual-Use Development Agreement the Technology Development and Transfer Office, EMOC and a small geospatial applications company named Nvision provided the parish with a new front-line defense. REACT, Real-time Emergency Action Coordination Tool, is a decision support system that integrates disparate information to enable more efficient decision making by emergency management personnel.

REACT is a decision support system developed by Nvision that supports various real-time models. Initially developed and deployed to support St. Tammany Parish's EMOC flood mitigation efforts, REACT can be extended to support numerous types of geographic impact models. St. Tammany Parish presented a problem requiring an accurate and real-time response; NASA supplied expertise in remote sensing and Nvision provided the hands on development of a web-based real-time GIS system. Project funding of \$300,000 was shared by all parties; NASA's Technology Development and Transfer Office along with St. Tammany Parish shared \$150,000 in direct project funding, while Nvision contributed over \$150,000 in internal research and development.

Huge areas of densely populated low-lying areas characterize St. Tammany parish. The potential for inundation comes from numerous sources: 1) torrential or enduring precipitation that overwhelms existing drainage controls; 2) drainages that exceed their maximum capacity; and 3) slosh effects from Lake Pontchartrain. The problem is further complicated by the fact that routinely all three of these potential threats coincide. Once inundation occurs health and human services concerns are at their highest priority. Ongoing concerns with waste treatment systems; transportation, hospital access and emergency evacuation route issues all compete for and require emergent attention.

To add to this dilemma, St. Tammany Parish has been the fastest growing area in the state of Louisiana since the early 1990s and is currently the 5th fastest growing parish/county in the United States, according to St. Tammany Parish officials. The increase in population and business growth along with the resurgence of land development in the parish compete against the land's low elevation, abundant waterways, poor drainage infrastructure, the absence of an adequate levee system and the area's high precipitation levels.

St. Tammany Parish was looking for ways to lessen the potential of this disastrous combination of factors when it turned to the Technology Development and Transfer Office at SSC for help. "The relationship that developed with NASA, NVision and St. Tammany Parish government was the epitome of a win-win situation. The flexibility that this program will afford parish government in development planning and emergency preparedness is incalculable," said Larry Hess, acting director of the St. Tammany Parish EMOC.

While REACT won't prevent the waters from rising, it does offer St. Tammany Parish residents an early warning to take action. The system collects meteorological data from various sources in and around St. Tammany Parish, including USGS gauging stations, the Louisiana Department of Natural Resources, NOAA, the Lake Pontchartrain Institute and the Causeway Foundation. This data is combined with other relevant information about the area then transferred to EMOC's computer system, real-time. The system conducts spatial analysis using the GIS database to provide visualization of analytical data. As the water rises, REACT captures all vital statistics about threatened areas such as residents phone numbers, roads and evacuation routes and critical facilities which maybe in harm's way.

Emergency responders can begin calling residents with warnings, planning for alternate evacuation routes, and evacuating facilities such as nursing homes and schools before roads are cut off. The early warning also allows residents time to move automobiles, furniture and other valuables to higher ground before evacuating.

"Decision makers have multiple factors to consider during emergency situations, REACT provides emergency management personnel with a real-time decision support system that integrates all of this disparate information to enable more effective decision-makings" said Tom Stanley, project manager within NASA's Earth Science Applications Directorate at SSC.

Nvision cut costs and reduced development time by building on existing commercial off-the-shelf (COTS) programs, such as BasinTools, the company's own watershed-modeling program, and ESRI's ArcINFO, ArcIMS and ArcSDE. By using COTS, it also made the program more efficient, reliable and easy to use.

"NVision's application of our (ESRI's) web-based technology in their REACT system is a prime example of the powerful use of GIS for Emergency Operation Centers and should serve as a model for such centers across the nation," said Sheila Sullivan, ESRI Regional

Office Manager, ESRI-San Antonio, TX.

St. Tammany Parish was eager to implement REACT into its EMOC for flood inundation maintenance, and is also excited to use the system as part of its Parish planning process for land development. "It has been and continues to be the vision of our Parish President Kevin Davis to provide the residents of St Tammany Parish with the most advanced and accurate tools with which to plan for growth and development while improving our overall public safety profile. With the assistance of NASA and NVision, we have taken a major step in that direction," Hess said. "The potential for use of this system does not stop when the floodwaters recede the system was developed to support a variety of impact models such as fires, hazardous material spills, airborne biochemical agents, and many others of crucial importance to first responders."

NVision is a small, woman-owned, minority-owned firm that specializes in advanced geospatial solutions. It is headquartered at the Mississippi Enterprise for Technology (MsET) business incubator at Stennis Space Center and has a satellite office in Slidell, LA.

"The Dual-Use concept of product development is based on the sharing of costs, risks and successes between the government and commercial partners. The result is an approach that provides flexibility and draws upon the capabilities of all parties. This project is an excellent example of how NASA and industry can partner to develop a NASA needed technology while at the same time help fulfill a commercial market place need," said John Bailey, NASA Technology Development and Transfer Office Dual-Use Program manager.

For more information on the Dual-Use Technology Development Program at Stennis Space Center, call (228) 688-1929, or access the web at technology.ssc.nasa.gov.

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