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### Gaps in Spatial Technologies Application Policy for Hurricane Disaster Mitigation in the Gulf of Mexico

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#### ABSTRACT

Hurricane damage in the Gulf of Mexico can be mitigated by better directed policies. Remote sensing technology is a reliable tool that could be critical in the mitigation of Hurricane disaster. There are many ways to map the layout of the environmental damage, but Remote Sensing has proved to be one if not the most accurate. Remote Sensing (RS), Geographic Information Systems (GIS) and Global Positioning Systems (GPS) can be very effective if used together. Whereas there are several Remote Sensing and Geographic Information System applications for disaster mitigation in Louisiana, the lack of coordination in policy, has minimized the mitigation impact. There is a lack of sound policy on application of spatial technologies. Using equipment such as Unmanned Aircraft Systems can be just the tool to get accurate data during very dangerous times. This obtained data can become useful in interpreting hurricane behavior, such as storm intensity, frequency, and possibly more accurate predictions of storm patterns.

Louisiana Coasts have been in constant danger from the threat of anthropogenic and natural disasters. In 2005 that threat became a reality when Hurricanes Katrina and Rita struck New Orleans and surrounding areas via the Gulf Coast. Since then thorough strategic planning and engineering implementation as well as risk assessment have been primordial in being preemptive to this matter. The destruction that this hurricane produced, not only had tangible implications, but intangible issues that arouse causing the state and New Orleans billions of dollars in structural damage and infrastructure overhaul as well as psychological trauma and devastated lives. These two hurricanes also ruined the marsh lands by adding salt water into these fresh water reservoirs.

The devastation of a hurricane can cause many changes on Urban Areas and particularly on the Urban Forests. Spatial data before and after data indicates that when a hurricane strikes, the most identifiably organic item that is damaged are the trees. Trees are what's needed to produce everything from the oxygen we breathe (biological), to the paper we write on (economic). Destruction of these areas also causes a mass exodus because of fears the urban area is not stable. This causes cultural flight and to an area such New Orleans, which relies heavily on tourism could be the city's undoing.

The lack of sound written policy at state level on use of spatial technologies has been Louisiana's "Achilles Heel". There are many organizations in the Gulf of Mexico area holding spatial data in databanks, but the lack of coordination seriously impedes the mitigation and recovery efforts. The Louisiana GIS Council is a major organ that brings government agencies together, however non-governmental organizations, academic institutions and local governments (like the city of New Orleans) are not part of the Louisiana GIS Council. The existing GIS policy is outdated, and the new policy has never been subjected to legislation, meaning that effectively there is a lack of official policy.

With 1/3 of Louisiana being below sea level, it is especially important that mitigation strategies are developed to prevent natural disasters such as the one that occurred in 2005 with Hurricanes Katrina and Rita. The Army Corps of Engineers along with the Intergovernmental Panel on Climate Change, and NOAA are constantly working with Louisiana to ensure that Levees are becoming more stable and that building structures are designed to withstand the impacts of flooding and wind damages. The tools that these groups use range from ArcGIS, ArcGlobe, COAST, and Desktop GIS. These tools are used to develop mitigation strategies that quantify and give real life identities to the potential situations that could occur. With this knowledge, these organizations can curtail their strategies to the predicted scenarios. Various outcomes can be predicted and help to outlay various strategies instead of only one.

Several organizations have been using remote sensing technology for mitigation of disasters in the Gulf of Mexico. Most outstanding is NOAA who use coastal elevation mapping to map areas of the Gulf of Mexico for modeling such as, 1) floodplain mapping including shoreline, 2) Storms surge and hurricane modeling, 3)SLR scenarios, and addressing ways to deal with emergency response. In order to use any of these functions, high-resolution mapping is required by flying over the region and capturing images of it in rapid succession. Legislative Mapping is another tool that is used in conjunction with NOAA that helps to aid in the jurisdictions and land rights of certain parts of the Gulf of Mexico; essentially breaking it up into areas that are to be maintained and regulated by various countries and states. IPCC - has been working on matters concerning the Gulf of Mexico and SLR scenarios. The US Army Corps of Engineers is responsible the reconstruction and reinforcement of levees. Current Project is the Morganza to the Gulf of Mexico Risk Reduction Project. The primary focus of this project is to protect the citizens of the lower parishes of Louisiana and its marshes from danger and erosion. Even though some of these organizations shared their spatial data, the lack of coherency of federal, state and local government policies stood in the way of service delivery in disaster mitigation.

This study surveyed remotely sensed imagery of hurricane impacted urban areas during Hurricane Katrina and Rita. Several sources of data are identified. Gaps in communication and coordinated exchange of spatial data in the previous disasters are outlined. Recommendations for a better more functional system are made. Spatial technologies in disaster management have been reduced to becoming effective weapons lacking a command and control structure to function effectively. The study identifies steps taken for better exchange and coordination of data sharing after the 2005 disasters.

## References

1. ERDAS 2005. ERDAS Field Guide 7th Edition. ERDAS Inc. Atlanta, GA  
support.erdas.com/documentation/files/FieldGuide.pdf
2. U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service. 2002. Fisheries of the United States, 2002. Washington DC. Internet <http://www.csc.noaa.gov/regions/gulfcoast.html>
3. Merrill, S, D. Yakovleff, D. Holman, J. Cooper, and P. Kirschen 2010 “**Valuing Mitigation Strategies: A GIS-based approach for climate adaptation analysis**” Fall 2010 internet <http://www.esri.com/news/arcuser/1010/coast.html>
4. E. M. Stark; U.S. Army Corps of Engineers Team New Orleans. 2008 Morganza to the Gulf of Mexico Risk Reduction Project internet <http://www.mvn.usace.army.mil/prj/mtog/>