An X-Band Satellite Ground Station for the State of Louisiana

Annual Report: February 1, 2005

Highlights:

Earth Scan Laboratory Website Commendation

Atmospheric, ocean, and land products derived from X-band satellite data are produced in near real-time and accessed at the home page http://www.esl.lsu.edu. The Internet Scout Project, funded by the National Science Foundation and others, chose the LSU Earth Scan Laboratory's web page for special recognition in the "Research" section of its March 19, 2004 issue of the "NSDL Scout Report for the Physical Sciences". Their report states that the web site offers a large quantity of detailed imagery from GOES, MODIS, and other remote sensing sensors as well as a series of hurricane animations. They also commended the site for listing research publications and on-line abstracts authored by faculty and staff of the Earth Scan Laboratory. The Scout Report is published by the University of Wisconsin Dept. of Computer Sciences and provides "high quality information about on-line resources. More information can be found at http://scout.wisc.edu/.

Training and Public Outreach

Undergraduate and graduate students at LSU receive hands-on training in the Earth Scan Laboratory on uses and applications of satellite data from the X-Band antenna system including Terra-1 and Aqua-1 MODIS, Oceansat-1 Ocean Color Monitor, and Radarsat-1 Synthetic Aperture Radar (SAR) data. In 2003 and 2004, the Earth Scan Lab staff participated in LSU Ocean Commotion and in demonstrations to the LSU Laboratory School. Numerous demonstrations were also given to visiting scientists and potential new faculty members and deans within the School of the Coast and Environment. Our faculty, staff, and products have been featured on several Baton Rouge TV stations as well as the recent NOVA program on Hurricanes. The LSU Earth Scan Laboratory plays an active role in LSU Hurricane Center activities. In 2004, the Earth Scan Laboratory received a Board of Regent Enhancement Grant to enhance training capabilities for students and faculty.

Graduate Student Awards

Evaristo Liwa, graduate student of Lawrence Rouse, Jr., is using MODIS data for wetland classification for his PhD research. He received the Knauss Fellowship and spent 2004 in Washington D.C. at the National Science Foundation, International program office.

Current LSU research projects that use the Earth Scan Laboratory X-Band facility capabilities

The Center for Coastal Zone Assessment and Remote Sensing, NASA Group 3 HBCU University Research Centers, (LSU Earth Scan Laboratory is university partner to Southern University-N. Walker P.I.), April 2003-April 2008, LSU budget $960,000, total award, $ 6,000,000.

New remote sensing methodologies for the surveillance of ocean features and improved understanding of circulation processes in the Gulf of Mexico, Minerals Management Service Coastal Marine Institute, (Walker, P.I.), September 2002-August 2005, $346,383.

Assessment and remediation of public health impacts due to hurricanes and major flooding events, LA Board of Regents (Walker, Co-P.I.), April 2002-March 2007, $107,810.

Rawinsonding of the atmospheric structure over the Baton Rouge area in the summer 2003, Louisiana Dept. of Environmental Quality, (S.A. Hsu, P.I.), $49,719.

Rawinsonding of the atmospheric structure over the Baton Rouge area in the summer 2004, Louisiana Dept. of Environmental Quality, (S.A. Hsu, P.I.), $49,741.

Simultaneous measurements of atmospheric visibility, particulate matter, and mixing heights at the Breton area IMPROVE site, Louisiana, Minerals Management Service (S.A. Hsu, P.I.), $299,979, September 2003- September 2006.

Determining overwater visibility and mixing height using satellite and in-situ measurements over the Gulf of Mexico, Minerals Management Service (S.A. Hsu, P.I.), October 2000-June 2004, $294,102.

Advancing the training capabilities and satellite data access within the LSU Earth Scan Laboratory, LEQSF Traditional Enhancement: Earth/Environmental Sciences, (Walker, P.I.), July 1, 2004-June 30, 2005, $70,000.

Deep Water Currents at 92W (Walker, P.I.), Minerals Management Service, 7/99-10/06, $553,286.

Hypoxia Studies in the Northern Gulf of Mexico (Walker, co-P.I., with Nancy Rabalais, Eugene Turner and Greg Stone), NOAA Center for Sponsored Coastal Ocean Research, May 2003-April 2006, $ 508,469.

Papers published or accepted for publication using X-band data

O.K. Huh and N. Walker, Remote sensing science and technology: the role of the Earth Scan Laboratory, *Gulf Coast Association of Geological Societies Transactions*, Vol. 53, October 23-24, 2003, Baton Rouge, LA, 2003.

H.H. Roberts, J.M. Coleman, S.J. Bentley and N. Walker, An embryonic major delta lobe: a new generation of delta studies on the Atchafalaya-Wax Lake System, *Gulf Coast Association of Geological Societies Transactions*, Vol. 53, October 23-24, 2003, Baton Rouge, LA, 2003.

Walker, Nan, Oscar Huh, Alaric Haag, Adele Babin, Jaye Cable, Gregg Snedden, DeWitt Braud, David Wilensky and Kota Prasad, A role for remote sensing in managing

Mississippi River diversions, *Backscatter*, Association for Marine Remote Sensing, vol. 14, no. 1, 25-28, 2003

Walker, Nan D**.,** William J. Wiseman, Lawrence J. Rouse, Jr., and Adele Babin, Seasonal and wind-forced changes in surface circulation, suspended sediments, and temperature fronts of the Mississippi River plume, Louisiana, Journal of Coastal Research, in press**.**

Book chapters published or accepted for publication using X-band data

Roberts, H.H., N.D.Walker, and S. Sheremet, Effects of cold fronts on bayhead delta development: Atchafalaya Bay, Louisiana, in *Morphodynamics and Sedimentary Evolution of Estuaries*, D. FitzGerald and J. Knight, Eds., Kluwer Academic Publishers, Dordrecht, The Netherlands, in press.

Roberts, H.H., S. Bentley, J. M. Coleman, S.A. Hsu, O.K. Huh, K. Rotondo, M. Inoue, L.J. Rouse, Jr., A. Sheremet, G.W. Stone, N. D. Walker, S. Welsh, W.J. Wiseman, Jr., A new appraisal of Louisiana's Sedimentary System from the Atchafalaya River to the Chenier Plain Coast, in *The Coastal Zone*, D. Davis and M. Richardson, Eds. 2004 Geoscience Publications, Dept. of Geography and Anthropology, Louisiana State University, Baton Rouge, LA., 2004.

Conference abstracts and talks using X-Band data (partial list)

Walker, N.D., R.R. Leben, S.P. Anderson, P. Coholan, Circulation and shelf-slope exchange processes associated with Loop Current cyclonic frontal eddies, EOS Transactions, OS31F-04 (INVITED), AGU Ocean Sciences Meeting, Portland, Oregon, 26-30 January 2004 (Talk and Abstract).

Roberts, H.H., R.T. Beaubouef, N.D. Walker, G.W. Stone, S. Bentley, A. Sheremet and I. Van Heerden, (paper) Sand-rich bay head deltas in Atchafalaya Bay (Louisiana): Winnowing by cold front forcing, Coastal Sediments '03, 5th International Symposium on Coastal Engineering and Science of Coastal Sediment Processes, Clearwater Beach, Florida, May 18-23, 2003 (Talk).

Huh, O.K, N. Walker, and N. Walker, 2003, Louisiana Office of Emergency Preparedness hosed International Workshop on Environmental Programs for Uzbekistan, May 20, 2003 (Talk).

Walker, N.D., Satellite remote sensing of coastal flooding from Hurrican Lili, Center for Disease Control, LSU Workshop, 26 October 2004.

Walker, Nan D. (invited paper), Biogeochemical modeling, groundtruthing and the Davis Pond Diversion, LS-LAMP and CCZARS Louisiana Research Conference, October 29-31, 2004, New Orleans, LA. 2004.

Davies, J.E., C. Moeller, M.Gunshor, W.P. Menzel, N.D. Walker, Estimating coastal turbidity using MODIS 250m band observations, Ocean Optics XVII, Fremantle, Australia, October 25-29, 2004.

Friedman, Karen. S., Xiawfeng Li, William G. Pichel, Pablo Clemente-Colon**,** Nan Walker, Tim Veenstra, Eddy detection using RADARSAT-1 Synthetic Aperture Radar, IGARSS 2004, Science for society exploring and managing a changing planet, Anchorage, Alaska, 20-24 September 2004.

Walker, Nan D. (invited talk/paper), Gulf of Mexico coastal marine applications using GOES-R data, GOES-R User Conference, May 10-13, 2004, Broomfield, Colorado, 2004.

Reports published using X-band data

B. Blanchard and S.A. Hsu, Meteorology and air quality observe in Baton Rouge, Louisiana during the 2003 ozone season, Louisiana Dept of Environmental Quality Air Analysis Division, LADEQ CFMS Interagency Agreement NO. 594353, February 2004.

Hsu, S. A. and B. W. Blanchard. 2005. Visibility and atmospheric dispersion capability over the northern Gulf of Mexico: estimations and observations of boundary layer parameters: final report. U.S. Dept. of the Interior, Minerals Management Service, Gulf of Mexico OCS Region, New Orleans, LA. OCS Study MMS 2005-008. 184 pp.

New collaborations using X-band data

The LSU Earth Scan Laboratory faculty and staff continue to collaborate closely with the Louisiana Office of Homeland Security and Emergency Preparedness providing data and interpretations to state officials and the LSU chancellor in times of environmental emergencies including hurricanes, tropical storms, fires, floods. The Earth Scan Lab staff provided satellite image updates every 5-10 minutes for 72 hours at the LOHSEP during Hurricane Ivan in September 2004.

The LSU Earth Scan Laboratory faculty have established collaborative research with NOAA NESDIS (Dr. William Pichel) in the acquisition and use of Synthetic Aperture Radar (SAR) data in the Gulf of Mexico region. Applications are being developed to map coastal flooding, to detect and track oil spills, ship wakes, river plumes, and high velocity currents.

The LSU Earth Scan Laboratory has collaborated with Dr. Jack Malone, LSU Veterinary Medicine in attempts to apply MODIS data to the prediction of West Nile Virus in Louisiana.

Drs. Nan Walker and Eurico D'Sa have initiated new collaboration with the NOAA Coral Reef Early Warning System program, focused on predicting and monitoring coral reef health locally and globally.