Digitalization of Coastal Management and Decision Making

Supported by Multi-Dimensional Geospatial Information and Analysis

A National Science Foundation Digital Government Project at The Ohio State University

Department of Civil and Environmental Engineering and Geodetic Science

Coastal zones have been directly or indirectly affected by a multitude of problems including global warming, climate change, rising sea levels, coastal erosion, environmental contamination, and overpopulation. Economic losses from coastal zone erosion alone exceed tens of millions of dollars per year. In Ohio, 95% of the Lake Erie shoreline is eroding (ODNR 1994) and erosion rates have been seen as high as 110 feet per year. Nearly 2,500 structures are with 50 feet of destruction. An urgent challenge faces governmental agencies whose mission is to manage land and water coastal resources. At Ohio State we will be addressing these problems in a National Science Foundation-funded research project entitled "Digital Government: Digitalization of Coastal Management and Decision Making Supported by Multi-Dimensional Geospatial Information and Analysis."

The goal of this research is to investigate and develop technologies to enhance the operational capabilities of federal, state, and local agencies responsible for coastal management and policy making. The research will develop a spatio-temporal data model for inter-governmental agency operations that for the first time will enable agencies to account for the dynamic nature of coastal zones in policy formulation and implementation. Multiple high-resolution spaceborne and in situ remote-sensing measurements will be combined with spatio-temporal databases, coastal hydrological modeling, and geospatial information analysis to provide detailed information for highly efficient modeling and forecasting capabilities along with a high degree of coordination between coastal management and policy making.

When successfully implemented, this project can a) significantly enhance the capability for handling spatio-temporal coastal databases, b) build a fundamental basis of coastal geospatial information for inter-governmental agency operations, and c) provide innovative tools for all levels of governmental agencies to increase efficiency and reduce operating costs.

The research project will be carried out primarily in the Great Lakes area: the pilot site will be on the Lake Erie coast. Research results will then be modified for transfer to a test site in the Tampa Bay area.

The Digital Government Project will integrate the expertise and strengths of The Ohio State University in geospatial information science and coastal engineering and the State University of New York at Buffalo in database systems and computer science with collaborating ma-

tional and state research agencies. Collaborating agencies include the NOAA National Geodetic Survey, Office of Coastal Survey, and National Geophysical Data Center; the U. S. Geological Survey Coastal and Marine Geology Program; the Office of Naval Research Laboratory; the Ohio Supercomputing Center; the Ohio Department of Natural Resources; the Ohio Department of Environmental Protection; and the Lake County Commission of Ohio.

Awardees of the grant ($1,052,933 for three years) from NSF are PI - Prof. Rongxing (Ron) Li, Department of Civil and Environmental Engineering and Geodetic Science (CEEGS), Co-PIs Prof. Keith W. Bedford and Prof. C.K. Shum, CEEGS; Dr. Raul Ramirez, the OSU Center for Mapping; Prof. Aidong Zhang, the State University of New York (SUNY) at Buffalo. In addition, the project has a strong project team consisting of a post-doctoral researcher and research assistants: Dr. Kaichang Di, Ruijin Ma, Rami Al-Ruzouq, Tarig Ali, Chung-Yen Kuo, Kevin Cheng, Xian Xu, and Sean O'Neil.

For more information please visit the Digital Government Project website at http://shoreline.eng.ohio-state.edu/research/diggov/DigiGov.htm.