WALSAIP-VTE: Visual Terrain Explorer A visualization tool for environmental monitoring and analysis

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Problem Formulation

Understanding the dynamics of the hydrological phenomena associated to wetlands requires analyzing data gathered from remote physical sensors, satellite images or digital elevation maps (DEM). The goal of this project is to develop a framework which will allow building more powerful visualization tools to complement the analysis of hydrological models for the study of wetlands.

Proposed Work

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This project aims to design and develop a framework for terrain visualization flexible enough to allow arbitrary visualization of terrain data combined with diverse data obtained through remote sensing techniques and from existing GIS databases. To support interactive visualization of potentially massive terrain data sets, the visualization tool with exploit hardware acceleration available in common computers, and leverage distributed computing resources where appropriate.

As part of this project we will research data partitioning and management schemes for local and remote data, algorithms that incorporate level-of-detail (LOD) rendering optimizations, performance scalability, data streaming considerations, and visualization-related metadata.

Framework Architecture

The modular architecture design employed by the VTE application allows customizing the data pipeline to better exploit the available resources and to provide multiple visualization options.





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Project Status

The VTE application has been developed using the Eclipse Rich Client Platform. VTE currently support interactive exploration of terrain visualizations constructed from DEM and satellite images. To provide scalability, a rendering level-of-detail technique was implemented, and support for out-of-core data management is currently in research and development.

www.walsaip.uprm.edu





Future Work

•Geo-referencing capabilities

•On-demand data streaming •GIS data integration •Sensor data integration •Performance scalability assessment



8 References

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Jobos Bay National Estuarine Research Reserve (NERRS) http://nerrs.noaa.gov/JobosBay/

Eclipse Rich Client Platform http://www.eclipse.org/rcp/

OpenGL - The Industry Standard for High Performance Graphics http://www.opengl.org

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