3D Environmental Impact Assessment

Online hydro-environmental modeling and visualization system for public engagement

Quantitative environmental impact assessment plays an important role in the sustainable development of our coastal and marine resources. It is often necessary to predict the impact of development projects or pollution discharges and the associated environmental risks in the receiving water. Our objective is to develop a cutting-edge real time GIS-based and integrated 3D virtual reality (VR) hydro-environmental modeling system. The unique technology will enable: (i) Robust and seamless 3D environmental impact prediction from near to the far field; (ii) Full integration with GIS data and advanced visualization capability; (iii) An educational tool to introduce concepts of pollutant mixing and transport; (iv) Effective communication and public engagement.

GIS-based 3D visualization

The visualization of the predictions of the 3D modeling engine is fully integrated with the GIS information. The technology involves data visualization, geometric modeling and real-time rendering based on dynamic scheduling of multi-resolution data with smooth transition between different resolution levels.

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There are two major components in our system: (i) a unique 3D hydrodynamic model with a fully embedded near field plume model VISJET - using a Distributed Entrainment Sink Approach (DESA); and (ii) the visualization of the simulations and predictions with GIS integrated 3D virtual reality.

Environmental and engineering professionals as well as the general public can easily visualize and navigate around the landforms and sensitive receivers when assessing the impact of a proposed project or polluting discharge. The system provides a platform for the public to offer comments and suggestions interactively.

Dynamic coupling of near- and far-field models of an outfall discharge

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