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Using parallel programming and a 3-dimensional visualization cave to map the acoustic energy distribution from a seismic array in the ocean

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Modeling and visualization of the dynamic acoustic field during a seismic exploration survey represent a computational challenge due to broadband, directional nature of the acoustic signal radiated by a seismic array. Standard acoustic propagation models (RAM and SWAMP) are upgraded for parallel processing and tested in the LONI (the Louisiana Optical Network Initiative) environment, using the Louisiana fiber optics grid computing network to model the 3-dimensional time-varying acoustic field in the ocean during a seismic exploration survey. The generated volume of data is transferred and visualized in the advanced immersive visualization environment, supported by Louisiana Immersive Technology Enterprise (LITE) facilities. The proposed technology is one of the first steps in developing real-time monitoring of the acoustic energy distribution in a large oceanic volume. This can be beneficial for environmental impact assessment and regulation and for seismic survey design. [Research supported in part by the Joint Industry Project through OGP and by ITI of University of Louisiana at Lafayette.]