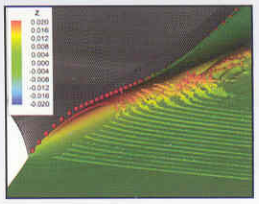
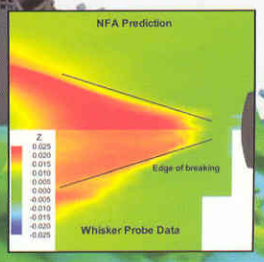
CRAY
THE SUPERCOMPUTER COMPANY

Naval Researchers Create First "Virtual" Wave Tank

Office of Naval Research, DoD HPCMP and ERDC DSRC



Wave cuts near bow



Wave elevations near stern

Challenge:

Traditional laboratory experiments designed to analyze the performance of ships under various water conditions are difficult to perform, labor intensive and expensive.

Why Is This Important:

Scientists working with the Office of Naval Research have taken a major step toward creating the first fully computer-generated wave tank for simulating and predicting real-world performance of new ship designs. These simulations are essential to designing the fastest, safest and most efficient marine vessels.

HPC Challenge:

Previously, the only way to predict how a new ship design would perform when moving through water was by conducting laboratory wave tank simulations -- a slow, labor- and cost-intensive task. Now, high performance supercomputers allow scientists to run sophisticated computational fluid dynamic (CFD) computer code that produces the most accurate (and cost-effective) simulations possible.

Cray's Contribution:

Using the Cray XT4™ supercomputer at the U.S. Army Engineer Research and Development Center (ERDC) DoD Shared Resource Center (DSRC), researchers can now apply CFD and other computer modeling codes to simulate highly complex water surface phenomena with extraordinary accuracy.

Additionally, ERDC DSRC's powerful Cray XT4 system will enable researchers to model phenomena previously impossible to simulate numerically such as water flow around a ship down to resolutions as fine as five centimeters and spray formation and spilling along the cusps of waves.

For additional information:

Paul Adams
paul.adams@usace.army.mil

Doug Dommermuth
douglas.g.dommermuth@saic.com

AMD Opteron™ 64