

## New Hybrid Laser/Gas Metal Arc Pipe Welding System Installed at General Dynamics NASSCO

A CNST project to develop an innovative pipe welding system reached a major milestone recently when the prototype system was transferred from the welding laboratory at Penn State's Applied Research Laboratory (PSU/ARL) to the pipe production shop at General Dynamics National Steel and Shipbuilding Company (GD NASSCO). The system, which is designed to weld pipe

from 4-inches to 30-inches in diameter with wall thicknesses up to 1/2 inch, was initially located at PSU/ARL for initial process development and testing, then was transferred to GD NASSCO in March 2007 to begin a three-month trial under production conditions. Since its transfer to NASSCO, hundreds of test welds have been completed to finalize the welding parameters for all foreseeable combinations of pipe diameter and wall thickness.

On March 23, 2007, the project team achieved a first in U.S. shipbuilding by attaining American Bureau of Shipping approval for a hybrid laser weld procedure. With this approval in hand, NASSCO is authorized to use the system to weld pipes that will be installed in the T-AKE class Combat Logistics Force Underway Replenishment vessels.

The primary advantage of the hybrid laser/GMA system is that it has the potential to drastically reduce the labor required to weld all the pipe that goes into the T-AKE. This 689 foot-long vessel carries 18,000 barrels of cargo fuel, contains miles of pipe, and involves thousands of welded joints. The labor required to weld all these joints with conventional pipe welding techniques is considerable, especially since the larger, thicker-pipes can require up to seven passes. With this new technology, these same welds can be completed in a single pass using welding speeds up to four times as fast as conventional welding techniques – potentially a 30-fold reduction in welding time.

### About CNST

CNST is a Navy ManTech Center of Excellence, chartered by the Office of Naval Research (ONR) to identify, develop and deploy, in U.S. shipyards, advanced manufacturing technologies that will reduce the cost and time to build and repair Navy ships. For additional information on this and other CNST projects, please visit [www.cnst.us](http://www.cnst.us).

GENERAL DYNAMICS  
nassco



Aerial Views of the System Installed in GD NASSCO Pipe Shop.

GENERAL DYNAMICS  
nassco



Prototype System and Operator.

