UNIVERSITY OF MICHIGAN
COLLEGE OF ENGINEERING

Department of Naval Architecture and Marine Engineering

cordially invites you to attend

THE CAPTAIN RALPH R. AND FLORENCE PEACHMAN LECTURE

presented by

Dr. Marshall Tulin

Professor Emeritus/Presidential Professor
University of California-Santa Barbara

"Prospects for High Speed Marine Transport in the 21st Century "

Wednesday, April 4, 2007
4 pm
*Johnson Rooms-Lurie Engineering Center**

**Reception following in Masco Faculty Commons*

Please RSVP to Kay Drake kdrake@umich.edu or(734) 936-7636

Abstract: Technical advances in the 20th century have set the stage for faster marine transportation in the 21st century, driven by incentives for speed, notably the transocean transport of time critical and very high value cargo. A clear example for the US is the transport of payloads of thousands of tons of heavy military equipment anywhere in the world within days. Plus the purely commercial incentive for fast marine transport arising from the globalization not only of trade, but of so-called "just-in-time' manufacturing in high value added sectors- computers for example.

The purpose of this lecture is to put prospects for high speed marine transport into perspective and to delineate the hydrodynamic problems, for hydrodynamic considerations are primary. They determine the boundaries of what is possible and how to approach these boundaries. The research challenges are revealed.

A comparison of the hydrodynamic efficiencies of displacement ships and hydrofoils is made, and it is demonstrated that the hydrofoil only attains superiority well into the Superhump regime, and the resulting efficiencies in the high speed supercavitating regime are below those of aircraft.

The desirability and challenge of operating large (>10,000t) displacement ships in the near Superhump regime is shown, and the goal of doubling aircraft efficiencies to L/D over 40, and achieving speeds over 70knots is set forth. Sources of resistance in the various speed regimes (sub, trans, and super hump) are presented. The achievement of high efficiencies for displacement ships at high speeds is shown to require a great reduction in high-speed bow wave drag, and moderate reduction in turbulent frictional resistance. There is reason for optimism.