# INVITATION to Seminar on:
# Safer and More Reliable Offshore Ships and Installations Using Hardware-In-the-Loop (HIL) Testing of Control Systems

## Rio Oil & Gas
## Tuesday September 12, 2006, 16.30-19.00

**Location:**
Riocentro Convention Center in Rio de Janeiro, Innovation Norway Auditorium, (PAVILHÃO DA NORUEGA).

**Increased Complexity of Control Systems on Offshore Vessels: A Safety Concern**
Offshore vessels and installations are characterized by increasingly complex power and automation systems. There is a variety of solutions consisting of stand-alone systems, partly integrated systems, and fully integrated systems. During the late 1990's low-cost off-the-shelf computers were introduced although they were not originally designed for automation purposes.

The increased complexity creates new issues of concern:

- Increasing number of incidents during operations due to errors in software systems in combinations with operator errors.
- Costly and delayed commissioning and sea trials.
- The need for new adequate testing and verification methods.
- Qualification and testing of SW upgrades.
- Improved facilities for operator training and verification of operator procedures.

**Marine Cybernetics** improves safety and profitability for our customers through independent testing of mission-critical control systems on ships and offshore installations. This is done using Hardware-In-the-Loop (HIL) testing based on our unique and patented CyberSea Simulator Technology. The customers will benefit from:

- Safer ships and rigs with less incidents due to software errors
- Extensive testing early in the design and engineering process
- More efficient sea trials
- Less use for potentially destructive testing
- Reduced downtime during operations
- Reduced overall cost

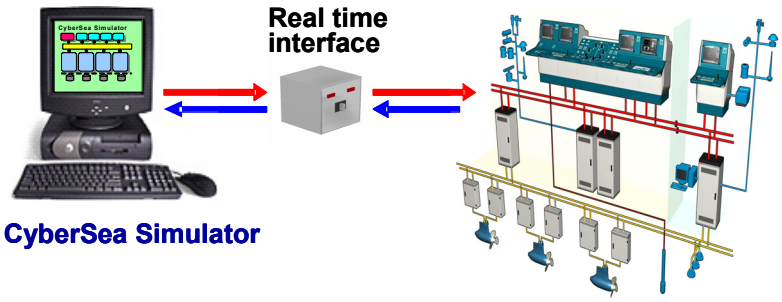
The HIL technology is becoming the new standard for testing and verification of DP and Power Management Systems on offshore vessels operating in Norway and internationally. In 2006 about 10 new buildings and ships in operations are subject to HIL testing, and for 2007 it is expected another 20 -30 vessels will be HIL tested.

## Hardware-In-the-Loop (HIL) Testing

Marine Cybernetics has together with partners developed the *CyberSea Simulator* for *Hardware-In-the-Loop* (HIL) safety and performance testing of control systems. This unique technology is used to detect SW errors and erroneous configuration parameters, and in this way prevent incidents due to SW problems. The use of HIL testing leads to less troublesome sea trials and commissioning, and improved tuning and configuration of the control system.

Det Norske Veritas (DNV) offers a new Standard for Certification (SfC) for HIL testing of computer-controlled systems.

- HIL testing of control systems will serve as input to certification of control systems and classification of marine vessels.
- HIL testing will be used in FAT (Factory Acceptance Tests), sea trials, annual tests, periodical tests and after upgrades.




## Program

1630-1700

- Registration with coffee and snacks

1700-1720

- Presentation of HIL testing of offshore ships and installations. Asgeir J. Sørensen, President, Marine Cybernetics

1720-1740

- Experience from HIL testing of offshore service and construction vessels, Tor Arne Johansen, Vice President, Marine Cybernetics

1740-1810

- Experience and background for Statoil engagement in introduction and implementation of HIL testing on offshore vessels, Ole J. Nordahl, Statoil

1810-1840

Presentation of class services for HIL testing, Paulo W. Bungner, Maritime Manager
DNV Rio de Janeiro

1840-1900

- Discussions:
  - Impact for oil companies, ship operators, yards and vendors.
  - Brazilian and Norwegian cooperation on safety of control systems.

Contact Persons for registration:
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