

# KONGSBERG Maritime Simulation

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# KONGSBERG GRUPPEN

Kongsberg Gruppen (KONGSBERG) is an international, knowledge-based group that supplies high-technology systems and solutions to customers engaged in the oil and gas industry, the merchant marine, and the defence and aerospace industries.





# Worldwide Operations



# Presentation

## KONGSBERG Maritime Simulation

- Overview
- RHIB Simulation Development
- RHIB Benefits
- Next Steps

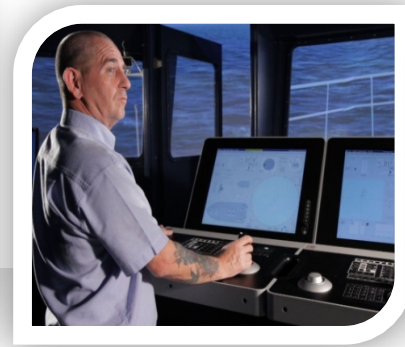
# KONGSBERG Maritime Simulator portfolio



**Ship's Bridge Simulator**



**Offshore Vessel Simulator**



**Dynamic Positioning Simulator**



**Crane Simulator**



**Engine Room Simulator**



**Cargo Handling Simulator**



**GMDSS Simulator**



**VTS Simulator**

# Kongsberg World-Wide Navy

## Armed Services Marine Simulation Customers



US Navy



Royal Dutch Navy



US Coast Guard



Royal New Zealand Navy



Canadian Navy



Royal Norwegian Navy



Irish Navy



Royal Swedish Navy



Portuguese Navy



Singapore Navy



Royal Australian Navy



Spanish Navy



Royal Danish Navy



UAE Navy



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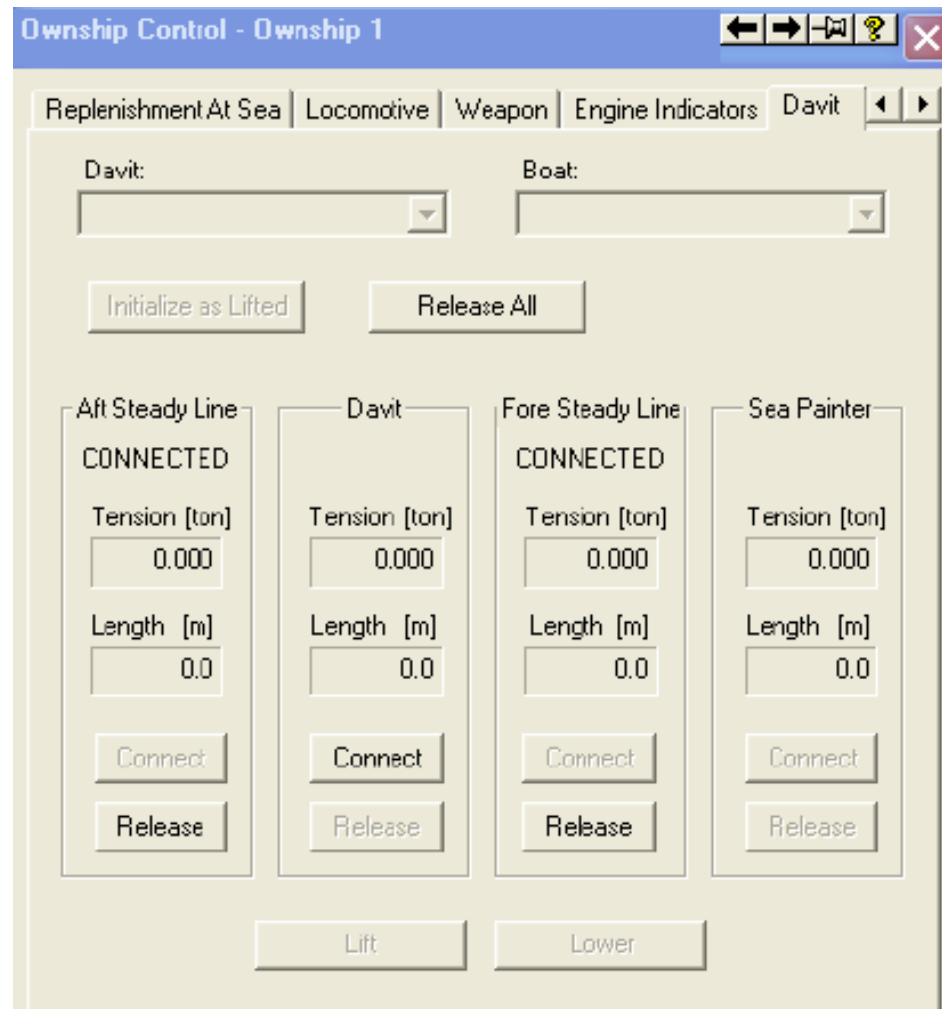


# Polaris RHIB Trainer

*Prepare For The Unexpected In A Safe Environment*

# RHIB operation

- RHIB launch and recovery







# Polaris RHIB trainer

## Background:

World wide naval request for full scale RHIB trainer

## Concept :

Use Polaris simulator with dedicated 6 DOF models of RHIB's to train RHIB manoeuvres in various weather condition, tactical operations and Launch & Recovery operations

## Modules :

Polaris simulator  
Dedicated 6 DOF RHIB models  
Dedicated RHIB instrumentation and operation panels  
Launch & Recovery module  
Motion platform with high update rate.



# RHIB model development and validation

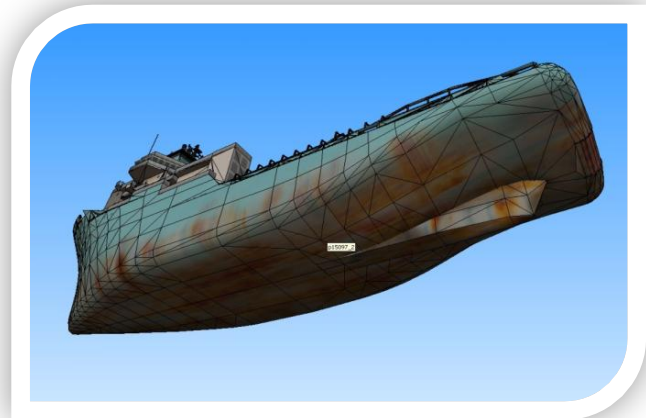
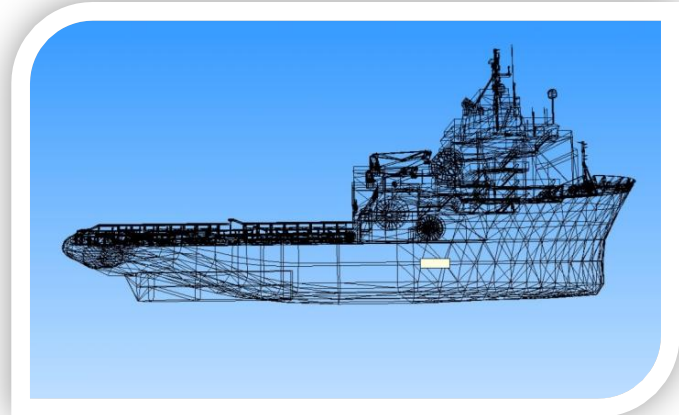
- CSCS provided boat performance data for 7m RHIB from a NSW Carderock data recoding study. (2007)
- CSCS validated model at Navy Amphibious Base Little Creek. (2008)
- Commercial Data for 11m RHIB available. (2007)
- Model validated by United States Marine Inc. manufacturer of 11m RHIBs.(2009)
- Updated models validated by CSCS in Virginia Beach (2010)





# High Speed = Bigger Challenges!

- Create 3D hull hydrostatics and hydrodynamics
- Encounter for which part of the hull is in the water (lift and drag)
- Interaction with waves. Consideration for both water surface shape as well as movement of water due to waves.
- Very high acceleration (multiples of G!) when the RHIB hits waves or water surface
- Tilting (trimming) of propeller
- Propeller aeration





# Challenges

- Planing Hull Realism
- Combine Hydrodynamics, Motion, and planing Hull
- Increase in model keeper update rates to 100hz
- Avoid simulation sickness by Synchronizing motion with visual que
- Feedback on model tuning

# Polaris Ships' Motion-Based Simulators

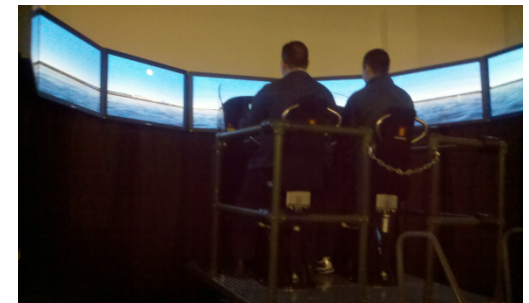
## Scalable Product line

- 360° visual scene
- 4 ton wheelhouse
- 8 ton live load
- Safety set at 15° pitch
- Safety set at 22° combined roll and pitch
- Full bridge team (up to 8 officers)
- CAE Series 600 motion platform

- 6 Degrees of Freedom
- Hull vibration effect



- 30 - 360° visual scene
- 800 lb cockpit
- 2000 lb live load
- Set at 10° pitch (22° available)
- Set at 10° roll (21° available)
- Helmsman and Navigator
- MOOG 6DOF2000E

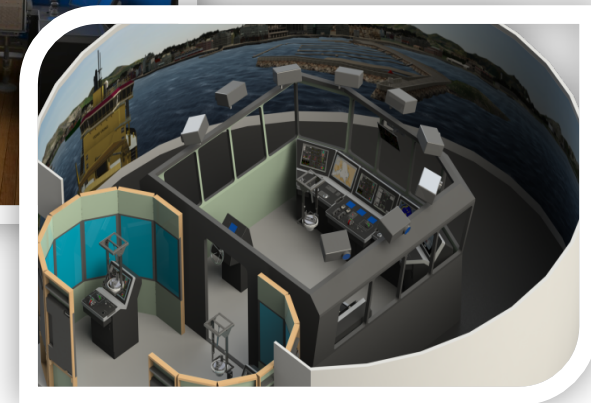
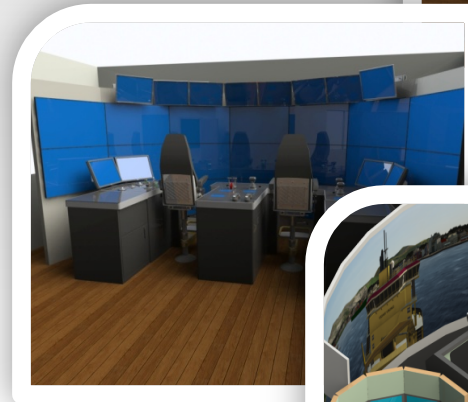


# Kongsberg Offshore Vessel Simulator

## From Desktop to Full Mission System

All Kongsberg simulators can be configured from a PC desktop simulator to full mission.

The simulators can be expanded at any time, either with additional instruments, workstations or complete integrated bridge systems.





# RHIB Simulator Instructor Benefits

- Ability to assess safe or optimum operation
- Monitor correct application of throttle in response to running or following sea
- Assess lee effect for launch and recovery
- Evaluate ability to manipulate electronic equipment underway
- Observe discomfort or fatigue caused by vessel motion.



## Application Assessment

Values captured for:

- Speed
- Pitch
- Roll
- Damage based on sea state
- Define operational limits



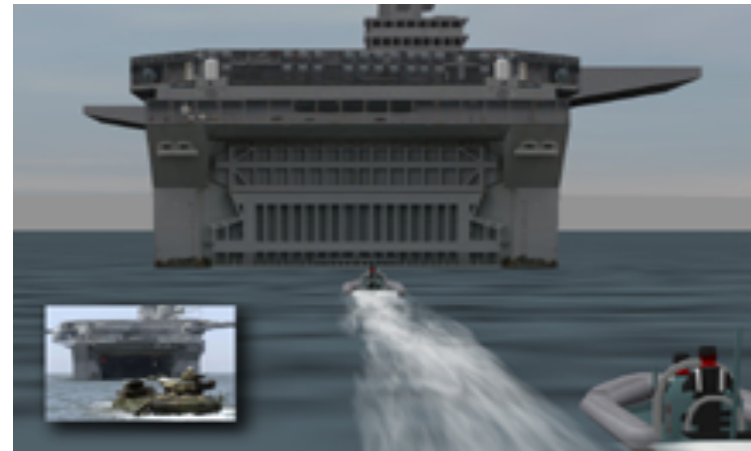
Instructor Station



# Remote Weapon Application Integrated Tactical Systems

## TACTICAL TRAINING

- Border Patrol
- Piracy
- Port Security
- Terrorism
- Boarding and Inspection







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# Polaris Anti-terrorism module

## Background:

Approached by Navies to further develop Polaris within anti-terrorism training

## Concept :

Detect potential dangerous targets and avoid damage to own ship or other ships in an convoy

## Modules :

- Radar & visual selection
- Illumination of targets
- Launching RHIB's & Helicopter
- Warning shots
- Direct shots
- Visual effects of damage and fire



# Visual Scenes



# RHIB Trainer – Why use a RHIB trainer?

## Some things to consider in a business case

- Cost to mobilize and demobilize boats to training area.
- Are valued assets and local traffic available?
- Weather can shorten or prevent planned training.
- Cost of fuel.
- Normal wear and tear on boats.
- Accidental damage to boats and piers.
- Unable to introduce machinery faults.
- Ability to reach throughput goals.
- Measureable assessments.
- Repeatability.
- Personnel safety factors.
- Practice Tactical Maneuvers (herding / shouldering)



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