1.10 Leveraging M&S software to build Marine Survival Craft Training Simulators

Leveraging M&S software to build Marine
Survival Craft Training Simulators

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MODSIM WORLD
Conference & Expo

Statistics

- **16%** - Percentage of total maritime lives lost over a 10 year period that were attributed to lifeboat accidents

- **12.5%** - Percentage of lifeboat drills that were performed unsatisfactorily during a 2009 inspection campaign

- **1.4%** - Percentage of ship inspections that identified lifeboat deficiencies serous enough to warrant detention

"Anyone using a lifeboat, be it in a drill or genuine evacuation, runs a risk of being injured or even killed."

UK Maritime Accident Investigation Branch
– 2001

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MARINE REPORTS - 2002 - M02L0061
Transportation Safety Board of Canada (TSB) Marine Investigation Report
Crew Member Lost Overboard

Bulk Carrier Kent
Near Verchères, Quebec
16 July 2002
Report Number M02L0061

Summary
On 16 July 2002, in fine weather and good visibility, the Bulk Carrier Kent, under the conduct of a pilot. In the port lifeboat ready for sea. The bosun was suddenly released and struck him on its descent. The alarm was raised and several life rings...

Lifeboat Accident Kills One; Injures Two More

Portland Press Herald   January 14, 2004

URL:
http://www.rigzone.com/news/article.asp?a_id=10424

One man was killed and two co-workers were injured Tuesday...

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Lifeboat Training

Defined by

- International Maritime Organization (IMO)

- Offshore Petroleum Industry Training Organization (OPITO)

- Flag State Maritime Authorities

Current Limitations

- Dangerous to replicate evacuation conditions and scenarios

- Requirement to demonstrate "Methods of launching a survival craft into a rough sea" not being met

- Mariners are put to sea having never been exposed to the situations they may encounter

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Lifeboat Training Gap

Emergency Conditions **Training Conditions** **Lifeboat simulation**

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Lifeboat Simulation

Simulator Objectives

- Mitigate training and operational risk

- Increase realism of emergency training scenarios

- Maximize the training objectives that can be achieved through simulation

- Achieve certification/accreditation from regulatory agencies

Technical Challenges

- Stimulation of lifeboat equipment

- Simulation of lifeboat hydrodynamics

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VEGA PRIME Marine

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Open Programming Architecture

- Create applications using supplied wave models or use your own custom wave models
- Incorporate completely foreign wave simulation algorithms and have them incorporated automatically into the provided rendering environment
- Apply the same calculations to the visual and non-visual (i.e. host computer calculating ships motions, forces, and dynamics)
- Produce complex wave models using an open and intuitive interface

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Multiple Ocean Types

- Position to any view point
  - Fixed location
  - Observer-centered
  - Surf zone
  - Large Area / Round Earth

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Synthesized Surfaces

- Physically correct wave model out of the box

- Maritime effects

- Customizable pre-defined ship motion strategies

- Short and Long crested waves

- Environmental and local reflections

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Synthesized Surfaces

- 13 sea states described by the Beaufort scale
- 9 sea states described by the Spectral Ocean Wave Model

- Multiple user-defined ocean definition parameters

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Surf Zone

- Shallow water modeling and coastline effects
    - Breaking waves
    - Cusp Surf
    - Sandbars
    - Depth and shoreline transitions
    - Wave effects on vehicle motion
    - Correct wave behavior
    - Seamless Transition from shallow to deep water

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Marine Effects

- User-defined vessel characteristics:
    - Bow waves
    - Stern
    - Hull
    - Size and shape correspond to the size, shape, and speed of the vessel
    - Interaction with the ambient water waves
    - Visual aid in determining the speed, maneuvering, and turning of the vessel
- Customizable ship motion strategy for correct behavior of objects / vessels on the ocean

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Survival Quest

Simulator Features

- Enclosed cabin to maximize "presence"
- Configurable to specific lifeboat models and hardware
- Simulates lifeboat motion in variable sea states

International Recognition

- Det Norske Veritas
  - Certified Class "S" Simulator
- International Maritime Organization
  - STCW Amendment, June 2010
- Transport Canada
  - Modification of TP 4957 - Marine Emergency Duties Courses
  - Model Course for Lifeboat simulation training developed

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Looking Ahead

High Speed Boats

- Training for Coast Guard, Navy and Waterborne Law Enforcement
- Vessel planing at 40+ knots
- Launch and recovery in chaotic wave environments

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Thank You

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