Simulation Technology

Ports WA Forum

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Introduction

- HR Wallingford
- Technology timeline
- Some numbers
- Elements of simulation
  - Port Hedland
- Future of simulation technology
Introduction to HR Wallingford

HR Wallingford

- Water engineering consultancy – Company non-profit distributing
  - Water, floods, coasts, maritime, energy
  - Research

- HR Wallingford Ship Simulation Software

- 10 full bridge ship and tug simulators

- UK and Australia Ship Simulation Centres

- Port design / training
The first ship simulator

- 1986
- 6 BBC Micro Computers
- Modular design
- Used Econet
- 150k RAM
- 100 lines of code
- 3 visual screens with additional radar and instruments
Ship Simulator Version 2

- 1991
- Single rear-projected screen
- Console ‘Pigcon2’
- Joystick view control
Ship Simulator Version 3

- 1997
- Console ‘Pigcon2’
- Latest Silicon Graphics computer
- High quality visuals
- 3 main rear-projected screens
Ship Simulator Version 4

- 2004
- Console ‘Pigcon2’
- PC based visual system
- 5 main rear-projected screens
- 1 plasma screen for aft view
Ship Simulator Version 5

- 2006
  - New design console
  - New high resolution projectors
  - 5 main rear-projected screens
  - 1 plasma screen for aft view
  - Named ‘Charlie’

- 2007
  - Second bridge simulator built and named ‘Oscar’
Dedicated tug simulator

- 2008
- 3 large forward view, rear-projected screens
- 15 high definition plasma screens for a 360° view
- Named ‘Victor’
Technology Timeline

Tug simulator Version 2

- 2012
  - ‘Victor’ upgraded to V2
  - Using 25 HD LED screens
  - Victor V1 moves to Fremantle and renamed ‘Tango’

- 2013
  - Transportable tug station simulator developed and named ‘Mike’
PPA contract

- 2013
- 3 new simulators developed, named ‘Sierra’, ‘Whiskey’ and ‘Zulu’ constructed in Fremantle, using:
  - 62 HD, LED screens
  - 26 PC computers
Ship Simulator Version 6

- 2014
- UK new purpose built facility
  - ‘Charlie’ and ‘Oscar’ now have 360º front projected screens using:
    - 16 projectors
    - 20 computers
  - ‘Victor’ relocated
  - Second tug simulator developed in UK using:
    - 12 x 4k resolution screens
    - named ‘Romeo’
Some numbers

2017 HR Wallingford’s facilities

- 7 full bridge simulators
- 3 dedicated observation areas
- 16 HD projectors
- 98 HD screens
- 14 x 4K resolution screens
- 352,512,000 pixels

- 21 instrumentation screens, including 9 touch screens
- 2 Vessel Traffic Service (VTS) simulators
Ship models

- 8 specific bulk carriers / tankers
- Full Port Hedland tug fleet

- Manoeuvring models designed in house, elements of which are based on:
  - OCIMF and associated – Prediction of wind and current loads
  - SNAME – Principles of Naval Architecture
  - Molland, A.F. – Maritime Engineering Reference Book (and the numerous references therein)
  - Proceedings of the International Symposia on Marine Propulsors
  - Proceedings of the International Conferences on Ship Manoeuvring in Shallow and Confined Water
  - Plus many more
Tidal models

- 5 ADCP meters
- TELEMAC flow model
Elements of ship simulation at Port Hedland

**Visuals**

- Vessels
- Water
- Terrestrial

10 million triangles per screen
Elements of Simulation

Software

- HR Wallingford Ship Simulation System software
- Developed in Australia
- Running on powerful computers
The future of ship simulation technology

Future?

- RV goggles (maybe)
- 3D screens
Thank you

- Simulator visit
- Questions?

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