Development of an extremely immersive motion based training simulator for handling

Who are we?

Founded in 2003

Based in Amsterdam, The Netherlands

30 employees

Automotive background

- OEM
- Formula 1
- Academic

> 100 motion based simulator

Training simulators

Well established in

- Motorsports
- Commercial and military flight
- Merchant and military shipping (bridge simulators)

What can be trained?

- Operate / handle the vehicle or craft
- Scenario / mission / drill

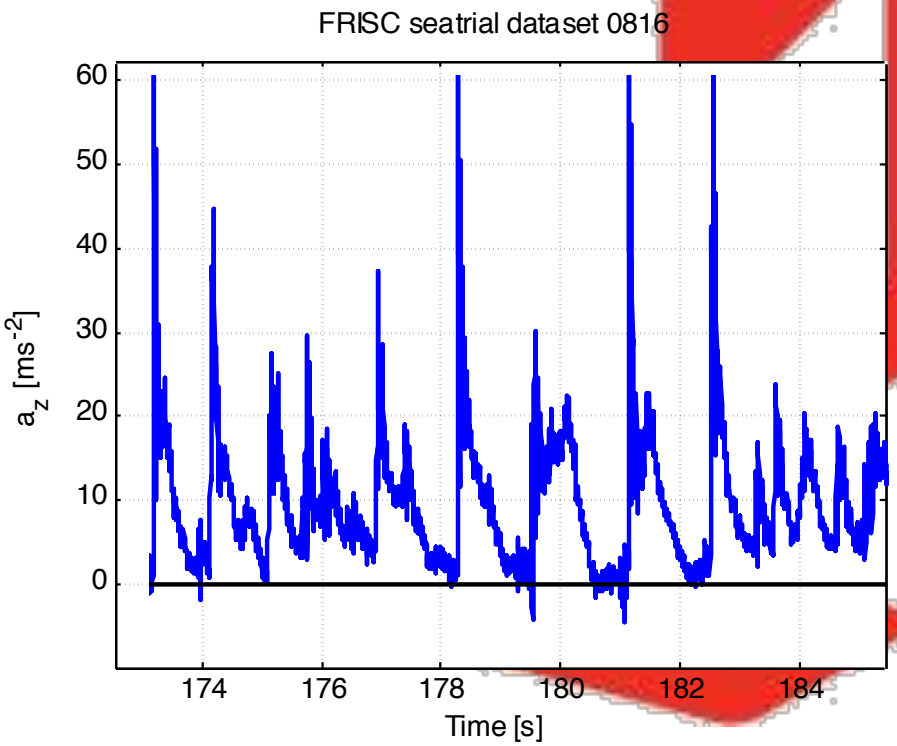
Training simulators for handling

- Realistic controls
- Proper dynamics
- State of the art graphics
- Relevant feedback through controls, motion etc

Feedback cues

Real life data

- $a_z > 60\ ms^{-2}$

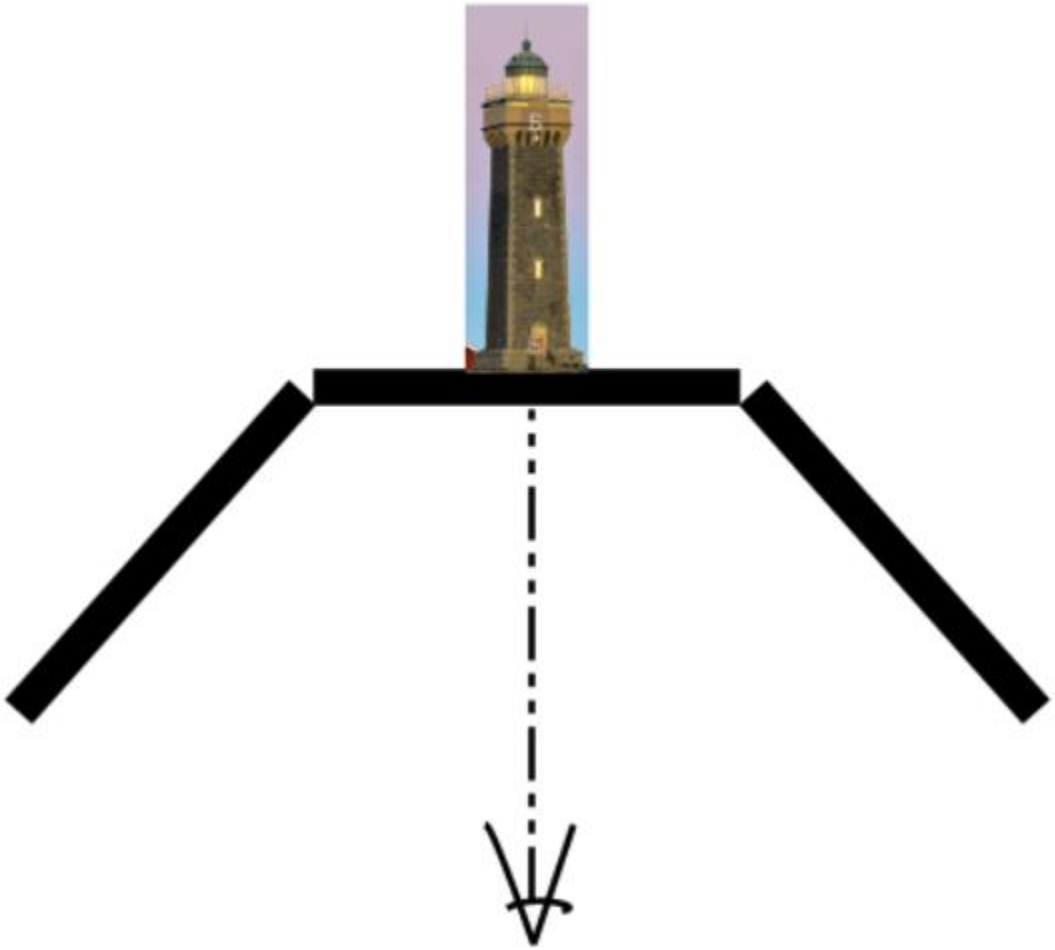


Simulator performance

- Electro mechanical
- $a_z = 18\ ms^{-2}$
- Yaw_max ~= 30 deg
- Latencies < 20 ms
- 120 FPS @ WQXGA

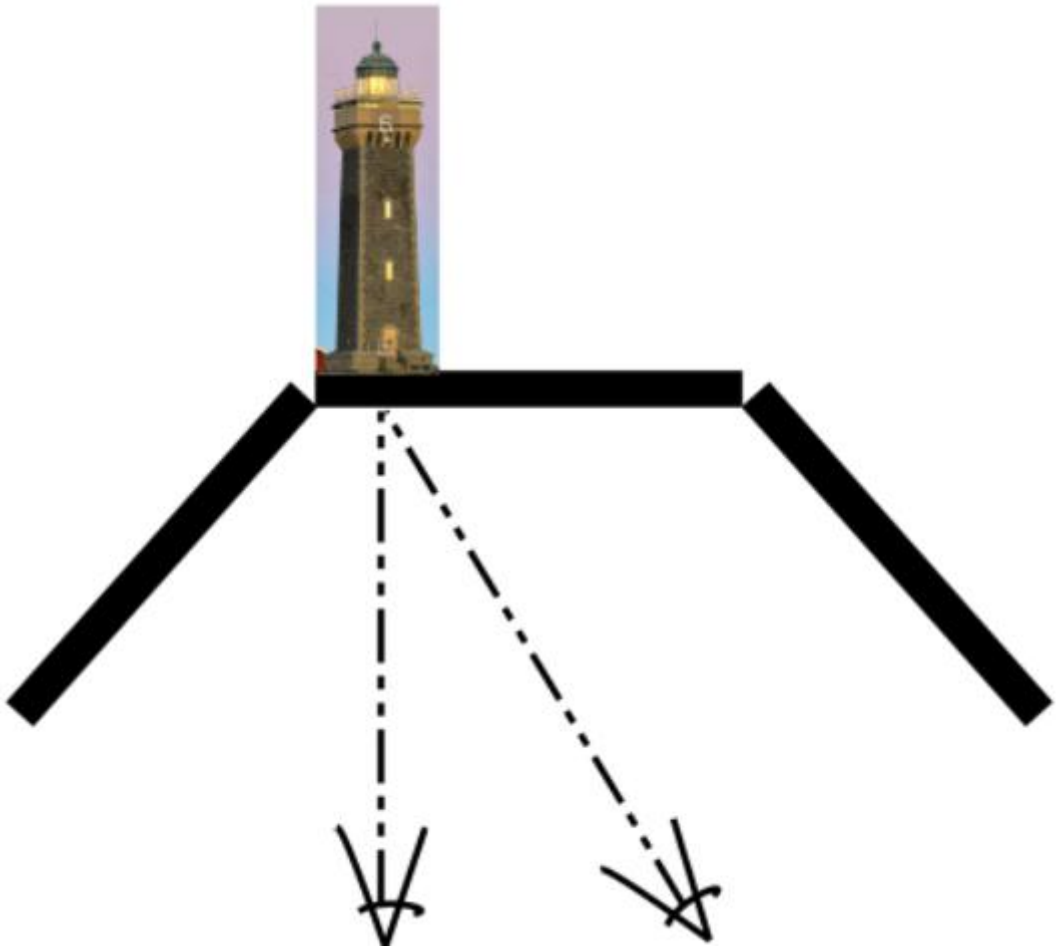
Multi channel visuals

- Monitors, single crew



Multi channel visuals

- Monitors, dual crew



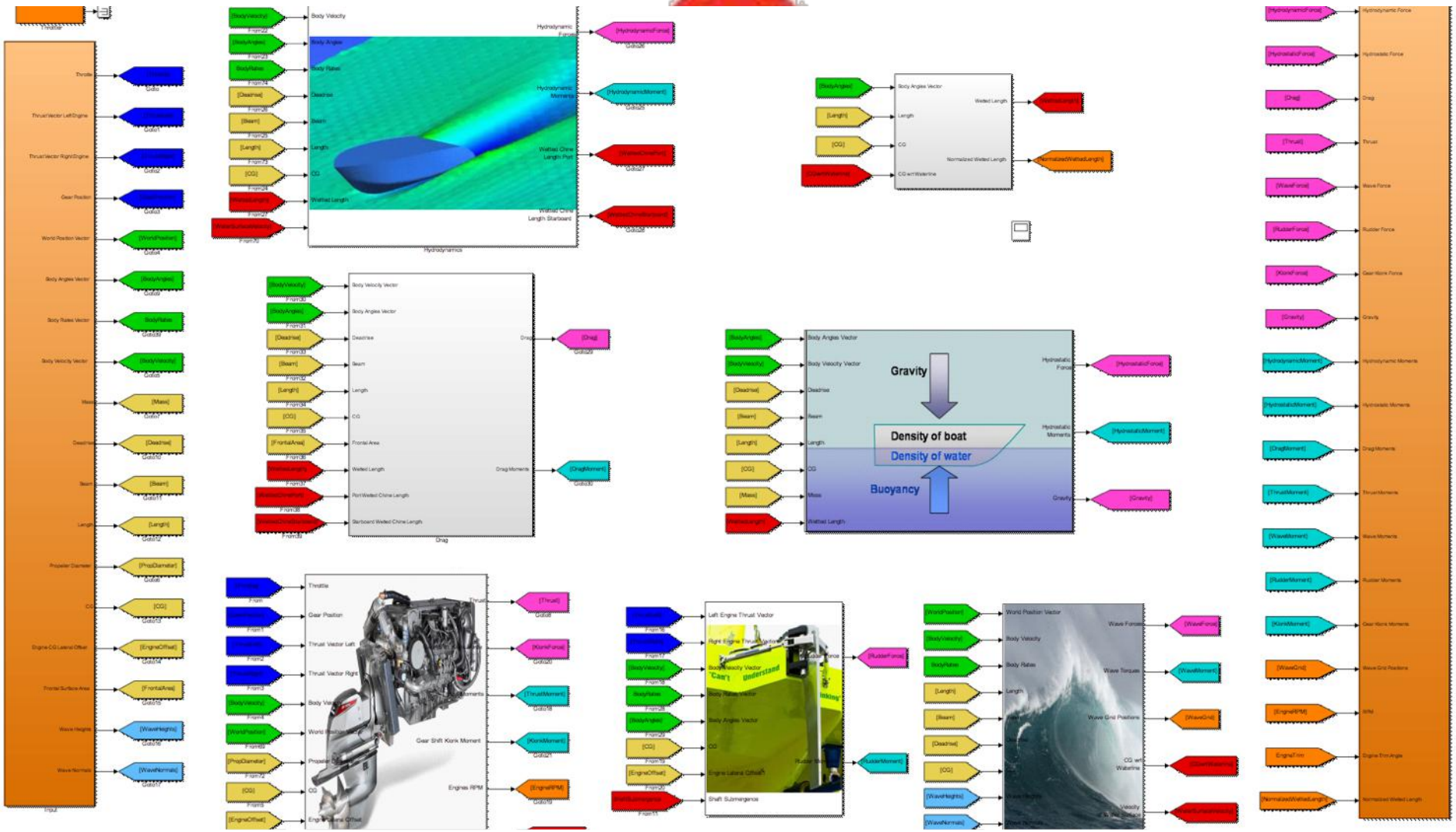
Multi channel visuals

- Projected solution, multi crew

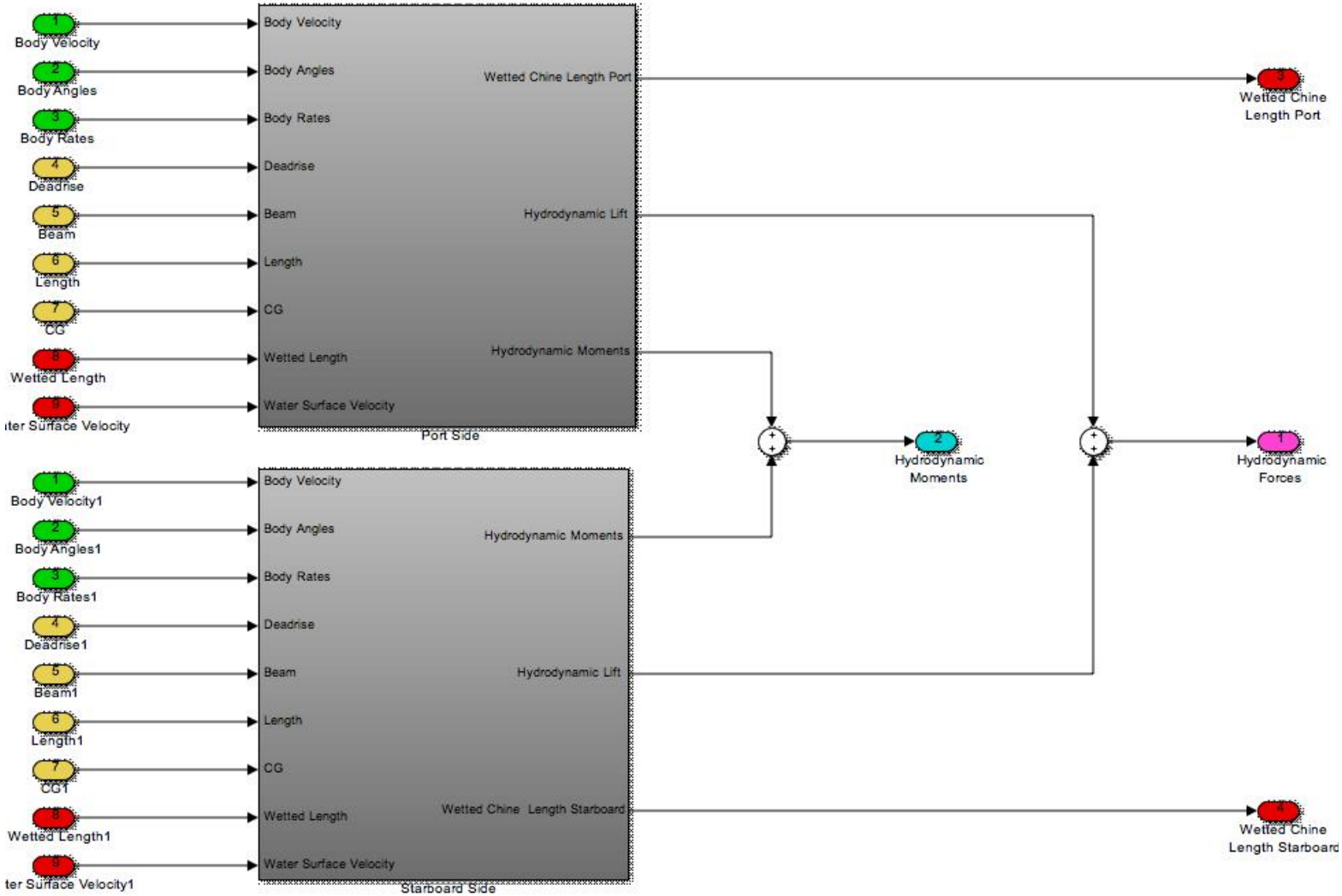
Dynamic simulation model charactristics

- V-hull
- Left / right side
- Wetted length
- Hard chines: wet or dry chines?
  - Waterdisplacement
  - Hydrodynamics
  - Slamming
  - Wake
- Multiple engines
- Jet / prop submerged surface
- Trim / tabs
  - Aero
  - Collisions
  - Water mass
  - Spray

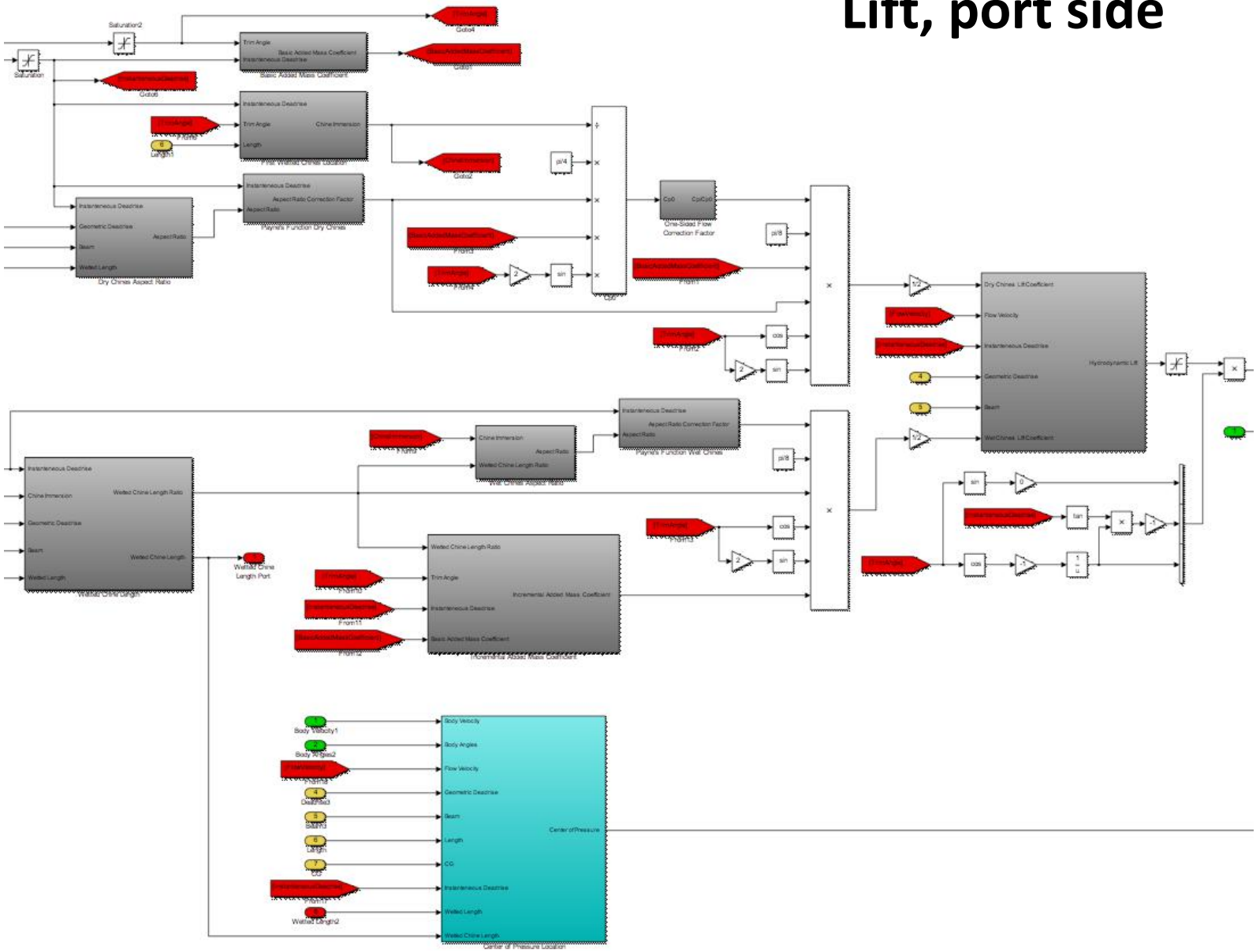
Dynamic simulation, scheme



Dynamic simulation, lift



Lift, port side



Next on the development agenda

- Varying design deadrise
- Multihull
- Decouple surface physics from graphics
- Improve radar simulation
- Advanced scenario manager
- Broach / Capsize effects
- Add more boat models (and customers ☺)

Having a simulator will

Increase training hours

Improve skills and safety

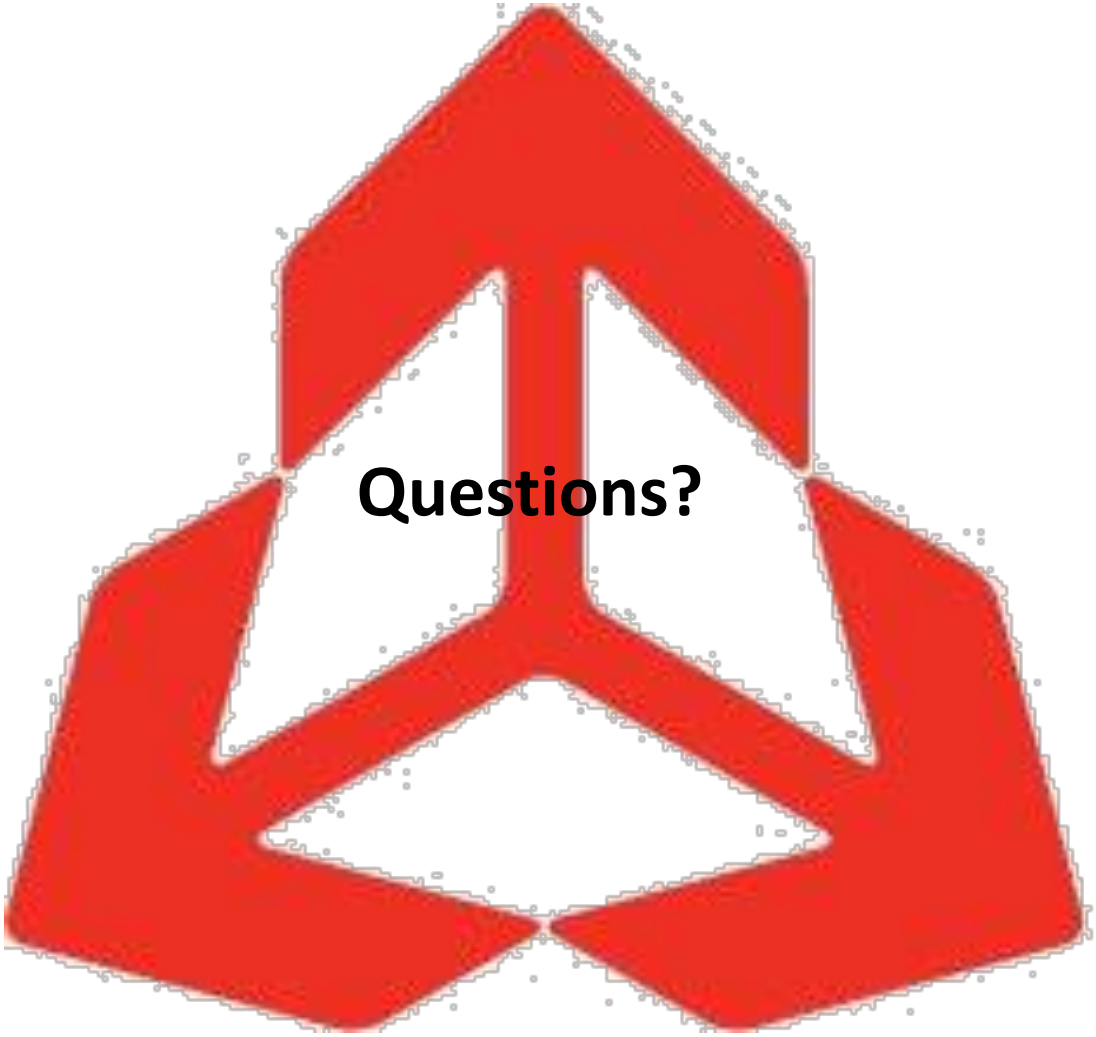
Provide repeatable, programmable conditions

Enable data based AAR

Reduce wear and tear on equipment and personal

Lower fuel costs

Minimize environmental impact


Questions?