

# Investigation of Korean Ferry “Sewol” Incident by Free-running Experiments

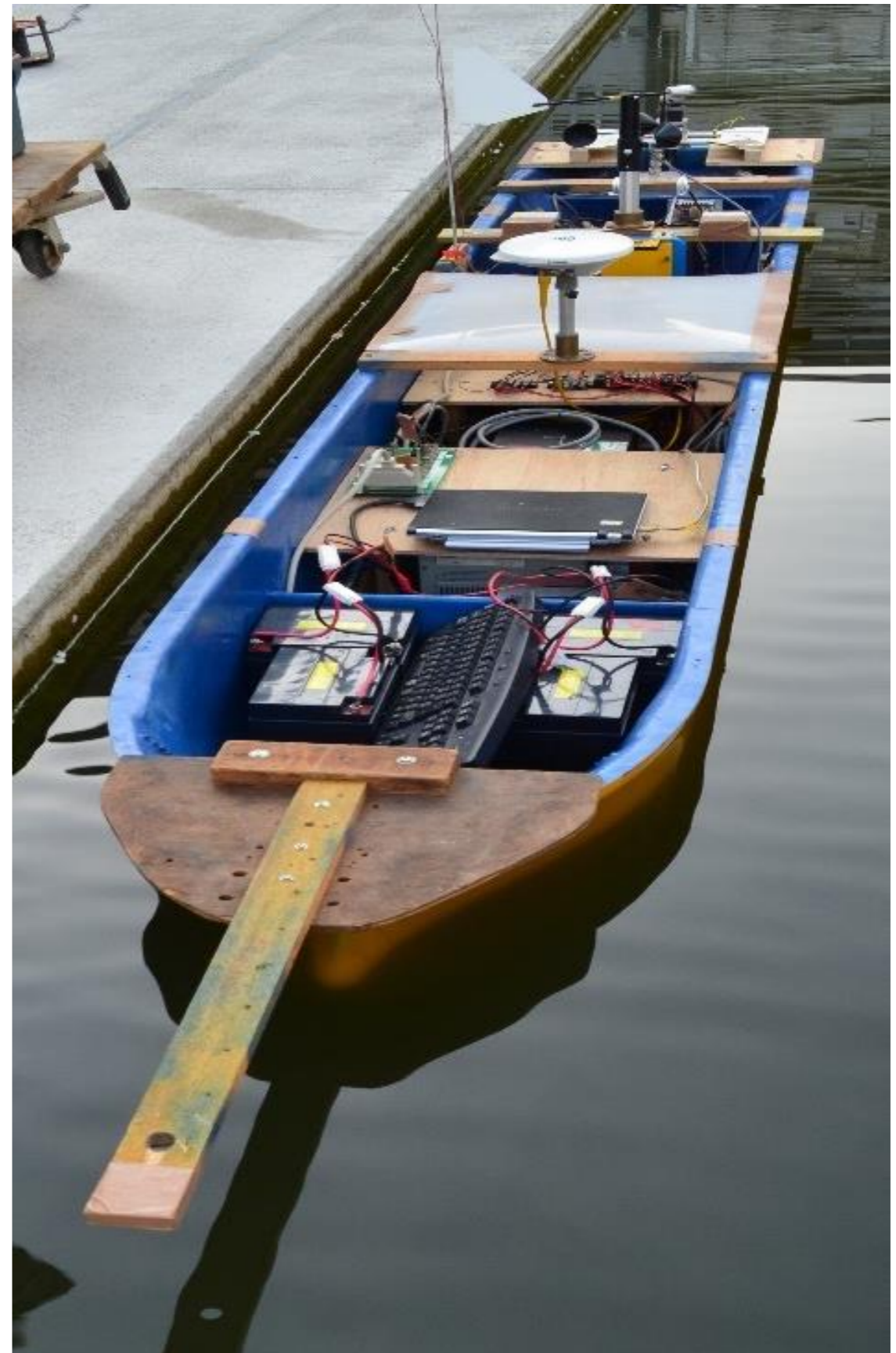


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Japan

# Free-running Experiment at Osaka University

since around 1956

K. Nomoto et al.: On ship manoeuvrability (1)  
and (2), J. of Society of Naval Architects,  
Japan, 1956, 1957.

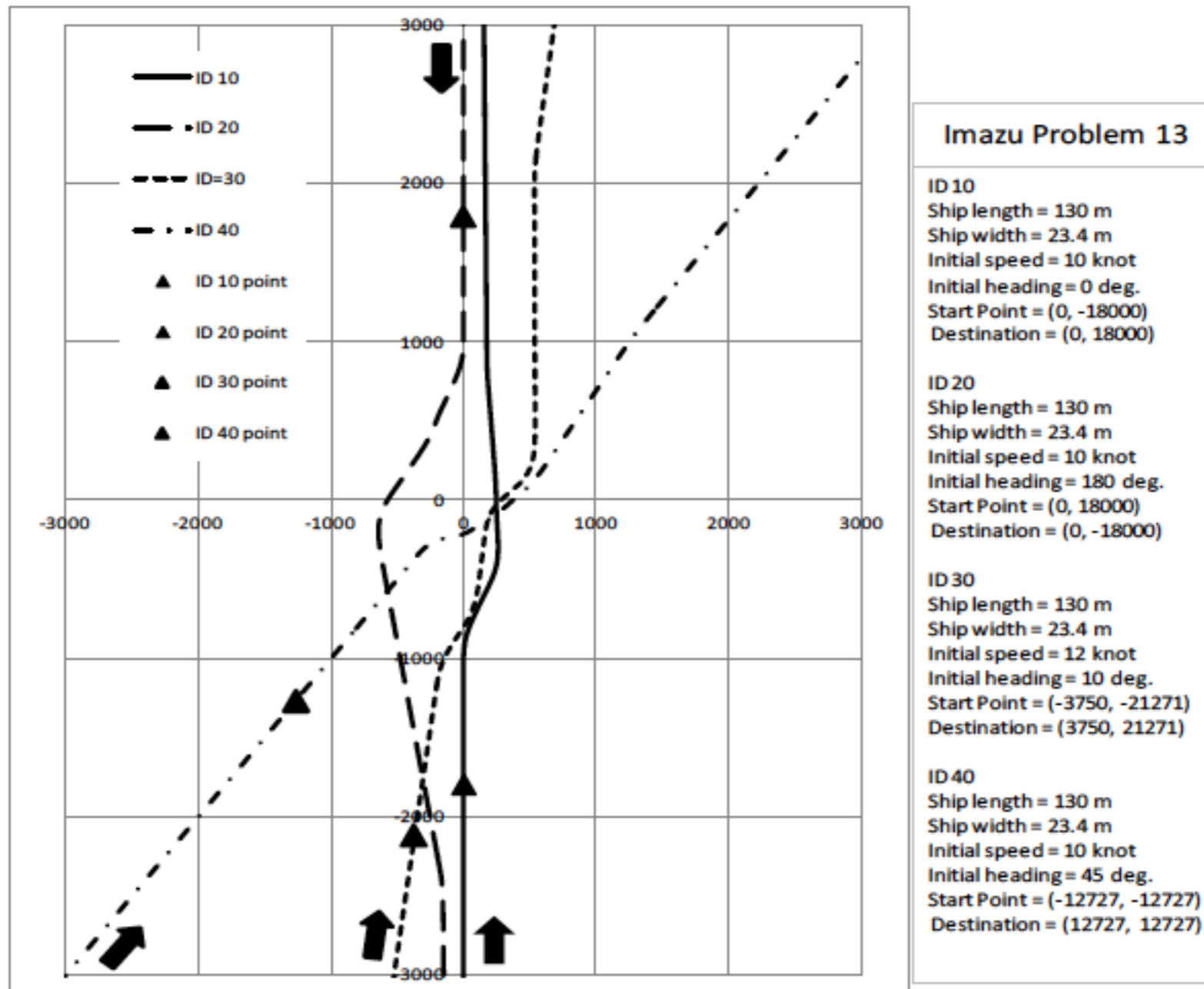


# Captive Model Experiments

Towing Tank Experiments  
Model Basins Experiment  
for  
Various purposes



# Automatic Collision Avoidance



# Ship Handling Simulators developed by Osaka University

World-first intelligent ship  
handling simulator, 2012

K. Hasegawa et al.: An Intelligent Ship Handling  
Simulator with Automatic Collision Avoidance Function  
of Target Ships, INSL17, 2012

One of the world-first ship  
handling simulators, 1976

K. Nomoto et al.: On Instability Criterion of Blunt-  
body Ships, 1st MARSIM, 1978.



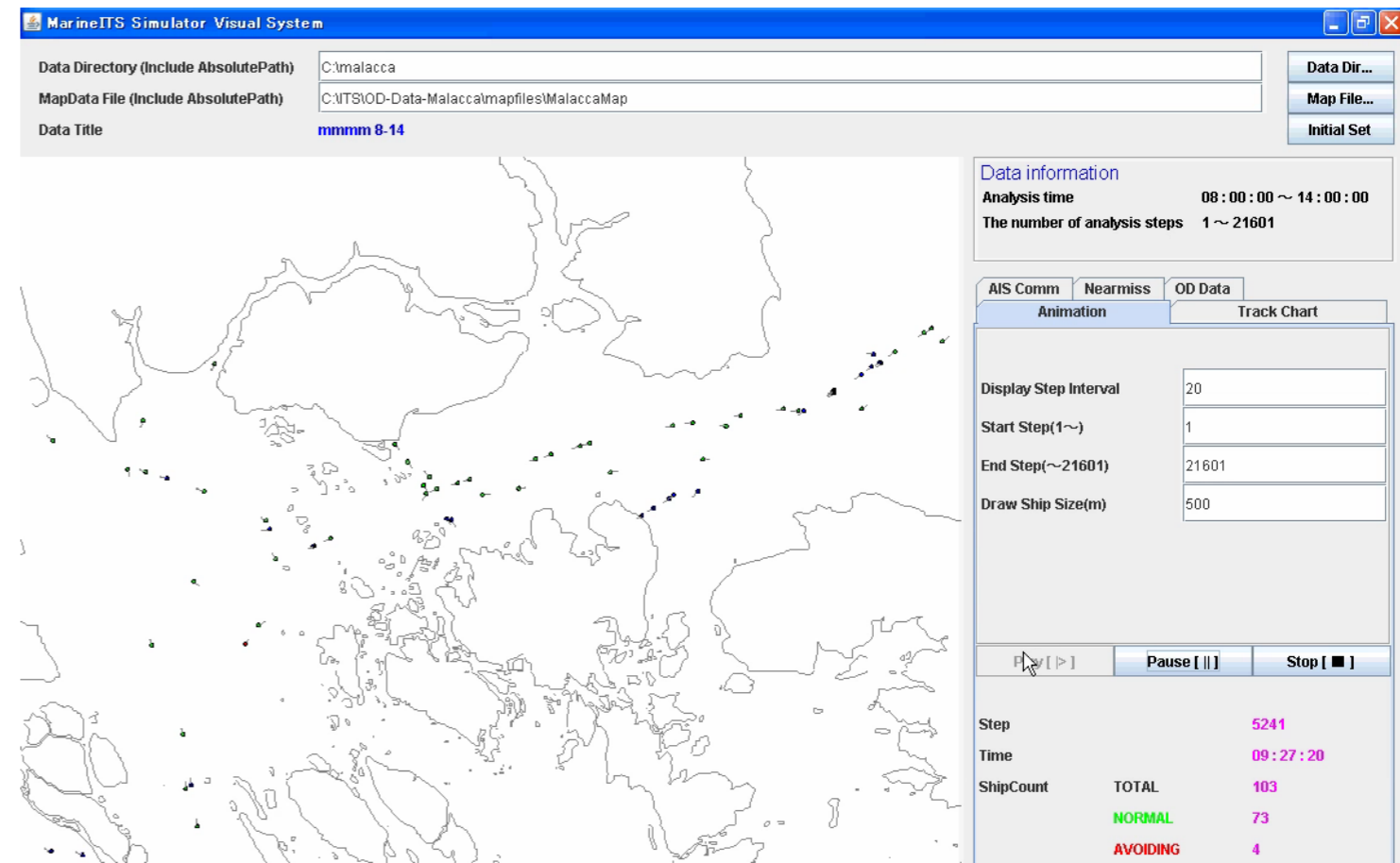
# Marine Traffic Simulation System

since 1987

K. Hasegawa et al.: Feasibility Study on Intelligent Marine Traffic System, MCMC 2000, 2000.



Upper: Tokyo Bay, Lower: Singapore Straits



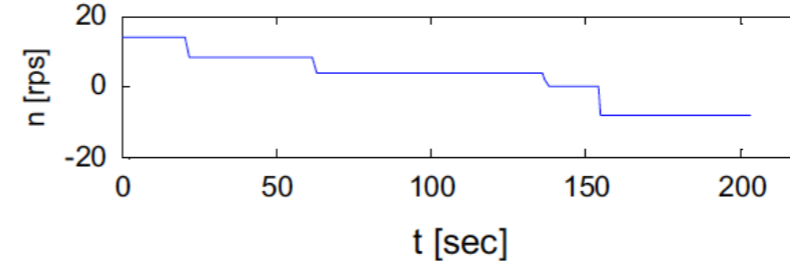
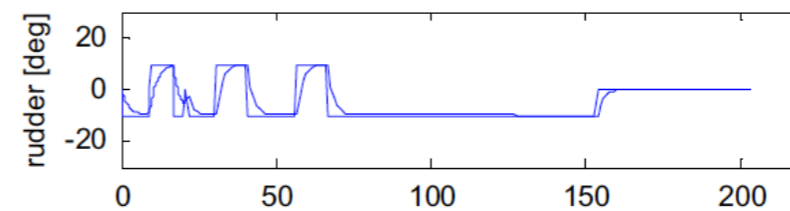
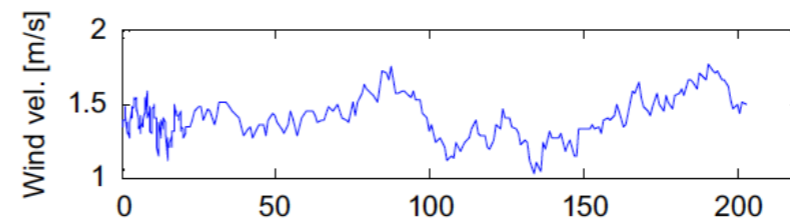
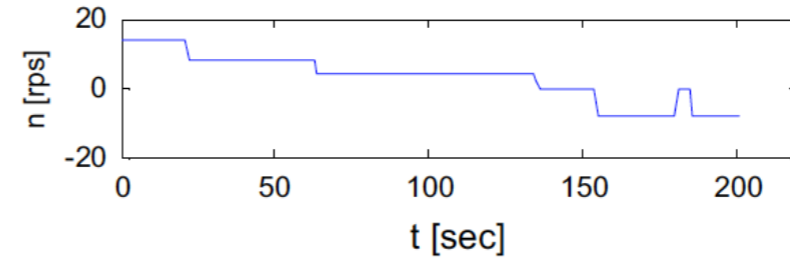
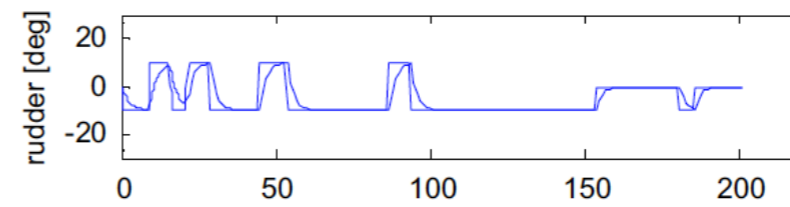
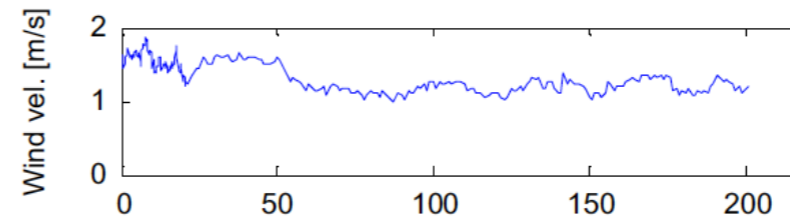
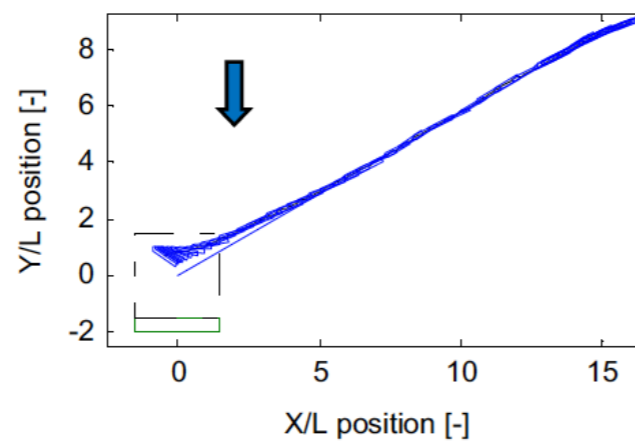
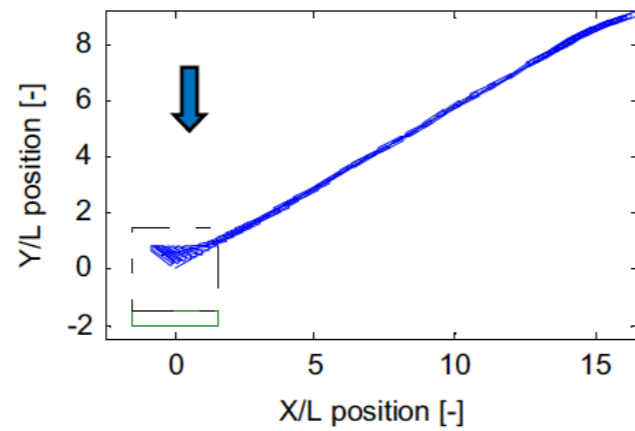
# AIS Simulator, 2006

K. Hata, K. Hasegawa et al.: AIS Simulator and ITS Applications, Proc. 48th International Symposium ELMAR-2006, pp.223-226, Zadar, Croatia, Jun. 2006.

Combining Marine Traffic Simulation System and AIS slot reserving system

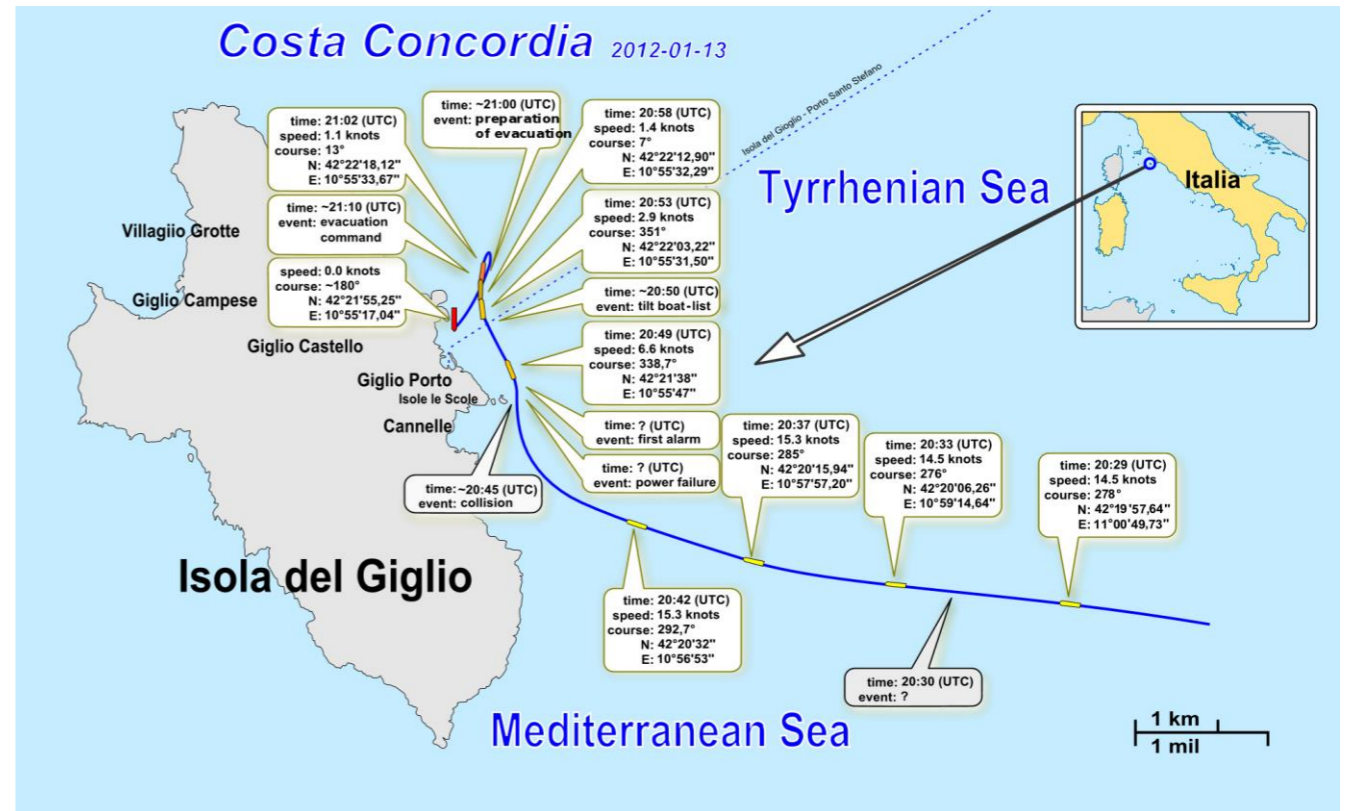
# Automatic Berthing

ANN-PD controller in different gust wind

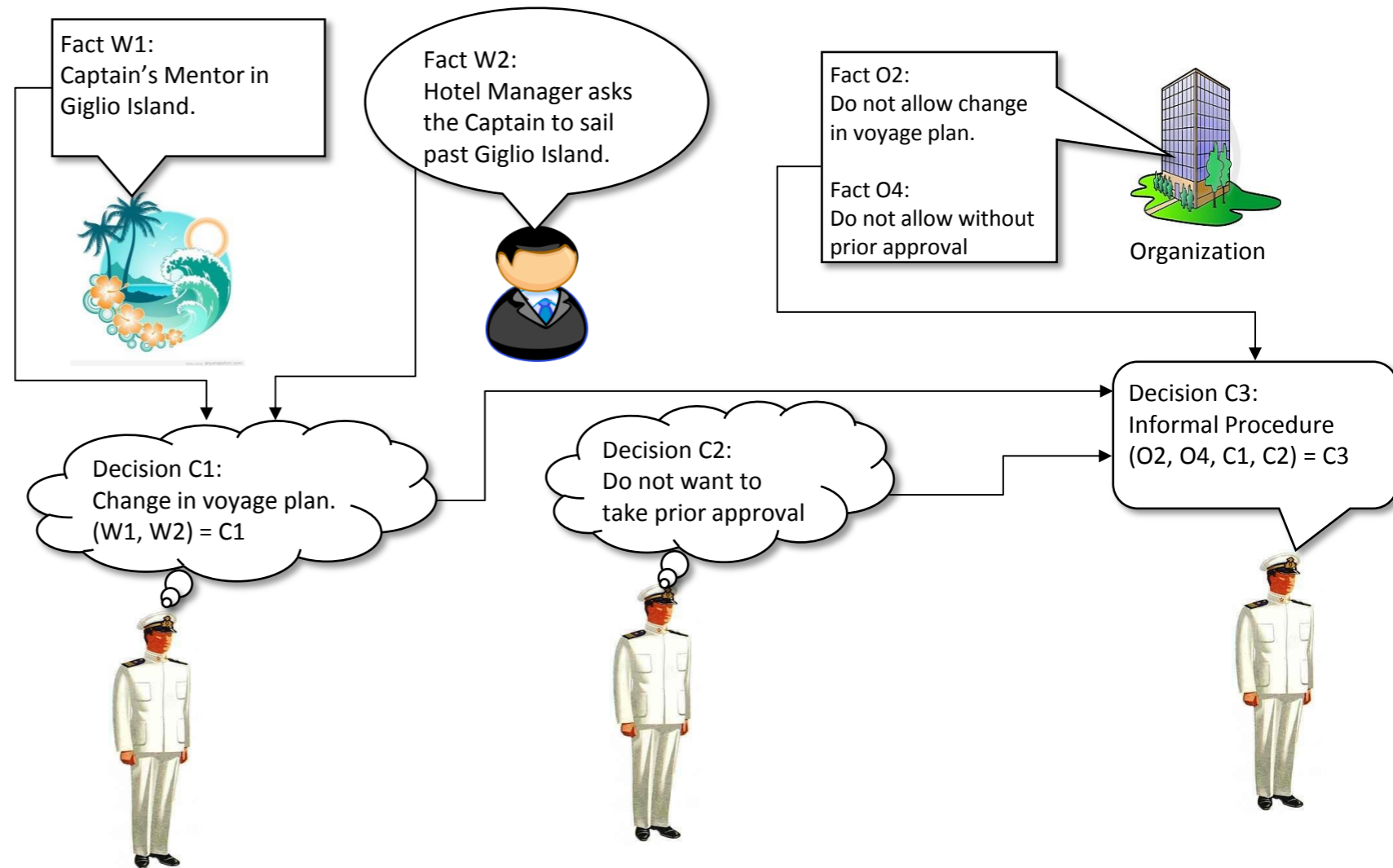




# Ship Casualties Analysis



- Human error analysis
- Logic programming tool to predict human error or succession of failures



# Motivation

- Should we go for numerical simulation or simulator study based on captive model experiments or free-running experiments?
- How should we model the human behaviours?
- Is Computational Fluid Dynamics (CFD) replaceable tool for?
- Can probabilistic risk assessment predict an accident which may occur tomorrow for a specified ship or a person?