MARIN

BETTER SHIPS, BLUE OCEANS

Cooperative Research Navies

Introduction

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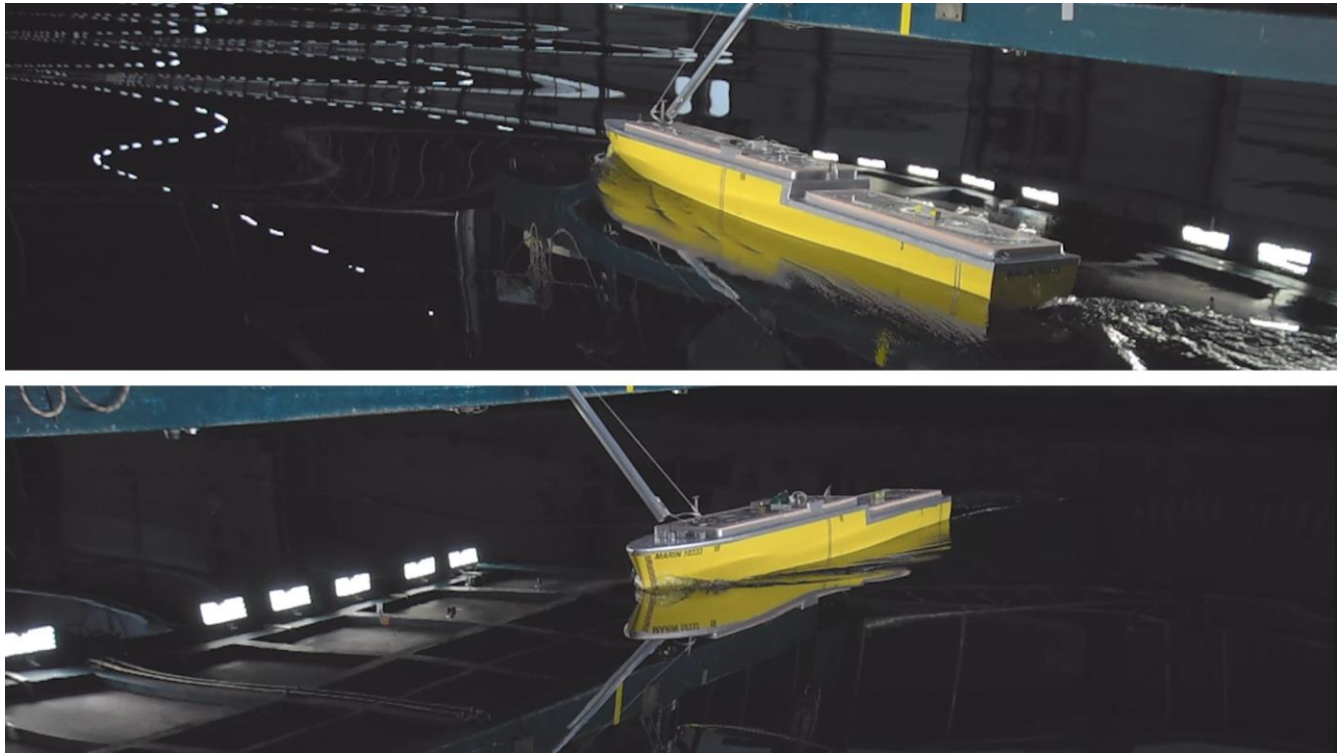
Cooperative Research Navies



Dynamic stability research

History

- Established in 1989, to:
  - Study mechanism of capsize
  - Develop guidelines for safe ship design and operation at sea
  - Including extreme conditions
  - Develop, validate, apply and maintain tools for the above purposes (e.g. FREDYN)

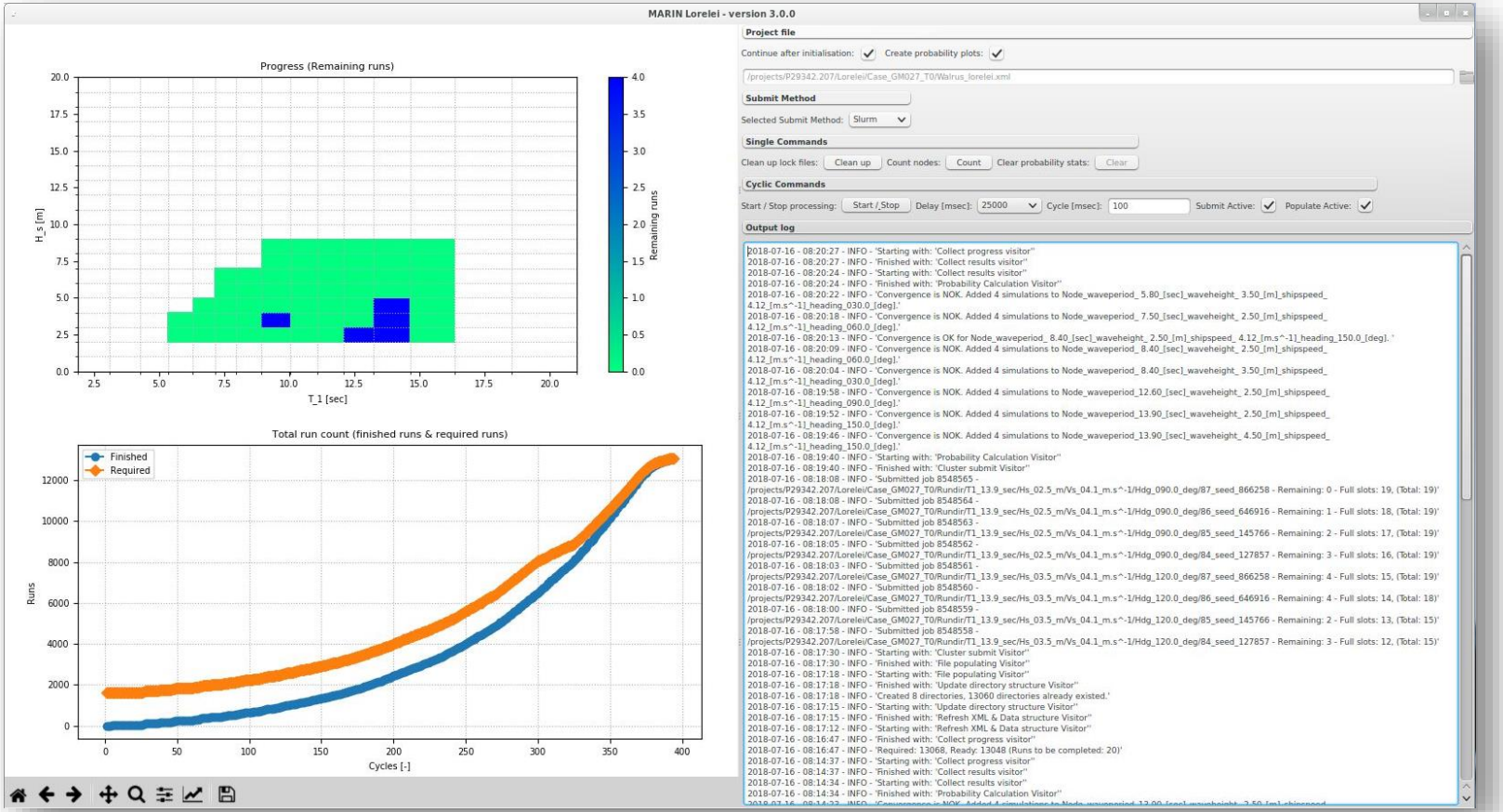
- Members:
  - Canadian Navy (DMSS, Ottawa and DRDC-Atlantic, Dartmouth)
  - French Ministry of Defence (DGA, Val de Reuil)
  - Royal Australian Navy (DST, Melbourne and Department of Defence, Sydney)
  - Royal Netherlands Navy (DMO, Utrecht)
  - Royal UK Navy (UK MoD, Bristol and QinetiQ, Haslar)
  - U.S. Coast Guard (Engineering Logistics Center, Baltimore)
  - U.S. Navy (NSWCCD, Washington DC)
  - MARIN

- Associate members:
  - Ecole Navale (Brest, France)
  - Qinetiq (Gosport, UK)

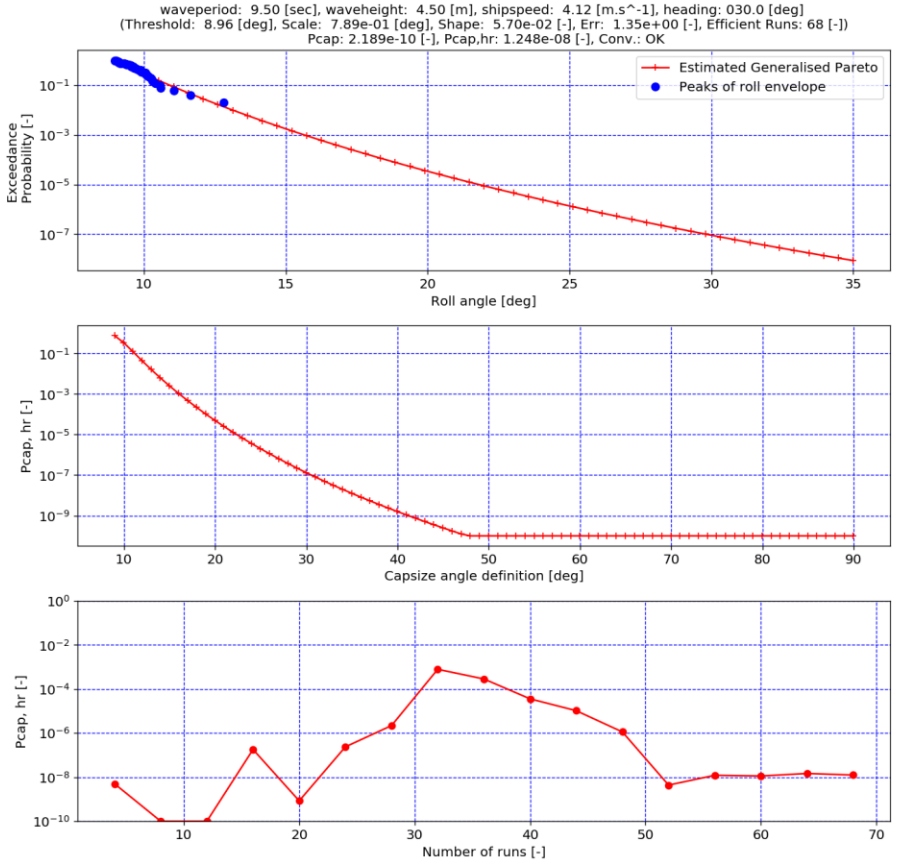
Progress

- Until Phase 9:
  - FREDYN development, transition from FORTRAN to XMF
  - Capsize methodology development
  - Intact criterion developed (‘0.38 mrad’)
  - Focus on frigates
- Phase 9/10:
  - Increased focus on other ship types
  - FREDYN development:
    - Widening applicability range (hydrodynamics)
    - Code modernization and benchmarking
- Phase 11/12:
  - ‘Small’ surface combatants
  - Damaged stability
  - Capsize methodology revisited

LORELEI: PCAP simulations



LORELEI: peak-over-threshold and GPD FIT



Large surface combatants Intact Criterion

- Results of many simulations with Lorelei
- Good correlation with area under GZ-curve until 70 degrees
- ‘Acceptable risk’ leads to 0.38 mrad