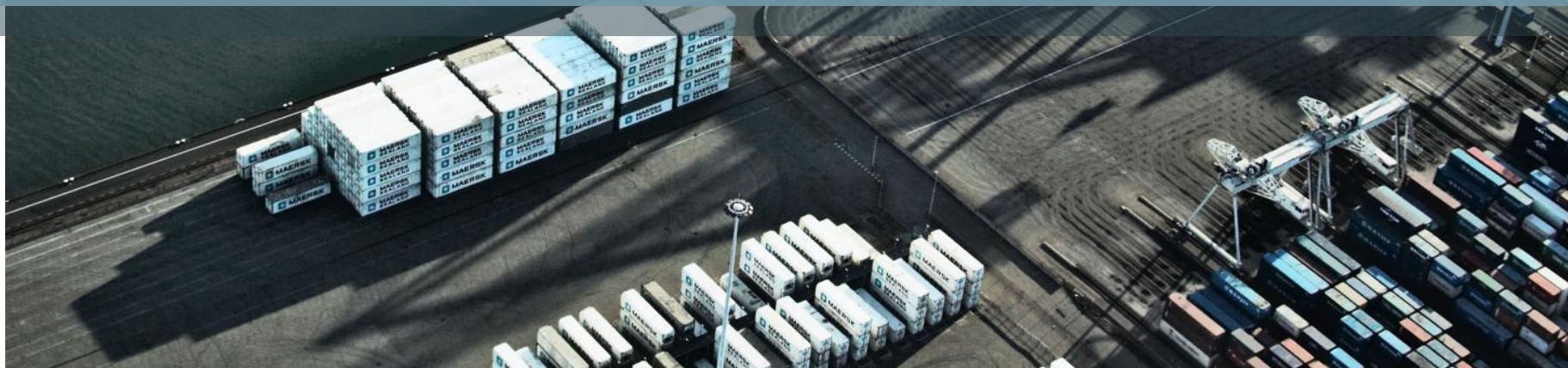


*ITTC 2014 - Copenhagen*



# Maersk Maritime Technology

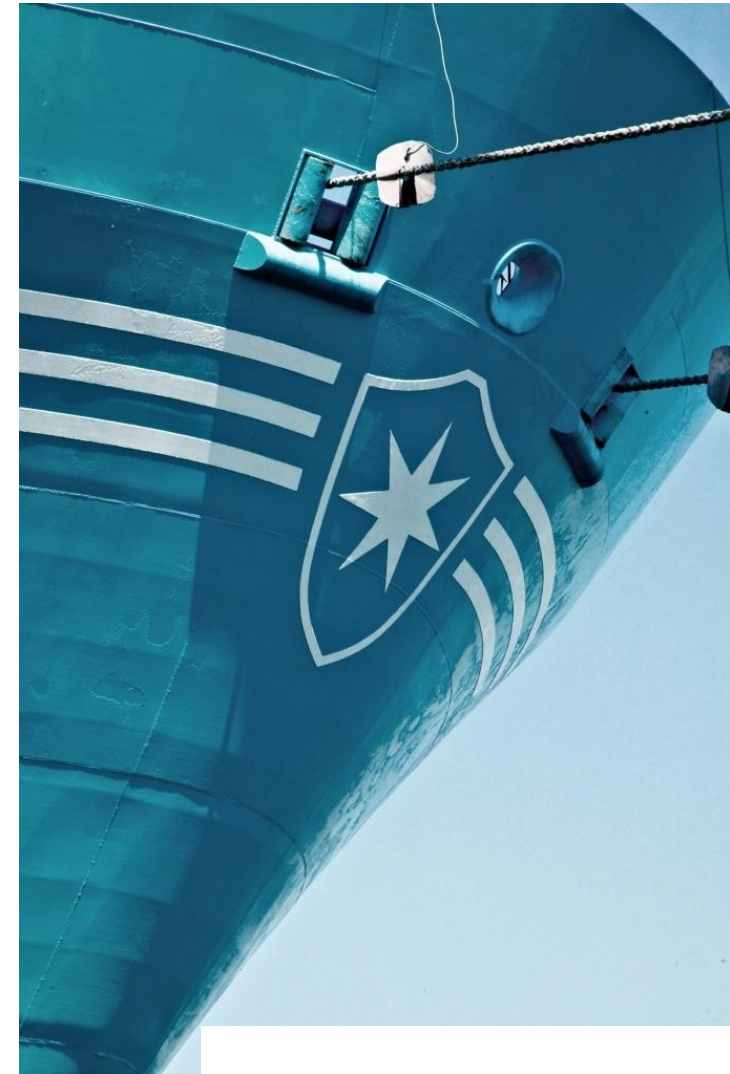
*Contributing to our partners' competitiveness through sustainable and cost effective technology solutions*



**MAERSK**  
MARITIME TECHNOLOGY

# Agenda

- Introduction
- Our requirements for model test
- Comparison of test results between towing tanks
- Scaling of a large speed range
- Accuracy of model propellers
- Q&A



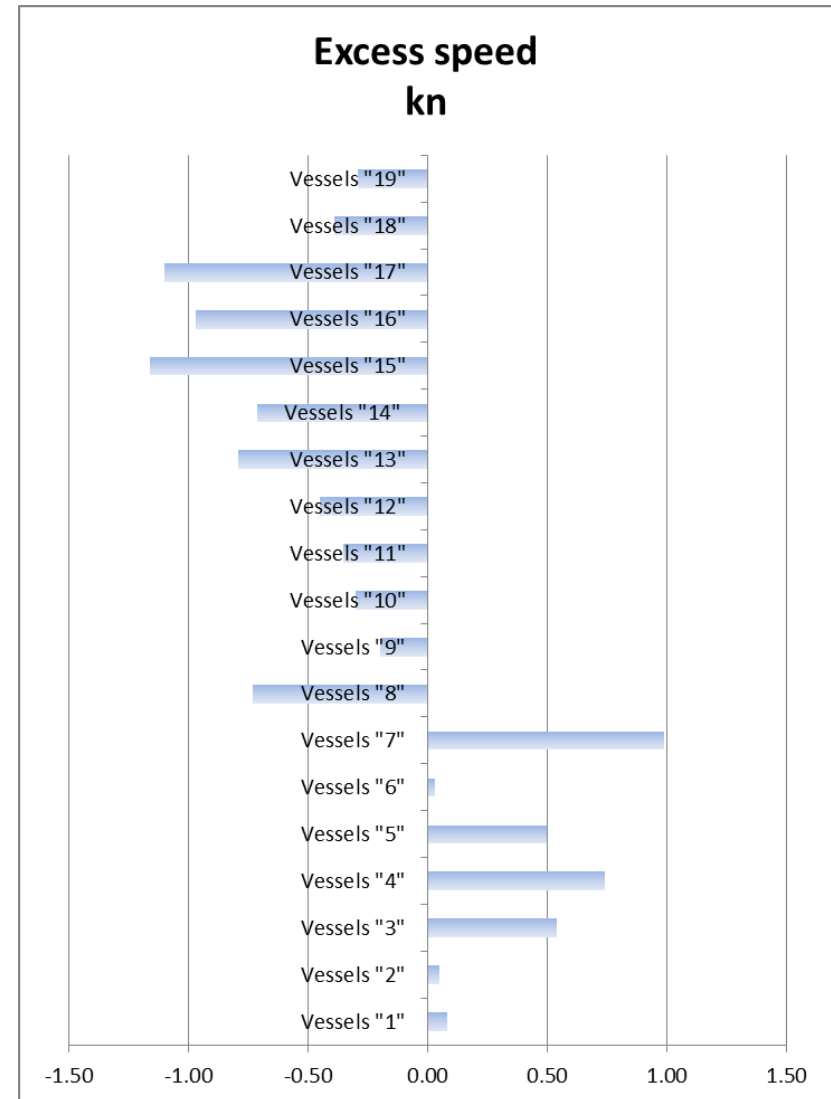
# Why model test?

- EEDI requirement
- Fuel bill > USD 5.000.000.000 per year
- Planning / budgets for new vessels
- Optimizing on existing vessels



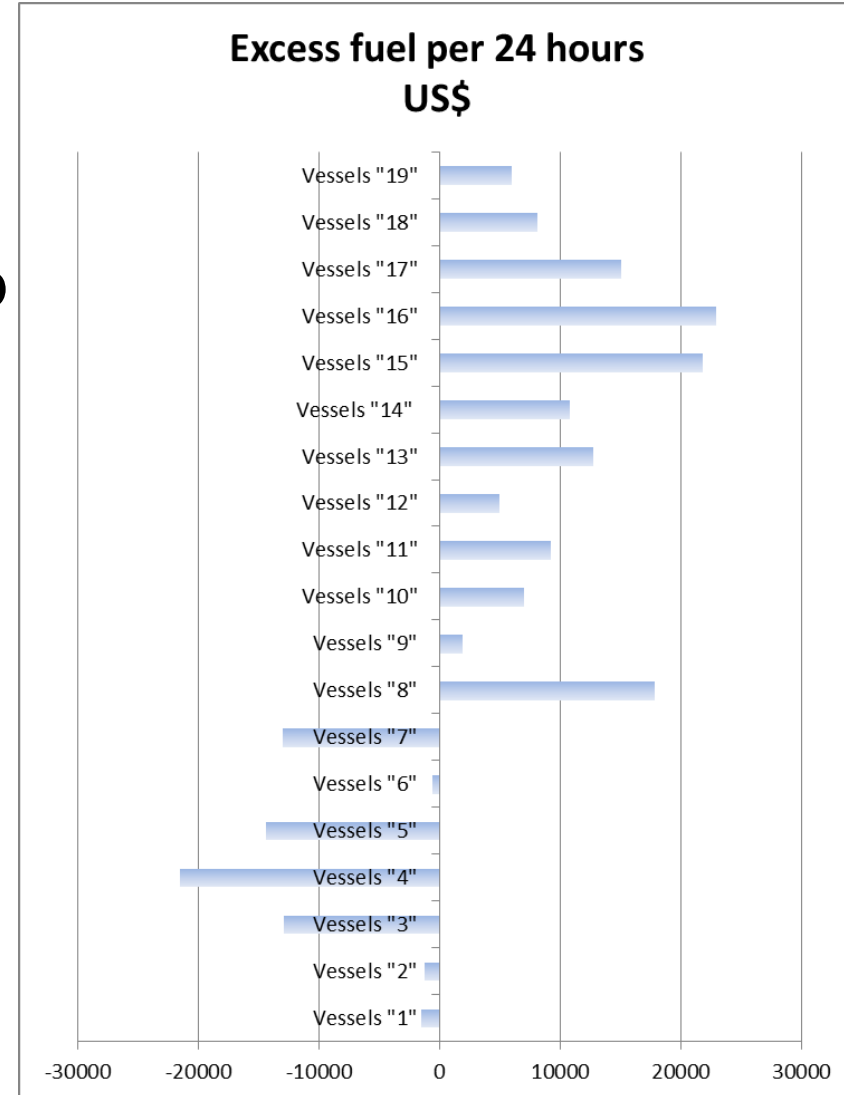
# Why model test?

- Daily extra consumption = USD 75000
- Per Year = USD 15 mill.



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# Trim Optimisation

More than 30 vessel class tested



Design speed



# Trim Optimisation

More than 30 vessel class tested



Design speed

Design speed – 4 kn



# Trim Optimisation

More than 30 vessel class tested



Design speed

Design speed – 4 kn

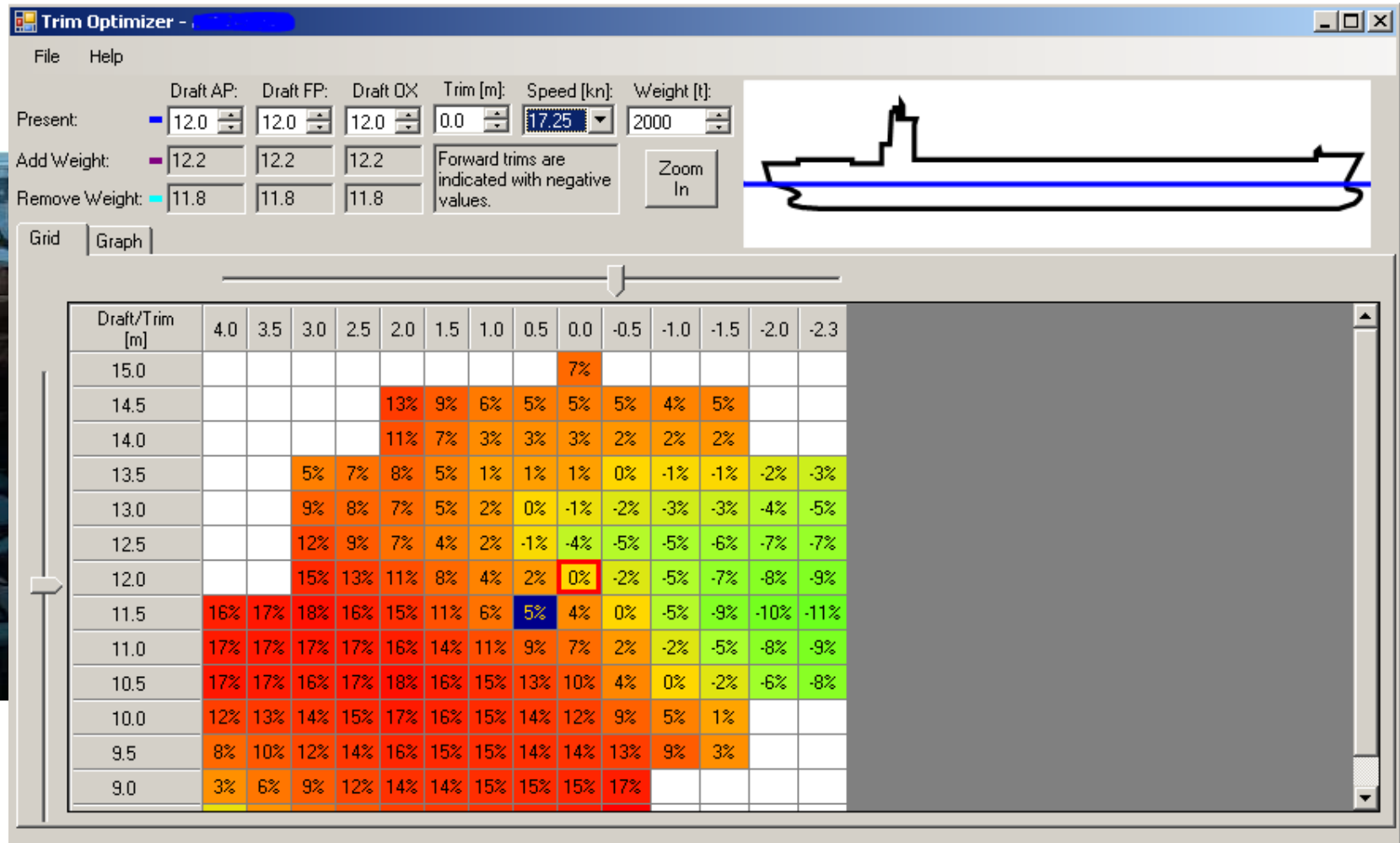
Design Speed – 8 kn





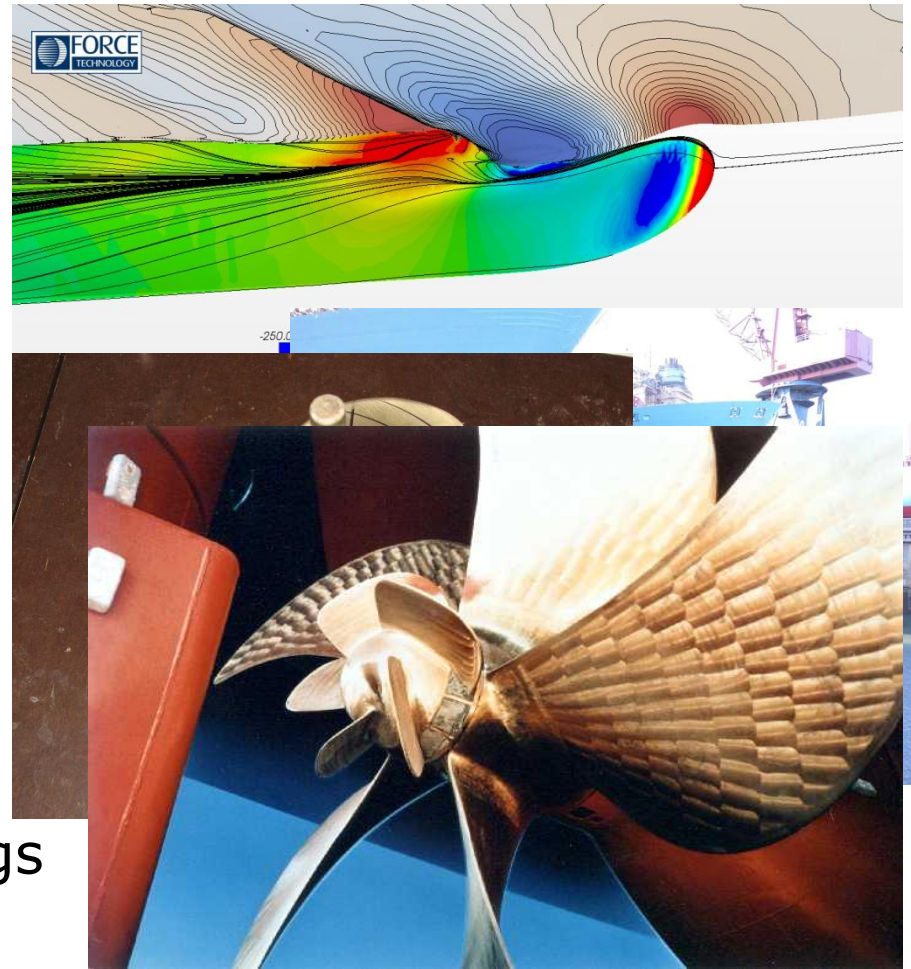
# Trim Optimisation

More than 30 vessel class tested



# Conversions of existing vessels

- Some 10 classes tested
- Bulbous bow optimization
- New propeller design
  - Less # blades
  - Less area
  - New sections
  - New type (CLT, Kappel, ?)
- Energy saving devises
- Accurate estimate of savings and ROI required

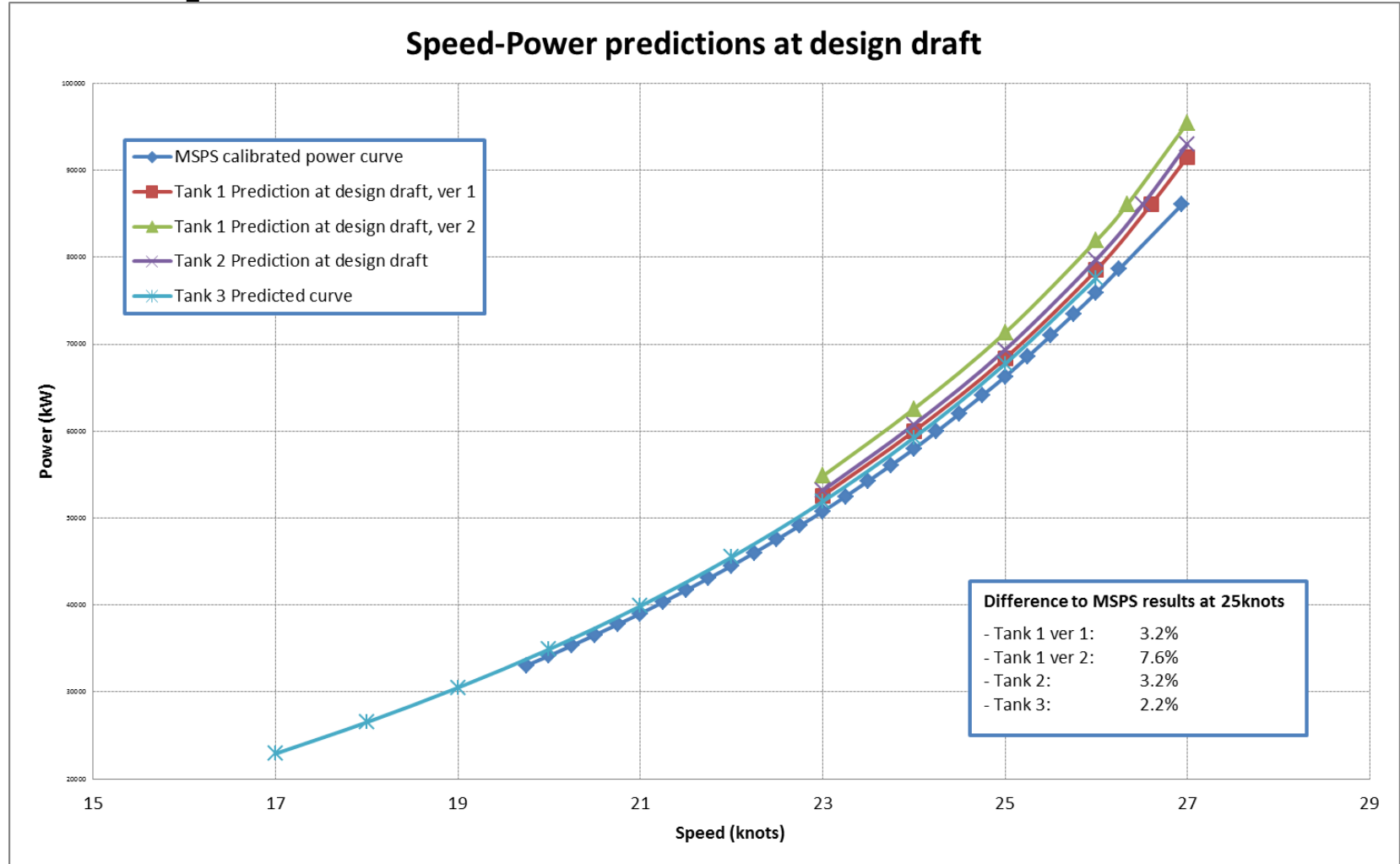


# Newbuildings

- Some 8 projects within last 5 years
- Triple E contract included hydrodynamic optimization
  - # of propellers / Hull type
  - Hull line optimization
  - Rudder + Headbox optimization
  - Propeller optimization
- Some 15% saved

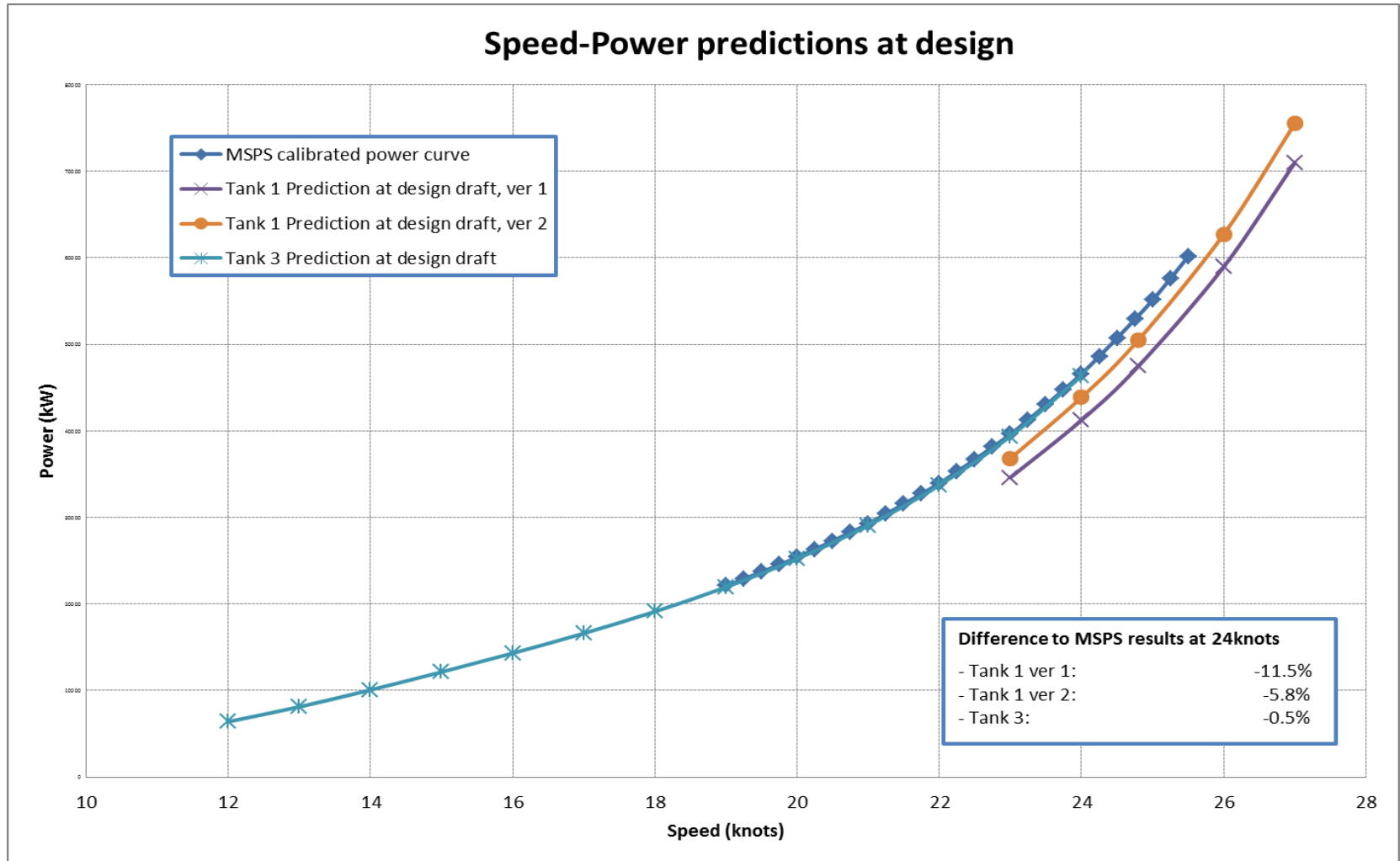


# Comparison of tank results

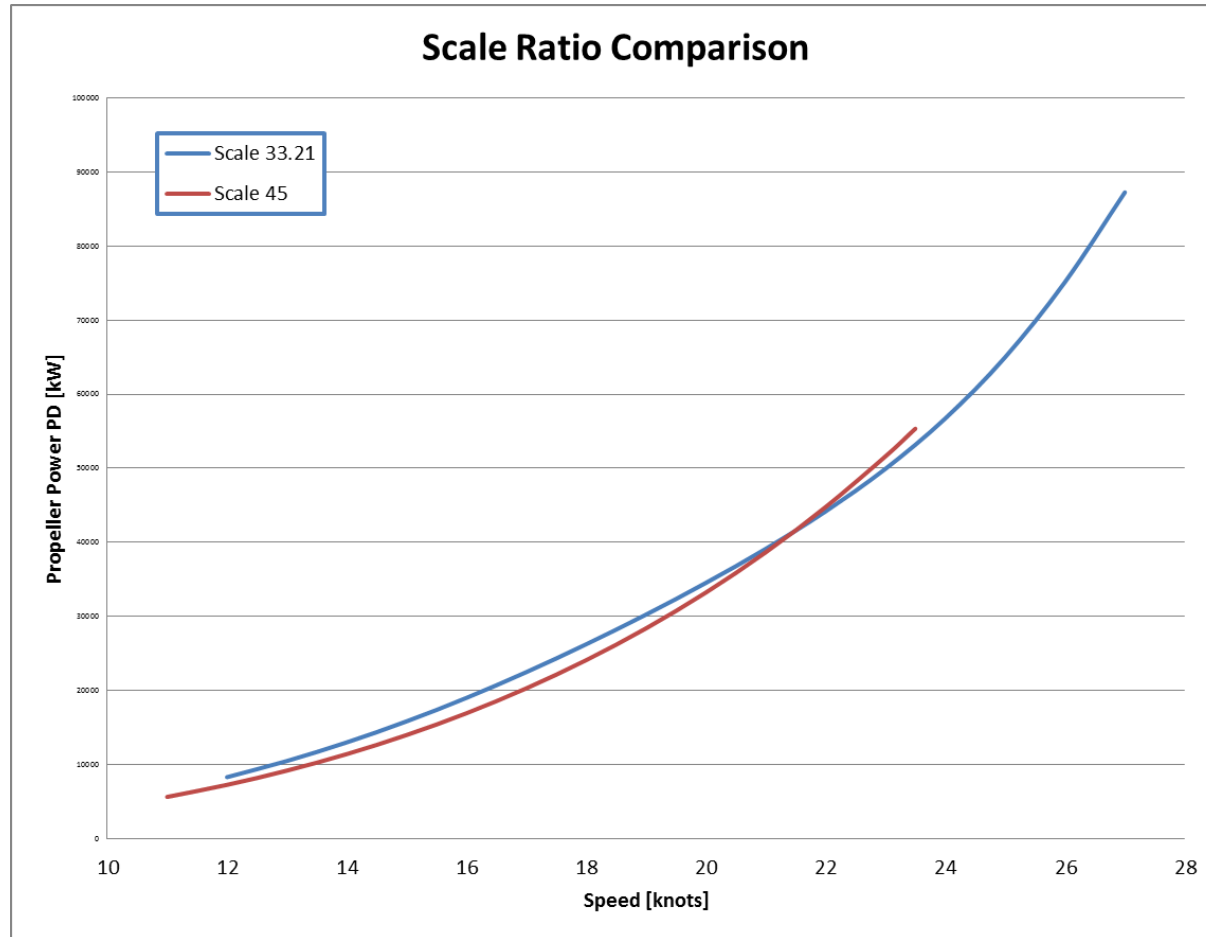




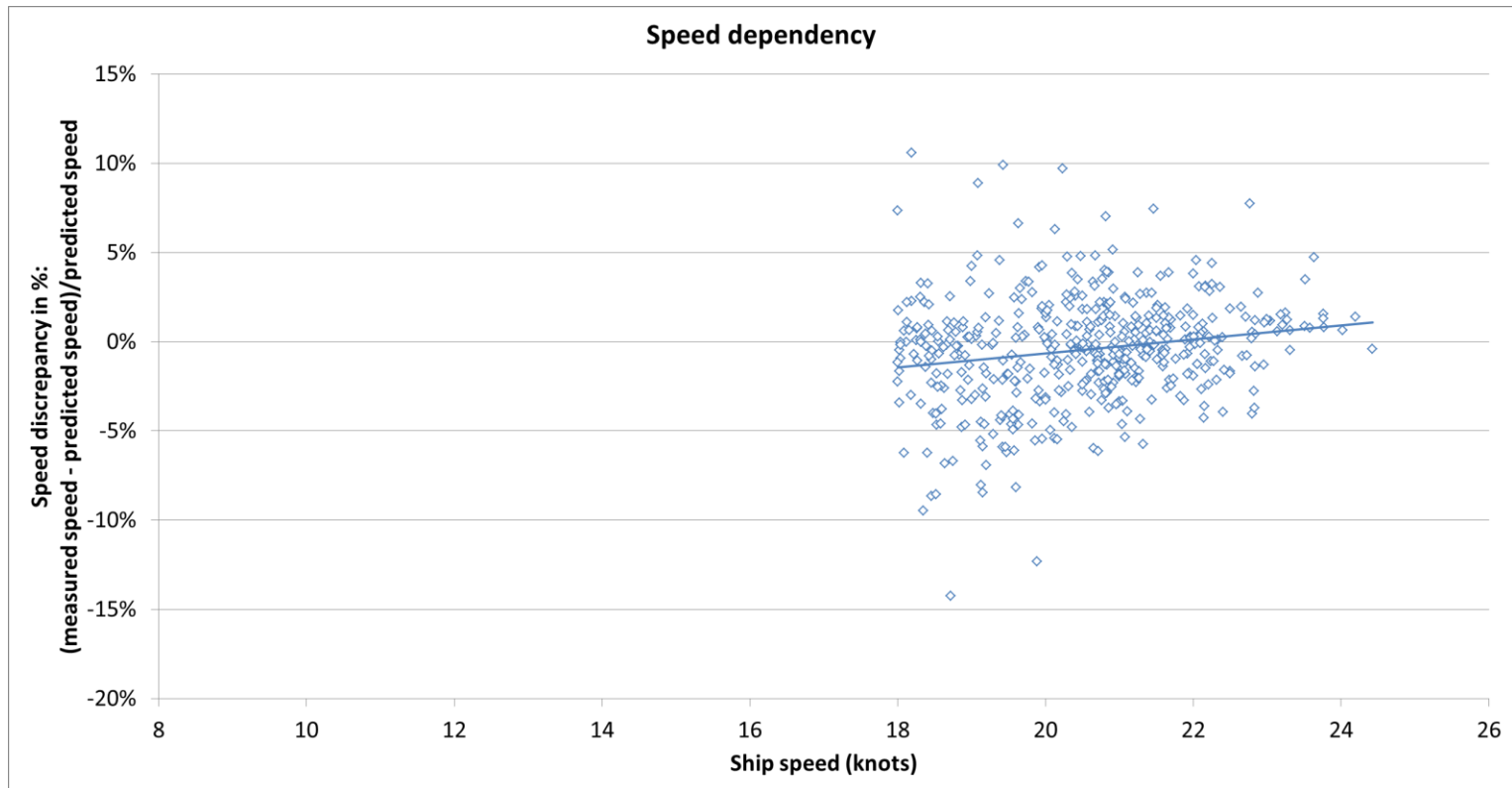
# Comparison of tank results



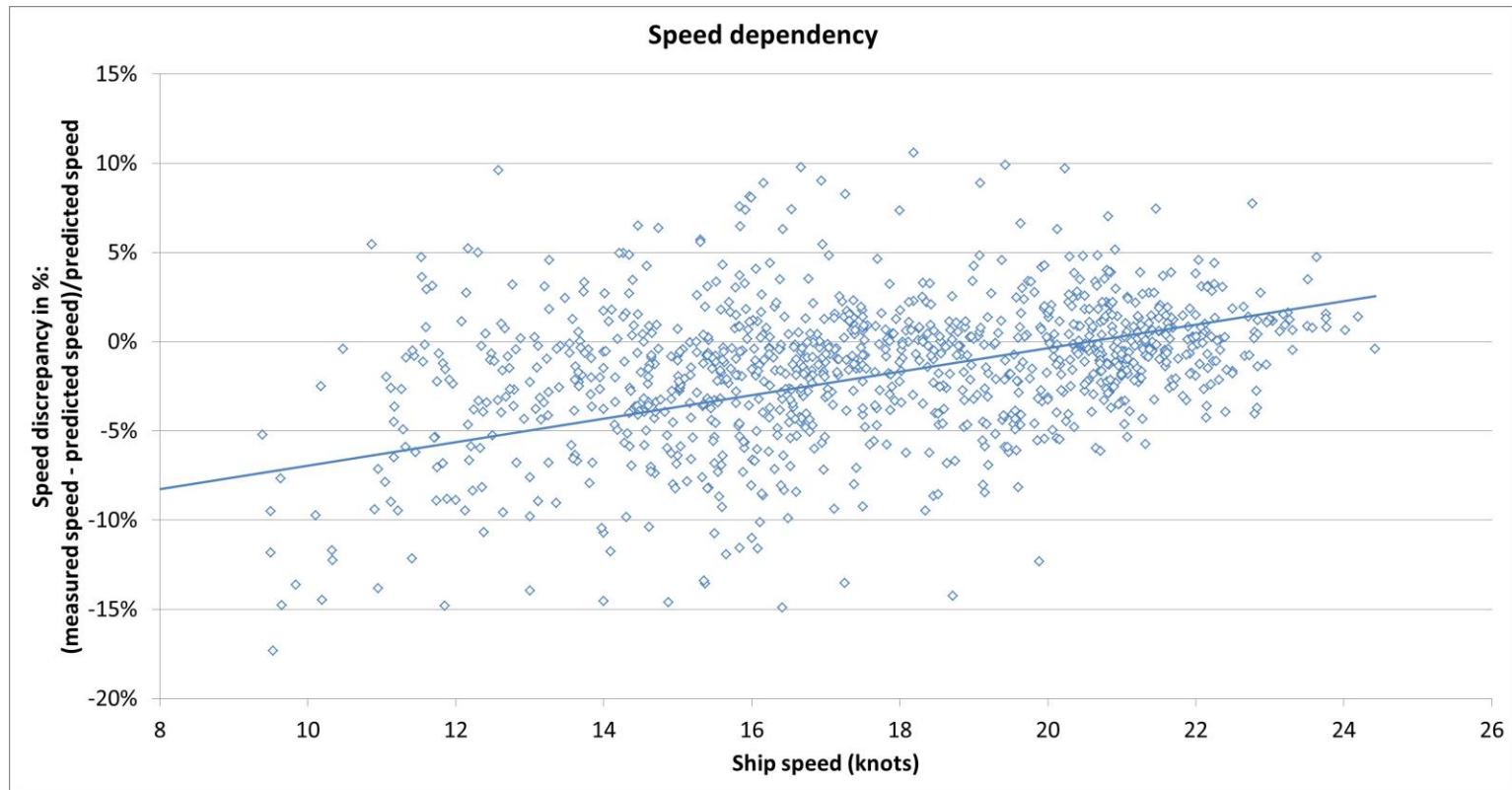
# Model scale influence



# Scaling of Large Speed Range



# Scaling of Large Speed Range

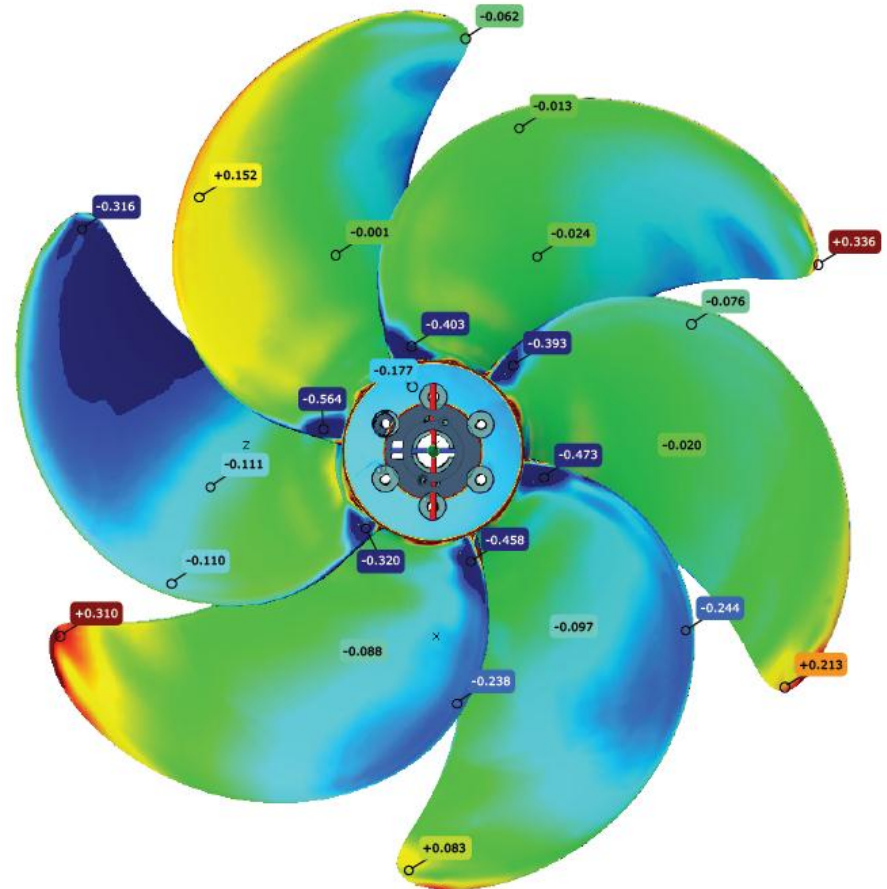
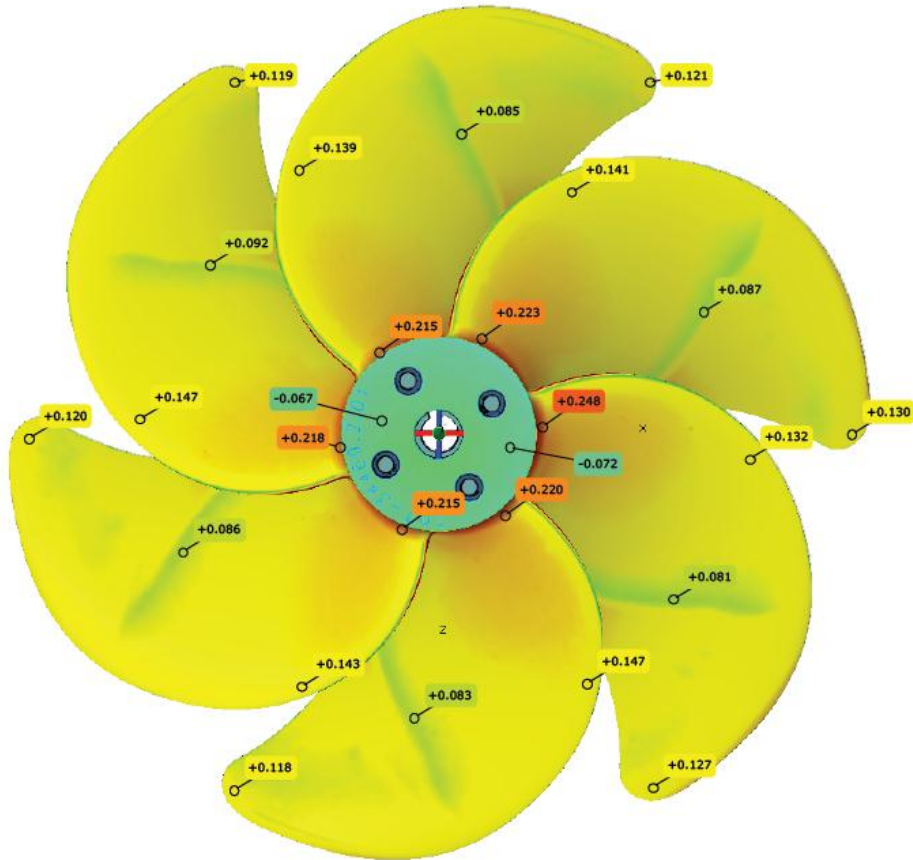




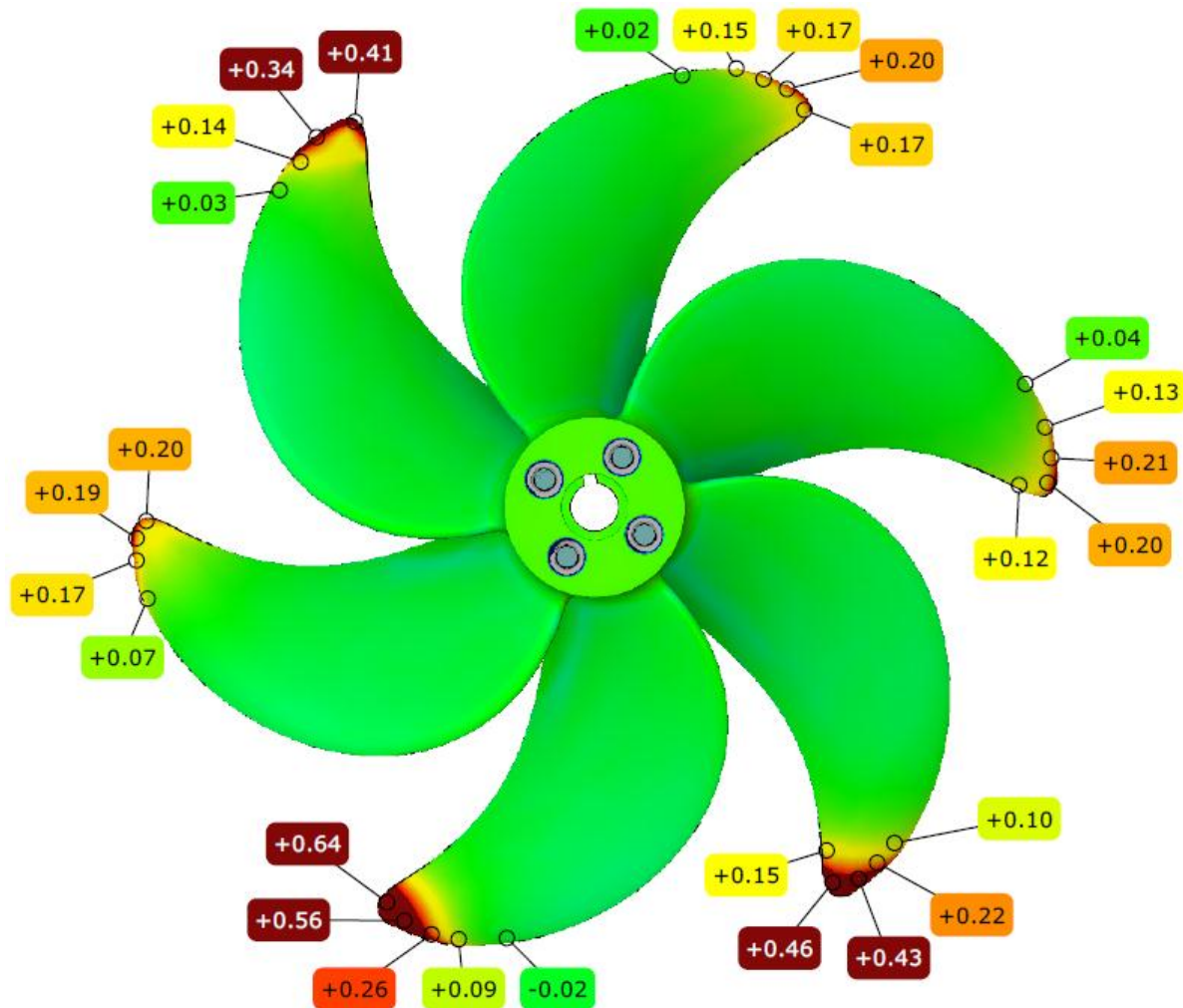
# Accuracy of propeller models



# Accuracy of propeller models



# Accuracy of propeller models



# Summary - Our hopes

- Better alignment of results from all towing tanks
- Recommendations for model size
- Improved scaling for low speed
- Influence of model accuracy
  - Study
  - Recommendations

