gastops

SERVICE OVERVIEW

DIGITAL SHIP SOLUTIONS

Reduce costs and risk by evaluating your propulsion system design in a virtual environment…the Gastops Digital Twin.

Gastops Propulsion System Integration and Simulation Services

Gastops has been an industry leader in Propulsion System Dynamic Analysis (PSDA) for over twenty years, pre-dating the dawn of 'Digital Twin' as a provider of specialized propulsion system integration services to system integrators, shipyards and marine control system companies around the world.

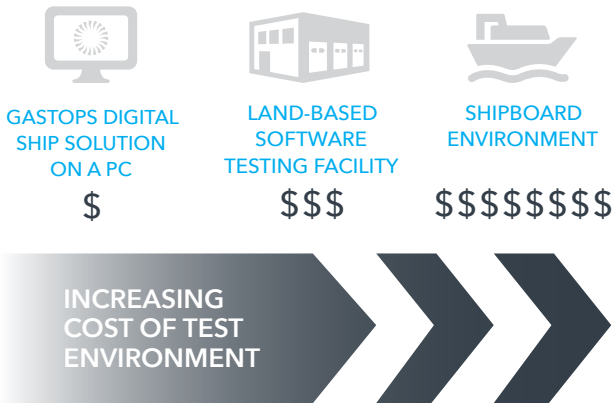
The core of our integration services uses dynamic simulations of marine propulsion plants as a basis to develop and evaluate appropriate control strategies for complex marine propulsion systems as well as to assess a propulsion plant's dynamic response over its entire operating range. The PSDA provides ship designers with the information required to evaluate ship performance and make advanced design decisions.

Following the design stage, the PSDA can then be used in a synthetic training environment to virtually operate the ship with real world response.

Gastops is a Trusted Partner for Simulation and Propulsion System Integration

Gastops has longstanding working relationships with:

- Royal Canadian Navy
- Canadian Coast Guard
- United States Navy
- United States Coast Guard
- Systems integrators, shipyards, vessel operators, and marine control system companies around the world



Gastops offers unparalleled domain knowledge and experience.

Sail the Ship Before it's Built

Reduce costs and risk by evaluating your propulsion system design in a virtual environment, throughout a modernization or new build design cycle.

Gastops uses state-of-the-art dynamic simulations to:

- Develop and validate propulsion control algorithms
- Independently evaluate performance of selected propulsion machinery
- Support the marine propulsion system design process
- Provide increased understanding of design

Gastops Simulation Expertise

Gastops simulation expertise includes the following types of propulsion systems:

- Combined Diesel or Gas (CODOG)
- Combined Gas or Gas (COGOG)
- Combined Gas and Gas (COGAG)
- Combined Diesel and Diesel (CODAD)
- Electric

Validate Early with Virtual Sea Trials

- De-risk your program by finding complex integration issues early
- Analyze system robustness with no danger to physical equipment
- Study fuel efficiency, low loading, stopping distance, and system performance in ice and high seas
- Optimize control system settings to improve system performance

Get the Full Picture Before You Build

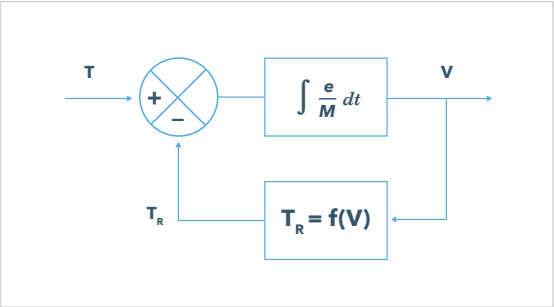
Our analysis combines control algorithms with propulsion and electric plant models including hull, diesel engines, propellers, shafting, gearboxes, motors, generators, gas turbines, and selected auxiliaries giving you the full experience of the ship's performance.

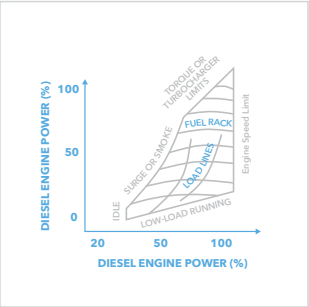
In-service Suppport and Ship Upgrade Programs

- Reuse the validated ship models throughout the ship's lifecycle to improve knowledge of platform performance
- Review "what if" scenarios throughout the ship's lifecycle
- Leverage existing models for high fidelity training systems
- Recreate and troubleshoot performance issues that are reported by operators
- Conduct tests and optimize performance in a virtual environment
- Adjust algorithms and control set points before implementing on the vessel

Predictive. Preventive. Proactive.

GASTOPS COMPONENT LIBRARY

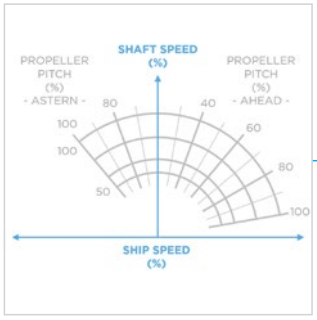




MANUFACTURERS

Individually validated propulsion machinery component models

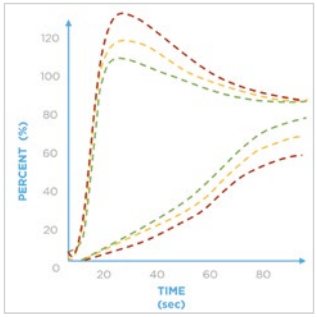
PROPULSION MACHINERY CONTROL ALGORITHMS



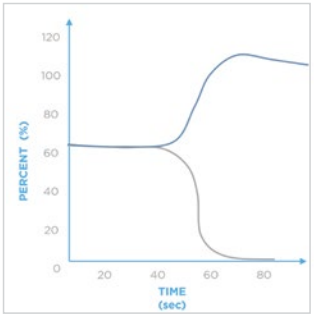
STEADY STATE OPERATING ENVELOPES

SHIP DESIGN/ MODERNIZATION

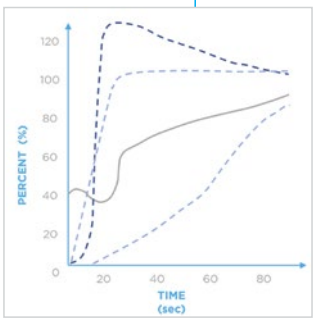
DYNAMIC ANALYSIS



PARAMETRICS



FAULT SCENARIOS



DYNAMIC PERFORMANCE

Worldwide Experience. Trusted. Proven.

Gastops has provided its propulsion system integration and simulation services on ship programs worldwide, including:

- CCG Offshore Oceanographic Science Vessel
- USCG Great Lakes Icebreaker
- US Navy LHD 8
- USCG Deepwater National Security Cutter
- University of Alaska Research Vessel
- Canadian Coast Guard Polar 8 Icebreaker
- German Navy F-124 Frigate
- USN Smart Ship – COGAG
- Korean Minehunter – CODAD
- Canadian MCDV – Electric Drive
- Singapore LPD – Diesel
- Royal Navy Type 22 – COGAG
- RNLN LCF – CODOG
- US Navy MHC-51 Minehunters
- Canadian Patrol Frigate
- Canadian Navy Tribal Class Update and Modernization Program
- USCG Offshore Patrol Cutter Program
- Oregon State University Regional Class Research Vessel (RCRV)
- USCG Polar Star – Electric Drive

USS Makin Island

- Modelled the ship's main systems, developed and verified control algorithms
- Created a system for real-time hardware-in-the-loop (HIL) testing of the machinery control system, generated code for onboard training
- Performed simulations to evaluate system response to various faults including short circuits and generator failures
- Cut time-to-simulation by two-thirds, identified key design issues early

Royal Canadian Navy Halifax Class Frigate

- Configured a model of the Halifax Patrol Frigate and validated against real results
- Designed and validated novel Gas Turbine propulsion algorithms to improve low speed acceleration as well as eliminate shaft speed and torque exceedances
- Implemented these algorithms in a land-based test facility at Gastops leading to the successful trial onboard the ship

CCGS Louis S. St. Laurent

- Assisted in a refit program when vessel was fitted with new propellers
- Modeled impact on system performance and control system
- Investigated steady state and transient state maneuvers, including ice ridge ramming and propeller ice milling
- Data from simulation agreed well with observed results and indicated that CCG requirements were met or exceeded

USCG Offshore Patrol Cutter Program

- Completed the dynamic response analysis to compare expected system performance to contract requirements in accordance with ABS Naval Vessel Rules
- Developed and validated the propulsion system control algorithm design for implementation by the control system vendor
- Completed studies of the system design to increase understanding of the platform in adverse conditions
- Leveraged existing models to create a real time hardware-in-the-loop Simulator Stimulator system for the Electric Plant Control System Vendor

About Gastops

Gastops is the world's leading provider of intelligent condition monitoring solutions used in Aerospace, Defence, Energy, and Industrial applications to optimize the availability, performance, and safety of critical assets. We offer peace of mind to our customers with innovative online monitoring sensors, at-line analysis, complex modeling and simulation, world-class laboratory testing, engineering, design, and MRO services that predict performance to enable proactive operating decisions. Gastops has been providing powerful insights into the condition of critical equipment since 1979.

gastops

Head Office
1011 Polytek Street
Ottawa, ON K1J 9J3
Canada

Nova Scotia
10-109 Williams Ave.
Dartmouth, NS B3B 2E3
Canada

Newfoundland
146A Glencoe Dr.
Mount Pearl, NL A1N 4S9
Canada

Europe
Info.eu@gastops.com

Asia
Info.ch@gastops.com

gastops.com
sales@gastops.com | +1 613 744 3530