

The FRIENDSHIP-Framework

Engineering software for simulation-driven design

The challenge of efficient design

High competitiveness, excellent products, winning orders – for both shipyards and designers it is crucial to offer suitable solutions to sustain in the market. Ships and components with higher energy efficiency, less fuel consumption and stronger robustness are no doubt a winning argument. However, developing better products will increase competitiveness only when the invested resources are managed thoughtfully: You need to cover all this on the basis of the existent resources, i.e. your design team and the software in place. Key challenge is to make more of existing investment, e.g. in CFD, and expertise, e.g. in-house developments, while improving resource output.

Software solutions from GL

Using the *FRIENDSHIP-Framework* is your effective design strategy for better ships and components and faster design processes.

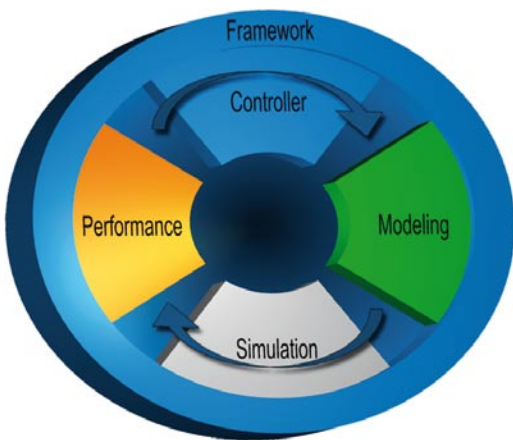
As the world's most advanced software for the simulation-driven design of functional surfaces, in particular hull forms, propellers and appendages, it allows designers to model, vary and select a real optimal design from numerous alternatives. The software's approach turns the traditional design process around: Instead of merely setting up a geometry and then checking its performance it uses integrated simulation to determine optimal shapes. The designer defines desired performance and quality and then utilizes computer power to generate options – and simulation becomes the driver of the geometry development. This speeds up the design process significantly. It guarantees, together with

practical solutions for data handling and processing, an optimal resource management and allows for more designs from the same resource invest. Optimized products achieve massive savings in fuel expenses for the operator on the one side and empower the designer to higher competitiveness and a stronger market position on the other side.

The *FRIENDSHIP-Framework* is a versatile and intuitive easy-to-use software for designers:

- **Software:** It facilitates both design and optimization from imported geometry, e.g. iges or offset files from an existing ship, and geometry development from scratch. Platform-independent (Windows, Linux), it fully supports systematic and comprehensive data collection, visualization and assessment of the design's quality.
- **Modeling:** Sophisticated parametric modeling (parametrics) with unique mathematics (FSpline, MetaSurface) support smart surface design and reduce model complexity remarkably.
- **Variation:** Integrated solutions for the management of objectives and constraints facilitate the generation and assessment of hundreds of design variants in overnight studies. Visualization and evaluation methods support the selection of the best design variant.
- **Optimization:** Single and multi objective optimization strategies lead to excellent product properties.

- **Integration:** Various coupling modes help integrate external codes and simulation programs like CFD (e.g. SHIPFLOW, STAR-CD, STAR-CCM+, ANSYS CFX, FLUENT, FINE/Marine). Investment made in software, in-house developments and personnel is enhanced and achieves higher return.
- **Pilots:** FRIENDSHIP SYSTEMS offers a pilot optimization at the customer's site to ensure smooth software implementation.
- **Know-how:** Expert training provides first-hand insight and conveys best practice knowledge not only for the effective use of the software, but also for your special knowledge in cutting-edge design technology.
- **Support:** Constant upgrades with new features and continued support enforce your position at the forefront of technological evolution and ensure a beneficial software use.



Holistic process: integrated simulation drives design development

GL your best partner

GL Maritime Software is the software provider and system integrator for the maritime industry. GL Group member FRIENDSHIP SYSTEMS develops and distributes the *FRIENDSHIP-Framework*, which enables designers worldwide to develop efficient functional products for maritime systems and turbomachinery. Based on longstanding design expertise and more than five years development advantage made in Germany, the company offers leading software solutions, implementation and integration services, training and extensive

support for your boosted competitiveness. We are experts not only in software development and support, but also in key fields such as developing novel technology, defining and streamlining internal design processes and system integration. As part of the GL Group with decades of experience and stability we offer you the highest investment security in the industry.

How you benefit

The *FRIENDSHIP-Framework* is a key enabler for design teams in shipyards, design offices, turbomachinery and component manufacturers to improve their competitiveness:

- Streamlined modeling (CAD) and simulation (CFD) at all design stages
- Faster processes, better results, high savings in resources (time, cost, manpower)
- Improved design quality: better hydro and aerodynamics, increased energy efficiency (typically 5 % for ship hulls), better seakeeping, higher robustness, lowered maintenance costs
- Reduced development time: more designs and deeper insight with existing capacity from a very early stage
- Lower costs and less time spent in model testing
- Reduced risk of expensive late changes

The *FRIENDSHIP-Framework* is made from designers for designers, maximizing usability and fit-for-purpose for the engineer:

- One environment for all product development phases for functional surfaces
- Easy integration of external tools based on a variety of coupling methods ranging from MS Excel to the most advanced viscous flow solver
- Consolidated design cycle with reduced ballast workload: compare and assess 100s of design variants in just one day
- Feature technology for safeguarding excellent designs and reduced workload in repetitive tasks

One-stop shopping at GL

The *FRIENDSHIP-Framework* is integrated in the GL product and services portfolio.

Software: A portfolio of state-of-the-art CAE tools such as GL ShipLoad, GL ShipModel, POSEIDON, Aeneas

Training: Simulation-driven design seminar, wide range of ship technology seminars, fuel efficiency seminars



Consulting: Innovative design concepts, advanced engineering, fuel efficiency consulting, streamlining of internal design processes

Classification: First-class comprehensive information, support and certification services to ensure smooth classification processes.

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