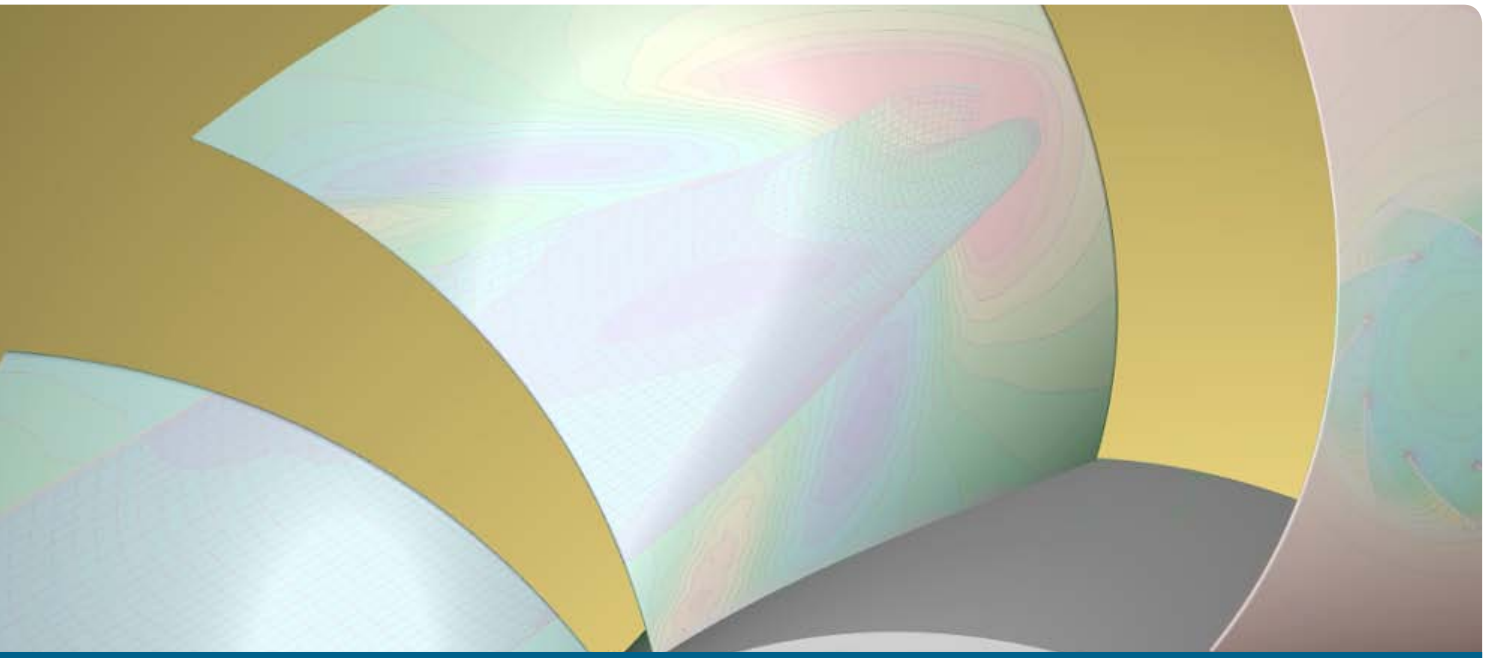
FRIENDSHIP SYSTEMS



FRIENDSHIP-Framework

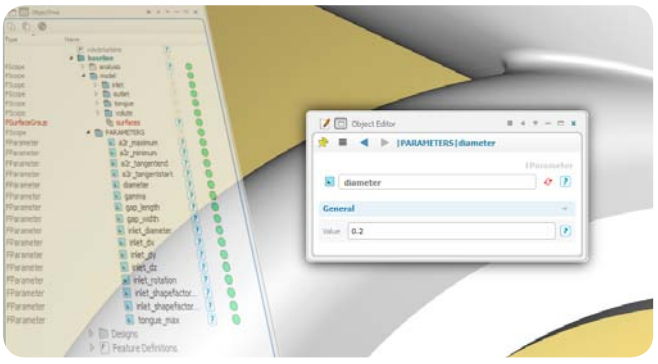
Design studies and shape optimization

The challenge of efficient design

Are you using CFD (Computational Fluid Dynamics) for your product design? Are you coping with minimization of pressure losses, wave or wind resistances? And, do you think that more automation of the design process for efficient shape optimizations would be great?

The solution you need

Leading companies worldwide use the engineering software FRIENDSHIP-Framework as their platform to develop and improve products, to streamline their design process and to maintain or increase their competitiveness. High flexibility with regard to your individual design approaches is central so that it can be completely tailored to your needs!



The FRIENDSHIP-Framework can be used for parametric design and formal optimization of e.g. ship hulls and appendages, fans, blowers, propellers, compressor and turbine blades, pumps and related components, turbocharger and general engine components, volutes, complex pipes, diffusers, channels and passages.

What makes it different to other design systems?
The FRIENDSHIP-Framework distinguishes itself through

- Unique parametric modeling techniques
- Integration capability for simulation software
- Built-in mathematical optimization algorithms

Modeling

Is it also a complete CAD system? Yes! It provides everything you need for creation of outstanding geometry models that are perfectly suited for automated processes. The focus is on complex free-form surfaces with flow-related tasks and efficient generation of feasible design variants. Use the FRIENDSHIP-Framework as your sole CAD system or as a complement in your R&D department for preliminary design and formal optimization.

Integration

Any external software that is required for your design process can be tightly integrated. In particular, any meshing and CFD software for which you have gathered experience can be coupled. Change your geometry and directly run, monitor and post-process your simulation – all within the FRIENDSHIP-Framework.

Optimization

The parametric geometry and your simulation software are then readily linked to built-in variation and optimization engines. Your individual design parameters get changed and CFD analyses are launched automatically for each variant. Browse through generated designs and assess geometry as well as simulation results of your best design candidates with a single click.

How you benefit

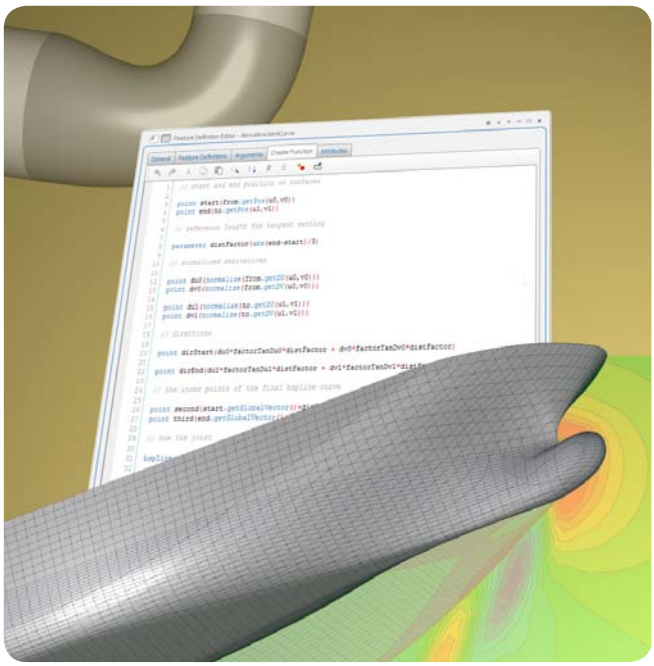
- **Better resource and workload management:** Overnight variant generation and optimization, usage of distributed computing
- **Efficient design investigation:** Smart and intuitive reduction of free variables so as to compensate expensive CFD calculations
- **Product quality:** Excellent geometries due to unique parametric techniques with focus on flow-related tasks
- **Flexibility:** Open software structure for adaption to company-specific design approaches and work flows
- **Budget control:** Lower costs and less time spent in model testing, less physical prototypes
- **Knowledge:** Systematic data collection and performance assessment of the design's quality in preliminary design, reduced risk of expensive late changes

Software-related services

Our software solutions are complemented by comprehensive implementation and support services. FRIENDSHIP SYSTEMS offers tailored on-site training and pilot projects, technical consultancy and configuration assistance. We are delighted to work with you on your own individual solution!

FRIENDSHIP SYSTEMS your best partner

Based on long-standing design expertise the company develops and distributes the FRIENDSHIP-Framework. As part of the GL Group with decades of experience and more than 6.000 specialists around the globe we offer you the highest investment security.



The FRIENDSHIP-Framework.

Software for simulation-driven design | Faster processes. Better products. Higher competitiveness.

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