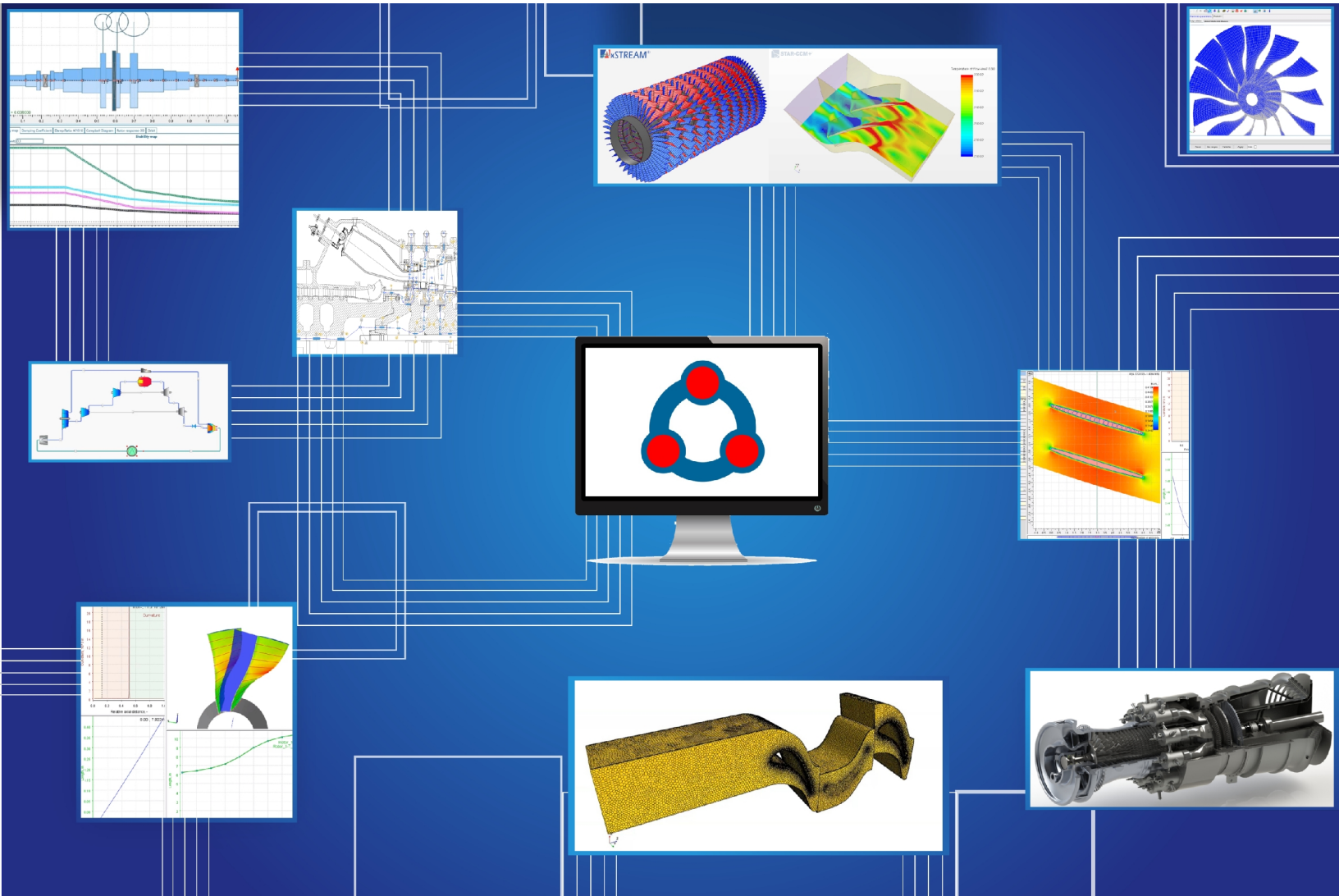
SoftInWay incorporated

Product Development through Integration, Optimization & Automation

AxSTREAM ION

Seamless Integration, Faster Results, Better Engineering



Empowering Innovation Through Optimization & Automation

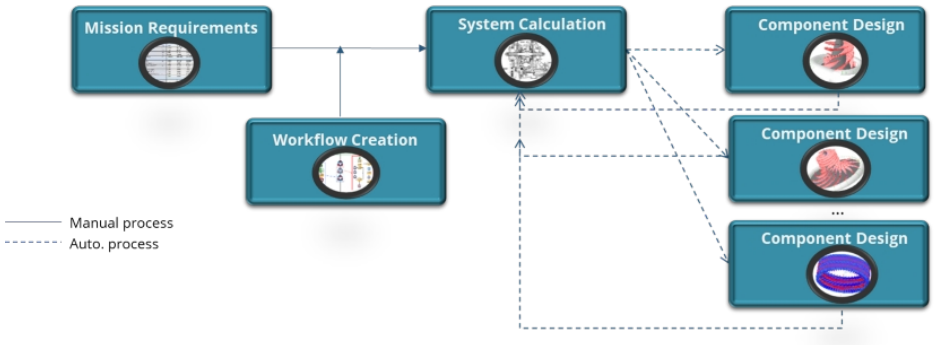
Are you getting the most out of your CAE Tools?

With AxSTREAM ION, system design and analysis is faster and more efficient compared to traditional approaches.

AxSTREAM ION can be integrated with all popular CAD and CAE software programs to facilitate complex multidisciplinary design, analysis, and optimization in a single integrated workflow.

AxSTREAM ION

AxSTREAM ION is a powerful software program that seamlessly integrates and automates the entire machinery design process. This facilitates effortless data exchange between various software programs, streamlining the design and analysis phases for both new and existing product development.



Reduce project development time through integrated workflows & parallel processing

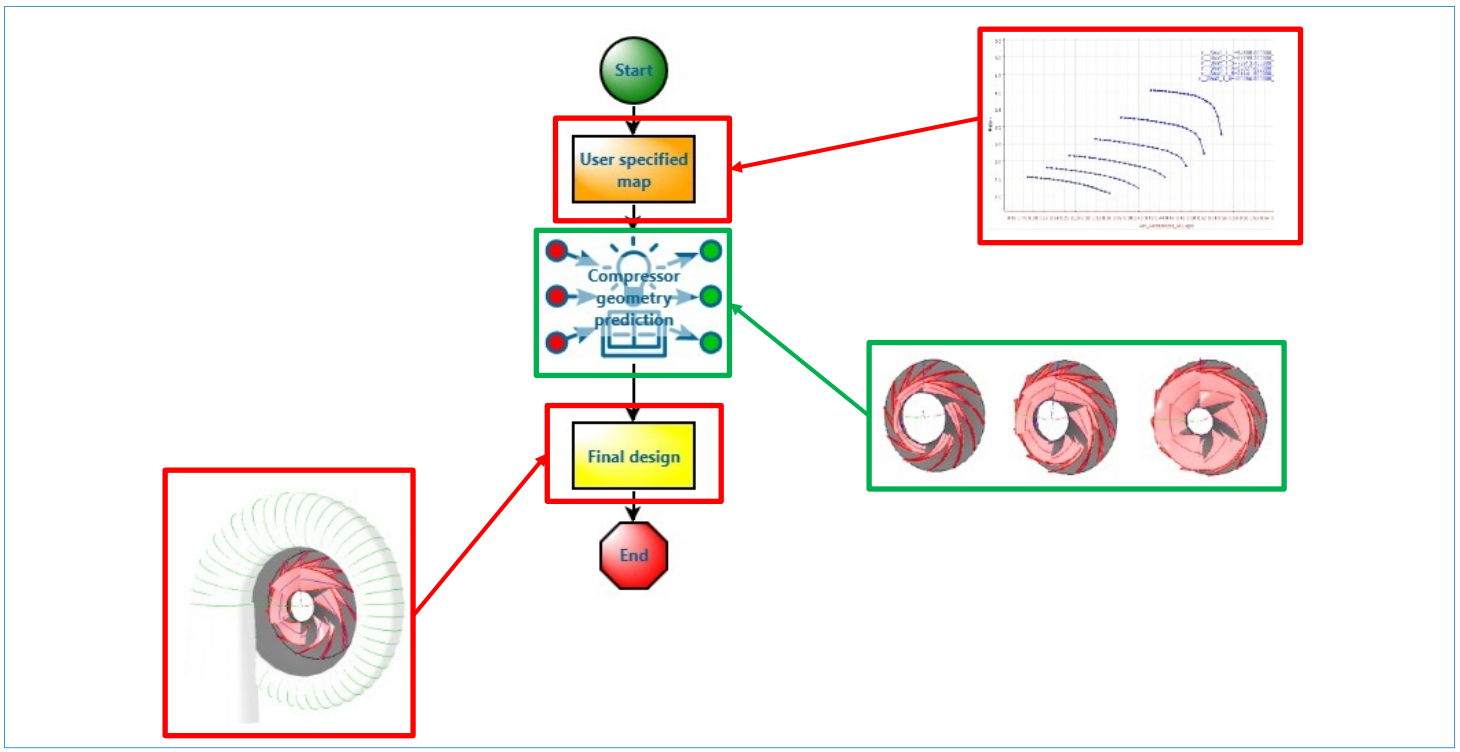
With technology's rapid development, traditional and manual design methods hinder an organization's competitive edge. With AxSTREAM ION, users can easily define workflows and automatically share data between internal and external 1D, 2D, and 3D solvers without compromising accuracy.

In addition, AxSTREAM ION users have access to parallel execution which enables them to plan, automate and run larger more complex design tasks simultaneously, regardless of their CAE toolkit.

Optimize Your Designs with Ease

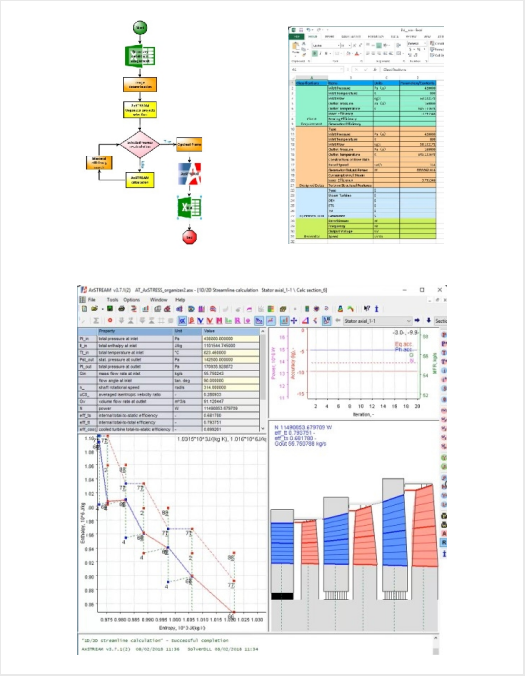
AxSTREAM ION offers a range of embedded multi-run tools, such as design of experiment, Monte Carlo simulation, various evolutionary algorithms, and more. You can also seamlessly integrate your custom tools to perform parametric studies, optimizations, and holistic system performance mapping.

By harnessing the power of parallel processing for multi-run calculations, users can experience a substantial 70% reduction in time required for these tasks.



AxSTREAM ION Use Cases:

Automatic Frame Selection for Application Engineers



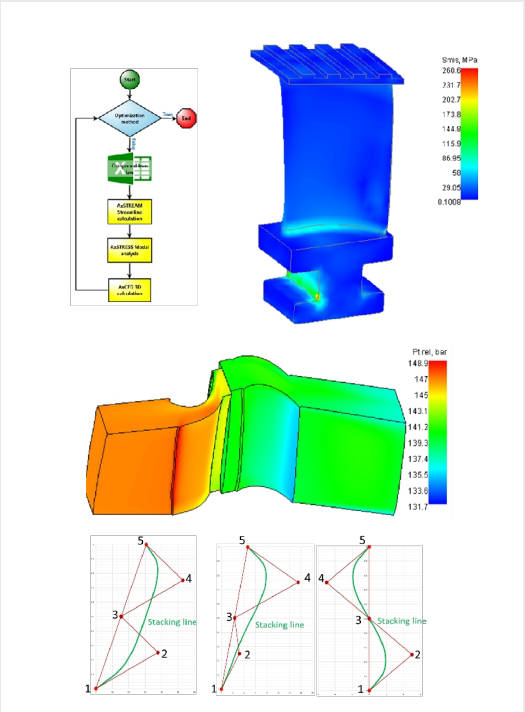
Objective: Selection of steam turbine frame for rapid and accurate project bidding.

Challenge: Manually determining relevant hardware and their performance for a given application and operating conditions at every project bid is time consuming and not always sure to generate revenue.

Solution: Automated filtering of relevant, existing steam turbine frames based on specified boundary conditions to determine performance parameters using 2D Streamline Analysis and determine best efficiency vs. cost compromise.

Benefit: 825% estimated time saving vs. doing it manually.

Turbine Stage Optimization Using Nozzle Compound Lean



Objective: Optimization of turbine nozzle using complex lean to improve efficiency.

Challenge: Compound lean results in a complex tri-dimensional flow that needs to be evaluated in CFD and FEA, making it very time consuming to study lean configurations, if done manually.

Solution: Automated machine selection to optimize performance and reduce cost using custom operating conditions (~825% time saving), including automated project bidding.

Benefit: Automated data processing and stacking optimization allows engineers to concentrate on other tasks while having a clean report in less time.

Streamlining product development with multi-disciplinary optimization

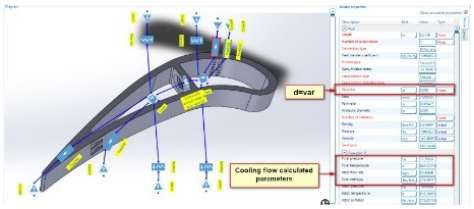
AxSTREAM ION has built in optimization algorithms that enable analysis and optimization across disciplines such as fluid dynamics, structural dynamics, thermodynamics, and acoustics with shared data analysis in one environment.

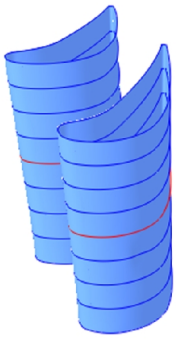
This allows companies and teams to make informed design decisions earlier on in the design process, leading to better products quicker with less iterations and lower development costs.

> "AxSTREAM ION has huge potential to transform our workflow at Vaya Space. We recently undertook a project involving 26 CFD simulations with slight variations in geometries to explore nozzle optimization. With ION, I set up a script that seamlessly executed all of these simulations over a single weekend without me needing to touch anything. This level of automation is invaluable to us because we aim to keep our computers running 24/7, as any downtime translates to wasted time. ION has significantly enhanced our efficiency, enabling us to optimize simulations and minimize downtime, ultimately contributing to improved project outcomes."
>
> **Brian Deyo**
> Aerospace Engineer
> **Vaya Space**

AxSTREAM ION Use Cases:

Cooled Turbine Blade Optimization





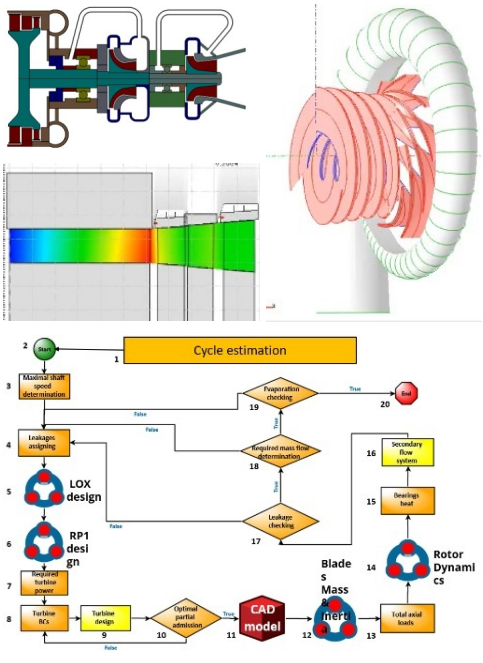
Objective: Optimization of turbine blade cooling for improved system performance without compromising structural integrity.

Challenge: Redesigning and optimizing gas turbines is a multifaceted task, involving various tools for heat balance calculation, hydraulic network analysis, turbomachinery design and analysis, FEA, CFD, and the internal geometry design of cooled blades. Blade cooling strategies may lead to compromised structural integrity, and excessive air extraction from the compressor may decrease turbine power production.

Solution: Employ coupled thermo-structural optimization for cooled blades to determine the optimal number and dimensions of cooling holes. This approach enhances aerothermodynamic performance while ensuring structural integrity.

Benefit: Achieves a 2.75% stage efficiency increase.

Automated Turbopump Conceptual Design



Objective: Design turbopump turbomachinery equipment and run reliability analyses to optimize spacecraft performance.

Challenge: Designing a turbopump is a complex, multi-component, multi-disciplinary task that requires a close integration of components and tasks to ensure proper operation and optimal performance.

Solution: Integration of tools for generative design and matching of turbine and pumps with rotor dynamic analyses and secondary flow calculations to ensure best overall performance based on specified requirements and constraints.

Benefit: Complete conceptual design of turbopump in less than 4 hours.

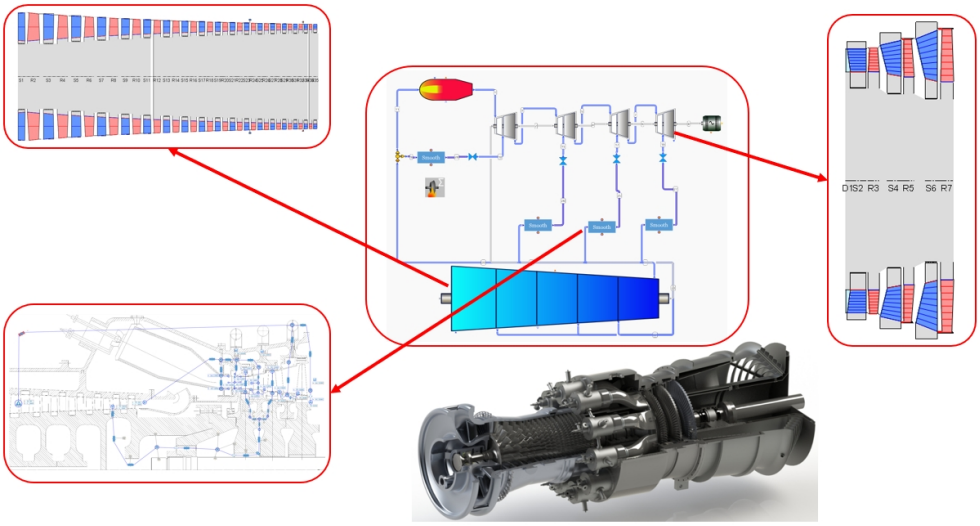
Gain Insights through virtual prototyping

Using AxSTREAM ION gives you the ability to model a machine at all stages of its lifecycle, which can be useful in monitoring the reliability and successful operation of any turbomachine, whether it is new from the OEM or at the end of its life cycle.

Through AxSTREAM ION, users can easily visualize the digital version of a machine to investigate reliability and equipment aging against real-world operating conditions. This can result in a machine's lifetime exceeding previous estimates through the ability to predict maintenance intervals, anticipate downtime due to mechanical failures, and speed up diagnostic processes.

From a development standpoint, components and systems can be designed, tested, and fine-tuned within a virtual environment. This approach allows for meticulous performance evaluation and adjustments, eliminating the need for costly physical prototypes.

For existing designs, physical hardware can be reverse engineered, creating a digital twin that can be meticulously analyzed, refined, or redesigned. In both scenarios, the concept of a digital twin extends to a digital thread, covering the entire product lifecycle.This approach empowers engineers to gain a comprehensive understanding of equipment, proactively identify potential issues, and implement preventative measures.



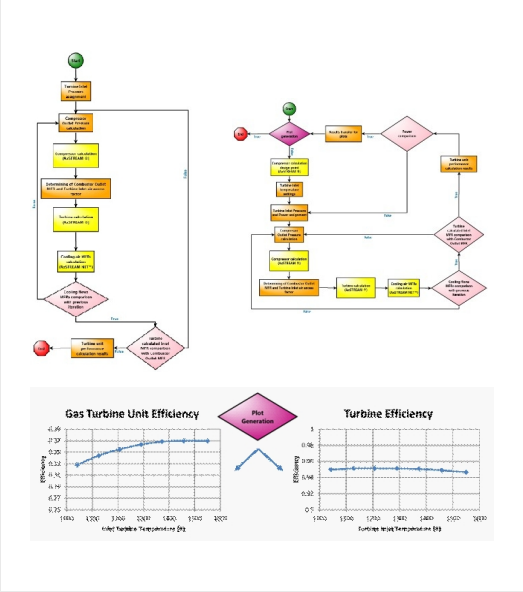
"I'm using AxSTREAM ION on a daily basis and find it extremely useful. I primarily utilize the product for running our 'digital twin' models, simulating various gas turbine units under different operating conditions. Using AxSTREAM ION, I can run an iterative algorithm that connects our compressor, turbine, and secondary flow models. Additionally, I often leverage its Mapping feature for sensitivity analysis.

What sets ION apart is its flexibility. The ability to incorporate scripts enables users to perform a wide range of tasks. For example, I use scripts for combustion calculations in each iterative step, and I can easily set the turbine inlet temperature profile to a defined profile using scripts. AxSTREAM ION is an invaluable tool and an essential component of the package you offer."

Amin Tabei
Mechanical Engineer
EthosEnergy

AxSTREAM ION Use Cases:

Gas Turbine Digital Twin



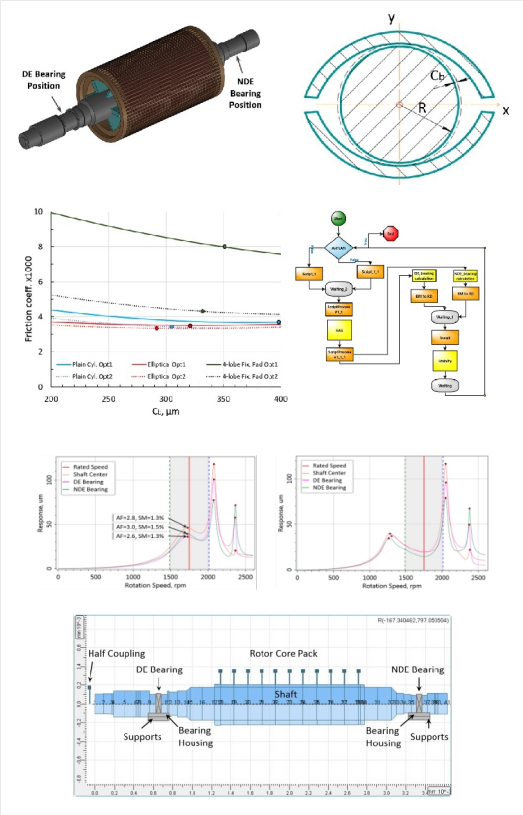
Objective: Creation of a gas turbine digital twin to investigate influence of gas turbine unit ambient and firing conditions on performance.

Challenge: 130+ parameters need to be matched between subsystems (including cooling system) and components.

Solution: Integration of all the appropriate solvers to pass data back and forth automatically until system convergence.

Benefit: Allows studying hardware on a virtual testbench to predict performance and failure points.

Induction Motor Hydrodynamic Journal Bearings Optimization



Objective: Redesign existing motor bearings to provide safe operation.

Challenge: Existing hardware has critical speeds too close to the rated speed, jeopardizing reliability during normal operation and start-up.

Solution: Coupled rotor-bearing optimization to determine best bearing configuration and dimensions to minimize friction losses, maximize oil film thickness and shift/dampen critical speeds.

Benefit: Estimated time savings of 350% when compared to manual analysis and optimization, freeing up valuable human resources.

Access to Post-Processing & Support

The AxSTREAM Advantage

- Seamlessly integrate AxSTREAM solvers, in-house codes, and third-party software.
- Customize with in-house rules and scripting for optimized designs.
- Predict ideal configurations, boundary conditions, and performance.
- Validate and generate new design concepts.
- Make informed design decisions earlier, reducing the need for continual iterations.
- Give teams additional capacity to work on new, cutting edge designs by utilizing AxSTREAM ION to carry the workload

Your fast track to project success

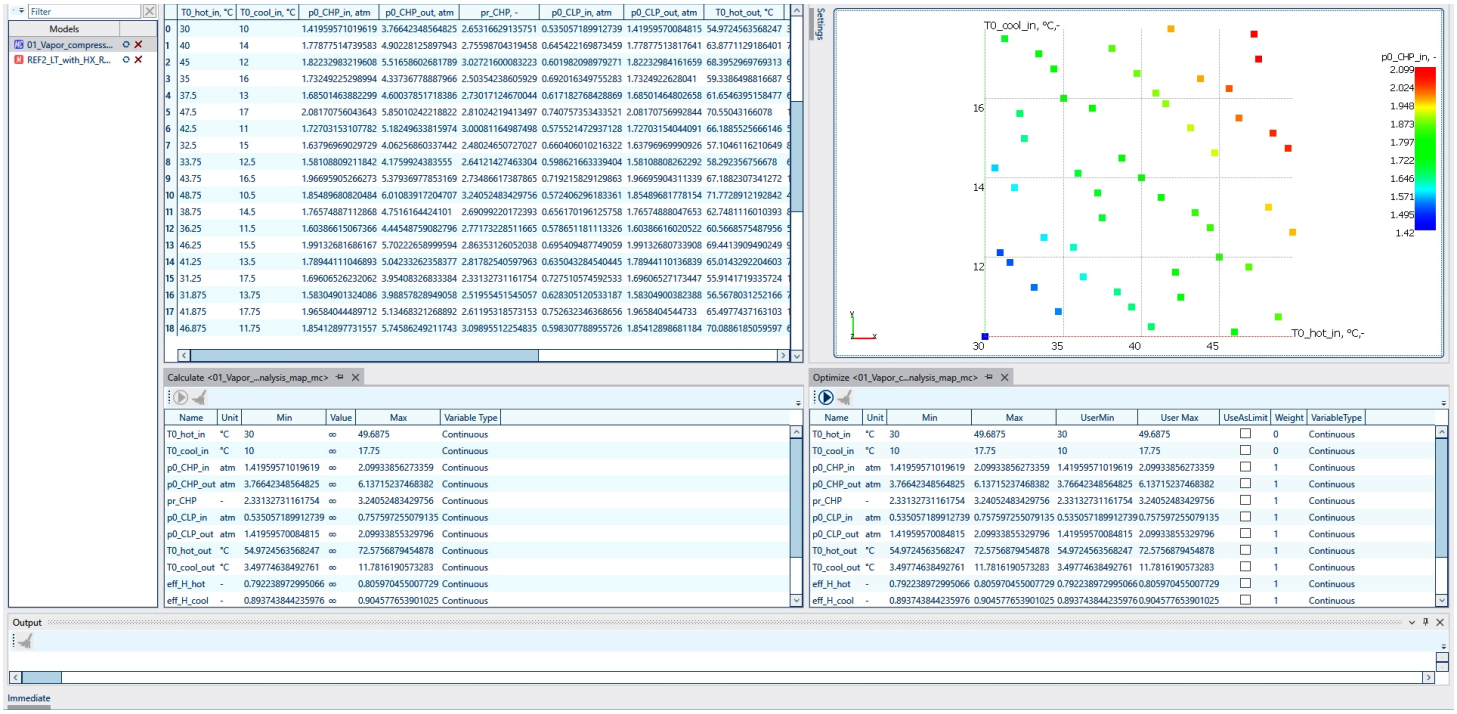
With AxSTREAM ION your entire team regardless of skill level can perform complex engineering tasks and explore new concepts faster than ever before. Not only does AxSTREAM ION facilitate rapid design, it also allows businesses to input their personal criteria and modeling rules which makes the system intuitive and usable for engineers with limited knowledge and experience.

Additionally, its embedded post-processing capabilities enable users to analyze multi-run tool results using cloud of points, maps, filtering, and surface response optimization based on user-specified constraints and goals. These results can then be exported in a variety of formats.

We're here to help

When you choose AxSTREAM ION, you're not just investing in cutting-edge software; you're gaining a trusted partner dedicated to your success. Our global technical support team is available 24/7 to address your questions, troubleshoot issues, and help you keep your work on track. Whether you're facing a technical challenge or need guidance, we're here to assist!

Alongside our technical support, we provide several training options, including online courses, customized workshops, corporate learning programs, and self-paced video courses. SoftInWay can also create custom workflows based on our customers' specific requests.



SoftInWay Offices

SoftInWay Inc.
20 Burlington Mall Rd, Ste 450
Burlington, MA 01803, USA
Phone: +1- 781-328-4310
info@softinway.com

SoftInWay UK Ltd.
65 Pastures Ave,
St Georges, Weston-Super-Mare
BS22 7SB, United Kingdom
Phone: +44 (0) 1934- 808692
uk@softinway.com

SoftInWay Switzerland GmbH
Baarerstrasse 2 – 6300 Zug, Switzerland
Phone: +41 44 586-1998
switzerland@softinway.com

www.softinway.com