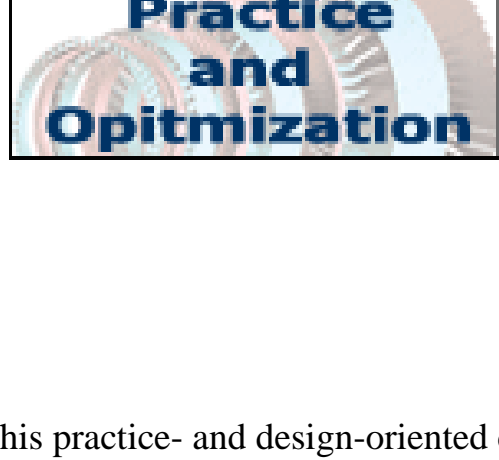


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Educational Programs

"Axial Turbine Flow Path Design and Optimization" Training Course



SoftInWay, Inc., the developer of software products for turbine design, including AxSTREAM™, the powerful software suite that encompasses the complete engineering process of gas/steam axial turbine flow path, is pleased to invite engineers to a new session of its education course: "Axial Turbine Flow Path Design and Optimization". The session will be held February 8-10, Burlington, MA.

This practice- and design-oriented course is based on over 400 years of experience in turbomachinery design and engineering by SoftInWay's team. Spanning a concepts-to-details process of axial turbine design/retrofitting, the course will enrich engineers with application-oriented guidelines for new / existing turbine flow path designs along with design techniques for the entire flow path and its optimization, including turbine flow path CFD analysis.

For registration and details, please [click here](#).

New Papers in Engineering Practice

**INCREASING STEAM TURBINE EFFICIENCY*
NEW SOFTWARE IMPROVES DESIGN ACCURACY AND SAVES TIME**

* The article was primarily published in Turbomachinery International magazine - November/December 2004

Leonid Moroz, SoftInWay, Inc.
Boris Arkadiev, SoftInWay, Inc.

Designers, especially those involved in redesigning and upgrading steam turbines, often aim for incremental increase in turbine efficiency. Even a fractional improvement in efficiency percentage can lead to significant increase in turbine capacity in absolute terms. A potential area of design improvement is the last stage of steam turbines. Turbine last stages and, particularly, their buckets are some of the complex components to design. This is why the designers have usually been able to ensure high last stage efficiency only at or near design conditions.

[More>>](#)

Openings in SoftInWay

We currently invite you to explore the vacancies that the links below are leading to:

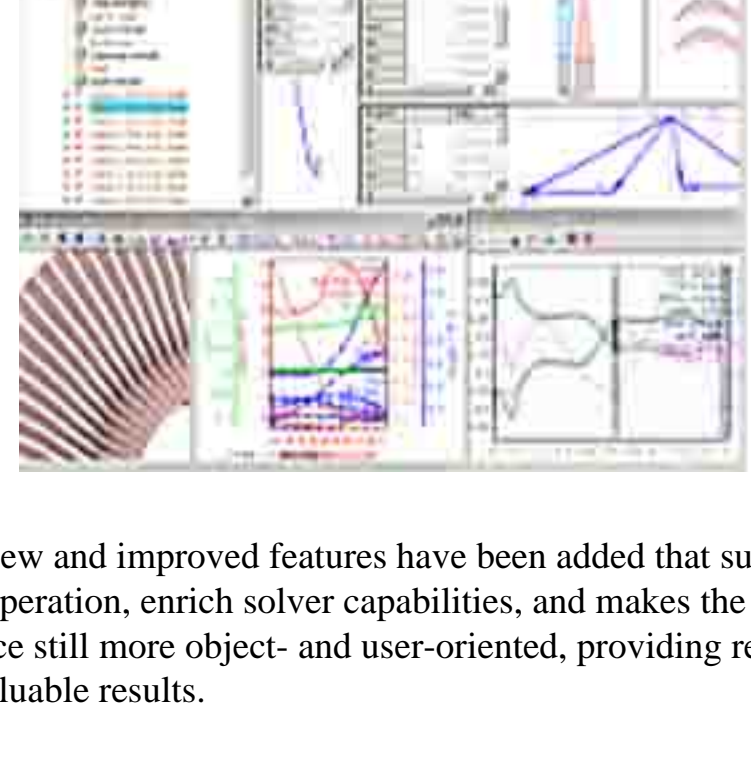
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- [Sales Engineer/Project Manager](#)

Join a strategically focused and highly motivated team involved in Scientific, Mechanical Engineering, Design Consulting and Software Development. You will have an opportunity to work on multiple projects in a very flexible, friendly and challenging environment.

AxSTREAM in Progress

Latest version 1.6 of AxSTREAM™ is released

SoftInWay has released a latest 1.6 version of its flagship product AxSTREAM™. New version lays the foundation for a framework solution on corporate level and expands the software functionality for end-users.



A set of new and improved features have been added that sufficiently ease user operation, enrich solver capabilities, and makes the suite performance still more object- and user-oriented, providing reliable and practice valuable results.

[More >>](#)

AxSTREAM Online Presentation

An opportunity to view AxSTREAM™ capabilities in Turbine Design at a glance!

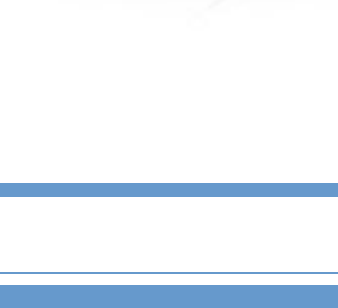
This presentation gives an overview of AxSTREAM™ software suite capabilities in axial turbines conceptual design and optimization. It features a viewer-oriented approach providing a spectrum of unique AxSTREAM™ design and optimization functions from concept to 3D model including the program's theoretical basics that allow for rapid turbomachinery prototype designs.

[View >>](#)

Welcome to our Science Club!

We will be glad to publicize your papers in mechanical engineering in our Science Club. Please submit your articles to lm@softinway.com

Here you will find an array of articles authored by our scientists and colleagues from academia and dedicated to various aspects of turbomachinery research, design, simulation and modernization, heat transfer, mechanical engineering etc.



[See articles >>](#)

AxSTREAM in Progress

LATEST VERSION 1.6 OF AxSTREAM™ IS RELEASED

FOR IMMEDIATE RELEASE

BURLINGTON, Massachusetts, January 5, 2005

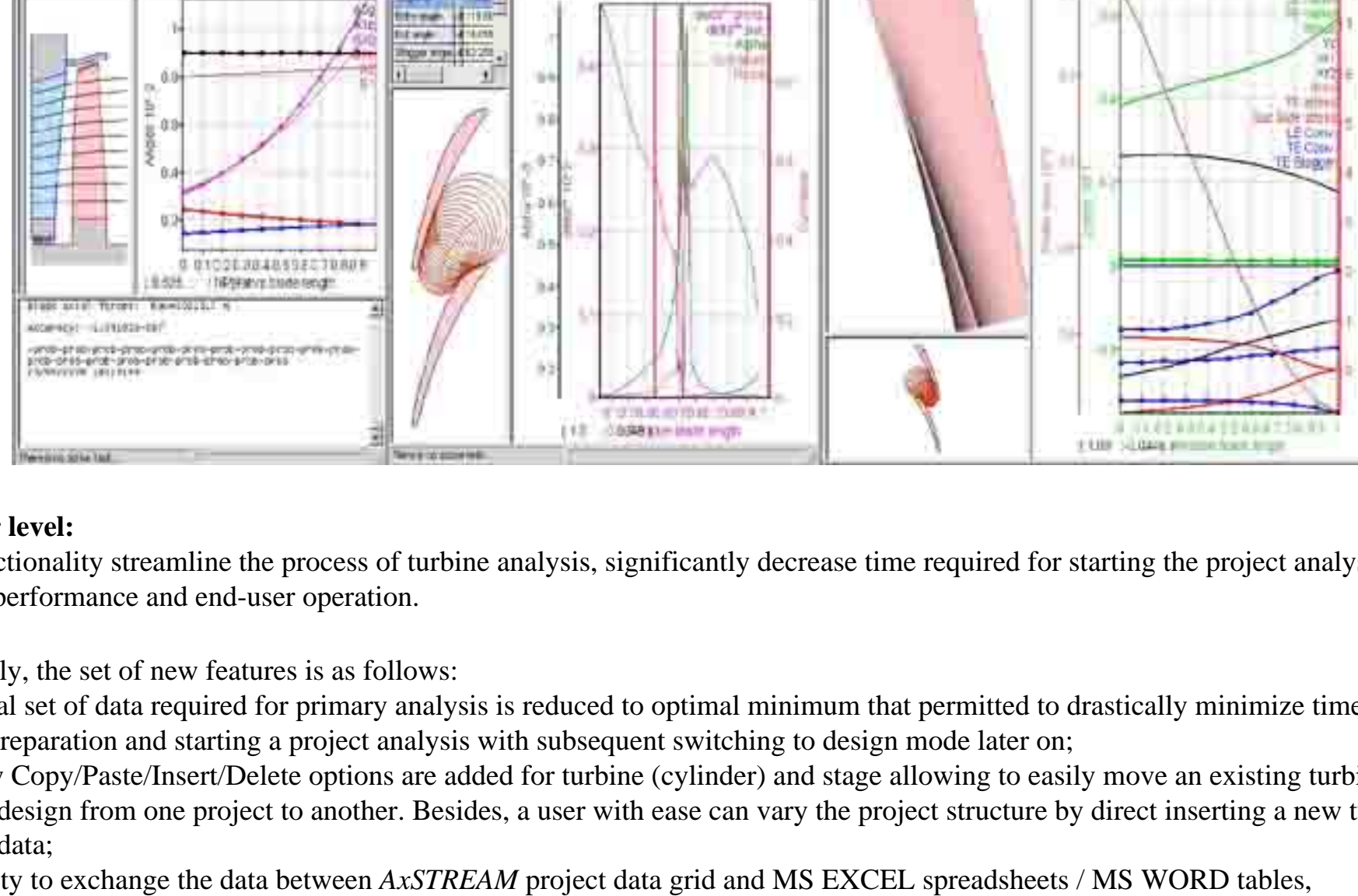
SoftInWay, Inc., one of the leading providers of turbine design software, announces a new version 1.6 of AxSTREAM™ - a professional tool for axial turbine flow path design.

This new version provides new key functional benefits to the turbine designers:

On corporate level:

The first elements of AxSTREAM-based turbine design framework are introduced:
"Corporate-accessible turbine/ stage libraries can be generated and explored for variety of projects distributed over the corporate network;

" ATLAS module (profile database module) is reorganized for network solutions that allowed to dispose of profile library binding to a single project and workstation.



On end-user level:

The new functionality streamline the process of turbine analysis, significantly decrease time required for starting the project analysis, facilitate the package performance and end-user operation.

Namely, the set of new features is as follows:

- " initial set of data required for primary analysis is reduced to optimal minimum that permitted to drastically minimize time for data preparation and starting a project analysis with subsequent switching to design mode later on;
- " New Copy/Paste/Insert/Delete options are added for turbine (cylinder) and stage allowing to easily move an existing turbine/ stage design from one project to another. Besides, a user with ease can vary the project structure by direct inserting a new turbine/ stage data;
- " ability to exchange the data between AxSTREAM project data grid and MS EXCEL spreadsheets / MS WORD tables, accelerating by this data preparation and widening a line of table data transfer methods;
- " completely OpenGL-based results visualization that provides, in particular, Zoom/Pan options for Cylinder, Stage, and Profiling windows;
- " Explorer-like style of the main Project window with enhanced presentation of property data, a group edit tab rigidly integrated in the table menu, and filter-controlled data grid. All these dramatically improve the performance in an interactive mode;
- " intrinsic navigations for Axisymmetric analysis and Profiling windows that facilitates user operation and accelerates a design process;
- " enhanced export of blade surface as a watertight IGES model ready for immediate mesh generation;
- " complete reorganization of the internal data structures in the way to integrate compressor design and analysis modules that will be implemented in AxSTREAM v.2.0 in the nearest future;
- " saving data in XML format that allows for supporting upstream-downstream package versions compatibility and exchanging the data between the projects in different versions missing any auxiliary transform operations.

"Over several years, SoftInWay has been developing AxSTREAM with the goal of creating a true professional-level turbine design solution. I am proud to say that, with the release of the AxSTREAM version 1.6, we have very closely approached to that professional level of design sophistication, while maintaining AxSTREAM's ease-of-use and affordability," says Leonid Moroz, President of SoftInWay. "Complete conceptual design, multidisciplinary optimization, fast processing, instantaneous visualization and realistic results make AxSTREAM a professional-level turbine design tool, with ease of use features that make it appeal to all turbine designers," added Mr. Moroz.

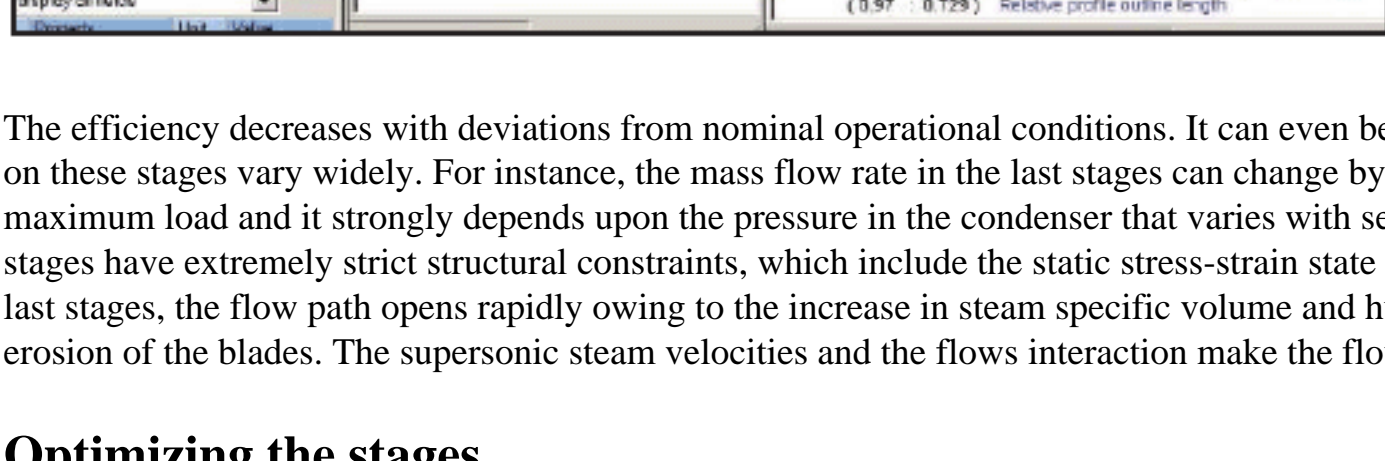
New and improved features position AxSTREAM as one of industry's best price-to-performance solutions for axial turbine design and optimization. Latest release of AxSTREAM encompasses the complete engineering process of gas/steam axial turbine flow path conceptual design and optimization, and delivers an advanced engineering desktop solution for use in turbomachinery industry. This software tool empowers designers to apply a concurrent development approach while solving coupled problems of performance, reliability, operating life, and low-cost design process.

Please address info@softinway.com for more information and sales@softinway.com for orders.

New Engineering Papers

**INCREASING STEAM TURBINE EFFICIENCY
NEW SOFTWARE IMPROVES DESIGN ACCURACY AND SAVES TIME**

Leonid Moroz, SoftInWay, Inc.
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Designers, especially those involved in redesigning and upgrading steam turbines, often aim for incremental increase in turbine efficiency. Even a fractional improvement in efficiency percentage can lead to significant increase in turbine capacity in absolute terms. A potential area of design improvement is the last stage of steam turbines. Turbine last stages and, particularly, their buckets are some of the complex components to design. This is why the designers have usually been able to ensure high last stage efficiency only at or near design conditions.

The efficiency decreases with deviations from nominal operational conditions. It can even become negative in some cases. The operating conditions on these stages vary widely. For instance, the mass flow rate in the last stages can change by 20 times when the turbine goes from stand-by to maximum load and it strongly depends upon the pressure in the condenser that varies with seasonal fluctuation in cooling fluid temperature. The last stages have extremely strict structural constraints, which include the static stress-strain state of the blades and vibration of the whole blading. In the last stages, the flow path opens rapidly owing to the increase in steam specific volume and humidity. This decreases efficiency and leads to faster erosion of the blades. The supersonic steam velocities and the flows interaction make the flow conditions sufficiently complex to model.

Optimizing the stages

There are many performance requirements for any stage. A few are efficiency, capacity, reliability, cost, and whether the components can be manufactured easily. The designer's first objective is to reduce these requirements (a quality multicomponent criterion) to a single-component function. For the last stage, the integral efficiency is a good choice for the target function and it should be defined as an additive function. The terms of this function represent exhaust efficiency at various operating conditions. For the non-nominal working conditions, the weighted coefficients can be given that reflect the duration of turbine operation on these regimes. Reliability requirements need not be optimized but to be considered as rigid constraints, within which the target function is optimized.

An accurate solution of the problem can be obtained with the help of thorough gasdynamic calculations and scrupulous analysis of the mechanical state of the stage components such as blades, band wires, and disk-shank connections. However, instead of the expensive full 3D analysis, it is much more practical to use simplified 1D and 2D modeling, leaving full 3D analysis to the final phase of the design process. At the same time, these simplifications should be validated against reliable experimental data.

Applying reduced-order modeling, AxSTREAM - a novel PC-based software for design, modeling and optimization of gas and steam turbines - dramatically accelerates the design process. The software provides with reasonable accuracy results that are ready for use in 3D solvers. In comparison with other software packages for axial turbine design, AxSTREAM, a product of SoftInWay, Burlington, Massachusetts (www.softinway.com), uses the multidisciplinary optimization approach for all phases of design such as flow path preliminary design, meanline stage-by-stage and turbine off-design analyses, axi-symmetric analysis and blade-to-blade profiling. AxSTREAM significantly reduces the search range for optimal bucket configuration. The package performs the stage and the airfoil optimizations on the basis of 1D and 2D aerodynamic and 1D structural calculations. The 3D model of the blades prepared by AxSTREAM can be easily exported to external 3D Computational Fluid Dynamics, structural analysis and CAD tools.

Openings in SoftInWay

Welcome to join SoftInWay Incorporate! We invite you to explore the vacancies presented below:

CAE Software Developer

This individual should have experience in development of complex engineering software projects and a strong background in CAE tools. Excellent understanding of FEA and / or CFD methods and issues. It is essential that the individual has a strong desire to learn and explore new technologies and is able to demonstrate good problem solving skills.

Requirements:

- B.Sc., or M.Sc., or Ph.D. in Mechanical Engineering, Applied Math or Physics with respectfully 5+, or 3+ , or 0-1 years of experience in engineering software development (C, C++, FORTRAN);
- Thorough knowledge of FEA and / or CFD methods;
- Hands on experience with at least one of the following tools: ANSYS, MSC.Software, ABAQUS, I-Deas, CATIA, Fluent, or CFX. Experience with SolidWorks and / or Pro/E is a plus.

Project Manager, Engineering Consulting

This individual will be responsible for all-round technical evaluation and coordination of project problems in FEA-based CFD, Heat Transfer, Stress-Strain areas. Recommending improvements, the project's technical issues evaluation including problems' review, sophisticated model description, precise boundary conditions evaluation, and gathering and analysis of other data required for providing further non-stop development process.

Also responsible for building and maintaining development schedules and fulfilling project deliverables on time, from inception to client sign-off. Beyond this, the candidate needs to have very sharp analytical skills, which s/he will use through the project life cycle, including detailed pre-development proposal analysis, projects feasibility evaluation, and user requirements analysis.

Requirements:

- Masters Degree or Bachelors in Mechanical Engineering with significant related experience at Power Generation Machinery oriented companies like GE, Pratt & Whitney, Rolls-Royce, Alstom. Computed Science Degree is desirable.
- 5+ years of complex Mechanical Engineering project management, engineering application development, design, and implementation experience.
- Experience in FEA-contained packages' implementation like ANSYS and/or similar toolkits is required.
- Principle knowledge in CFD, Heat Transfer, Stress-Strain, Machine Design, is extremely appreciated.
- Must be strongly focused and extremely organized.
- Proven experience in writing specifications, quality assurance, project complexity, labor effort estimation, and risk analysis skills.
- Exceptional oral and written communications skills are essential.
- PMI certification is a plus.

Sales Engineer/Project Manager

The essential job function of this person is business development and sales of engineering/software development consulting services including:
- forecast development to achieve national sales goals;
- developing and implementing a strategic sales plan to achieve national sales goals;
- identify, close and maintain key accounts;
- provide information to marketing to improve products and profitability;
- monitor and assess major competitors' activities and support.

The person will perform sales work inside and outside in support of SoftInWay's engineering services for diverse industries including Aerospace, Power Generation, Automotive, Energy, Petrochemical, Utilities, Gas, etc. He/She will prepare proposals or service contracts for SoftInWay's engineering services with deep understanding of customer requirements and company's team Design and Engineering abilities in FEA-based CFD, Heat Transfer, and Structural applications development. Coordinate and schedule marketing activity. Serve as Project Manager for various projects, both temporary and ongoing.

Requirements:

- Minimum 4 year Degree in Mechanical Engineering or related areas with significant related experience at Power Generation Machinery oriented companies like GE, Pratt & Whitney, Rolls-Royce, Alstom.
- 5 - 8 years experience of surpassing sales quotas in selling consulting services to C-level executives in engineering and scientific.
- Principle knowledge in CFD, Heat Transfer, Stress-Strain, Machine Design, CAD/CAE, and Visualization is appreciated. Knowledge of MS Office and MS Project is a plus.
- Excellent prospecting and presentation skills .
- Must be strongly focused and extremely organized.
- Exceptional oral and written communications skills are essential.

About SoftInWay Corporation

SoftInWay, Inc., located in Burlington, MA, a twenty years old corporation, is a scientific and Engineering organization that has a broad foundation of experienced turbomachinery development talent that markets engineering services, software products, and education. We provide design simulation solutions that use visualization of data to solve complex engineering problems. Our clients depend on us to fill non-core engineering capabilities/analysis, and provide the engineering software design tools/software to rapidly develop products and modernize/re-fill legacy turbine equipment. We are very efficient, easy to work with, cost effective, and are proud of our 24 hour customer service support. AxSTREAM is our premier solution for your design and analysis process; our technical roots go back over 30 years, we have 9 PhD level engineers and over 100 man-years of knowledge-base in the product. We are bringing this technology to the market as "AxSTREAM" - making it straightforward and rapid for your development team to conceptualize and optimize turbine flow path design.

For more information, visit <http://www.softinway.com> or call 781-685-4942.

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