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### TURBINE RETROFITS FOR INCREASED EFFICIENCY USING AxSTREAM

During the past 10 years utilities and power producers have been upgrading/retrofitting large power plants to extend life and improve performance. One primary area for performance improvement has been the steam turbine, and this has usually been accomplished by retrofitting steam turbines with new rotor systems to incorporate a new, more efficient steam path.

AxSTREAM has been widely recognized and used as a powerful tool for the design and optimization of new flow paths. More and more, OEM's and turbine service/overhaul businesses are looking at AxSTREAM to evaluate and analyze existing steam paths, and then develop new, high efficiency designs with AxSTREAM that can be installed into the existing cylinders with the existing rotors.

AxSTREAM can be used in retrofit/upgrade projects in a number of ways:

- Analyze the performance of the existing flow path (blade shapes)
- Examine the effects of modification to the flow path (removal of a row of blades, for example)
- Design new blades and vanes to optimize efficiency, increase through-flow, etc.
- Calculate/validate effects of cycle modifications on the turbine such as an increase in boiler capacity
- Develop new performance maps

AxSTREAM has been used many times to analyze the performance of existing steam paths and through its optimization process, gains in steam turbine performance of 2 to 3 percentage points in efficiency have commonly been realized.

AxSTREAM provides power producers and turbine service companies the best of both worlds: Reaping the benefits of a higher efficiency steam flow path without having to purchase new rotors.

### CONGRESS IN ST.PETERSBURG

On June 27 turbo-machinery experts from throughout Russia gathered at a special scientific and technical gas turbine congress in St. Petersburg, Russia. The congress was titled "Scientific and Technological Developments and Production for Russian Gas Turbine Industry." and was sponsored by the Russian Academy of Science. The conference was held on the campus of the Polzunov Scientific and Development Association on Research and Design of Power Equipment (NPO CKTI) which is the largest scientific and development association in the field of power generation equipment in Russia.



SoftInWay was represented by Technical Director Petr Pagur and Chief Scientist Yuri Govorushchenko who jointly delivered a paper titled, "Integrated System for Turbo-machinery Conceptual Design" using AxSTREAM multidisciplinary design, analysis and optimization software.

A key session that stimulated great discussion was "future trends and directions of the Russian power generation market. Other popular sessions focused on themes such as new developments in high efficiency gas turbines, axial compressor

performance, and profiling and analysis of a blade with high aerodynamic efficiency for a cooled turbine. A large number of scientists, designers and gas turbine specialists attended the congress, representing many major Russian companies including Power Machines Company, Perm Engine Company, NPO Saturn, FSUE MMPP Salut, RAO UES Russia, and Gazprom.

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### SOFTINWAY STRENGTHENS SALES NETWORKS IN ASIA, EUROPE

SoftInWay has expanded its worldwide sales network by appointing Kyokuto Boeki Kaisha, Ltd. (KBK) in Japan and SmartCAE srl in Italy to provide distribution of AxSTREAM design and optimization software. Both companies are leading sellers of CAE solutions and services in their respective countries.



"KBK has worked closely with major Japanese turbo-machinery companies such as IHI, Toshiba and Mistubishi for over 55 years," said Mr. Kazunobu Otake, Senior General Manager. "They have told us on numerous occasions that they must achieve higher levels of efficiency in their designs, and AxSTREAM will help them greatly in achieving this prime directive."

"The strategy of SmartCAE is to promote and support the highest quality tools that provide a true technical advantage to our customers," stated Mr. Francesco Palloni, Director of Business Development. "AxSTREAM is a powerful tool that perfectly complements our present portfolio of CAE solutions for engineering."



"Japan and Italy are home to many of the world's premier power generation, automotive aerospace and industrial manufacturing companies in the world," said Dr. Leonid Moroz, President of SoftInWay. "These two companies will be tremendous assets in distributing AxSTREAM to these companies, and to provide a higher level of customer service and support than ever before." Both companies will also be distributing the educational versions to engineering colleges and universities in their country.

### NEW OPTIMIZATION TOOLS IN AxSTREAM

Several powerful design optimization tools have been added to the latest version of AxSTREAM, Version 2.1.

New preliminary design capabilities permit interactive, real time editing of design parameters and meridional outline, providing greater versatility, freedom and speed to develop optimized flow path. With a simple click and drag, the Mollier diagram can be changed to examine redistribution of heat drop between stages, meridional dimensions (spans) can be changed, and performance results in charts can be adjusted. When any change is made, impact of change is calculated and displayed in all formats instantaneously, providing immediate feedback. New graphical representations of efficiency as a function of flow and load coefficients (cloud of solution points) have also been added.

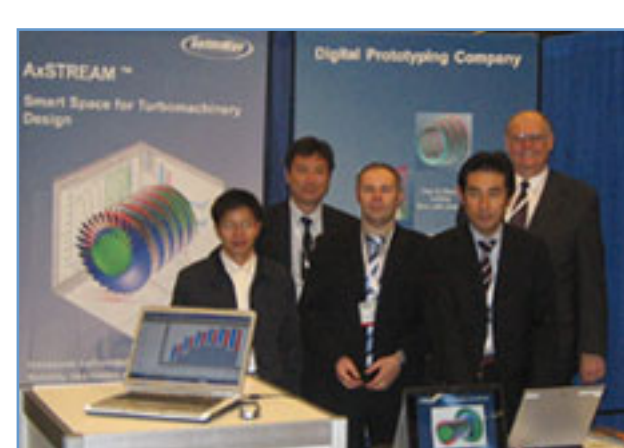
The new AxPLAN DoE engine is enhanced with the ability to resize response surface to focus on optimum design solution for specific search constraints, and permits incremental adjustment of design variables to reach extremum very quickly.

These new features are illustrated in a new animated presentation that can be viewed by clicking on the following link: [Axial Turbine New Features](#)

### AxSTREAM TRAINING AT TURBO EXPO 2007

This past May at Turbo Expo in Montreal, SoftInWay conducted a training program on all facets of the AxSTREAM suite of design, analysis and optimization software for turbo-machinery flow paths. This class had an especially high degree of interaction and connection as it included both customers and SoftInWay international distributors.

The course covered the design many different types of turbo-machinery from steam turbines to centrifugal compressors to radial turbines. The class environment was very stimulating in that individuals from different disciplines shared with each other their approaches to design, and how AxSTREAM has increased their personal work productivity.



Left to right: Dr Fang (Navigation Pioneer-China), Mr. Matsui (KBK-Japan), Dr. Moroz (SoftInWay), Mr. Nara (KBK), Mr. Brown (SoftInWay)

SoftInWay, in conjunction with its distributors, will be offering generalized training classes worldwide on a local level in the near future. For details, contact [info@softinway.com](mailto:info@softinway.com)

SoftInWay wants to express its gratitude to all who visited our booth at the Turbo Expo exhibition, and wishes to say greetings to all of the new friends that were made over those three days.

### ENGINEERING AND CONSULTING SERVICES

SoftInWay's Engineering Services Division provides a comprehensive range of CFD and FEA engineering simulation and analysis services. Our mission is to help customers evaluate design issues from the earliest stages to maximize engineering productivity and to prove concept, increase efficiency and reliability of individual components or engineered systems. Analysis of flow, thermal, structural and vibration stresses are areas of special expertise. To the right is the design of a radial turbine for a diesel engine.



Industries served include aerospace, aviation, heat transfer, HVAC and refrigeration, industrial equipment, medical and biomedical, power generation and more. Projects have involved a wide variety of equipment such as boilers, heat exchangers, fuel pumps, IC engine blocks, ceramic turbine blades, impellers, etc.

Visit our website to view an expanded list of capabilities and projects.

### HOT VACANCIES

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

[Sales Engineer/Project Manager](#)

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[CAE Software Developer](#)

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

### ABOUT SOFTINWAY CORPORATION

**About SoftInWay.** A USA corporation, headquartered in Burlington, MA, SoftInWay's mission is to serve the high technology community by providing software products and engineering services in the area of research, design and digital prototyping of power generation equipment. The company develops products for rapid turbomachinery design, provides technical engineering services, and uses in-house and industry standard CFD, FEA and CAD tools to address design issues at the earliest possible stage to maximize engineering productivity and increase the efficiency and reliability of equipment. The core product, AxSTREAM, is an integrated solution based on the over 400 years of collective turbomachinery experience of the SoftInWay's engineering team, with the clear goal of bringing to industry a professional software tool for rapid, optimized turbomachinery flow path design.

For more information, visit <http://www.softinway.com/> or call 781-862-7867.

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