

## ICS Control Solutions for Turbo-machinery & Power Plants

*Two decades of leadership in turbo-machinery  
upgrades and retrofits*



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## ICS - The Leader in Turbo-Machinery Control Upgrades

With two decades of experience and hundreds of successfully completed projects, ICS is the proven leader in control solutions for power generation, oil and gas, and industrial turbo-machinery applications worldwide.

ICS provides fully-engineered and field-proven solutions tailored to meet customers' needs for absolutely reliable operation of critical assets while delivering high performance - all within a manageable overall cost.

From power plants in Alaska to oil lift facilities in the Sahara desert and steel plants in Russia, ICS has satisfied customers in countries all around the world. ICS services these installations from our main offices located in US and Ireland and through local network offices.

### Application Knowledge

ICS is first and foremost a turbo-machinery solutions provider. ICS's team includes many ex-OEM specialists who have in-depth knowledge of specific machinery problems. This expertise is built into each project solution. ICS can analyze and solve the underlying operation and maintenance problems of the equipment and combine these solutions into the system modernization.



### Turnkey Project Engineering

Project execution is critical to the success of every upgrade project. ICS specializes in completing projects on a fully engineered package basis; not just as hardware supply. ICS total project approach includes definition of the application needs, identification of machinery control problems, full system engineering and installation and commissioning – all on a complete turnkey basis.



### Case Study

In 2004, a large steel producer in Turkey awarded ICS a contract to upgrade five Russian-manufactured steam turbines used for power generation and steam extraction for the plant process. The steel plant was undergoing a major revamping and needed increased power to feed the blast furnaces. ICS revamped the plant power house with redundant STC2000 steam turbine controllers, excitation systems, generator protection, instrumentation, steam valve actuators as well as HMI systems and networks. The project complexity involved conversion of all original 1970's vintage Russian systems to the latest technology. ICS worked side by side with the client's engineers to coordinate the power house upgrade within the overall plant modernization works. In 2008 the last unit was successfully commissioned, and the ICS control systems are delivering reliable power for this critical installation.



## ICS Control Solutions

ICS has developed expert solutions for practically all turbo-machinery irrespective of original manufacturer in power generation, oil & gas and industrial applications. ICS systems have the back up of a dedicated team of turbine controls specialists who have unmatched capabilities in solving control-related problems. ICS control software (from a proven library of basic and advanced control functions) together with application specific software is at the core of every system. To guarantee confident and trouble free operation for each ICS project, this software is developed, applied and tested to ICS and ISO9000 Quality Control standards.

ICS provides comprehensive solutions for:

- Gas Turbine Control
- Steam Turbine Control
- Hydro Turbine Control
- Wind Turbine Control
- IGCC – Integrated Compressor Controls
- Generator and Excitation Systems
- Balance of Plant Control



## Control Applications

ICS application designs with control systems and mechanical interfaces cover almost all OEM turbo-machinery, including:

### Gas Turbines

GE - LM and Frame  
Solar  
Rolls Royce – RR & Allison  
Alstom / ABB  
Pratt & Whitney  
SWPC – Siemens, Westinghouse & Ruston  
Others – Orenda, Hispano-Suiza etc.

### Steam Turbines

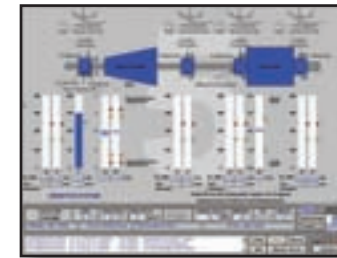
GE  
Westinghouse  
Elliott  
Alstom / ABB  
Ansaldo / Franco Tosi  
Others – Hitachi, Mitsubishi, LMZ etc.

## The Latest Technology

For the lowest life-cycle cost and latest technology, ICS solutions are built around proven commercial off-the-shelf technology (COTS). With advances in modern control hardware, non-proprietary COTS technology delivers significant performance advantages. When compared with specialized hardware systems (so called dedicated systems) COTS also greatly reduces cost and logistical issues associated with obsolescence.

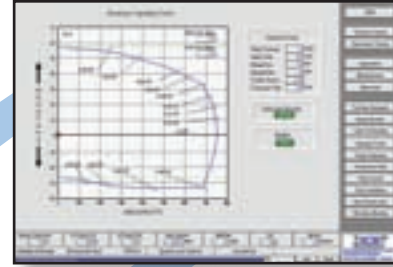
In 1991, ICS was the first company to develop a Programmable Logic Controller (PLC) based control system for turbine control. Since then, ICS has been the industry leader in developing open-architecture, user friendly, cost effective solutions to upgrade and modernize turbine controls, power generation controls, and auxiliary equipment. ICS systems are available with the following features to suit the application:

- Choice of hardware platforms
- Open connectivity to other systems
- Simplex or Redundant controllers
- Integrated control functions
  - compressor, generator
- Advanced control functions
- IEC61131 / IEE1588 compatible
- SIL / Hazardous applications



### Generator Controls

For generator drive units, ICS provides a complete package of solutions covering generator control and protection, excitation/AVR and synchronizing. Digital generator controls can be totally integrated with the turbine controller for seamless operation and easy troubleshooting.



### Turnkey Installation

Experience, careful planning and attention to detail are required for problem-free and on-schedule installations. ICS specializes in reliability upgrades, and understands that outage times must be minimized to meet customer business needs. Clients can be assured that the focus of ICS is on having projects, as well as the plant, run smoothly. With over twenty years of specialist experience on the most complex retrofits, ICS is the safe choice for a successful project.

### Comprehensive Service

Every ICS project is supported by our Field Service Department with an experienced and dedicated team of engineers. On projects around the world, this team has gained ICS a reputation for excellence in installation, start-up, training and after-sales service. In addition, ICS maintains a dedicated service center linked to customer sites via remote communication link. ICS experts can quickly perform emergency troubleshooting, inspect system diagnostics, or install software enhancements without traveling to site.

### Balance of Plant

ICS offers distributed controls (DCS) for boilers/HRSG and balance of plant systems using DCS, PLC and PC based systems depending on the system needs.



### Integrated Compressor Controls

Integrated compressor and turbine control systems provide cost and maintenance advantages when compared to inter-connecting multiple stand-alone components. ICS provides:

- Integrated Compressor Control
  - Single or Multi-stage
  - Scalable Unit Control
- Compressor Systems
  - Lube Oil
  - Seal Oil
  - Vibration
- Anti-Surge Control
  - Incipient Surge Detection
  - Surge Control
- Train Control
  - Capacity Control
  - Pressure Control
  - Load Sharing & Optimization
  - Performance Control

