

- modelling and simulation
- control design
- system troubleshooting
- technology transfer and training
- energy efficiency investigation
- software tools

Capability Statements

Independent Control Consultancy, Technology and Training Services

Consultancy Services

Modelling and Simulation

At the heart of a typical ISC project is our capability in Dynamic Modelling and Simulation, whether derived from first principles or plant data. We use high-fidelity, properly validated models to provide our clients with answers to "what-if" questions. Such models give confidence that design and/or operational changes will perform to the required specification.

Often dynamic modelling is viewed as complex - a technique with which engineering staff are unlikely to get involved. At ISC we use our considerable experience in modelling the behaviour of a diversity of systems and processes and work closely with our clients to solve their problems. We aim to help clients understand the developed model. It can be provided in standalone form for client use. Furthermore, we can provide training on using the model where appropriate.

Our engineers utilise a wide variety of modelling packages such as LabView, MATLAB/Simulink, VisSim and Hysys.

System Troubleshooting

Every process plant has control issues, most of which do not appreciably impact on profitability or safety. However, there will be some that, if corrected, could significantly benefit the plant's operation through lower variability, increased throughput, reduced energy usage or manual intervention. Unfortunately such problems often become accepted as the norm with the perception that a solution would be too difficult or too costly. Yet most problems can be simple and cost effective to fix - providing the problem source is known.

ISC is routinely engaged to look at process control problems that suppliers have looked at but failed to solve. We have an excellent track record in finding the real cause of problems through our special combination of theoretical understanding, extensive practical experience and engagement with all functions in a client company. Myths often abound regarding causes of such problems. Approaching a problem with an open mind is an important aspect of ISC philosophy, as is using the simplest, most cost effective solution.

System performance problems are not always due to the controller, though often they are labeled as such. ISC's approach to troubleshooting is that all aspects of the system are to be scrutinised before reaching a conclusion. Sensor, actuator, system design and operational aspects are all considered.

Control Design

The development of effective control strategies is a core skill of ISC engineers. A proper assessment of the process as a whole is undertaken, including effects on neighbouring/coupled systems and processes. Control objectives, disturbances, nonlinearities, uncertainties, robustness and noise immunity are all considered when a control strategy is developed. Solutions can range from simple classical feedback/feedforward to advanced control, such as model-based methods like MPC or methods like Fuzzy Logic control. However, simplicity is a key objective in our solutions, providing performance criteria can be met.

The effectiveness of a design is usually proved in simulation to enable commissioning with confidence. Comparison with existing control can show the expected benefits.

Our designs are normally implemented by the client or a preferred system integrator, though we provide implementation advice. Where requested, we have on several occasions undertaken the implementation stage in our scope.



Our Core Competencies

- Dynamic modelling and simulation
- System troubleshooting
- Control design
- Optimisation
- Algorithm development
- Technology review
- Research
- Training
- ACTC

Our Philosophy

- Approaching problems with an open mind
- Dedicated to identify practical and innovative solutions without compromising performance
- Imparting understanding and empowering our clients to drive improvements themselves

Our Expertise

- In-depth understanding of control technologies
- First-hand experience in diverse industrial applications
- Substantial experience in modelling system or process behaviour
- Expert analysis of complex problems
- Proven project management and research skills

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Optimisation

Once a model of a system has been defined, formal optimisation methods can then be used to find the best solution to a problem. This can range from finding the best tuning parameters for a difficult control problem, or determining the most profitable/best way of operating a plant or system. Optimisation can be applied to static and dynamic problems, including both hard and soft constraints and conditional logic. Methods used include Quadratic Programming, Gradient Searches and Genetic Algorithms.

Technology Services

Algorithms: In-house software expertise for bespoke control or data processing algorithms development. Our background means we can look for novel solutions to difficult problems, and analyse the methods in terms of validity and robustness.

Technology Review: We use our first-hand knowledge of the needs of industry to provide an impartial assessment of automation and control related technologies, either for a potential end-user or for a vendor looking for technical endorsement.

Research: ISC is involved technically and as programme managers in government and EU funded research projects. We also support research projects through our Applied Control Technology Consortium and its links with academia.

Training Services

ISC has delivered highly regarded training on control engineering to clients throughout the UK, Europe and USA. Our courses represent the most comprehensive available in the field of control engineering and can be focused on particular requirements of the client company. We offer:

Scheduled Courses → On-Site Courses → Bespoke Courses

We train at all levels, from introductory material for technicians, refresher for engineers, to new or advanced control techniques for research groups.

What delegates said about our recent training courses ...

"Very stimulating - well done!"

"Examples were very good and showed how to apply theory"

"Well run and presented"

Applied Control Technology Consortium (ACTC)

ACTC helps member companies pursue a policy of understanding and appropriately applying control technologies. It has been self-financing since 1993 and has grown to become truly international, providing control technology support to companies operating in industries as diverse as Automotive, Aerospace & Defence, Chemical & Petrochemical, Energy, Marine, Metal Processing, Food and Drink manufacturing.

ACTC Member Services

Technical Meetings → Basic & Advanced Control Training Courses → On-site Tailored Course → Case Studies → Consultancy and Problem Solving → Fast Access to Consultants → Special Interest Groups → Educational Notes and Technical Reports → Access to ACTC own Software Toolboxes and Commercial Control Design Packages and Hardware Rapid Prototyping Systems → Mailings, Newsletters and Conference Reports → Reference Library and Internet Site → Industrial Forum for Networking and Promoting Services/Products

Service Examples

Consultancy Modelling and Simulation

- Main Oil Line Pump Instability
- CHP Steam Pressure Improvement
- Nuclear Power Plant Modelling

System Troubleshooting

- Compressor Train Frequent Trips
- Steam Raising Boilers Operational Issues
- Evaporation Tower Level Instability

Control Design

- Ship Roll Stabilisation Optimisation and Control
- Heave Compensation on Survey Vessel
- Paper Mill pH Control

Technology

- Review of Valve Technologies for Offshore Oil Applications
- Multivariable and Model-Based Mill Controls
- Bespoke Nonlinear Sensor Compensation
- Offshore Wind Farm Optimisation Strategies
- Control Performance Assessment

Training

- Control Fundamentals (Theory and Practice)
- Introduction to Process Control
- Predictive Control
- Optimisation and System Identification
- Process Control Academy
- Rolling Mill Academy

If you are interested in any of the above services, please contact us by phone, e-mail or online.

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About ISC

Our Company

ISC has been a leading industrial control consultancy for over 20 years, providing the following services:

- Consultancy - in the area of dynamical simulation and modelling, control design, process control troubleshooting and many others such as technology reviews, algorithms and research.
- Training - offering a range of 'off the shelf' and tailor-made training courses covering a broad range of control topics as well as bespoke course development and delivery.
- Software Tools - developing software tools for system identification, simulation and design, and for the benchmarking and assessment of control performance for the process industry.
- Technology Transfer via the Applied Control Technology Consortium (ACTC).

Since its formation, ISC has served multinational clients in many industries and has since established a fine reputation.

An in-depth understanding of control technologies together with unrivalled experience in diverse industrial applications uniquely positions us to deliver exceptional value to our clients.

Our People

ISC has first-class control engineers, with many years of experience in representing process dynamic behaviour with first principles models and designing suitable controls for meeting given requirements.

Our Expertise

- We are active in diverse industrial applications.
- We are renowned for expert analysis of complex problems and are dedicated to identify practical and innovative solutions.
- Our training courses in control are aimed at providing sustainable, long-term improvements in asset performance through the development of in-house resource.
- Our impartiality means we can provide the most appropriate solutions for our clients.
- We impart understanding and empowering our clients to drive improvements themselves.



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Clients Include

- Anglian Water
- BAE Systems
- BP Chemicals
- BP Exploration
- BP Oil Grangemouth Refinery
- British Energy
- British Nuclear Fuels Limited
- Caley Ocean Systems
- UPM Caledonian Paper
- CarlBro
- Corus
- Daimler-Chrysler
- Ford Motor Company
- Freescale
- General Motors
- GSK
- Innoval
- Johnson Matthey
- Lloyds Register
- Marathon Oil
- Ministry of Defence
- Pilkington Glass
- PowerGen
- QinetiQ
- Ricardo
- Roche Products
- Rockwell
- Rolls-Royce
- Scottish Power
- Scottish & Southern Energy
- Scottish Water
- Severn Trent Water
- Shell
- St Regis Paper
- Texaco North Sea UK Co
- Yorkshire Water