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

**industrial
systems
and control**

Capability Statement – Automotive Industry

Independent Control Consultancy, Technology and Training Services

ISC provides independent, high quality control engineering consultancy and training services to the automotive industry. We specialise in advanced control strategy investigation and optimisation using high-fidelity, well validated dynamic models.
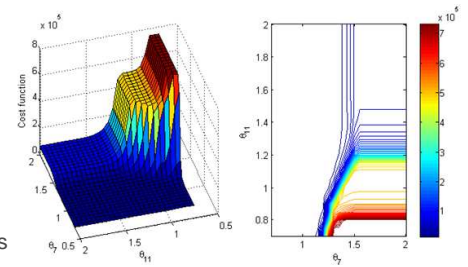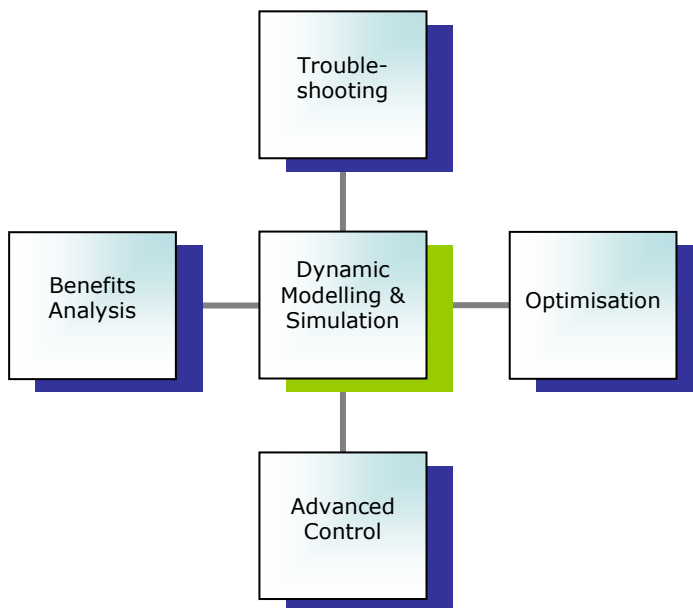
We thrive on:
- Solving challenging and practical control problems
- Providing our clients with an insight into system responses through high-fidelity models
- Optimising control design processes, methods and parameters to yield the best possible engine management.

New advanced control laws have been developed with major international automotive companies and work published on various aspects of modelling, advanced control and condition monitoring. The modelling methods range from detailed nonlinear physical models of engines to special forms of system models that are simpler to use with advanced control methods, such as state-dependent or LPV models. The control laws evaluated are designed to provide improved performance whilst limiting emissions and providing fuel savings. They range from simple nonlinear controllers to various types of advanced predictive controllers, depending upon whether gasoline or diesel engines are involved and the types of simplification that maybe required for on-line implementation. Problems of fault detection and condition monitoring, using both linear and nonlinear estimation methods, are also considered.

Solutions can range from gain-scheduling variations of classical feedback/feedforward to advanced control, such as model-based methods like nonlinear predictive control. Nevertheless, simplicity remains a key objective in our solutions, providing performance criteria can be met. Our software tools include MATLAB/Simulink and LabVIEW.

ISC can also support the development of real-time engine control, through the National Instruments range of dedicated Powertrain Controls Software and Hardware Modules. This provides a comprehensive set of actuator drivers, sensors modules and customised software operating in LabVIEW to provide fast and flexible implementation of core ECU functions. It is typically used within R&D various types of engine development (SI, Diesel and Hybrid).

Our Expertise
- In-depth understanding of control technologies
- Extensive experience in diverse industrial applications
- High-fidelity modelling of system behaviour
- Expert analysis of complex problems
- Proven project management and research skills

Our Core Competencies
- Dynamic modelling & simulation
- Nonlinear modelling and system identification
- Advanced control design and implementation
- Model-based control
- Optimisation
- Algorithm development
- Benefits analysis and technology review
- Research & Development
- Training

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

Trouble-shooting

Benefits Analysis

Dynamic Modelling & Simulation

Optimisation

Advanced Control

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

→ modelling and simulation
→ control design
→ system troubleshooting

→ technology transfer and training
→ energy efficiency investigation
→ software tools

industrial systems and control

Consultancy Service Examples

→ General Motors - SI engine nonlinear modelling and system identification
→ General Motors - SI engine control-oriented model parameter estimation
→ General Motors - SI engine advanced nonlinear model-based control
→ Toyota - Diesel engine control-oriented modelling
→ Toyota - Diesel engine advanced nonlinear model-based control
→ General Motors -SCR system identification
→ General Motors - Control model calibration
→ Torotrak - Variable transmission system

Training Services

ISC has delivered highly regarded training on control engineering to clients throughout the UK, Europe and USA, including Chrysler, Ford, Freescale, GM, Jaguar, Ricardo, Toyota and Visteon. 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 train at all levels, from introductory material for technicians, refresher for engineers, to new or advanced control techniques for research groups. We offer:

Scheduled Courses ● On-Site Courses ● Bespoke Courses

We have developed and delivered bespoke application orientated training courses for clients in the automotive, defence and aerospace and marine industries.

What delegates said about our recent training courses …

"By far one of the best that I have taken"

"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 Service Examples

→ *Visteon Case Study - Applying LabVIEW to TIVCT engine control*
→ *LabVIEW Case Study – Modelling and Control of the Electronic Throttle*
→ *Control Fundamentals: Theory & Practice*
→ *Introduction to Estimation and Kalman Filtering*
→ *Robust and Reliable Control Systems Design*
→ *System Identification*
→ *Hybrid and Predictive Control for Nonlinear Industrial Applications*
→ *ACTC/NI Control Design Workshop*
→ *Optimisation and System Identification*
→ *Advances in Real-Time Control of Nonlinear Systems*

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

Clients Include

- Chrysler
- Ford
- Freescale
- General Motors
- Jaguar
- Ricardo
- Torotrak
- Toyota
- Visteon

Course Examples

- Control Fundamentals (Theory and Practice)
- Predictive Control
- Optimisation and System Identification
- Kalman Filtering
- Overview of Modern Control
- Introduction to Robust and Multivariable Control Design
- Introduction to Nonlinear Control
- Servo Systems and Control
- Introduction to LabVIEW and Control Design/Simulation Toolkit
- Fundamentals of Dynamic Control using LabVIEW

ACTC Membership

- Training course entitlement
- Site visits by consultants for problem solving
- Free access to members-only software and technical dissemination reports
- Access to industrial forum for networking and promotion of services and products
- Free or discounted cost entry to technical workshops or academies