

INCOSE UK Spring Conference **30th March - 1st April 2009**
“The Application of Systems Engineering”



INCOSE UK SC09

Discover the latest Systems Engineering ideas and trends, **learn** about pragmatic ways to put them into practice, and **meet** the people who make them happen at the UK's premier Systems Engineering event.

The problems facing public and private enterprise are becoming increasingly complex and difficult to predict and plan for. To combat this, solutions are evolving to be more modular, flexible and integrated, requiring common infrastructure and ways of working and maximising the use of people and information to react more quickly, effectively and sustainably. Sectors such as Defence, Transport, Civil Engineering, Space and Aerospace are already making increasing use of Systems Engineering to deal with these problems, not only to produce integrated, high technology products and services, but also to guide the integration of technology, business processes, people and infrastructure to produce enterprise solutions and capabilities.

The UK Chapter of the International Council on Systems Engineering (INCOSE) is actively involved in promoting the sharing of ideas across public, industry and academic boundaries to improve best practice in Systems Engineering. The INCOSE UK Spring Conference is an annual event that has been running for over 10 years and represents a unique opportunity for organisations and individuals interested in Systems Engineering to meet and share ideas.

The theme of the INCOSE UK 2009 Spring Conference is 'The Application of Systems Engineering' and will focus on examples of the benefits and issues of a systems approach to complex real world problems.

The conference is a 3-day event:

- > Day 1 will provide a selection of world class tutorials offered by INCOSE UK members and affiliated organisations.
- > Days 2 and 3 will provide our usual mix of papers and case studies.

This year's event will feature a conference dinner (with a guest speaker – see the section on this in the brochure), plus an exhibition offering opportunities for Systems Engineering suppliers to reach existing and potential customers. As always, this year's event will provide delegates with opportunities to discover more about Systems Engineering, to network and to discuss ideas.

This year's technical programme will include sessions on:

- > The role of Systems Engineering and some of the broader change initiatives currently being considered in other sectors, such as Enterprise Architecture (EA) and Capability Management (CM).
- > Presentations and case studies describing examples of best practice in the application of Systems Engineering, including discussion of:
 - > The application of Systems Engineering technical and management processes across the lifecycle.
 - > The relationship between Systems Engineering and other disciplines such as risk, the environment, human factors and configuration management (to name but a few).

The venue for SC09 will be the East Midlands Conference Centre, Nottingham.

A message about the INCOSE Spring Conference 2009 by UK President



*Doug Cowper
President*

From the wide range of Systems Engineering definitions and guidance there is a common theme of practical application. The value of Systems Engineering good practice is realised when we apply it to solve real world problems in our projects, programmes, organisations and society as a whole.

This year's Spring Conference focusses on the application of Systems Engineering so that we may realise its value. The event complements the hosting, for the first time outside of the US, of the Conference on Systems Engineering Research (CSER). We have also added a one-day joint event in April to our programme of events for this year, to bridge between Systems Engineering research and its application.

Our exhibitors, paper and tutorial presenters bring a wide range of experience in applying Systems Engineering in a number of domains that will facilitate the exchange of knowledge in putting Systems Engineering to work. On behalf of INCOSE UK, I look forward to welcoming you all to the conference, where you will have the opportunity to share experiences, network, and discuss/debate issues with fellow Systems Engineering professionals from a wide range of organisations.

INCOSE UK Event Dinner



Alan Chambers MBE

The SC09 dinner will be held on the Tuesday evening, and will include an after dinner speech from Alan Chambers. The Event Dinner is included in two and three day packages or can be purchased separately for an additional guest or one day attendance.

Alan Chambers served with the Royal Marines in the most extreme climates, from the Arctic to the desert, the jungle and remote mountain ranges. Then, after years of planning, preparation and fundraising, he led the first British team to walk without any support services from Canada to the Geographic North Pole.

The walk on ice lasted a gruelling seventy days. Suffering near starvation and a dwindling fuel supply to cover 500 miles in the worst polar weather recorded in 100 years, they achieved what many said was impossible. It demanded an extraordinary level of commitment, focus and teamwork. Alan was awarded the MBE as a result.

Alan relates his experiences to business audiences with wonderful clarity, outlining how the values which helped them reach the North Pole apply in any competitive environment. He demonstrated this with the England rugby squad before their assault on the 2003 World Cup, and again two years later when he addressed the national cricket team before they went on to win the Ashes.

Alan now takes business leaders on polar expeditions. He believes in leading from behind, watching the team. His mantra revolves around meticulous preparations, taking tough decisions, managing emotions and questioning conventional thinking.

Alongside Pete Goss, Alan Chambers is planning to close the chapter on one of the most famous ever endeavours - following in Captain Scott's footsteps.

We are pleased to be offering six tutorials this year; covering a range of subjects and for a range of experience levels. Please sign up early to avoid disappointment. At previous events some tutorials have been oversubscribed.

All tutorials start at 0900, with registration and coffee starting at 0800. Refreshments will be available at 1030 and 1500, with lunch at 1230. For full information on the tutorials visit our conference web site.

T1 - Introduction to Using and Managing System Assurance Networks	T2 - Introduction to The Systems Modelling Language (SysML)	T3 - A Techniques Tool-Box for Defining Stakeholder Requirements
<p>Colin Brain <i>SE Validation Ltd</i></p> <p>For nearly two decades assurance networks have successfully documented and communicated why stakeholders should have justified confidence in the properties of complex and potentially risky systems. However, producing and managing them is not as easy as it first appears. This tutorial will provide delegates with a sound understanding of what kind of networks there are, why they are being increasingly required by international standards and how they can be used effectively to help plan, manage, and document system engineering endeavours. The tutorial will include practical exercises and thus will be limited to a maximum of 15 delegates. The tutorial will probably not appeal to engineers who believe that system engineering is simply a matter of capturing and satisfying quantified requirements.</p>	<p>Matthew Hause <i>Artisan Software Tools</i></p> <p>This one-day course for systems engineers introduces the Systems Modelling Language (SysML) and how it can address the needs of systems engineers. The course addresses key issues relating to systems engineers such as modelling requirements, physical and logical architectures, parametric equations, behavioural modelling, and continuous systems. It includes the 9 SysML diagrams and 3 cross-cutting notations.</p> <p>The tutorial is appropriate for systems engineers and others involved in modelling systems, which include software, hardware, and test engineers, as well as procedural systems. Examples and exercises are all based on technical examples and the current SysML specification.</p>	<p>Simon Hutton <i>Headmark Analysis Ltd</i></p> <p>Stakeholder requirements, business goals, user needs – all express what stakeholders want to achieve with a system, not how it will work or what the technical solution may be. Understanding stakeholder requirements is a fundamental element of any Systems Engineering approach, setting the scope and expectations from the start. This understanding has become increasingly important as organisations seek competitive advantage from successful systems – ones that deliver real benefit to the business or to customers. However, stakeholder requirements involve people and organisations, soft issues and wicked problems, and poorly defined boundaries. Hard analysis techniques often fail to produce useful results, and the stakeholder requirements fail to contribute anything of value to the project, quickly falling into disrepute.</p>
T4 - Systems engineering competency assessment – demonstrating the competency of your systems engineers	T5 - Creative Problem-solving – a systemic approach to creative change	T6 - Systems Thinking
<p>Jon Holt and Simon Perry <i>Brass Bullet Ltd</i></p> <p>In recent years it has been desirable for organisations to be able to demonstrate their capability (ability of the organisation) in order to gain the competitive edge and, hence, to win new business. It has come to light however, that capability is impossible to realise without having staff who can demonstrate competency (ability of the individual) in related areas.</p> <p>The overall aim of this tutorial is to provide an overview of an approach to competency assessment for systems engineers. As well as this sound theoretical overview, the tutorial will also provide a hands-on demonstration of how the assessment process works, what the results look like and what can be done with these results.</p> <p>The approach presented here, the Universal Competency Assessment Model, is currently being used as part of the MoD strategy for competency assessment that is being carried out in conjunction with The Defence Academy.</p>	<p>Adrian Terry <i>Achievement Advance Ltd</i></p> <p>This action learning based tutorial explores systemic creative change and introduces the creative problem solving model and foundational creativity tools. It considers how creativity and innovation can be harnessed in a systemic and purposeful way that can be understood and managed. It:</p> <ol style="list-style-type: none"> 1. Considers the dynamics between problem-solving and creativity. 2. Explores individual styles and how to harness these to improve productivity and quality in change, problem-solving and innovation. 3. Explores social roles and how to enhance collaborative effort. 4. Introduces the nine dimensions of a creative workplace climate. 5. Highlights the need to 'move-off solutions' and explore needs to create purposefulness. 6. Provides practice with creativity and problem-solving to gain hands on experience with some of the creativity tools. <p>The tutorial is suitable for anyone who is faced with managing change and wants to harness a group's potential to release more productive and focussed systemic change.</p>	<p>Barbara Jones <i>ConsultantQ</i></p> <p>This tutorial is designed to allow interdisciplinary and multi-cultural systems engineers to share their needs, processes, and successes in Systems Thinking. It is intended that after this tutorial, participants will be able to initiate or improve Systems Thinking at work.</p> <ul style="list-style-type: none"> > To understand what differentiates systems thinking from other forms of thinking. > To understand how to apply systems thinking in analysing and improving situations. > To share different approaches and successes. <p>Systems Thinking is used in both hard and soft systems approaches and there are a variety of techniques and tools that can be used. This tutorial will cover the following themes:</p> <ul style="list-style-type: none"> > What is Systems Thinking? > What does a Systems Thinker do? > What does a Systems Thinker need? > Tools and Techniques. > Applying Systems Thinking. <p>It will be an interactive workshop, consisting of individual and small group activities, feedback and discussion, short seminars and tutor inputs practising some of the approaches and skills covered.</p>

Conference Programme : Day 1

Tuesday 31st March 2009 : Day 1

Day 1 – Tuesday 31st March 2009

08:00	Registration and Coffee		
09:00	Opening Remarks Andrew Farncombe, <i>Technical Director - INCOSE UK</i>		

Session 1 – Enterprise Architectures

09:10	Jon Holt: <i>Brass Bullet</i>	Enterprise Architecture – Systems Engineering in the mist	Enterprise Architecture (EA) is a powerful concept that can be applied to any organisation and one that realises strong benefits. Unfortunately, like many powerful ideas, EA is often misunderstood. This paper explores several fundamental questions such as what, exactly, is EA all about? How does it impact on Systems Engineering? Is there a common approach for EA and Systems Engineering?
09:50	Tim Rabbetts: <i>QinetiQ</i> Richard Smith: <i>MBDA</i>	Architecting a 21st century System and its Enterprise	This paper reviews existing combat system technical and enterprise architectures, and outlines the Modular and Open Systems Architecture (MOSA) approach. Although parts of the architecture have been tailored to meet specific naval requirements, the overall approach is more broadly applicable. The paper indicates how the resulting architecture could be delivered by a number of potential enterprise solutions.

Session 2 – Case Studies (Part 1)

11:00	Paul Cooper, Phil Bartholomew: <i>Mott MacDonald</i>	Terminal 5 Rail Projects: An Untold Success Story	If someone was asked what memories they have of the opening of Heathrow's Terminal 5, they will probably recall the travel disruption and irate passengers portrayed in the media. This is a great injustice, since behind the media headlines were many untold success stories. The extension of two railways to Terminal 5 (the Heathrow Express and the Piccadilly Line) was one such success. The Systems Engineering applied to the design and construction of these rail extensions was another.
11:45	Gary Davis, Keith Washington: <i>Dstl, Fort Halstead</i>	Developing a system using MoDAF – a Case Study	Developers of government systems face the same challenges as product developers in the commercial world: increased capability at reduced costs in rapidly decreasing time periods. This paper describes a Model-Based Systems Engineering (MBSE) study where MoDAF has been successfully applied to baseline a new MoD system. Within four months the work has provided an Invitation to Tender to allow early teaming with Industry.

Session 3 – Systems Engineering and other disciplines

13:30	Barbara Jones: <i>ConsultantQ</i>	Environmental maturity model. Bags-for-life are not enough!	This paper identifies the strategies of eco-friendly design (green design, eco-design, sustainable design and sustainable innovation) over the full engineering lifecycle. Considering simple environmental impact measures (MET matrix, Eco-design strategy wheel), a three-dimensional environmental maturity model is proposed which can be used to examine the level of maturity in sustainable development and enable more sustainable engineering processes.
14:15	James Jenkinson: <i>Quintec Associates</i>	Def Stan 00-250: Testable Human Factors Requirements	For many years, Human Factors requirements for UK Defence systems have been specified using Defence Standard 00-25. However, complete compliance with this was, in practice, difficult to achieve, since much of the content was guidance or had conditional applicability. This paper will explain work resulting in the newly revised Defence Standard 00-250, which addresses these issues by giving each requirement acceptance criteria, thus making them testable.
15:30	Mike Brownsword, Simon Perry: <i>Brass Bullet</i>	Formalising risk assessment through the use of SysML parametrics	Many organisations carry out risk assessments but the approach taken is often simplistic, over-complicated or incomplete. One way of developing a clear and structured understanding of the factors involved is through the use of SysML parametric networks, which provide a graphical representation of the often complex relationships involved. This paper will show how the use of parametric networks can have a beneficial effect on the understanding, quantification and qualification of risk.
16:15	Andrew Tunnicliffe: <i>London Underground</i>	Towards Visualisations of Configuration Management	One of the principal areas of concern for managing large programmes is the management of risk associated with change. The central issue is one of communication. This presentation proposes better methods of communicating change. An illustration of this is shown using the Victoria Line Upgrade project, where a visualisation of the configuration has improved communication. Areas of success are highlighted and a number of improvement areas identified.

INCOSE UK Briefing on Professional Recognition

17:00	Hillary Sillitto: <i>Thales; et al</i>	Systems Engineering meets Professional Regulation: Establishing a Recognised Profession	This briefing covers the current approaches to professional recognition by the Systems Engineering community and presents the views of stakeholders captured at a workshop held by the UK Chapter of INCOSE in May 2008 and of Chapter members captured at the 2008 Autumn Assembly. It compares the professional context for systems engineers in the US and the UK, shows why a "one size fits all" approach will not work, and proposes a holistic, nested model of systems people into which all current approaches can be mapped.
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Day 2 – Wednesday 1st April 2009			
08:00	Registration and Coffee		
09:00	Opening Remarks Andrew Farncombe, <i>Technical Director - INCOSE UK</i>		
Session 4 – Capability Management			
09:10	Alan Harding, Jennifer Mollett: <i>Insyte</i> Malcolm Touchin: <i>SEIC</i>	Developing Systems Engineering Capability to support Capability Management	This paper discusses an approach to assessing, planning and maturing Systems Engineering capability to address the breadth and depth of customers' capability management problem space. This approach has been used to inform understanding of the UK MoD's Through Life Capability Management (TLCM) initiative and the benefits of a more collaborative approach to future projects in this environment. The long term aim is to produce a framework which can act as the basic language of Systems Engineering for TLCM.
09:50	James Mant, Kirsty Brown, Graeme Symes, Richard Govan: <i>Dstl, Portsdown West</i>	Learning through a Capability Investigation	Using Through Life Capability Management (TLCM), new and existing military capability is planned and managed coherently across all Defence Lines of Development. The TLCM process has 6 stages. Stage 5 is the Capability Investigation (CI). This paper is based on a recent pilot CI with industry involvement, focussing on its value and the learning outcomes for the MoD and wider community.
Session 5 – Case Studies (Part 2)			
11:00	Roger Farnham, Erik Aslaksen: <i>Sinclair Knight Merz</i>	Applying Systems Engineering to Infrastructure Projects	One application area where Systems Engineering has not always had a significant impact to date is in what might be collectively called 'infrastructure' projects: systems such as motorways, ports, power, etc. In this paper we identify what we believe to be the main barrier to the application of Systems Engineering and illustrate this with a couple of case studies. We then describe and discuss a proposed approach to overcoming this barrier.
11:45	Jonathan Cook, Merfyn Lloyd, Simon Masley: <i>UK MoD</i>	Systems Engineering in Fast-Track Military Vehicle Acquisition	The presentation will show how the application of a systems approach is helping to resolve many of the integration issues arising from the fast-track acquisition of military vehicles in the UK Ministry of Defence (MoD). The approach draws together the information, physical and human factor domains and exploits previous work that MoD has undertaken to develop a generic architecture that can be specified for future programmes and retro-fitted to older fleets.
Session 6 – Processes in the Systems Engineering Life-cycle			
13:30	Philip M'Pherson: Emeritus Professor of Systems Engineering, <i>City University, London</i>	The Values of Systems Engineering and Holistic Systems Engineering Design	There is a tendency to optimise design in Systems Engineering from the point of view of the organisation conducting the project. This may lead to the delivery of a system that is not optimised over the operational cycles to the satisfaction of all the stakeholders concerned with the system's performance and its impacts on the wider environment. The presentation argues for a holistic approach to system design in which the In-Service operational performance is paramount to the satisfaction of the set of 'operational' stakeholders.
14:15	Edwin Swidenbank, Sara Withall: <i>Thales Air Operations</i>	Use of the MoDAF Business Reference Model for the Engineering Process	For many global companies, a Business Reference Model (BRM) is used to introduce common practices. However, almost all programmes exhibit significant differences in their local processes. This paper describes an enterprise model, based on the MoDAF, which is flexible enough to cope with tailoring over several programmes, yet still able to achieve a common set of core enterprise processes.
15:30	Alan Knott, Roger Moorey: <i>Parsons Brinckerhoff</i> Barry Hodges: <i>Transport for London</i>	Implementing Progressive Assurance on the East London Line Project – Lessons Learned	The East London Line Project has defined a comprehensive argument structure for collecting Systems Assurance evidence which builds up a Technical Case to support final system acceptance. This uses a version of the Goal Structuring Notation to graphically present the Systems Assurance argument. This paper will describe how the Assurance practices are inter-related with the Systems Engineering practices used on the project. It will focus on how the original 'Progressive Assurance' concept evolved as the project moved through the life-cycle.
16:15	Andrew Stuart: <i>Westinghouse</i> Matthew Hause, Dave Richards: <i>Artisan</i>	Testing Solutions through SysML/UML	As systems become increasingly more complex and the time to market decreases, systems engineers have to develop novel solutions to testing. The scenario is particularly acute when dealing within the safety-critical domain. This paper highlights how UML and the improvements introduced by SysML can aid testing. It is based on (a) many years' experience of building and testing systems and (b) the experience gained by companies using this approach.
17:00	INCOSE UK President's Closing Remarks - Doug Cowper		

Registration and Pricing

Description	Members		Non members	
	Member	Student	Non member	Student
All three days (Mon 30 March, Tue 31 March and Wed 1 April) includes a Tutorial on Monday and the Conference Dinner on Tuesday.	£700.00 Inc VAT	£350.00 Inc VAT	£772.00 Inc VAT	£370.00 Inc VAT
2 days (either Mon 30 March and Tue 31 March or Tue 31 March and Wed 1 April) includes Conference Dinner on Tuesday.	£500.00 Inc VAT	£250.00 Inc VAT	£572.00 Inc VAT	£270.00 Inc VAT
A Tutorial on Mon 30 March.	£300.00 Inc VAT	£150.00 Inc VAT	£372.00 Inc VAT	£170.00 Inc VAT
Conference on Tue 31 March only.	£300.00 Inc VAT	£150.00 Inc VAT	£372.00 Inc VAT	£170.00 Inc VAT
Conference on Wed 1 April only.	£300.00 Inc VAT	£150.00 Inc VAT	£372.00 Inc VAT	£170.00 Inc VAT
Conference Dinner on Tue 31 March (if not included above, or for additional guest).	£35.00 Inc VAT	£35.00 Inc VAT	£35.00 Inc VAT	£35.00 Inc VAT

Non-member rates include annual membership fees that are exempt from VAT for the membership year.

The event registration will be managed for INCOSE UK by Dot The Eye Ltd. To register for the event visit our online registration facility at www.incoseonline.org.uk. Here you can register for the event and pay by card through a secure payment facility with Lloyds TSB Cardnet via Protx. Options to pay by cheque or company order are also available.

If you are unable to take advantage of our on-line registration facilities please contact Dot The Eye Ltd either by email at: enquiries@incoseonline.org.uk or by Telephone: 01460 298217 or Fax: 0845 280 5304.

Please book early.

Accommodation

Accommodation is available at the conference venue in the University halls of residence at £50 inc VAT for an en-suite bedroom and breakfast per person per night. This can be booked as part of the conference registration.

Alternatively you may use the venue's Hotel Reservation Service to book your own accommodation in one of the nearby hotels. The Hotel Reservation Service is a centralised resource, which is in daily contact with hotels in and around Nottingham with whom it has negotiated preferential rates. If you wish to discuss your hotel requirements with someone from the HRS team please call: 0115 951 3640 or email: hrrs@nottingham.ac.uk

Exhibition and Sponsorship

SC09 offers a unique opportunity for suppliers of Systems Engineering products and services to reach a highly focussed audience. Space is available during the conference for exhibitors. Details of available exhibition space and sponsorship arrangements (including discounts for UKAB member companies) are available on the INCOSE event website:

www.incoseonline.org.uk

Registration and Pricing cont...

Venue

The East Midlands Conference Centre Nottingham is a flexible purpose built venue located on the University Park Campus, a few miles from junction 26 of the M1 motorway.

At the heart of the building is the recently re-furnished conference theatre with retractable tiered seating and state-of-the-art AV facilities. The dramatic light filled Atrium provides a generous space for delegates to meet over coffee, and includes additional meeting/tutorial rooms.

The venue also includes free parking for up to 350 cars and onsite accommodation if needed.

For full details and pictures of the facilities, plus detailed directions etc. go to the venue website: <http://emcc.co.uk/perfect.htm>

INCOSE UK & CSER Joint One Day Event – 23rd April 2009

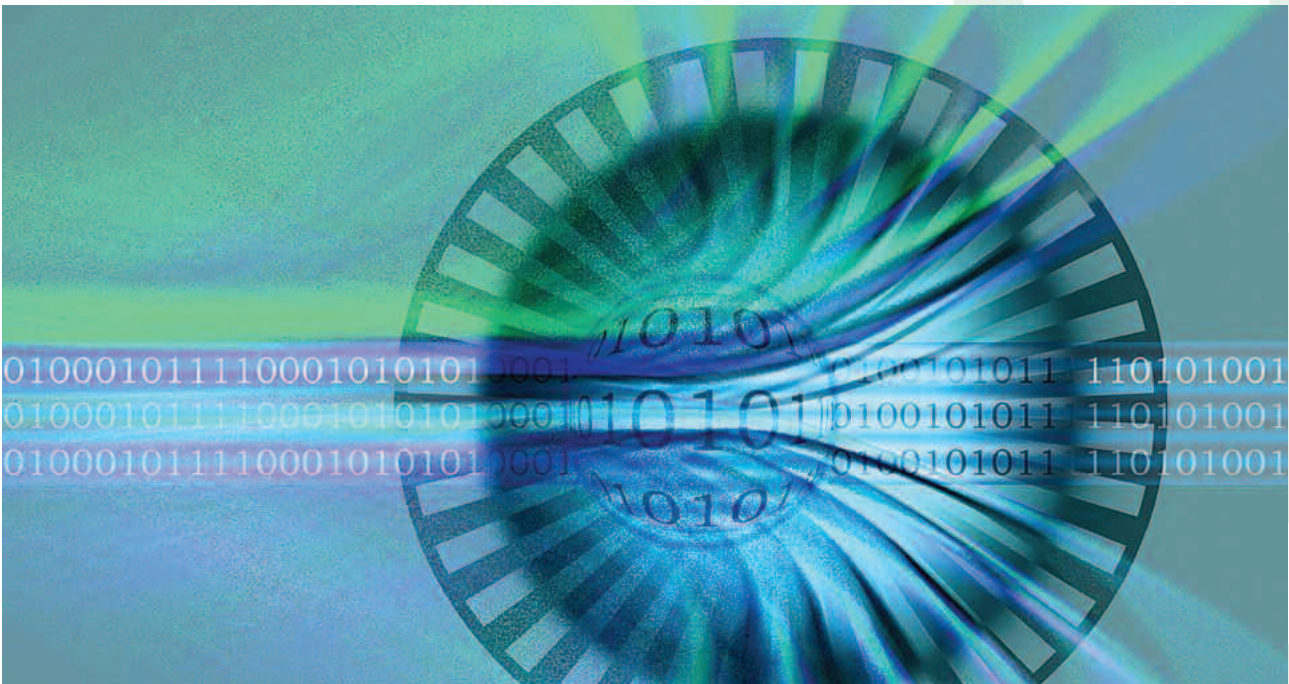
The theme of the INCOSE UK 2009 Spring Conference has been chosen to complement the International Conference on Systems Engineering Research (CSER) which will be held outside the US for the first time at Loughborough University from 20 - 22 April 2009. To take advantage of the opportunity provided by these two Systems Engineering events, INCOSE UK and Loughborough University will host a joint event on 23 April 2009 at the Systems Engineering Innovation Centre (SEIC) in Loughborough.

The aim of the joint day is to bring system engineers from academia, industry and government sectors together to discuss the strengths and weaknesses of the current links between Systems Engineering research and application.

The event will contain briefings by invited speakers taken from the leading Systems Engineering academics attending the CSER conference and cross sector representatives of the industrial and customers' perspectives. There will also be an opportunity for delegates to discuss key issues such as "What it means for the UK and other Systems Engineering aware nations to be Value Added System Integrators in a global supply chain" and "What does Industry need or what does Academia feel Industry is lacking?"

The international Conference on Systems Engineering Research (CSER) will contain academic papers on research into Systems Engineering processes and innovative systems technologies together with presentations from Systems Engineering practitioners on the exploitation of Systems Engineering research.

For more information and to register go to: <http://cser.lboro.ac.uk/>



Programme changes.

While INCOSE UK will make every effort to provide the programme as advertised it may become necessary, for reasons beyond our control, to make changes to speakers and or to the timing and content of the programme. INCOSE UK will not be liable for any costs incurred by delegates in relation to such changes.

Please refer to our web site: www.incoseonline.org.uk for full information and any last minute changes.

The International Council of Systems Engineering (INCOSE) is a not-for-profit membership organisation founded to develop and disseminate the interdisciplinary principles and practices that enable the realisation of successful systems. INCOSE has grown significantly since its formation in 1990.

Today, there are over six thousand members representing a broad spectrum – from student to senior practitioner, from technical engineer to program and corporate management, from science and engineering to business development. Members work together to advance their technical knowledge, exchange ideas with colleagues, and collaborate to advance Systems Engineering.

INCOSE UK is supported by the following organisations that make up the UK Advisory Board (UKAB).

The UKAB advises the Chapter Board on aims and strategy, and co-ordinates working group activities with the Technical Director.



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INCOSE UK **Spring Conference 09**

Register at www.incoseonline.org.uk