In This Issue:

2 ...... President's Corner
       The UK President reports on his activities over the last few months.

2 ...... Become a Chartered Engineer through INCOSE
       Details of a new agreement between INCOSE and the IET.

3 ...... By-law Changes
       Important changes to INCOSE’s by-laws.

3 ...... Election of INCOSE UK Officers
       Details of new UK Communications and Events Directors.

4 ...... Candidates standing for INCOSE President-Elect
       Introducing the three candidates for the post of President-Elect to INCOSE International.

4 ...... Systems Engineering Effectiveness Study
       The Business Case for Systems Engineering Project.

5 ...... INCOSE International Symposium 2011
       A summary of events at the recent INCOSE UK Annual Conference.

6 ...... SEBoK open for Review
       The latest version of the Systems Engineering Book of Knowledge is available for your review.

9 ...... From the corner...
       Innovation versus experience.

10 ...... The UK Advisory Board (UKAB)
       Members and contact information.

12 ...... Events Calendar

13 ...... Tutorial Days 2012

14 ...... Local Groups and Working Groups

15 ...... The Back Page
President’s Corner

Welcome yet again to the President’s Corner. As usual, the recent weeks have been extremely busy and there is much to reflect on. This time, I would particularly like to highlight some of our activities focussed outside of INCOSE UK that provide benefits to members through broader relationships and networks.

In an earlier President’s Corner I outlined our initiative to provide a ‘collective voice’ for Systems Engineering in the UK in support of policy development and strategic decision-making. Our first practical output was a set of formal comments on the MOD’s Green Paper on Equipment, Support, and Technology for UK Defence and Security (ESTUDS). Following this, the MOD/INCOSE relationship has continued to develop, first with a very constructive meeting between INCOSE UK and the MOD’s Director Safety and Engineering (D S&E) and his staff, which is being followed-up by a joint MOD/INCOSE UK workshop to explore practical steps towards the embedding of a Systems Approach within Defence. The workshop is being led on the MOD side by the Head of the Systems Engineering and Integration Group (SEIG) and includes a variety of INCOSE UK experts drawn from individual members and UK Advisory Board (UKAB) companies.

The constructive dialogue developing between MOD and INCOSE is perhaps unsurprising given the traditional strength of systems engineering in Defence – and let’s not forget that MOD is a longstanding member of the UKAB – but we are starting to see that similar engagements may be valuable in non-traditional areas of systems engineering. For example, we have started to explore the merits of working together with professional bodies and others in the civil engineering domain. Early discussions have been promising and there is likely to be something more concrete emerging soon.

The recently launched partnering agreement between INCOSE UK and the Institution for Engineering and Technology (IET) is another excellent example of the value to be derived by working with other groups outside of INCOSE. In this case, the cooperation is aiming, in the first instance, to help UK systems engineers in their professional development. One of the challenges for INCOSE UK members is to understand how best to develop their career in the discipline of Systems Engineering. Internationally, INCOSE has promoted a development route through the certification scheme (ASEP, CSEP and ESEP) – and this is beginning to bear fruit. However, within the UK there is a long tradition of professional development through Chartership and this is already part of the strategy being followed by many organisations and individual engineers. We are therefore delighted to have reached an agreement with the IET to provide a cost-effective route for systems engineers who are members of INCOSE to become Chartered. We see our members following a dual route of CEng (or IEng) and CSEP which sets them out specifically as having systems engineering competence. [There is more on this elsewhere in this issue of ePreview.]

Regarding the relationship between INCOSE UK and INCOSE at the international level, I reported a while ago that we had been in discussion with ‘Central’ about how value is delivered to members and the role of ‘National Chapters’ in this. The INCOSE Board of Directors has recently developed a proposal to establish ‘Sectors’ within INCOSE, each with a Sector Director – and the intent of this proposal is to improve the direct influence of Chapters on the Board of Directors. Over the next couple of months, the entire INCOSE membership will be asked to vote on this proposal – we will shortly be sending out full details for you to consider. In brief, it is proposed that there will be three Sectors and the Sector Directors will be elected by Chapter Leaders. The initial thoughts of the UK Council are that although the proposal does not address all of our concerns it is a step in the right direction; we will therefore be supporting the proposal.

Finally, I must mention the annual conference, ASEC2011. We have an excellent programme this year with many eminent researchers and practitioners presenting papers, giving tutorials or making an input in some other way. Despite the ongoing economic turmoil advanced registrations have been very good but there are still places left. The conference remains the best and most productive networking opportunity for systems engineers and I look forward to seeing you there.

Dr Mike Wilkinson
President INCOSE UK
email: president@incoseonline.org.uk

Become a Chartered Engineer through INCOSE UK

One of the challenges for INCOSE UK members is to understand how best to gain recognition as a professional involved in the discipline of systems engineering. The preferred approach within INCOSE has been to follow the ASEP-CSEP-ESEP route – and this is beginning to bear fruit. However, this ‘international’ approach is not always cognisant of local conditions in particular countries, like the UK, and we know from a number of membership surveys that achieving Chartered status through INCOSE UK has been one of the top priorities for INCOSE UK Members for some time.

To this end the role of Professional Development Director was created on the UK Council, with a main objective to create a route for professional/career development that would meet the expectations of both individual members and the organisations. On taking up the role of Professional Development Director last autumn Mr Ian Presland has worked tirelessly to forge a budding partnership with the IET to enable INCOSE Members to be awarded Chartered status without having to join another society, the first phase of achieving the overall objective.

We are therefore delighted to announce that we have reached an agreement with the Institution of Engineering and Technology (IET) to provide a cost-effective route for systems engineers who are members of INCOSE to gain Chartered Engineer (CEng) status, registered through the Engineering Council. The scheme also supports registration as an Incorporated Engineer (IEng) (as well as EngTech and ICTTech if required).

Professor Michael Wilkinson, President of INCOSE UK and Mr Nigel Fine, Chief Executive Officer of the IET signing the agreement
There are other key benefits of this scheme – such as access to the IET’s team of volunteer professional registration advisors to assist with the professional registration process, and access to the IET Career Manager tool, through which members can record their background, experience and continuing professional development activities online.

If you log into the members area of our website www.incoseonline.org.uk, under the menu option of Professional Development you will now find information on how to become a Chartered Engineer through INCOSE UK, frequently asked questions and an option to start the process.

To become a Chartered Engineer through this route you must be a fully-paid up member of INCOSE UK, and will need to pay the following fees:

**Annual Associate Membership** (via INCOSE UK–IET Agreement)
- CEng / IEng – £34 (compares to £120 full IET membership fee)
- EngTech / ICT Tech  – £17

**Assessment Fees** (one off fees as part of application)
- CEng / IEng – £173
- EngTech / ICT Tech – £52

**Engineering Council Registration Fees** (to maintain registration)
- CEng – £46
- IEng – £36
- EngTech, ICT Tech – £15

In summary, the INCOSE/IET agreement is a major step forward for the professionalisation of systems engineering in the UK. We are confident that it will deliver significant benefits to INCOSE UK members.

**By-law Changes**

Dear Members,

We are writing to advise you of important changes to INCOSE’s by-laws, and would like to ask Chapter Members to take the time to review these changes and vote on them.

You are being asked to vote on the following changes to the INCOSE by-laws:

- Establish the right of the Board to define three global sectors spanning the geographic distribution of INCOSE chapters;
- Establish the right of the chapter presidents within each sector to appoint one voting Director to a three-year term on the Board of Directors;
- Remove all mention of the Member Board and all appointments and elections associated with that body.

So What? Well, this change will mean that there will be three members of the INCOSE Board of Directors who will each be directly accountable to National Chapters, providing a means of escalating issues such as dissatisfaction with the level of service provided by INCOSE Central directly to the Board of Directors, rather than the current convoluted mechanism going via the Member Board, which tends to get bogged down in US specific issues. We anticipate that this will give the UK a stronger voice as part of a collective European voice, with direct influence where it matters.

The Board has already approved a number of changes which are within their current authority which will be implemented if the by-law changes are approved by the members.

These include:

- Approving the creation of Chapter and Member Support Committees as standing committees appointed by the Board of Directors and transferring elected Member Board Regional Representatives into these committees for continuity;
- Agreeing to the external spokesperson role of the three Sector Directors;
- Defining the staggered terms for the three Sector Directors to ensure continuity on the Board;
- Defining the three sectors: the Americas; Asia (excluding Russia, Israel and Turkey) and Oceania; and Africa, Europe, Russia, Israel, and Turkey.

If approved, the by-law changes will take effect on 1st December 2011.

For more information on the details please visit the news section of our website where a number of documents on the subject can be downloaded.

You will receive an e-mail during the first week of November from INCOSE Central with your instructions for voting electronically.

All of the members of the INCOSE UK Council will be voting in favour of these changes and we recommend that you do the same.

**INCOSPE UK Council**

**Election of INCOSE UK Officers**

Following the call issued during the summer for candidates to step forward for the posts of INCOSE UK Events Director and Communications Director, only a single nomination was received for each of the posts. As the candidates are standing uncontested we are able to proceed directly to their appointment without a formal vote.

On behalf of the UK Council, I am therefore very pleased to announce that from 10 November 2011 Ian Gibson from Jacobs Sula will become the new Events Director and Robbie Forder from BMT Hi-Q Sigma will be the Communications Director. Ian has been serving as Communications Director for the last few years and Robbie has been serving as BMT Hi-Q Sigma’s representative on the UKAB. The personal statements from Ian and Robbie are reproduced below for your information. I wish them both good luck in their new roles.

I would also like to take this opportunity to thank Rick Adcock for his sterling work as Events Director over the last five years - I know Rick will continue to take a keen interest in the Chapter while expanding his role with INCOSE Central. I would also like to thank Ian Gibson for establishing the Communications Directors role within the UK Council and look forward to working with him on forthcoming events.

**Mike Wilkinson**

**INCOSPE UK President**

**Events Director**

**Ian Gibson:** Events are central to the existence of INCOSE UK as a forum for debate and discussion, and over the past 7 years I have been heavily involved in running free Bristol Local Group events, and also took a lead role in organising both of the INCOSE UK One Day Events that have been held in Bristol so far, ensuring that everything came together successfully on each of the days. My current position on the INCOSE UK Council as Communications Director has given me plenty of exposure, experience and involvement in the realities of running large scale events, so I feel well placed to...
continue the good work that Rick Adcock has set in motion during his time as Events Director. Should I be elected to the position, I will seek to maintain the high quality of our events, looking to expand their scale when economic circumstances allow it. I will also look to support the expansion of Systems Engineering outside of its traditional domains through collaborations with other organisations where appropriate.

**Communications Director**

Robbie Forder: With the imminent introduction of Certification and Chartership into INCOSE UK, despite the downturn, I believe there is a real opportunity for INCOSE to change gear and start to attract a wider membership. Those that know me will know that I am an engaging and enthusiastic contributor to any collaborative initiative so INCOSE can expect a highly active participation from me should I be selected for this role. My overarching objective will be to promote Systems Engineering in our existing industry domains and seek to spread the message into new sectors. I currently work closely with both the strategic and marketing functions within my current position so I would expect to fit into this role with relative ease.

**International President-Elect Candidates Webinar**

INCOSE Webinar 36 was held on October 19th, 2011. If you missed the webinar, you will be able to see a recording of it on INCOSE Connect at: http://www.incose.org/practice/webinars.aspx

You can also view the previous thirty-five INCOSE webinars here.

This webinar is in a moderated forum where the candidates for INCOSE (International) President-Elect will present position statements and discuss their responses to the issues facing INCOSE as we move forward. The Candidates are:

- **David Wright** is currently Director for Logistic Initiatives with Lockheed Martin UK, Simulation Training and Support. He joined INCOSE in early 1995 and became a regular attendee at UK Chapter events. David is a Chartered Engineer, a Fellow of the Institution of Electrical Engineers, and serves as Associate Director Leadership Development for INCOSE.

- **Stephen Cook** is the Director of the Defence and Systems Institute and the Technical Director - Systems Engineering of the Defence Systems Innovation Centre. Stephen is a Past President of the Systems Engineering Society of Australia.

- **Andrew Pickard** moved from Derby in the UK to lead the Rolls-Royce Engineering group in Atlanta, working in the areas of conceptual design and advanced materials. Andrew is a Fellow of the Institute of Materials, Minerals and Mining, a Chartered Engineer, a member of the American Institute of Aeronautics and Astronautics, a member of the SAE Aerospace Council, and Chair of the INCOSE Corporate Advisory Board.

Pat Hale, INCOSE Past President and Chair of the Nominations and Elections Committee was the moderator for the discussion.

The webinar is a combination of PowerPoint slides + audio.

INCOSE Elections Open on the 31st October, 2011.

**Systems Engineering Effectiveness Study**

Dear Members,

INCOSE is participating in the Systems Engineering Effectiveness Study being conducted by a joint committee of the National Defense Industrial Association (NDIA), the IEEE Aerospace and Electronic Systems Society (IEEE-AESS), and the Software Engineering Institute (SEI).

**Background**

In 2006 through 2008, the NDIA Systems Engineering Division conducted the Systems Engineering Effectiveness Study (SEES). Through anonymous and confidential survey techniques, this study identified statistical relationships between the application of specific SE practices to development projects and the performance of those projects, as measured by satisfaction of budget, schedule, and requirements. The results, published in 2007 and 2008 clearly demonstrated the benefits of SE, showing that:

- in the set of projects applying the least SE, only 15% delivered the highest levels of performance;
- in the set of projects applying the most SE, 56% delivered the highest levels of performance.

Based on the success of the 2008 SEES, the NDIA Systems Engineering Division decided in early 2010 to update and enhance it by broadening the population to include more domains, and by gathering data from a larger sample. They launched the “Business Case for Systems Engineering” (BCSE) project to accomplish this.

**BCSE Project**

The objective of the BCSE project is to gather sufficient data from current and previous projects to enable creation of a framework for improving performance of development projects through the effective application of Systems Engineering activities.

This study will survey individual product-producing projects to assess 1) the characteristics of the project, 2) the SE activities applied to the project, and 3) the resulting project performance. Completion of the survey will require approximately 30 minutes for each project. Data will be analysed to ascertain the statistical relationships between specific SE activities and project performance. Like the previous survey, data security and confidentiality will be paramount.

**Participation**

If you or your organisation would like to participate in this study or if you would like more information about the SEES, please access their website at: www.sei.cmu.edu/go/bcse2/

Reports, papers, and presentations are available for download from the BCSE web site.
The 21st Annual INCOSE International Symposium (IS 2011) took place from the 20th to the 23rd June 2011 in Denver, Colorado, USA.

Further details can be found on the event website:
http://www.incose.org/symp2011/

Fifteen members of the UK Chapter attended IS11 in Denver this June, and were enthusiastic representatives of our nation and our chapter. This level of engagement befits the second largest chapter in INCOSE, and we were involved at all levels from overall INCOSE strategy, key roles in Working Groups, through to presenting individual papers. This short summary is my personal perspective on the key topics that were discussed, and other goings on of interest to a UK audience.

The International Symposium is a Big Event – 824 INCOSE members attended with an additional 70 guests, representing fifty-five countries. Most chapters were represented (62 out of 80), giving the event a really global feel. The Asian and Far-East sectors of INCOSE continue to expand, and together with an already-strong European contingent gives good balance to the historically large US membership.

The theme to the event was the continued increase in how much all aspects of our lives are interconnected, and the key role that systems engineers and systems thinking plays in making this happen.

• Professor Tsuyoshi Fujita from Japan discussed the role of SE in architecting and reconstruction after recent tsunami/nuclear events;
• Chris Barkey from Rolls-Royce plc gave what a powerful keynote on our role in ensuring customer and societal benefits from our products, framed in a video that even moved some sceptical old systems engineers;
• Vice Admiral (USN Ret.) Conrad Lautenbacher talked to us about Global Earth Observation System of Systems – a fascinating and complex SOS with truly global scope and ramifications;
• Kedric Brown from IBM looked at telecommunications and how complexity and connectedness has grown so remarkably over the years.

My observation from these keynotes and many discussions with fellow INCOSE members is the applicability of systems engineering and systems thinking to such a diverse range of activities – whether national regeneration, global coordination or product realisation within our businesses. More and more people, including senior stakeholders, are using the term “systems thinking” correctly when referring to the need to understand systems as a whole, and to use this understanding to inform decision-making. Our role as systems engineers is to promote systems thinking in these kinds of situations, using language that our audiences understand – we are there to do the translation from “systems speak”.

The other major theme this year was the importance of systems engineers as leaders, regardless of our specific role in an organisation. John Thomas (President-Elect, INCOSE) refers to it as “Systems Engineers with Moxie” but unless you happen to be an American from New England you won’t know that Moxie, a soft drink, is synonymous with courage or spirit. John sees INCOSE’s key attribute as helping develop all of us, pushing to raise the bar for the contribution of systems engineers to achieve enterprise and societal outcomes. As professionals we should all be able to lead appropriate to our individual context – whether as effective team-members who challenge and offer constructive feedback to our seniors, or as managers and directors where effective, ethical leadership is expected of us. This theme links well with INCOSE UK’s emphasis on professionalism in systems engineering, underpinned by competency frameworks, career paths, Chartered status, and professional certification.

INCOSE Strategy and Direction

One of INCOSE’s important roles is to maintain a future vision of systems engineering, which is currently a view of SE in 2020, published in 2007. That vision identified areas that have steadily grown in importance since its publication, including the growth of model-based approaches, and increasing demand from industry for SE certification as the part of on-the-job training.

At IS2011 we launched an activity to refresh this forward vision in a new product to be titled “SE Vision 2025: SE solutions for societal needs”. This updated is expected to include visions in specific domains, overall systems engineering trends, and consideration of opportunities, and threats. It is really important that INCOSE members from UK contribute to this refresh along with a wide range of international colleagues, so that the new vision truly reflects worldwide trends and challenges.

Increased voice for Chapters in INCOSE strategy

Over the years that I have attended International Workshops and Symposia, there has been lively conversation about the relationship between chapters and INCOSE’s central organisation. One particular topic has been the balance between the proportion of individual member subscriptions that funds the central organisation, and how much is are available for the work of the chapters.

Previously these discussions have gone round in circles. At IS11 we made a key breakthrough, with the unanimous endorsement of the Board, by agreeing proposed changes to by-laws to create three Sectors within INCOSE, each with a Director representing the interests of their chapters on the Board. These Directors will be personally responsible for understanding the needs of the chapters in their sectors (likely to be the Americas, EMEA - Europe, Middle East and Africa, and Asia-Pacific) and will help steer the Board on issues such as overall organisation, fees, and evolving INCOSE to be a global organisation.

Members of the UK Chapter leadership (Mike Wilkinson and Alan Harding) have been personally involved in this work and we urge members to vote to ratify the by-law changes in the ballot during November 2011.
News on Professional Development

INCOSE Systems Engineering Certification is a formal method for recognizing the knowledge and experience of systems engineers, regardless of where they may be in their career. Establishing the certification scheme has been one of INCOSE’s two Strategic Initiatives for some time, and it is maturing well – at the time of IS11 it had over 885 SE professionals:

- 50 Expert Systems Engineering Professionals (ESEP)
- 721 Certified Systems Engineering Professionals (CSEP)
- 114 Associate Systems Engineering Professionals (ASEP)

Take-up of the scheme by individuals (as a method of distinguishing themselves) and organisations (as part of internal development schemes) is also healthy with the most recent company Memorandums of Understanding announced with BAE Systems Land & Armaments Business Sector, and TASC Inc.

In the wider field of professional development there is continued healthy interest in SE Competencies, and their use in support of personal development. Eileen Arnold chairs the new International Competency WG, and during IS11 also chaired a Competency Panel which was standing room only! The aim of the Competency WG is to add to the existing INCOSE SE Competency Framework with increased emphasis on “soft skills” and links between SE and PM disciplines.

INCOSE UK papers recognised

Once again papers submitted by INCOSE UK members were honoured with Best Paper awards at the Symposium. This year two papers were recognised.

Hillary Sillitto from Thales UK, and an INCOSE Fellow, was recognised for his paper entitled “Unravelling Systems Engineers from Systems Engineering: Frameworks for Describing the Extent, Variety and Ambiguity of Systems Engineering and Systems Engineers”.

The second UK paper was a joint paper from our UK Capability Working Group entitled “Capability Engineering - An Analysis of Perspectives”, authored by: Michael Henshaw, Loughborough University; Duncan Kemp, Department of Transport UK; Peter Lister; Andrew Daw, Harmonic; Alan Harding, BAE Systems; Andrew Farncombe, John Boardman Associates; Malcolm Touchin, SEIC.

Systems Engineering Body of Knowledge

The last aspect I wanted to mention is BKCASE. This programme is led by a university partnership between the Stevens Institute of Technology and the Naval Postgraduate School, both in the USA. The programme’s twin aims are to define a Systems Engineering Body of Knowledge (SEBoK); and to develop an Advanced Graduate Reference Curriculum for Systems Engineering (GRCSE).

Version 0.5 of the guide to the Systems Engineering Body of Knowledge was released on 19th September at the website www.sebokwiki.org.

The SEBoK V0.5 is a collection of 29 knowledge areas containing 115 topics, 7 case studies, 7 vignettes, and 5 use cases. It contains 166 primary references, and hundreds of additional secondary references. It has a glossary with 389 terms.

The SEBoK is one of the main outputs of the BKCASE project (www.bkcase.org). INCOSE, the IEEE Computer Society, the IEEE Systems Council, the Association for Computing Machinery, the National Defense Industrial Association, and the Systems Engineering Research Center were partner organizations in the development of the SEBoK. Primary funding was provided by the Office of the Deputy Assistant Secretary of Defense for Systems Engineering, with significant contributions in kind coming from the home organizations of the authors.

A number of UK authors contributed significant effort to this milestone, in particular Richard Beasley (Rolls Royce) and Hillary Sillitto (Thales UK), Rick Adcock ( Cranfield University), Mike Henshaw and Charles Dickerson (Loughborough University). In addition many UK reviewers contributed their opinions and expertise and some collaborated closely with authors and offered material, in particular the members of the INCOSE UK Architectures and Capability working groups - our thanks to all of you.

Version 0.5 is the second release. Version 0.25 was released in September 2010 to limited review, and over 3000 comments were received from 114 reviewers. Based on those comments, Version 0.5 represents a significant improvement. The final version is planned for release in September 2012.

Version 0.50 is released for world-wide review. Over the next three months, we are soliciting feedback through the discussion tabs on each article, and through a general form found in the left margin of each page under the tab, “Note to Reviewers.” On December 15th, this feedback will close, and we will again compile comments and begin another adjudication round.

INCOSE UK would like to encourage all its members to contribute to this review. Please feel free to distribute further in your various communities.

Dates for your diary in 2012

- International Workshop 2012
  - 21th-24th January 2012, Jacksonville, FL, USA
  - Hyatt Regency Jacksonville Riverfront
  - 225 East Coastline Drive
  - Jacksonville, Florida 32202, USA

IS2012

The 22nd Annual INCOSE International Symposium (IS 2012) will be held in Rome from July the 9th to the 12th, 2012.

Members are encouraged to submit papers, panels and tutorials for this IS 2012 event. The deadline for proposals is: the 8th of November 2011.

Find below a link to the INCOSE IS 2012 pages on the website: http://www.incose.org/symp2012/

Potential contributors can find further details on the Submissions page.
INCOSE President Samantha Robitaille and Michael Henshaw

High school Robotics project

BAE representatives

Public art at the convention center

INCOSE President and Duncan Kemp

Delegates meet the INCOSE President

Lawrence Argent’s “I See What You Mean”

Symposium Dinner

Denver skyline

Symposium Venue – the Colorado Convention Center
**UP-SKILLING MANY OF UNITED KINGDOM’S MOST SUCCESSFUL ENTERPRISES**

**UNIVERSITY OF YORK COURSE PROGRAM 2012**

See how best practice enterprises continue to turn to PPI’s leading-edge training to improve their employees’ abilities in completing projects on time, on budget and to the delight of stakeholders.

**Systems Engineering**
5 - Day Course - Presented by Mr. Robert Halligan
20 - 24 Feb 2012 London
23 - 27 Apr 2012 London
29 Oct - 02 Nov 2012 London
This course is certified by ECSA for 5 points (ref. INCOSE 11/002/13)

**Requirements Analysis & Specification Writing**
5 - Day Course - Presented by Mr. Clive Tudge
03 - 07 Sep 2012 Bristol
15 - 19 Oct 2012 Manchester
This course is certified by ECSA for 5 points (ref. INCOSE 11/001/13)

**Systems Engineering Management**
5 - Day Course - Presented by Mr. Clive Tudge
27 Feb - 02 Mar 2012 London
This course is currently in the process of becoming certified by ECSA

We also offer the following courses on-site, plus many more:
- OCDs & CONOPS in Capability Development 5-Days
- Cognitive Systems Engineering 5-Days
- Software Development Principles & Processes 5-Days
- Integrated Product Teams 3-Days
Consider on-site training for savings in course fees of up to 50% over public courses.

INCOSE UK members are also eligible for an additional 10% discount.

For further information on the courses listed above, or to request a proposal for on-site training, please visit [www.ppi-int.com](http://www.ppi-int.com)

Project Performance International
PO Box 2385, Ringwood North
Victoria, 3134, Australia
Tel: +61 3 9876 7345
Fax: +61 3 9876 2664
contact@ppi-int.com
When is coming up with an innovatively designed system better than relying on experience of using tried and trusted devices? Or vice versa?

Well, sometimes the designing engineer has no choice. There has been new legislation that prohibits building any more units of the old design. The raw materials are no longer available, and can’t be synthesised or manufactured. The design is going to be used in an environment it was not designed for and is likely to fail. The design costs too much to build again. The person who is going to use it has become allergic to some of the materials in the design. This list of reasons could go on a quite a bit.

Whatever the reason, the design engineer has to come up with something new. The first response will be to try to find a way to modify the design as little as possible. After all, this is the most likely to save to time, cost and work. This approach is very much part of the ‘make do and mend’ culture, something I am sure you are all familiar with.

This ‘made do and mend’ can bring its own problems with it. With a change here and a change there, the design morphs into something very different from the original. Think of car models. How many times have you heard phrases like that was that year’s model, which did not have such and such? This ‘make do and mend’ leads to its own interesting configuration issues, as I’m sure you can well imagine.

So, what other situations lead to the need for invention over relying on experience?

There is the one-off build, like Heathrow’s Terminal 5, the Chunnel and the Brabazon. The what, you may well ask?

The Brabazon was a large propeller-driven airliner designed to fly transatlantic routes, carrying 100 passengers in spacious conditions. A prototype was delivered in 1949 and its size was similar to a Boeing 767. However the airlines at the time felt it was too large and expensive to be used, and it was broken up for scrap in 1953. If only…

The Brabazon was not the only project ahead of its time. The Chunnel was as well, with the first tunnels being dug in 1881, well over a whole century ahead of building the successful tunnel.

These are big projects. I know from experience that innovative ideas on a very much smaller scale also get rejected, only to see the light of day years later. They were rejected by experienced engineers and suffered from the ‘not invented here’ syndrome.

Admittedly the turnaround for the smaller projects from rejection to implementation was much shorter than the big scale ones. Why? My guess is that entrepreneurs have the resources to invent, build and push to sell small devices that fulfil a need. They don’t for the big projects, where pooling of resources is a must. So are we developing into a culture where technology is concentrated in the small, easy to produce gadgets?

So far, all the invention noted above has been in response to a need, a kind of invention pull. What about invention push?

Under what circumstances can invention push occur? Well, where would you find inventions with no apparent usefulness?

One place I can think of is the entertainment business in its various forms and guises. Kites, once children’s toys, are now being used to reduce the fuel used by long-distance cargo ships. The gizmo used in Star Trek to check someone’s health is being actively developed at the behest of DARPA.

This does not mean relying on experience is a bad thing to do. Experience allows us to avoid pitfalls that we know happened in the past. It also allows us to come up with a solution more quickly than if we had to start the design from scratch.

Let me give you a non-engineering example. Every now and again I like to solve the odd chess problem. I was looking at one the other day and worked out which lines to examine using ‘rules of thumb’. I found one of two possible solutions almost immediately, which was too quick for my normal snail’s pace at these things. I then got that nagging feeling I’d seen something similar before and decided to check my notes. I found I had actually solved the same problem five years ago. Then it had taken me hours and hours to get to the right answer. Why? Because I was working out the ‘rules of thumb’ from scratch then.

These days, experience is being reinforced by the recording and comparatively easy access to data, whether it is in old-fashioned libraries or in computers or on the internet. It’s been done this way before, so it becomes the easy solution to follow. How many stories have we heard about user and system requirements being written the way the customer wants the system to be built? Worse, how many times are old user and system requirements dusted off an old project and inserted into a new project, just because the requirements engineer is short of time or cannot be bothered with all the hassle?

If the requirements rely on such data or the experience behind it, will the user know any different?

Not really. He has nothing to compare his system against.

On the other hand, if innovation is used in the new system, the user can always compare it to what might have been. Innovation, any innovation, needs to be proved to be useful. The user requires assurance that it will benefit him or her. So innovation has an uphill struggle compared with reliance on experience.

Which may be why at the moment innovation comes mainly as a result of need. Experience reduces the use of resources and is the favoured design paradigm.

System engineers seem happy with this. So why do I have this nagging feeling?
News from the UK Advisory Board (UKAB)

Firstly, I would like to welcome the organisations who have recently joined the UK Advisory Board: Cranfield University, Purple Secure Systems and Lockheed Martin UK Amphill. Together with the existing member organisations, the UKAB continues to grow and assist the Chapter in driving the profession forwards.

During the last year the UKAB has been reinforcing its ties with the Council of the UK chapter, providing particular consultation with individual members of the council, as well as making significant contributions to Council led initiatives on professionalisation and specific outreach activities. This has included reviewing the draft agreement with the IET for professional registration and the related web based application facilities, providing an initial group of trained supporters for the registration process, providing trial run candidates for registration and supporting the launch event with the IET. Similar activity is underway with the SEP scheme, with the draft agreement with INCOSE central under review at present. Outreach activities involving UKAB support include supporting the Chapter’s response to the Defence green paper, involvement in the EPSRC Systems Engineering Workshop, and a joint workshop with SEIG on the implementation of the System of Systems Approach. Council and UKAB are in the process of a setting up of an External Relations Committee with a view to increasing the outreach and influence activities conducted by the chapter. Meanwhile the UKAB continues to support a number of working groups on specific topics and has recently held an exploratory session to test the viability of a potential working group on Systems Engineering for Small and Medium Enterprise. Whilst it seems that there is currently insufficient support/need for the formation of a working group per se, several useful actions have been identified for independent action by those participating in the discussion. It is intended that a brief account of the discussion will feature in the next edition of Preview.

I would be glad to hear from other organisations that are interested in joining the Advisory Board. Please contact me at: chris.lamb@incose.org.

Regards,
Chris
UKAB Chair

UKAB Members
BMT Hi-Q Sigma has expertise in all areas of programme management and systems engineering across several sectors. We use this experience to develop and deliver training courses that are:

- rich with relevant and practical information
- delivered by our most experienced consultants who are also accomplished trainers
- interactive, and engage delegates through discussion, case studies and exercises
- continuously improved using feedback
- able to provide a solution to satisfy the business needs and objectives

We have designed and delivered tailor-made training to support some of the most complex projects and diverse organisations.

**Our public courses include:**

**PT002 – Enterprise Architecture Overview – 1 Day Course**
Bath - 27th October 2011 and 12th January 2012

A one day course which will enable a greater coherent understanding to be achieved of the practical application, challenges and benefits of the utilisation of an Enterprise Architecture in the integration of systems and Programme Management.

**PT003 – Applying MODAF in Acquisition – 2 Day Course**
Bath - 7th/8th December 2011 and 15th/16th February 2012

A two day course which provides system engineers, programme managers and project staff with the practical skills they need to apply MODAF in a way that supports and informs acquisition decisions. Incorporates discussions on the benefits of MODAF and the challenges of implementing Enterprise Architecture within defence.

**Your Next Step**

Request further information on these courses from our Training Team by emailing training@hiqsigma.com or 01225 820980. Visit our website at www.hiqsigma.com

“Where will our knowledge take you?”
### INCOSE Events Calendar

For updates, more information and registration visit the INCOSE UK website at [www.incoseonline.org.uk](http://www.incoseonline.org.uk)

<table>
<thead>
<tr>
<th>Date/Time</th>
<th>Organisation &amp; Location</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>16 November 2011</td>
<td><strong>INCOSE Associates</strong></td>
<td><strong>Off-The-Shelf (OTS): Making it work for the MOD</strong></td>
</tr>
<tr>
<td>All Day</td>
<td>Bailbrook House Hotel, London Road West, Bath, BA1 7JD</td>
<td>Commercial OTS, Military OTS or just plain OTS, and the desire to use as much ‘standard’ readily available kit is an attractive option in these times of heightened financial pressures. Going ‘off the shelf’ is surely a way to reduce costs? Of course, there are pros and cons to the use of any solution and OTS will undoubtedly offer both advantages and disadvantages. It is important therefore to establish as much background to the impact of OTS to ensure it delivers effective solutions and that decision makers’ eyes are opened to the micro, macro, short term and long term impacts. OTS is too important a subject to be the object of superficial examination. This industry workshop and consultation will draw on the knowledge that exists in the marketplace and attempt to identify clear tasks and responsibilities to provide constructive debate and decision making on the future use of OTS. The workshop is being organised and facilitated by Niteworks, the MOD-Industry partnership, and sponsored by Dr Chris Mace, Director Defence Support Review.</td>
</tr>
<tr>
<td>22 November 2011</td>
<td><strong>Railway Interest Group</strong></td>
<td><strong>Decision Making from Data: Causes and Uncertainty</strong></td>
</tr>
<tr>
<td>17:00 for 17:30</td>
<td>London Underground, 55 Broadway, London SW1H 0BD</td>
<td>This talk describes a case study in the use of data and probabilistic modelling for decision making and the wider applications of the principles to other problems in Systems Engineering. The case study, an on-going collaboration between Queen Mary University of London and RSSB, concerns the safety of rail passengers using stations. RSSB co-ordinates the Rail Industry’s collection of passenger incident data and this data is used to track the risk of different categories of accidents. However, rather than ‘what is the current risk?’ what if we want to know ‘How can the risk be reduced?’ For this, we need to model causally: how far would the risk be reduced by feasible safety improvements. We show that incident data alone is not sufficient for this: we need to integrate other sources of data and use probabilistic modelling to approximate complex relationships.</td>
</tr>
<tr>
<td>22 November 2011</td>
<td><strong>South Coast Local Group</strong></td>
<td><strong>Complexity Science - by Dr Jason Noble</strong></td>
</tr>
<tr>
<td>19:00 - 21:00</td>
<td>Xyratex Technology Limited, Langstone Road Havant Hampshire PO9 1SA</td>
<td>Complexity science looks at systems with many parts that interact to produce global behaviour that cannot easily be explained in terms of the behaviours of individual components but only as a result of their interactions. Complex systems include IT networks, ecosystems, brains, markets, cities and businesses. Recent developments in complexity research have brought together ideas from the study of complex adaptive systems, systems biology, physics, environmental sciences, engineering, and information technology to create exciting new research directions and innovative cross-disciplinary activities. The push from industry to solve complexity challenges has produced a massive response from the UK research funding councils and the academic community. The University of Southampton’s Institute for Complex Systems Simulation (ICSS) was launched in 2009 and is jointly funded by EPSRC (£6 million) and the University of Southampton and its partners (£6 million). The Institute brings together world-class simulation modelling research activities from across the University of Southampton and hosts Southampton’s Doctoral Training Centre (DTC) in Complex Systems Simulation. Dr Jason Noble is a research fellow at the University of Southampton and works in the Agents, Interaction and Complexity group. He has a D.Phil. in Cognitive and Computing Sciences from the University of Sussex and a B.A. in Psychology, from Macquarie University, Sydney. His career has included positions at the Max Planck Institute in Berlin and at the University of Leeds. The talk will review the status of complexity science as an academic discipline, introduce the ICSS and describe the skill set we are imparting to our PhD students, and present a few examples of interdisciplinary complex systems research at Southampton.</td>
</tr>
<tr>
<td>29 November 2011</td>
<td><strong>Railway Interest Group</strong></td>
<td><strong>Defence in Depth - Identify Defence Elements within a Railway Transport System</strong></td>
</tr>
<tr>
<td>17:30 18:30</td>
<td>London Underground’s offices in 55 Broadway, London SW1H 0BD</td>
<td>The RIG is honoured and delighted to be able to announce that Alain Cointet of RATP has agreed to talk to us on the topic of “Defence in Depth: Identify Defence Elements within a Railway Transport System” on Tuesday 29th November 2011, 1730H-1830H. The presentation will take place at London Underground’s offices in 55 Broadway, London SW1H 0BD.</td>
</tr>
<tr>
<td>Date/Time</td>
<td>Organisation &amp; Location</td>
<td>Description</td>
</tr>
<tr>
<td>----------------</td>
<td>--------------------------------</td>
<td>-----------------------------------------------------------------------------</td>
</tr>
</tbody>
</table>
| 30 November 2011 18:30 for 19:00 | Bristol Local Group Room 1N05, UWE Frenchay Campus, Bristol | Organisation and Behaviours - Systems Engineering within the wider enterprise  
More details to follow. See events page at: www.incoseonline.org.uk |
| 25 January 2012 18:30 for 19:00 | Bristol Local Group Room 1N05, UWE Frenchay Campus, Bristol | Nuclear Power - how can a systems approach help?  
More details to follow. See events page at: www.incoseonline.org.uk |
| 15-16 February 2012 - Full Days | INCOSE Associates Shrivenham, GB | Systems Approaches for Future Defence Capability  
The Defence Academy of the United Kingdom at Shrivenham is hosting a symposium on Systems engineering for Defence, sponsored by the Director of Safety and Engineering, who is responsible for MOD's engineering Strategy. The event, organised by the Department of Informatics and Systems Engineering of Cranfield Defence and Security at the Defence Academy, is one of the series of Symposia at Shrivenham, to be run on Wednesday 15th and Thursday 16th February 2012 in the Defence Capability Centre Conference |
| 19-22 March 2012 Full Days | INCOSE Associates Hilton St Louis at the Ballpark, | 10th Annual Conference on Systems Engineering Research (CSER 2012) |
| 28 March 2012 18:30 for 19:00 | Bristol Local Group Knowledge Exchange Suite, Merchant Venturers Building, University of Bristol, Woodlands Road, Bristol, BS8 1UB | Systems Research Showcase  
Once again, this event will feature three EngD students presenting their findings so far from their research. |

**Tutorial Days 2012**

Following the success of this year’s tutorial days, the Events Team is planning to run two more tutorial days next year. They are scheduled for **Wednesday 14th March** and **Wednesday 20th June** 2012.

A **call for tutorials** was issued to members on 1st of November and can be found on the website (www.incoseonline.org.uk) under the dates of the two tutorial days in the events calendar. If you know of anyone who might be interested in presenting a tutorial who is not a member of INCOSE please bring this call to their attention.

An overview of the call for tutorials

INCOSE UK is inviting individuals or organisations to offer full day tutorials to be delivered on either Wednesday 14th March or Wednesday 20th June 2012. An honorarium is payable to presenters to encourage individuals to take part and to cover expenses.

Tutorial days provide an opportunity for INCOSE members to explore new topics and extend their knowledge of Systems Engineering practice. Our target audience ranges from those looking for an introduction to well established subjects to those with an interest in ‘cutting edge’ techniques and approaches. We therefore welcome proposals that will enable us to offer a balanced tutorial programme that will appeal to all sectors of the Systems Engineering community. We are open to new content as well as established favourites.

Submissions must be made by **23 November 2011**, for more details please visit the events section of www.incoseonline.org.uk.

A decision on which tutorials will be presented on each of the tutorial days will be made in early December. Successful tutorial presenters will be informed by the middle of December and registration will open shortly after that.
The Bristol Local Group held the last event of their 2010-2011 events programme on Wednesday 13th July, looking at the topic of:

"The Final Step - Getting Systems Into Service".

This interactive workshop event took the question of "Why does the final part of getting a system into service often follow a more protracted path than expected?", and examined this important part of the lifecycle from both a systems and a project management perspective to identify some of the pitfalls and issues that can occur, and some of the approaches that are used to mitigate against them.

Colin Brain acted as the chair and facilitator for the session, assisted by Paul Handisides, and followed on from his initial scene setting presentation by asking "Who is responsible for getting systems into service?". Some held the view that it was the End Users responsibility; others thought it was a matter of collaboration between End User and Vendor. It was noted that acceptance normally affected the balance of responsibilities, and responsibilities would differ between entry into service and in service itself. It was also noted that for large complex systems, a raft of new and existing organisations would be engaged to bring a system into service.

This led to a discussion as to whether End Users get what they want/need/had been contracted for them, when a system enters service. Views included:

- "End users need to be involved early and throughout"
- "End Users may not have the vision of the solution"
- "An End Users view of a Systems purpose is subjective, and can differ between stakeholders. Therefore the stated requirements are paramount"
- "It’s easier to write a system requirement than a user requirement"

The meeting moved on to discuss change. One participant described how requirements are handled in the mobile phone industry, where phone operators are often the source of new requirements or changes, as they interact directly with end users. Standards committees set requirements to enable the network components to interoperate (or operate), with various stakeholders (including the phone operators) vying to ensure that the standards are of benefit to their own organisations. Developers then implement changes to maintain competitiveness and generate revenue in response to changing requirements and changing standards.

The issue of System Boundaries was raised, since issues can arise across those boundaries when a system enters service. One attendee commented that "even with standardised Interfaces, problems can occur". It was suggested that the provision of a service over time approach, (with reference to the Rolls-Royce model), could solve the ‘Entry Into Service problem’. It was pointed out that the effectiveness of the "Power by the Hour" service approach) "depends on whether something is new or a change or replacement to an existing system".

Following on from this, an attendee wondered whether any system could be considered as ‘New’ in this sense as they require a significant change to the supporting infrastructure. This prompted a discussion about hybrid cars as a bridging technology and the use of subsidy to encourage sufficiently rapid introduction of infrastructure to enable a new technology to achieve critical mass.

The meeting then went on to consider measures to mitigate risks that can compromise a system’s entry into service. One observation was that "on London Underground, the customer intends to run the new systems in Shadow Mode, operating but not controlling the movement of trains for a period to enable problems to be smoothed out". It was noted that this may not always be possible with Heathrow Terminal 5 being cited as an example of this, where despite rehearsals, staff were not given sufficient time to get to their duty stations.

Other observations made during this section of the event included:

- "There is a cost associated with Commissioning Tests"
- "Does not the mobile phone example illustrate a case where a system of system issue arises when the new system operates in context?" (when it enters service)
- "It comes back to how to communicate System Boundaries"
- "Rolls Royce has a specific organisation with the expertise to take a new system into service"

Colin then summarised the discussion, with inputs from participants:

1. It is essential to define the organisations, roles and responsibilities to take a system into service;
2. It is essential to design mechanisms to handle the introduction of changes before, during and after service entry;
   a. by considering how this can be done in a development contract;
   b. by considering how this can be done once the original developer has completed the development contract (including by the third party);
3. Practitioners need to recognise that when a system enters service, it will encounter issues and risks which are inherent in its domain.

Reflecting on this meeting, the organisers formed a view that "putting into service" is a problem because it is usually a “system of systems” issue and most “classical” systems engineering approaches are geared to taking single systems from requirement definition to verification against those requirements.

Quite a gap there between those two situations...
And finally ...

It may be controversial but ... INCOSE Systems Engineering Certification, what do UK Systems Engineers think? Is it worth bothering with, or is CEng the better route for recognition within the (UK) industry. It's certainly the case that if you're looking for alternative employment you won't currently find any UK employers asking for a Systems Engineering Professional (SEP) certification but you will find most employers looking for a CEng as proof of competence. Now that INCOSE and the IET have reached an agreement that enables INCOSE UK members to more easily achieve CEng status through IET associate status what does this mean for the future of SEP in the UK? Do we need some sort of convergence or modification of the SEP and CEng process that fits with the UK model?

What do you think? What competency framework is your work based professional development based upon: INCOSE, IET or something else? I'd welcome any comments or points of view. (preview-editor@incoseonline.org.uk)

Steve Fisher
Preview Editor

If you have an event you would like publicised in Preview, or wish to contribute an article, please contact the Preview Editor, Stephen Fisher by email at preview-editor@incoseonline.org.uk

Not an INCOSE Member?
Join INCOSE UK To-day!

How do I join?
Fill in the on-line application at www.incoseonline.org.uk

What does it cost?
Full members pay £95 per annum (reducing to £90 if paying for a full year by direct debit). Students pay £35 per annum.

Membership subscriptions are eligible for tax relief. The UK Chapter has been approved by the Board of Inland Revenue under Section 201 Income and Corporation Taxes Act 1988.

What are the benefits?
- A UK and World-wide Forum for Systems Engineering
- UK and International Interest Groups, Working Groups and Conferences
- A chance to influence the way Systems Engineering develops
- The opportunity to network and learn from other Systems Engineers

Preview is the Quarterly Newsletter of the UK Chapter of INCOSE, the International Council on Systems Engineering. All INCOSE UK members receive a copy of Preview, in addition to the regular e-mail bulletin ePreview. INCOSE UK Members may also download the quarterly Systems Engineering Journal, and INSIGHT, the INCOSE Newsletter.
Preview is the Quarterly Newsletter of the UK Chapter of INCOSE
the International Council on Systems Engineering.