In Brief

Autumn Assembly another Great Success!

The Autumn Assembly was held at Tortworth Court, Gloucester, during October 2007. It proved a great success, and the large number of members who attended were treated to a wide range of interactive workshops and opportunities to network. There are reports from several of the workshops in this newsletter, starting with an overview report on Page 6. You will also find details of the plans for future events on page 18, starting with the Problem Solving one day event on 24 January 2008.

INCOSE UK Annual General Meeting

The AGM was held during the Autumn Assembly. A full quorum of more than 5% of the membership was present, and for the first time proxy voting was used to elect the Board of Directors. All Board positions were confirmed, as were the Board appointed roles. A full report is on Page 4.

Notice of intention to make past INCOSE UK Conference Papers centrally available

INCOSE plans to release all UK INCOSE/NCOSE papers from the UK Conferences prior to 2000 in the near future. We believe our existing author release notices allow this since they address release in the UK. However, if any member does not want his or her paper released to all members and later to the public, he or she should notify comms@incose.org and ipcontrol@incose.org to withhold his/her paper.

Editorial

Welcome to this Autumn Edition of Preview, the quarterly newsletter of INCOSE UK.

Here’s a thought for you to ponder. As this edition took shape within the random formatting generator that is MS Word® I found myself wondering if Systems Engineering is becoming a victim of its own success. One of my regular contributors teases us inside by asking who does the systems engineering of systems engineering. Who defines the context, sets the requirements (and verification criteria), validates the design and produces the acceptance evidence? What is the scope of systems engineering? These should be relatively simple questions to put to a body of systems engineers. It should be even easier to answer as you read the latest newsletter of INCOSE UK, but I am afraid the content doesn’t help us this time. Indeed, this edition is testament to the growing diversity of systems engineering, making it difficult to really grasp and explain the scope. Inside you will find summaries of several of the workshop sessions held during the Autumn Assembly. Topics range from soft systems and competences to systems dynamics and architectures. In-service systems are not forgotten, as sometimes we get excited about capabilities, goals and requirements and forget about the real world. The UK Advisory Board has grown over the past few months to represent industry, academia, consultancies large and small, and even tool vendors! The local groups go from strength to strength, and the events planned look at programme management, synergies between space and rail (not on the West Coast Main Line, surely?) and interfaces and emergence. Even next year’s International Symposium doesn’t help us tie things down, with a theme that aims to address the expanding scope of systems engineering application and responsibility.

But is this expanding scope good for the discipline? ‘Creep’ is something systems engineers discourage, isn’t it? Will it make us jacks of all trades and masters of none? Will we find that we have diluted things so much that the boundaries blur and we can’t explain what we are there for? Or is it time to get back to basics, in true political fashion?

Enjoy this breadth of this edition, but if you feel it is getting too broad and shallow you know where to write and express your opinions!

Simon Hutton
Editor
INCOSE UK
INCOSE UK Joins the Engineering Council

One of the Chapter’s policies in promoting Systems Engineering has been to work with other organisations whose activities and interests overlap with ours. When that overlap also extends to the status of our members and the questions of accreditation, we have a double incentive for establishing at least some form of working relationship.

Members should already be aware that we have a formal agreement with the IET that covers various joint activities and common interests, largely at a promotional level. The Board is now pleased to announce that the Chapter has been invited to join the Engineering Council as an Affiliate. Note that this does not give us Royal Charter status. That is something that has traditionally taken many years to achieve, usually for organisations much larger than ours and which is now actually being discouraged for new organisations because of a general desire at Council level to see the various Institutions amalgamating rather than multiplying. What affiliation does give us is the opportunity to have a voice (and ears) at the Engineering Council level and the opportunity to enter into “buddying” relationships with one or more of the Chartered Engineering Institutions and with whom we might either discover or develop common cause on the matter of accreditation for systems engineers as well as extending and broadening our opportunities for promoting the discipline.

In seeking affiliation, the Chapter has already been approached by one Institution with a view to developing a number of topics of common interest in the field of systems engineering. These topics include the possibility of supporting a move to creating a title of Chartered System Engineer under the Royal Charter granted to that Institution. It would be imprudent to say more at this stage since discussions are at a very early stage and more was raised on this approach at the Autumn Assembly. During the Systems Thinking session I opened up for general discussion the whole matter of working with others on SE topics after I set out what it is that makes SE distinctive.

This is an important time in the growth of our organisation. Numbers are growing steadily. We have a very active and growing Advisory Board that has already produced a competency framework document; there are the newly forming regional and working groups all of which is in keeping with the pioneering spirit that the Chapter has a reputation for. At the back of all of this there is an emerging and quite distinct UK flavour of SE which is rapidly becoming our leitmotif.

One area that we have been less successful at as a Chapter (arguably) is in engaging the membership. So, let me at least try to remove any concerns over barriers to participation. Anyone with a particular interest in making a contribution in this area is invited to contact me at alllen@gba.net. I would like to hear from anyone who just has questions or might have something specific to say and requires a platform, or, even if you’d like to get involved in the discussions with other Institutions, then do contact me.

Finally, and just to show that we always try to think outside of the box, we are certainly not limited to peer relationships with the Engineering Institutions. Discussions have already been held with Institutions for Physicists and Mathematicians in the past. We may not seem to have much in common with one or two of our fellow EC affiliates, such as the Institute of Asphalt Engineers, but then, who would have thought an old civil engineering sparks like myself would end up in INCOSE?

And did you know that some of the best practical systems thinkers are in the nursing profession? See http://www.bsn-gn.eku.edu/BEGLEY/GSThand1.htm#top

Allen Fairbairn
Chapter Secretary
INCOSE UK

ECUK - The Engineering Council

About ECUK

Under its Royal Charter, ECUK regulates the engineering profession in the UK and formally represents the interests of UK engineers abroad. It is a Designated Authority under the current General Systems Directives.

ECUK’s mission is to set and maintain realistic and internationally recognised standards of professional competence and ethics for engineers, technologists and technicians, and to license competent institutions to promote and uphold the standards.

The ECUK Vision is to provide a clear means to ensure that employers, clients, government and society can have confidence in the skills and commitment of engineers, technologists and technicians.

The engineering profession in the United Kingdom is regulated by ECUK through 36 engineering Institutions (Licensed Members) who are licensed to put suitably qualified members on the ECUK’s Register of Engineers. The Register has three sections: Chartered Engineer, Incorporated Engineer and Engineering Technician. These titles are protected by the Engineering Council’s Royal Charter and may only be used by registrants.

In general there is no restriction on the right to practise as an engineer in the UK. Registration, which is renewable annually on payment of a fee and provided that there has been no violation of codes of professional conduct, is recognised as desirable in many fields of engineering employment and provision of engineering services but is not mandatory. There are a small number of areas of work, generally safety related, which are reserved by Statute to licensed or otherwise approved persons.

All candidates for registration as Chartered Engineer, Incorporated Engineer or Engineering Technician must satisfy the competence standards set by ECUK and be members of the appropriate Licensed Member engineering Institution. Applicants must show that they have a satisfactory educational base, have undergone approved professional development, and, at interview, must demonstrate their professional competence against specific criteria.

ECUK spells out its role

In 2002 the old Engineering Council was split into two organisations - the Engineering & Technology Board (ETB) and the Engineering Council UK (ECUK). Five years on and there is still confusion in some quarters about the nature of their respective roles.

Basically, ETB is responsible for promoting engineering and professional registration, while ECUK has the job of regulating the profession – a function that requires it to maintain the national register of Chartered Engineers, Incorporated Engineers and Engineering Technicians and to set the standards of competence that govern the
award and retention of these titles. ECUK’s extensive duties include monitoring and supporting its 36 licensed engineering institutions to ensure correct and consistent application of the standards for registration, as well as those that lay down the requirements for degree accreditation – which is another important area of its work. Moreover, it does much to foster and facilitate co-operation between the institutions in order to disseminate good practice.

ECUK has also been heavily involved with important educational and training developments. For instance, it has coordinated the creation of the MSc in Professional Engineering, a new work-based learning approach to attaining CEng registration. It is active too at earlier stages of the engineer ‘formation’ process, as evidenced by its participation in the development of a number of the 14-19 Diplomas, particularly the one for engineering.

Among its many other commitments, ECUK is a member of various international organisations and agreements, which has allowed it to exert real influence outside the UK. This has benefited not only individual registrants – some 50,000 of whom are domiciled overseas – but also UK engineering businesses and our system of engineer education.

**Professional Affiliates**

Professional Affiliates of ECUK such as INCOSE UK are organisations that can participate in the development of the engineering profession through opportunities to network with other like minded bodies and by access to information on major issues which affect engineering and the engineering profession. Affiliation to ECUK acknowledges the contribution and importance of organisations that enhance engineering knowledge.

Simon Hutton
Editor
INCOSE UK

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**From the corner…**

...Quis custiodet ipsos custiodes?

The old Roman saying of ‘Quis custiodet ipsos custiodes?’ readily translates to ‘Who guards the guardians themselves?’ It’s like: Who banks the banks? ; Who does the mathematics of mathematics? ; Who sets the requirements for setting requirements? ; Who is the systems engineer of systems engineering?

Now there’s a thought. System engineering all types, variants and deviations of systems engineering. But before we leap into the esoteric heights of meta-to-the-nth-power systems engineering let’s take a look at possible (but probably not exhaustive) types of system engineering.

One common one is the waterfall or Vee diagram. On the left-hand side of the Vee, requirements are stipulated in outline at the top of the Vee and then developed in more and more detail down the Vee until you reach the point where the whole system is built and used. Sounds nice and simple in practice, which is probably why it is used so widely. One problem with this is how the first set of requirements at the top of the Vee is stipulated. Are they actually realisable in the context in which the desired system is to be used? Furthermore, for a large system, requiring many components and being versatile enough to do a wide range of jobs, this method can be labour intensive. It is not therefore not surprising people have been looking at trying to modify and slim this method.

Then there’s the (evolutionary) spiral development method. This starts like the Vee diagram with an initial set of requirements. The system is then developed until it is realised that the requirements need changing possibly because equipment tests have thrown up some unexpected results or there’s a better understanding of the environment. The requirements are then altered and you start again taking what you’ve learned from the previous work where possible. In practice the choice of system solution expands its possibilities until such time as the solutions can be whittled down to what will end up being a single choice. This needs careful overall control to ensure the aims are met, especially when some of the unexpected changes can occur. This method tends to concentrate on parts of the problem, which in turn can lead to a sub-optimal engineering solution i.e. it was the best decision at the time and the rest of the system with consequent weaknesses is built on this decision.

An up and coming method counteracts this problem by considering ALL the potential issues from the start in a systematic manner. This has been called the fusion method, though it may have other names. Here the problem is to get all the information into a succinct form from which the right decisions can be made. Progress is being made in this area, but more is required.

All the systems engineering methods have achieved success under the right conditions. It is very much a case of choosing the right method. Or to put it another way (with apologies to a certain UK Chapter committee member and Shakespeare), from Hamlet Act 3 Scene 1:

*To Vee, or not to Vee; that is the question:*

**Whether 'tis nobler in the mind to suffer**

*The slings and arrows of those righteous comments,*
*Or to take arms against a sea of troubles,*
*And by opposing end them? To make: to build;*
*No more: and by build to say we end*
*The heart-ache and the thousand desired wants*
*Systems are heir to, 'tis consummation*
*Devoutly to be wish'd. To make, to build;*
*To build, perchance create: ay, there's the rub.*

But it still leaves us two serious problems. Who sets down the initial requirements and who does the systems engineering of systems engineering?

O B Server
In accordance with the AGM calling notice, sent to all members at the due time in September, the Annual General meeting was held at Torkworth Court during the course of our Autumn Assembly event. The meeting commenced a few minutes after five in the presence of 55 members and was chaired by an ex President of INCOSE UK - Paul Davies.

This was the first AGM held in accordance with the new rules on Proxy voting agreed at the AGM in October 2006. The new rules also permitted that a minimum of 5% of members should be present, (which there were), or vote using the proxy procedure. Secretary Allen confirmed that he had received a small number of Proxy voting forms, all of which were in favour of the Board's proposals.

President Andrew Daw reported on activities during his first year in office concentrating on the growing influence of INCOSE in the UK with particular reference to other professional bodies. On the International Scene Andrew referred to the positions on the International INCOSE Board held by UK members Samantha Brown, Ayman El Fatartry and David Wright.

He also advised that our management team was strong as were our finances and we finished the last year on June 1st with over 550 members for the first time.

Secretary Allen Fairbairn confirmed that he would be filing the annual report to Companies House by the deadline of 28th October.

Finance Director Peter Lister confirmed that the finances were in a healthy position and that our turnover in the previous full year had doubled to £243k. This was due to a number of factors including our participation in, and financing of, EuSEC 2006 in Edinburgh and to the exceptionally high attendance that we attracted to the Spring Conference in April 2007. Anyone wishing to see a copy of the annual financial statement please contact Allen.

Rick Adcock reported briefly on our events during the year including EuSEC 2006, and Spring conference 2007. He also advised that we were currently at our only major event in this INCOSE financial year due to the IS 08 being held in Utrecht next June and we were participating in that.

Allen then reported in more detail on our becoming an affiliate member of the Engineering Council over the last twelve months and other potential relationships.

Paul then conducted the election, naming the Board members for the coming year and these were confirmed in position without exception by a show of hands.

President Andrew Daw
President Elect Douglas Cowper
Immediate Past President Hillary Sillitto
Finance Director Peter Lister
Secretary Allen Fairbairn

Paul also announced that existing Board appointees would continue in their current positions. The main appointments are:

Communications Gordon Woods
Technical Director Andrew Farncombe
Events Director Rick Adcock

President Andrew advised what he saw as key Issues for 2007/2008. These included continuing to grow our relationships with other organisations as with The Engineering Council.

A major continuing theme / issue is the work that we are doing with / through UKAB on CSEP and Competencies. We had to resolve exactly how this programme would be established to provide the benefits that our members sought. In addition we would be increasing the focus on development of local groups and anticipated wider activity in the European region.

The meeting finished at 5.55 pm just in time to participate in the networking over a few drinks in the Atrium lounge.

John Mead
Administrator
INCOSE UK

At the time of writing the UK membership stands at 589 which is our highest ever at this time of the year. It could be another record year by the time we get round to our current financial year end on next May 31st 2008.

There are about 30 of you for whom we do not have a correct email address. If you do not receive ePreview, the monthly edition of Systems Engineering News distributed by email you are probably one of them. If you would like to receive it, and other membership communications please email me at john.mead@incose.org and advise your current address and other details.

John Mead
Administrator
INCOSE UK
Hello all,

Simon, as outgoing editor, has offered me a few column inches to introduce myself, so here I am. My name is Malcolm Gardner and I live near St Albans, just North of London.

Socially: I am married with a 2 year old boy and keep myself busy with Adventure Racing and sailing a small, stupidly fast high-performance dinghy called a Cherub. Cherubs are more of an engineering project than just a boat, so it is a good way of keeping my hands dirty with carbon-fibre, hydrodynamics and smiles.

A Warm Welcome to Your New Editor!

I am very pleased to introduce Malcolm Gardner, who has become my new best friend by volunteering to take on the INCOSE UK Editor role! Malcolm introduces himself below, and I know that you will continue to give him the positive encouragement and support I have enjoyed. I wish him every success in taking Preview and ePreview forward.

INCOSE Presidential Elections 2007

The 2007 election of officers includes the position of President Elect, a 2 year tenure leading to the role of President. The President is the senior officer and spokesperson for INCOSE, providing leadership and strategic direction for the organization. Due to unfortunate circumstances in global postal services, delivery of INCOSE ballots to nine Region III Chapters has been delayed. Because of this delay, the INCOSE BOD have decided to extended the ballot deadline to 31 December 2007. This deadline applies to all INCOSE members. As a result, election results will be announced no later than 4 January 2008.

The three Presidential candidates are from Region III, with two coming from the UK Chapter. They all attended our Autumn Assembly during October, and took the opportunity to share their ideas with the excellent turnout.

Samantha Brown has been an INCOSE member since 1999, and is currently the Technical Director. Her vision for INCOSE has four main themes – Participation, Partnership, Professionalism and Performance. Samantha promised that, if elected, she will "continue to commit my time and energy to INCOSE, pursuing these themes to deliver my Vision - a vibrant and respected organisation which is increasing capable of meeting the aspirations of its members and the needs of society."

David Wright joined INCOSE during 1995, and took on the role of INCOSE Treasurer during 2006. David’s vision is centred on the membership. He tells us that "I am committed to a re-engagement with you, the membership. I want INCOSE to listen to what individual members are saying, to formulate plans, and rapidly to implement those plans so we better address your needs and desires. I am equally determined to establish a closer, more dynamic and interactive relationship with our Chapters, the bedrock of INCOSE. This dialogue is vital for our continued success and will ensure we are well positioned to deliver real value to members."

Paul Schreinemakers has been an INCOSE member since 2000, and has served on the Board of the Dutch Chapter, including a spell as Chapter President. He is also General Chair of the 2008 International Symposium. Paul is keen to recognise and exploit the diversity in INCOSE to improve INCOSE products, noting that "involving members of different cultural backgrounds in creating these products will encourage tailoring them to the diversity of appreciation."

Further details of each Candidate and their visions for the future of INCOSE are available on the INCOSE web site. Don't forget to use your vote before 31 December – INCOSE is a membership organisation, and it will only continue to thrive if you, the members, actively participate. What better way to start this involvement than by voting for the future!

Simon Hutton
Editor
INCOSE UK
Autumn Assembly 2007

Well there is one thing which you all agreed, and probably only one, and that was the venue and how delightful you all found it. We get to the detail shortly but on the venue Excellent! and similar comments were made by several of you. I was disappointed that no-one mentioned the trees but you cannot have failed to notice some of the truly gigantic and impressive trees around the building itself. Anyway excellent venue and surroundings is a good start.

While we are on the venue there were many positive remarks about the food, to one I notice it was the thing that he liked best about the event ( not sure how to take that!). Getting it was not always easy and the coffee on one occasion was “absolutely dreadful” according to one. I have let the hotel know all of your views.

I should explain why we were there as it will answer other points that came up frequently in your responses. After our usual Spring Conference format sold out with everything from tutorials, formal dinner, drinks reception, event handbook, even some squeezed in exhibition stands that there was not really room for and 204 people when we were planning for 150 the Autumn Assembly was deliberately designed to be a less complex affair. So; no formalities or tutorials, no formal dinner, exhibition etc but a simple get together for workshop like activities with lots of networking, in a comfortable old country hotel – and I think that is what we got. It really cannot be necessary to have a formal dinner for networking, in fact I think it restricts it to just the few at your table, but we thought – a bit last minute- that a free drinks reception would be great for networking and apparently you all, bar one, agreed enthusiastically that it did.

I have to agree that administration was perhaps “a bit flakey” on the day, however there was really no excuse for not knowing what was on and when as it was exactly as given in the brochure two or three months previously and that this was so was stated in the joining instructions sent to everyone registered in the week before the event. If you lost your brochure it was also on the website but we cannot make you read it! All that you did not know was where, and it was only a choice of two rooms. Yes we had also prepared a table of what was where, which was always available on the registration desk, but it would have been better if a copy had been included in the delegate packs. Noted for future events.

Most, that used it, liked the new on line registration system and it will provide a better service next time as it is developed further - even getting attendee lists out on time we hope. You did all got them eventually. We will not get one system that suits all but more and more of you and your sponsors have been asking for online booking so finally we have it thanks to Peter Lister’s determination.

One difficulty when organizing these events is to decide which venue to choose 6 months in advance when you have only a very loose idea how many will attend. You certainly do not know the likely split when doing workshops. The Tortworth hotel did have other rooms available, and yes at extra cost but this was not a deciding factor –they were mostly on other floors and although offered to each of the most popular session leaders each thought that they were better co-located in and around the two big rooms. With the hotel claiming a capacity of
100 classroom seating in each of our large rooms, and 200 in theatre style we rather thought that temperature etc would be manageable with our maximum number reaching 92 for just one session. Just think how warm it may have got with 200 in each of them. So yes a slightly uncomfortable compromise but the alternative may have been to close the booking early, (as we had to for the Spring Conference), once we had say 60 in any session, and turned all those extra members away. Yes some delegates were too hot and some were too cold but of course we do not know the venue until we have tried it and history tells us that there is always going to be someone too hot and someone too cold anyway.

Virtually everyone said it was good value for money with 4 saying no, out of a total of 141 that attended and one “This is the first INCOSE event that I do not believe was good value for money”. However our aim is to please everyone and we will therefore keep trying harder; if you would like to help us do better we are always open to volunteers. Please note that all Board members and other volunteers all pay for their attendance –it is not a route to a free ride.

There were many comments which relate to particular individuals circumstances or experience and you do not want to hear those, but all of your comments have been typed up and collated filling 14 sheets which have been sent to each of the Events committee and will be heard. In fact you can see an immediate response to some of them elsewhere in this issue. Thank you for taking the time to complete the Q&A form whether your comments were complimentary or otherwise.

To finish with some quotes from Event overall – What did you like most? The workshop style provided good scope for discussions and networking / Networking with like minded individuals / Good venue-well organized / Lots of new people, good atmosphere, good networking / Great variety of topics and drinks session on Monday, and not forgetting, Food!

INCOSE UK Chapter President Andrew Daw welcomes David Keep of Harmonic as the latest member of the INCOSE UK Advisory Board during the Autumn Assembly

Some from - What did you not like? The coffee! / Lack of formal dinner/ too much focus on INCOSE / similar topics to the Spring Conference/ too MOD centric / lack of INCOSE literature for new members (note it was there on the INCOSE stand in the smaller room)/ lack of programme / room directions / attendee list.

Some from - Anything else you would like to say ? Wonderful variety of topics / I appreciate all of the work that must have gone into the event and volunteers efforts, well done.

John Mead
Administrator
INCOSE UK

Not a Member Yet?

Join INCOSE UK To-day!

What would I be joining?
By joining the UK Chapter you also obtain full membership of INCOSE – The International Council on Systems Engineering.

How do I join?
Download the application form and direct debit form from our web-site at www.incose.org.uk/joining.htm or contact John Mead at john.mead@incose.org.

What are the benefits?
- A UK and world-wide forum for systems engineering.
- A chance to influence the way Systems Engineering develops.
- The opportunity to network and learn from other Systems Engineers.
- Regular newsletters and Journal from INCOSE and the UK Chapter

What does it cost?
Full members pay £72 per annum (reducing to £68 if paying for a full year by direct debit). Students pay £20 per annum. Membership subscriptions are allowed for tax relief. The UK Chapter has been approved by the Board of Inland Revenue under Section 201 Income and Corporation Taxes Act 1988.
In 2006 a joint decision was taken between the Management Board of INCOSE UK and the UK Advisory Board to develop a strategy for the development of INCOSE UK.

The need for change was driven from a number of perspectives; finance, outreach, image, influence, benefits, etc. however a major element was the performance on the recruitment and retention of members. Since it’s inception in 1994 membership numbers had grown until around 2000, when, like most organisations of this type membership numbers largely stagnated, however the membership churn was typically around 25% per annum. The strategy development was driven by a desire to retain existing members, a retention of existing members would result in a year on year increase in membership numbers by the churn and a strengthening of the organisation to have a greater say with the US.

Whilst it is relatively easy to brainstorm ideas that ‘might’ improve the organisation it is difficult to predict the effect any change will have, indeed after the introduction of a relatively successful congestion charging scheme in London, its expansion to cover a larger area changed the dynamic of traffic and congestion once again returned to central London, albeit to a lesser extent.

So how to develop a strategy for INCOSE UK that will be beneficial rather than detrimental? The answer was to develop a model for the INCOSE UK organisation and where strategies could be developed and the effect predicted before deployment.

The model, initial development resided around the use of causal loops to develop a basic understanding of the interactions and followed the following conventions:

One of the key’s to this was an understanding of the context of the existing environment, using James Martin’s 7 Samurai; Membership churn can be described as (P1), this resides within the context model for INCOSE UK (S1), the development (S2) and deployment (S4) of a strategy to correct the problem which subsequently modifies the context (S1’), it is unlikely that any deployment will not create further problems (P2). The challenge for the strategy is to ensure that resulting problems are kept to a minimum.

Where (+) indicates a re-enforcing relationship, for example, the greater the bank balance the greater the interest which subsequently increases the bank balance, this is a re-enforcing loop and is ultimately unstable. Similarly as hunger increases then the need to eat increases, but as you eat it decreases your hunger. This is a balanced loop and is considered stable.

Early development of the model was created by a small number of individuals and consequently lacked sufficient stakeholder perspective to have significant validity. The model however did provide sufficient confidence in the process to continue and engage the membership to add richness to the stakeholder view and to provide feedback on what the membership would like from INCOSE UK. In addition, an essential extension to the model is to add parametric relationships and using actual values from recent performance to be able to predict future performance of the organisation.

The AA 2007 offered that opportunity, a chance to engage a small number of the membership to explain the approach, get your feedback and hopefully provide a learning experience. What I didn’t expect was the 91 members who crowded into the room for what was notionally called a ‘workshop’, If you were one of the 91, I thank you for your interest and hope the size of the groups didn’t spoil your enjoyment. The following models were generated in the workshop in a very short space of time and consequently still need to be formalised and analysed into a set of coherent views that can be used.

The following diagrams represent interactions based around the following themes:

1. Membership Numbers
2. Finance
3. Professional Knowledge
4. Corporate Standing
5. Outreach
6. Sharing Best Practice
7. Products
8. Networking

Note: There are two Membership models in the following diagrams each generated by different groups.
It is clear that much work still needs to be done to complete the models in terms of a causal loop and then further with the addition parametric relationships to convert the models into a full system dynamic that can be exercised within a number of scenarios. INCOSE UK sees the model as key to the development of an effective strategy that will develop INCOSE UK in a direction that satisfies the membership aspirations and needs.

This is YOUR INCOSE, your involvement either through the development of the model, through feedback on events and other activities or through the direct involvement in local or national groups is key to its success. Be instrumental in the development of the organisation that may shape your career for the future.

If you want to help with the development of the model email me at les.oliver@lepsystems.com your help would be most appreciated. I will be organising the next working session for the model for early in the New Year.

Les Oliver
INCOSE UK
The systems dynamics workshop was supported by Kim Warren from the London Business School. Kim introduced the concept of performance over time, to understand where an enterprise is going, why it is going where it is going, and how performance can be driven in the right direction to support strategy. Kim explained the use of systems dynamics to understand behaviour over time, and used the model of INCOSE UK to illustrate. The workshop finished with an entertaining look at the challenges to building INCOSE membership, with the following factors identified by the audience. The next challenge is to understand what can be done to speed the good flos and prevent the bad ones.

Those interested in exploring these ideas further should consider Kim's latest book to be published shortly by J Wiley. **Strategic Management Dynamics** presents a complete framework in the field of Strategic Management. In the book Kim builds on, and goes substantially beyond existing strategy textbooks with a focus on understanding and managing how organisations perform over time. Based on simple but powerful underlying principles, the book both lays out a comprehensive approach to strategy analysis, design and delivery, and connects with established frameworks in the field. In "Strategic Management Dynamics" Kim provides a valuable teaching resource, which can be used as a core textbook to bring strategy to life. With numerous examples from different sectors, the book is supported by a rich variety of simulation-based learning materials that are essential if strategy principles are to be experienced, rather than just discussed. For those who have already learned about strategy, this book provides an important update and extension of their knowledge. It features many simulation models to demonstrate dynamics principles in strategy as well as in marketing, human-resource management, R&D, operations management and other functions - ideal for class exercises and assignments. It includes a detailed worked example built up from chapter to chapter, illustrating the key frameworks of strategy dynamics analysis. It provides an extensive discussion of established strategy frameworks, adapted to demonstrate implications for how organisations perform over time. It includes numerous academic and managerial references as useful supplements in degree courses and executive education. It contains end-of-chapter questions and exercises, supported by detailed worksheets.

Kim provided a sample chapter during the Autumn Assembly – you can download you own copy from www.kimwarrenbooks.com.

**Autumn Assembly 2007 – Soft Systems Methodology Session**

The session was designed to introduce attendees to the basic principles underpinning the Soft Systems Methodology (SSM), give an opportunity, as small groups, to develop simple SSM artefacts associated with a familiar situation and then look at several case studies which illustrated typical but diverse problem situations where the technique had been used recently.

**Steve McIntosh** considered that it was first necessary to understand the term ‘system’ as applied in this area since the INCOSE agreed definition was considered somewhat ‘loose’. A fundamental tenet of SSM is that systems of human activity undertake purposeful activity and a key consideration was "what does the system have to do to achieve its purpose, given the constraints which apply?". Purpose is a matter of judgement and reflects values. System boundaries need to be determined and depend on understanding the interactions and inter-relationships between the system and the environment; they also reflect the scope of issues to be solved or managed and the scope of what can be managed or influenced.

**Prof Brian Wilson** gave an overview of how he had developed SSM to support organisational analysis and stressed that SSM was ‘Thinking about thinking’. Real-world problems are complex, messy and contain people whilst SSM delivers a powerful way of thinking about the real-world which is simple, precise and defensible. Having been introduced to the basic artefact of SSM, the Root Definition (RD), how it was constructed and its constituent elements, delegates were then invited to think about RDs relevant to Congestion Charging. This example was very useful as it illustrated the fundamental distinction relevant to SSM between ‘What’ and ‘How’; congestion charging was a ‘how’ and there were several potential ‘whats’ to which it might be a relevant how. After the tutorial part of the session, during which the presenters circulated amongst delegates to assist their deliberations, Prof Wilson went on to describe Enterprise Model Assembly. This was the method now used to construct conceptual models relevant to problem-solving in complex organisational situations. He illustrated the use of enterprise model assembly with reference to a project in Tameside Children Services; this project also allowed him to explain two distinct types of SSM model; the Issue Based model which is relevant to the problem solving system or conduct of the ‘intervention’ itself and the Primary Task model which is relevant to the organisation of interest and used during the intervention to inform identification of desirable and feasible changes.

**Geoff Hunt** then briefly outlined several other case studies where SSM had been used recently. These included: the design of the top-level processes of 2 major organisations to support process-based management and ISO 9001:2000 certification; derivation of organisational information requirements; undertaking strategic and operational business improvement and; business and IT alignment for a major multi-national publishing group consisting of 4 Companies, 20+ Business Units and 100+ Stakeholders.
Around 40 delegates at the INCOSE UK Autumn Assembly in October 2007 took part in a workshop on the Systems Engineering of in-service systems, that is sustaining existing systems rather than realising new systems. The workshop was led by Bruce Elliott of Atkins and Stewart Leinster-Evans of BAE Systems. Stewart explained that the UK Advisory Board (UKAB) had identified systems engineering of in-service systems as a major issue and that the UK Chapter was forming a working group to address this issue. It was hoped that the workshop would kick-start the working group as well as benefiting the participants.

Stewart and Bruce explained how the issue manifested itself in their respective sectors, military aerospace and rail, and provided the group with the problem statement as framed by the UKAB. In summary the UKAB had concluded that, although that changing existing systems is not different in principle from realising new systems,

- Some of the issues concerned with realising new systems, for instance defining architectures, are less problematic when changing existing systems;
- Some of the issues concerned with changing existing systems, such as fault diagnosis, are more problematic than when realising new systems; and
- The existing SE Body of Knowledge and the competences of SE practitioners tend to be stronger on the issues that matter to new systems and weaker on the issues that matter when changing existing systems.

The participants first worked to refine the problem statement. The group broadly supported the UKAB formulation but added some important points, including the following:

- Those changing existing systems often have to contend with a badly-defined legacy in which it is not clear what the system is, what it does, how it works or what is expected of it, for instance;
- The drivers for change of a system include not just changes in the physical and regulatory environment but the need to do so may be challenged;
- Systems engineers working on in-service systems typically have to work within more constraints than those realising a new system and identifying these constraints can be problematic;
- Keeping the system running while it is being changed may be a significant part of the problem, but the need to do so may be challenged.

The participants then moved to the second phase of the workshop, looking at how the problem may be addressed. A great deal of wise advice was offered, including the following:

- The “classical” approach was considered applicable to the problem but with more attention given to analysis of constraints;
- Before starting to change a system, ask “Why are we doing this?”;
- Then analyse the existing system and its environment in more detail in order to create a maintainable set of SE documentation as a baseline for proceeding;
- Keep the system as-delivered, the system as-used and the system as-last-changed distinct.

What was most striking about the workshop was the degree to which participants from many different sectors shared the same problems and, broadly, the same views on how to tackle them.

The objective to kick start the working group was met: Bruce and Stewart left with a great deal of detailed material for the working group to build on. Participants also left with a clearer view of the problems of SE on in-service systems, the reassurance that they were not alone in facing them and some useful advice.

The workshop considered that INCOSE could assist practitioners by pointing out the difficulties and providing guidance on overcoming them and by helping them explain to other stakeholders the complexity of the issues. It is hoped that the emerging working group will make a start on such assistance. Anyone interested in joining the working group should contact Bruce Elliott on bruce.elliott@atkinsglobal.com. Although the working group is currently constituted under the UK Chapter, participation from all INCOSE chapters is welcomed.

**Autumn Assembly 2007 – Competencies Of Systems Engineering Session**

The Competencies of Systems Engineering Session’s aim was to provide an overview of the INCOSE UK Competency work to date, gather feedback from delegates who have already been using the competency framework guide, to provide a live demonstration of how the guide can be used to assess individuals and to gather ideas on a roadmap for Chartered Systems Engineer.

**Doug Cowper** and **Sandra Hudson** provided a brief history into the development of the Systems Engineering Competencies Framework and the subsequent Guide to Competency Evaluation to set the context for the Competency breakout group work and to provide an update on the latest developments. The original problem was identified by a UKAB Strategy meeting in November 2002 in that: “Many projects suffer from a lack of good quality systems engineering throughout the whole supply chain”. One of the causes identified was: “Why aren’t there more systems engineers?”

This led the discussions on to the question of “how do individuals and enterprises identify what key set of skills are required to conduct good systems engineering?”

INCOSE UK has attempted to tackle this problem of defining the Competencies of Systems Engineering by:

- Defining the problem & setting the boundary
- Reviewing current activity & best practice
- Formulating a competency framework
- Identifying the competencies for Systems Engineering
- Defining competency levels
- Providing guidance on how these competencies may be used.

**Sandra Hudson** of General Dynamics gave a presentation on using the INCOSE UK systems engineering competency framework as part of the GDUK Engineering Competency Framework. The GDUK framework comprises of 4 aspects: Engineering Competency, Ability/Knowledge in Supporting Tools & Techniques, Domain Knowledge and Generic Behavioural Competencies. The Engineering Competency is divided into: Systems, Software, Hardware, Mechanical, and Support. The framework will be used to:
• Understand each individual’s capability and the overall company capability.
• Identify where learning and development is required.
• Basis for discussions at annual appraisals.
• Basis for Personal Development Plans.

David Hawken of the Ministry of Defence gave a presentation on the “up-skilling” programme within the MoD and the use of the INCOSE Systems Engineering Competency Framework to provide a baseline. The competency framework was also used to explore the perceived value and perceived competency level within the MoD. The output of this survey produced some interesting results in the competencies that were perceived as valuable to the MoD and those that were not. The presentation concluded with a look at a proposed career map to professional engineer status.

Andrew Spice of GCHQ presented the EASE (Enterprise Architecture & Systems Engineering) change programme within GCHQ. The aim of the programme is to adopt and enable best systems engineering and enterprise architecture practice, to professionalise the SE workforce, and to drive through business and cultural change within GCHQ. Andrew provided an overview of developing the GCHQ SE Competency Framework which is based upon the INCOSE UK framework. This development included compressing the INCOSE framework from 21 competencies to 10, as this was a requirement from their HR department. The tailoring also included more emphasis on consulting and soft skill competencies. An example of the competencies framework was given plus an overview of how GCHQ have developed their SE staff and the successes they have had with their tailored training programme.

The presentation concluded with some of the challenges ahead for the EASE project and included: continuing to scale the SE capability to match the demand profile, adapting the SE career stream for different specialist flavours and providing a major SE awareness campaign.

The session discussed the issue of how many competencies there should be. One delegate thought that 21 was too many. A suggestion was made that the Competency Working Group should address the issue of how many competencies there should be. One point to be made here is that the number of competencies used is a tailoring requirement by an organisation. In the case of GCHQ this was a requirement from HR. A comment that was made was that the number and flavour of competencies did look like it had been written by a group of systems engineers. This is a good thing as the Competency Working Group had set out to define the competencies from an engineering/engineering management point of view.

The tailoring discussion let on to another issue – “how do you validate the tailoring?” The session did not discuss this point in much detail, however, it was briefly discussed as part of the INCOSE UK SWOT analysis in breakout group 2. There is an opportunity here for INCOSE UK to get the Competency Framework accepted and then provide validation that organisations who tailor the competency framework are still compliant with it.

A question arose regarding whether the US was aware of this work. Doug Cowper reported that it had been presented in Rochester and discussed at various CSEP meetings. Samantha Brown (BAE Systems and INCOSE Technical Director) suggested it should be put forward as an official INCOSE product and that presenting it now would be very timely as INCOSE are looking at the university SE syllabus.

Breakout Group Work

The following is a summary of the breakout group work.

Group 1: Dr. Jon Holt and Simon Perry of Brass Bullet Ltd. gave a short presentation on the practical assessment of competencies. Starting with a discussion of capability (the ability of an organisation) and competency (an ability of an individual) and the way that capability plus competency gives confidence in an organisation, a number of example frameworks were then discussed, namely UKSPEC, SFIA and the INCOSE competencies framework. For each of these frameworks their key concepts were discussed as were the mappings between the three frameworks.

The discussion turned next to the use of the frameworks and the need for any assessment based on a competency framework to be repeatable, measurable, based on best practice, transferable and flexible. One way of achieving this is via a competency assessment model such as Brass Bullet Ltd’s Universal Competency Assessment Model (UCAM).

UCAM is a competency assessment meta-model and set of processes designed to be used with any competency framework (or set of frameworks) by an organisation. The purpose of UCAM is to establish a reusable competency assessment framework that clearly defines: the aims and needs of any assessment, the acceptable evidence types, the assessment scope and helps in the production of a competency profile for the person assessed.

The framework consists of four main processes: framework definition, framework population, assessment set-up and assessment.

The framework definition process is carried out once per framework and models each source framework to aid in its understanding and to help in the mapping of one framework to another. The framework definition process has been applied to the INCOSE competencies framework and the output of this process was shown and discussed with the group members. Framework population is carried out once per organisation and defines the competencies applicable to an organisation (which may come from more than one competency framework) together with the evidence types that will be accepted at each level for each competency. This process is important as it enables repeatability of assessments and comparison of assessment outputs. The outputs of the process, together with the output of the framework definition process, form the main inputs to any assessments. An example applicable competency set based on the INCOSE competencies framework was presented and discussed.

Next discussion turned to the assessment set-up process. This is done once per set of assessments and defines the competency scope for the assessment, which defines the competencies to be assessed and the levels at which they will be assessed. A key point here is that competency scopes should be based on needs of the assessment and that there is no point in assessing an individual against all competencies and at all levels; the competencies and levels should be selected based on, for example, the role or position and the reason for the assessment such as recruitment or annual appraisal. Example competency scopes for requirements engineers, development managers, tutors and graduates were presented and discussed.

The assessment process was considered and an example of such an assessment performed on one of the group members. Assessment of each indicator for an example competency at each of the four levels was carried out, with the presented evidence recorded. The key idea used here is that of the competency profile. A pass/fail result is recorded against each indicator and this is converted to a rating percentage for that competency at the level assessed. This rating percentage is then converted to a not met, partially met, largely met or fully met rating, adopting the rating model used by CMMI and SPICE. When this is done for each combination of competency and level to be assessed it gives the competency profile for
the person assessed. The crucial point here is that this approach does not simply give a pass or fail for each competency and level, but a rating that acknowledges the indicators that were successfully demonstrated during the assessment.

Finally, discussion turned to using such competency profiles and their relationships to the defined competency scopes. Regular assessments should be performed and a person's profile should evolve over time to demonstrate maturity and continuous improvement. This evolution will mean some competencies drop off the profile, new ones are added and some increase in rating and assessed level. The defined scopes can be used for recruitment, analysis of training needs based on a comparison with a profile, target setting etc.

The group members contributed many useful ideas to the discussion, including: the use of competency assessments in annual review and pay awards, the possibility of having an assessment process acknowledged and ‘certified’ by a customer (this is of particular relevance to those doing work for the MoD) and the need for the INCOSE competencies framework to be accepted by the Engineering Council UK. For the systems engineering profession to grow, competency profiles need to be portable, requiring such accreditation of the competencies and the assessment approach taken. The approach exemplified by UCAM may go someway to achieving this.

**Group 2: Lead By Dr Doug Cowper (Cleave Systems)**

**Aim:** What would be the route map to support chartered systems engineer status?

**Assumption:** This is required by INCOSE UK’s members and corporate members in order to avoid debating whether it is of value. This is covered by our survey conducted earlier this year and other UK chapter work.

**Approach:** The approach of the breakout group was: 1) To establish some requirements that would enable INCOSE UK to chartered systems engineers (UK Spec etc), 2) Do a SWOT analysis on INCOSE at present against these requirements and identify gaps, 3) Collect ideas on how these gaps might be fulfilled and chart on a roadmap, and 4) Identify the risks, potential costs and rewards involved.

**Outcome of the Breakout Group:** The following summarises the output of the breakout group:

1) **Requirements:** The following list of requirements were identified. Please note this list is the result of a 15min brainstorm and has not been properly analysed. This analysis will be carried out as part of the UK Chapter action planning activity.
   - Accreditation by EC(UK) – UK Spec
     - Education
     - Experience (how much? – many years?)
     - Continuous Professional Development
   - Accreditation of relevant degree courses
   - Agreement of competency framework - validation of tailoring
   - Specific classifier on CEng of say CSysEng?
   - Support from industry

2) **INCOSE SWOT & Gap Analysis:** The following table identifies the Strengths, Weaknesses, Opportunities and Threats of the UK Chapter regarding professional recognition and CEng accreditation. The numbers against each point in the weaknesses and opportunities boxes are used to analyse the gaps, covered later on.

<table>
<thead>
<tr>
<th>Strength</th>
<th>Weakness</th>
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| • Industry buy-in (strong UKAB membership)  
  • The SE Competency Framework  
  • EC(UK) Affiliate  
  • We collectively demand high standards from SE practitioners  
  • Wide range of backgrounds of members | 1. Recognition & awareness (especially in wider community)  
2. Lack of local events (does not include Bristol)  
3. Lack of awareness of SE across academia  
4. Demand high standards from SE practitioners |

Opportunities

1. More promotion (internal & external)
2. Increased use of framework
3. % of members who are graduates - not chartered
4. % of members without engineering qualifications
5. Providing validation of tailored framework
6. Providing CPD programmes


The group carried out the following quick gap analysis on the SWOT analysis results:

Opportunity 5 addresses weaknesses 1 and 2 and will be addressed with the one-day sessions planned for next year. However, the group identified the following additional activities that could also address weaknesses 1 and 2:
- Internal issue not addressed.
- Range of targeted promotional material.
- Roadshows.
- Communities of interest within organisations e.g. DE&S (UKAB have a role to play here).
- Targeting Engineering Universities (what is in it for the graduate? - publishing, job opportunities, industrial demand for the skills.

Opportunities 6, 9, 10 address weakness 4. INCOSE UK could provide validation of the competency framework and Continuous Professional Development (CPD) programmes. This however has a significant impact on the organisation as this could not be carried out by a volunteer organisation.

3) & 4) Collate ideas on how these gaps might be fulfilled and chart on a roadmap & identify the risks, potential costs and rewards involved. These last two activities were not carried out due to running out of time in the session.

**Group 3: Lead By Sandra Hudson (GDUK Ltd))**

Comments based on "Systems Engineering Competencies Framework – Issue 2, November 2006".

Break out Group 3 addressed the following questions:

**What can be improved? How?**
1) Are there too many competencies?
   a. HR want fewer competencies
   b. Can some be merged?
2) Need to identify who the customer is in the ‘SE Competencies Framework’ document
   a. State the purpose of the document and target audience
3) The ‘Framework’ focuses on large organisations. Can any guidelines be given for use with small organisations?
4) Need to develop some tailoring guidelines. Case studies of applications in different organisations.
5) How can the ‘Framework’ be tailored to a particular job or role on a project?
6) A different level of information is required for different customers. Need to describe how the ‘Framework’ may be used in the different circumstances. Customers (users) may be:
   a. Management – in the formation of a project team
   b. Individuals
   c. HR
7) Does INCOSE want to licence the SE Competencies Framework document?
Autumn 2007

Autumn Assembly 2007 – Architectures Session

The INCOSE UK Chapter Architecture Working Group (AWG) staged a very successful Autumn Assembly session based around several ongoing themes within the AWG. The session attracted 70 participants from a great diversity of backgrounds, contributing to a very lively and stimulating interactive programme of activities, including briefings, workshops and poster sessions.

The session was opened by Dr Mike Wilkinson, co-chair of the AWG, who outlined its background, aims and work programme. The AWG has been using wiki technology to enable collaboration and this was demonstrated by Dr Paul King, who has taken the lead on making the wiki work very effectively for the group. This was followed by a briefing from Dr Stuart Arnold on the ‘wider landscape’, reflecting particularly on the presence of architecture in standards and the efforts of the AWG to contribute to the advancement of the draft IEEE1471 standard through the ISO fast-track process. Stuart was able to provide information ‘hot off the press’ on the status and progress of this standard.

A set of parallel interactive breakout workshops formed the main event of the session, covering three of the key AWG workstreams, namely Concepts and Definitions (led by Dr Peter Bryant), Types of Architecture (led by Dave Mawby, co-chair) and Uses of Architecture (led by Dr Paul King). In each of the three workshops, participants were asked to consider their own views on a range of architecture questions and hypotheses, which was followed by an exercise to understand any divergent views and, where possible, to reach a consensus. A very interesting outcome from the workshops was greater understanding of exactly where convergence appeared to be possible – and where it appeared to be impossible. The detailed inputs made during the workshops are currently being analysed by AWG members and will be made available to AA07 participants in due course. The results of the analysis are influencing the AWG’s forward programme and are being incorporated into a paper to be submitted to the 2008 International Conference. They will ultimately feed into the products of the AWG, such as Z-Guides and other guidance on best practice.

Informal feedback from attendees was that they found the exposure to the ‘work-in-progress’ of the AWG extremely interesting and valued the opportunity to make their own contributions. A number of new AWG members were ‘discovered’ at the session and they are already making important contributions towards the ongoing programme.

Mike Wilkinson
Architectures Working Group
INCOSE UK

1) What Next?
   1) Gather data on the application of the SE Competencies Framework.

2) What worked well? Why?
   1) The ‘Framework’ is very useful for interviewing, as a basis for questions.
   2) It provides the recognition for skills an individual has.
   3) It provides a coherent baseline to talk around.
   4) It is an external (from individual organisations) frame of reference.
   5) It enables the identification of people who aren’t systems engineers but do systems engineering.
   6) Useful to help identify training needs.
   7) It provides a good checklist for academia to check course content.
   8) Need to expand the soft/people skills section. Check what’s already available in other frameworks.
   9) Compare and contrast with other frameworks and publish analysis. E.g. SFIA, UK SPEC etc.
   10) The interpretation of the competencies is focused towards Aerospace/Defence. It would be useful to have examples from other domains.

What’s Missing?
   1) Competencies on Research and Innovation.
   2) Some discussion on how SE competencies defined in the ‘Framework’ bridge to other. areas within an organisation e.g. research and development.
   3) The Systems Thinking competency needs to be expanded.

Next Steps
The session reconvened to provide reporting back from break out groups and discussion. The next steps for the output of this session involve feeding back comments relating to the competency framework and assessment guide into the next annual Change Control Board. The output of the group looking at the route map to support chartered systems engineering status will be fed back to the UK Chapter Board for inclusion in future strategy and action planning sessions. The next one is due in December. Finally, INCOSE UK would like to thank all the presenters and all those who participated for making the session a success.

If you have any further comments please forward them to:

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Reach Out to the UK Systems Engineering Community

Preview and ePreview are sent regularly to every INCOSE UK Member. Copies are often made available at local group events to non-members, and electronic copies can be downloaded by visitors to our web site. Each edition will be read by over 500 systems engineering professionals, giving a unique path to a clearly defined market segment. Your organisation can benefit from this exposure by advertising your company, product or service in Preview and ePreview, for as little as £250 for a full page colour advertisement in Preview, or £300 for a paragraph and link in ePreview. For further details, and special member rates, contact our Administrator, John Mead, at john.mead@incose.org.
INCOSE UK at AWE Institutions Day

During the past 50 years, the Atomic Weapons Establishment (AWE) based at Aldermaston has been at the forefront of the UK’s nuclear deterrent programme. The organisation has a diverse workforce of over 5,000 staff, mainly consisting of scientists, engineers and technologists.

INCOSE UK was invited to AWE's Institution’s Day on the 23rd October. The main aims of the event were:

- To demonstrate AWE’s commitment to professional development and recognition,
- To promote collaboration between AWE and the institutions,
- To encourage AWE staff and contractors to join the professional institutions thereby demonstrating their commitment to Continued Professional Development,
- And to raise the profile and important of AWE’s Heads of Profession and the professions they represent.

The event opened with an address from Dr Don Cook the Managing Director of AWE. The rest of the day involved AWE staff dropping in to walk round the exhibition and talking to institution representatives. Finally the event was closed by Garry George, Head of Profession for Mechanical Engineering.

The event was very well attended by both the staff and the institutions. We had a large number of enquiries regarding membership and Paula Pritchard applied for membership on the day.

INCOSE 2008
Systems Engineering for the Planet
The Netherlands
15-19 June

Theme: "Systems Engineering for the Planet"

The symposium theme "Systems Engineering for the Planet", addressing the expanding scope of Systems Engineering application and responsibility. Examples of this expanding scope are Safety & Security, Disaster control, Resource efficiency, Infrastructure, Transportation systems, Climate impact, Water Management, Education & Government, Sustainable developments... you name it.

New! Sub-Theme Tracks
A novelty for this event will be a set of 3 Sub-Theme Tracks, focussing on the application of SE in complex consumer and industrial systems, transportation systems and water management & flood control. Each of these STT’s will span one day and address the topic via an introduction, several related papers, an on-site visit and a closing panel discussion.

Technical Program
The INCOSE International Symposium in 2008 provides this year’s premier international forum for participants from Government, Industry and Academia to learn more about Systems Engineering, and to share knowledge on the most recent innovations, trends, experiences and concerns within the profession of Systems Engineering. The Technical Program is the core of the Symposium, and the common focal point for networking for the more than one thousand participants who will attend the 4-days event.

In addition to the high quality paper presentations and panel discussions, tutorials addressing different in-depth topics will be held throughout the Symposium. This year ALL the tutorials will be available to the delegates to sign up for, at no extra cost – just note your preference during registration.

The Technical Program will address general Systems Engineering topics, (for different experience levels), in addition to thought provoking presentations related to the Symposium Theme: "Systems Engineering for the Planet". "Systems Engineering for the Planet" is concerned with achieving balanced solutions that account for the social, technological, economic, environmental, and political constraints, in whatever your system or product of interest may be. This concerns the traditional Systems Engineering areas within INCOSE e.g. the defense industry for security & terrorism control; the aerospace industry for transportation systems; and space industry for earth oriented satellite systems. Examples of other systems from newer areas within INCOSE include the civil construction industry and automobile industry, to name just a few of the diverse span of interest areas.

The submission of draft papers, tutorial proposals, panel proposals for IS2008 officially closed on Monday, 5th November 2007. The technical programme will be issued soon, so keep an eye on the conference web site at www.incose.org/symp2008

"Come and join us to make this a great event!"
Paul Schreinemakers, General Chair of the Host Committee
I would like to start by thanking everyone involved in the organisation and delivery of the 2007 Autumn Assembly for their hard work. You can find more information on both the technical content and delegate feedback elsewhere in this issue. I would like to focus on the bigger lessons we can take from the event and the general plan for INCOSE events over the next couple of years.

When I took over the UK events in 2006 I inherited a well organised set of UK events which have been providing a high quality benefit to UK members. My first task was to maintain that standard, which I have tried my best to do over the last 12 months. At the same time I was asked to consider the future of UK events for two reasons:

1. The “fixture congestion” of the next couple of years and into the future.

2. The changing makeup of the UK membership and what that means for events.

The most pressing congestion issue is the International Symposium in the Netherlands in June 2008 (IS08). However, there are lots of other Systems Engineering events out there with which we need to compete.

The UK membership of INCOSE continues to grow, as part of a general trend in the non-USA chapters in Europe and Australasia. I believe this trend is also bringing a change in member needs. We have more members who are new to INCOSE and to Systems Engineering. Many of these are not full time Systems Engineering practitioners but rather need to understand Systems Engineering; work in a team with Systems Engineering information; or apply Systems Engineering to new domains. At the same time some of our traditional membership has moved on from simply sharing best practice to actively moving the discipline forward. This is most obvious in the number of new working groups being formed.

Based upon this analysis we developed a plan of events for 2007 & 2008 as follows:

- Spring Conference 2007 as a traditional INCOSE UK event, with a mixture of papers, tutorials, exhibitions etc.

- No spring conference in 2008, to avoid clashing with IS08. The spring conference will be back in 2009.

- Autumn Assembly 2007 to be a smaller more focused event concentrating on current UK working groups and “hot topics”. If this works well we will continue this format into 2008 and beyond.

- A series of 1-day event for 2008. These events are aimed at promoting Systems Engineering to a wider audience and engaging new members.

So what have we learned so far and how is the event plan going?

The spring conference was a great success, and showed us a number of things. Firstly that high quality content and positive marketing will draw a good crowd from the existing INCOSE membership and beyond. It has also made us wonder about the size of venue and other activities we might consider. All of this will be considered when we begin to plan for SC09.

The Autumn Assembly also got a good response from most delegates. The fact that we were using a new venue, a new booking system and a new format did cause some issues, as you can read about in John Mead’s article. There are three more general lessons which I will take from the event:

1. When we do something new at an event we must make it very, very clear in the marketing and event information. If you look in the detail of the material produced for the event you will find information describing exactly what was being offered. It is clear from the feedback of a number of delegates that this on its own was not sufficient. You can expect a much clearer message about event content and intended audience in the future.

2. One of the big surprises of the event was the number of new and inexperienced members who attended. While many of them enjoyed the event, this audience would like to see content describing basic Systems Engineering principles, and a wider view of Systems Engineering outside of current INCOSE work. Providing this view has been an aspiration of the events team for some time, although not as part of the Autumn Assembly. In particular, the 1-day events planned for next year will focus on more basic Systems Engineering principles and application.

3. If we get the message clear, and combine it with other content, there is an audience for both working group lead and tool and techniques workshops. We will continue to build on our working group activities alongside any new events.

The events plan for 2008/9 currently looks like this:

- Systems Engineering Problem Solving, 1-day event Bristol, 24th Jan 2008
- Second 1 –day event Midlands May 2008
- Third 1-day event London September 2008
- Autumn Assembly 12-13 November 2008
- Spring Conference 27-30 April 2009

The dates, venues and content of these events will firm up over the next few months, and we will of course keep you all informed of how things are going.

The next event to look forward to is the first of our 1-day events in Bristol on 24th January 2008. This event will illustrate the basic principles of applying a Systems Engineering approach to a complex real world problem; at the same time providing information and tuition on a range of problem solving techniques.

I hope to see as many of you as possible that this event, and at future INCOSE events.

Rick Adcock
Events Director
INCOSE UK
You wouldn’t buy a car without taking it for a test drive first, so why adopt a new method or technique without putting it through its paces first?

This event is aimed at new or inexperienced Systems Engineers, who want to find out more about the Systems Engineering approach to problems; and more experienced systems engineers who feel a need to add something new to their toolbox but aren’t sure which of the many methods and techniques would be most suitable.

The event will take the following form:

- **Overview of systems engineering concepts**, this is to set the scene and to provide a common context for all of the techniques.
- **Technique overview**, a brief introduction to all of the techniques on offer.
- **Group tutorial**, a more detailed run through of each of the techniques (this will run in parallel so delegates will have to pick one technique for the tutorial).
- **Exercise**, the newly trained delegates will be formed into multi-skilled groups to tackle a set of realistic and related problems within a systems engineering framework – an opportunity to road test the techniques and see how they fit together.
- **Presentation** of the results from each of the groups, followed by a **Discussion** of the pros and cons of each technique both on their own merits and as part of a system approach.

During the day itself, the voice of the stakeholders will be provided by members of the organising committee, who will be at liberty to disagree amongst themselves, change their opinions, and do all those other things that make systems engineering a challenge, and that you would expect a worthwhile technique to take in its stride.

**Note: attendance at this event will be limited to a maximum of 60 delegates.**

The event will run from 9:30 to 17:00 on Thursday 24th January 2008, at the BAWA social club in north Bristol, which is located 2 miles from M4 junction 19 and M5 junction 16, see http://www.bawa.biz/htm/php/driving_directions.php.

The price for the 1-day event will be £150 for INCOSE members, £186 for non members (includes 6 months membership) and £75 for students, this includes refreshments and lunch.

Registration will be available shortly via our web-site [www.incose.org.uk](http://www.incose.org.uk)

Please contact R.Adcock@INCOSE.ORG with any other queries.

So, why not come along on **24th January 2008** and take the opportunity to test drive some technique... you might find the one you’ve been looking for!
INCOSE UK Advisory Board - UKAB

Incose UK is supported by the following organisations that make up the UK Advisory Board. The UKAB is chaired by Sandra Hudson of General Dynamics, and advises the Board on aims and strategy, and co-ordinates working group activities with the Technical Director, Andrew Farncombe.

UKAB Contacts

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**Rail Interest Group - RIG**

The INCOSE UK Rail Interest Group (RIG) has been formed:

- To provide a forum for those interested in Systems Engineering in rail to network in a less formal environment, to exchange good practice and to provide mutual support in an area which can require some sustained perseverance;
- To promote, improve and share the practice of Systems Engineering within the rail industry;
- To foster connections with other professional bodies within rail and thereby promote cross fertilisation of knowledge and experience across sectors and community disciplines;
- To promote awareness of INCOSE UK and encourage membership within the rail industry.

For further information see www.incose.org.uk/rig.htm.

RIG Event: Space Systems Engineering – Synergies with Rail

1700H-1800H, Wednesday, 16 January 2008,  
Professor Alan Smith,  
Centre of Systems Engineering  
University College London

While both the rail and space sectors maintain a transport infrastructure, at first glance they would appear to be very different indeed. In space passenger numbers are tiny, timetabling is trivial, vehicle reuse is patchy and for the space shuttle you have a ~2% chance of not coming home. However, on closer inspection similarities and common challenges can be identified. Both rely on the development and implementation of innovative technologies to enhance their capability. Both demand highly reliable (and safe) systems at an ever more affordable price. Both need to manage the expectation of their customers and users to ensure continued public support. While present manned space activities are considered ‘exploration’, in the future space tourists will expect a level of safety compatible with any other transport system.

However, while lifecycle process models for space and rail are not dissimilar, the implementation can be quite different. The approaches taken by space and rail sectors in the four areas mentioned above will be compared. Synergies will be identified and discussion invited.

To book, obtain directions or for any other questions, please contact the RIG Chair, Bruce Elliott (bruce.elliott@atkinsglobal.com or +44 (0)7970 694043).

**Bristol Local Group - BLG**

Do you live or work within striking distance of Bristol? Have you always wanted to share your ideas, but never found the time? Well, the perfect opportunity is now here to share ideas and meet with like minded colleagues in an easy going evening atmosphere. Attendance to Bristol Local Group events will not be restricted to INCOSE members and, where possible, will be free of charge. The objectives of the BLG are:

- To provide a forum for existing INCOSE members to network in a less formal environment;
- To promote and improve the practice of Systems Engineering;
- To foster connections with other professional bodies within the same regional area and thereby promote cross fertilisation of knowledge and experience across sectors and community disciplines; and
- To promote awareness of INCOSE UK and encourage membership.

**BLG Event – How V&V Applies Across the System Lifecycle**

Wednesday 28th November – 6.30pm for 7pm to 9:00pm  
University of the West of England (UWE), Bristol

Most people think of verification and validation as things that only get done towards the end of system development. This workshop turns that notion on its head and will set out to explore the central role that V&V should play throughout the lifecycle of any successful system. The event will feature three facilitators with long and varied experience of verifying and validating systems (and systems of systems) across different domains. As with all local group events the main purpose of the evening is to allow INCOSE members (and potential new members) to meet, ask questions and share their views on the chosen topic. Refreshments are available.

The event will take place in Room 2Q50 however delegates are advised to meet in the upstairs Bar area before the event for registration and refreshments (past the shops in the middle of campus, up the stairs through the library/reception area). The event will be held on the University of the West of England (UWE), Frenchay Campus, Bristol (see www.uwe.ac.uk/maps/frenchay_map.shtml).

Delegates have a choice of car parks for this event: Car Park CP20 by the Business Park opposite the campus, Car Parks CP1 and CP2 on the campus, and the Visitors Car Park behind the security gatehouse (you may need to obtain tokens from here to open the barriers). There will be signs to the lecture theatre from the main entrance.
The meeting was convened to provide the group with a view of the current challenges facing Proposal management professionals and to gain an appreciation of the activities of the APMP Systems Thinking Working group activity; to gain an understanding of current modelling techniques and their application to the bid proposal process and finally to allow an opportunity for system modelers and proposal management professionals to meet and discuss these applications and the issues that surround them.

The meeting was attended by 34 people including presenters and organisers.

The meeting began with a brief introduction outlining the work of the SEIC followed by an explanation of its connection with INCOSE and the joint aim of both organisations to raise awareness of systems engineering and its applications. This was followed by a brief introduction to the Association of Proposal Management Professionals and their Systems Thinking working group.

Margaret Helsabeck, is director, Centre for performance excellence, BAE SYSTEMS and a member of the APMP Systems Thinking working group. She gave an overview of the aims and aspirations of this group and effectively ‘asked the question’ of the following presenters, such that they provide their view on particular aspects of this initial presentation. The function of this presentation was to raise awareness amongst both bid proposal professionals and systems engineers of the working group activity and provide an opportunity for systems engineers to relate their work to aspects of the working group aims.

Simon Perry then presented the work that Brass Bullet has done regarding the modelling of generic processes which has also been applied to the bid process. Simon outlined the UML views that he felt were relevant in performing this activity and gave examples of how these views are generally applied.

There is an overall concept view and a realisation view. The concept view captures the ideas behind the process and the realisation view requires 7 views (there are potentially more that could be used, but these seem to be the most appropriate) to fully describe the process, these views are all related.

The realisation views offer the opportunity for further discussion and negotiation regarding their state and what they show. If these views are integrated and consistent between each other they provide an accurate view of how a process operates.

The views are as follows:

- Requirements view (necessary for determining why you are performing the process and for consequent validation of the process);
- Process structure view (forms the basis of process mapping, defines the organisation formally);
- Process content view (process 'library');
- Stakeholder view (organises the hierarchy of the organisation, can include statutory conditions and standards as part of the organisation);
- Process behaviour view (shows process responsibilities);
- Information view (identifies process artefacts and the relationship between them);
- Process instance view (shows how the process is strung together to meet the requirements).

Key points are that standards and standard constraints could become part of the process which then dictates a ‘cleaner’ and by definition compliant process to work to and that consistency between these views leads to a more accurate understanding of how the organisation operates.

Graham Bleakley of Telelogic then spoke of enterprise architectures and the MODAF Framework which is now mandated by the MoD.

In the past, all that was required of suppliers was that they delivered a product; they are now being asked to supply a ‘capability’.

Describing an enterprise and its architecture is a way of describing such a capability in that modelling an enterprise requires that not only physical objects relating to that enterprise are modelled but also how those objects operate in concert.

This framework, like UML requires a number of views (named viewpoints) to be developed, these viewpoints relate to the views and needs of specific Communities Of Interest (COIs).

Being able to develop and model these viewpoints and, importantly, retain consistency between them in a similar manner to the method described above when modelling processes using UML is key to developing an overall idea of how the effective the ‘capability’ will be in meeting its commitments.

MODAF is a framework that incorporates these viewpoints and is based on the DODAF framework developed by the US Department of Defense.

The idea is that MODAF provides a common language, much in the way that UML does, but at a higher level of abstraction, allowing strategic and operational factors to be considered. This common language it is hoped will provide an effective communication pathway between the MoD and its suppliers, hence reducing acquisition costs (through reductions in rework) as it provides a more structured approach to determining what is required and provides transparency to changes in strategy.

MODAF operates under 5 Communities Of Interest, all of which are in the MOD domain, it is felt that at present the way in which these viewpoints impact on Industry is not well understood, research appears to be concentrated in the MoD areas of strategy and operations. The operational viewpoints and technical (system) viewpoints where Industry is expected to operate are less well informed and require further development.

It is this point at which the bid process and what is required to support it have to be considered further. It is expected that the viewpoints developed to that point will inform the bid process. How that impact will manifest itself is not well understood at present.

There appears to be a clear demarcation at present as to where the MoD develops its viewpoints and Industry develops its viewpoints. It is suggested that Industry would be able to participate more effectively if it were involved earlier in the strategic/operational viewpoint development phase.

A discussion brought out the following points:

**Application of MODAF**

It is suggested that industry needs to be involved at an earlier stage than it currently is in developing the MODAF viewpoints.

MODAF is mandated but there is not much information available on implementation.

There was a view that there is no viewpoint of MODAF that applies to the bid winning process, this was accepted but the MODAF concept is
being taken up in other sectors (UK Government, Shell and Lloyds) so this may change in the future.

There is also no specific viewpoint of cost issues, these issues are dealt with through trade-offs that inform the model, but do not drive it.

There was a view that MODAF is too complicated and may not be appropriate for all customers. This was accepted and its use depends on the sector in which the business is operating.

The benefits of modelling the bid process were questioned. The view was that taking such a systems engineering approach may also have organisational benefits as the organisation operation would be viewed holistically. It was also suggested that by taking the modelling approach provides a common view which informs such factors as price, cost and risk, all of which need to be balanced when developing a bid. It was also accepted that this process would be an iterative one as the bid proposal was developed.

It was also suggested that a common view of the bid will help in terms of life cycle issues and how such issues will need to feed into design

**Competitive Bidding**

There was an opinion that what was presented did not seem to support competitive bidding, this was answered with the view that the techniques support early concept definition which will provide a more informed view on any bid also that a modelled approach lends consistency to the bid process. The model can only give a partial solution to the bid as a whole

**Cultural Issues**

A view was expressed that people did not follow process, it was argued that when such a situation existed, this is usually either a cultural or a management problem or a combination of both.

The view that any bid development team is resource limited and can only provide bids proposals at a high level of abstraction in certain cases. This was accepted but the view was that this situation would change with the introduction of MODAF.

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**Farewell and Thanks to Ken!**

Ken Astley has been the driving force behind the Midlands Local Group since it formed a few years ago. Unfortunately Ken is leaving the SEIC and will be stepping down as the Group Co-ordinator. On behalf of INCOSE UK I would like to thank Ken for his efforts, in particular for sharing the events with us through his write-ups for Preview. I am very grateful for having such excellent content to rely on! Duncan Priestley at the SEIC has taken over the reins and will be co-ordinating future events.

The next scheduled group meeting will be held on Wednesday 21st November 2007, the nominal start time will be 2pm (unless an earlier start time is requested). The subject of the meeting will be ‘capability’.

Simon Hutton
Editor
INCOSE UK

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**A Final Word From the Corner…**

...Systems Engineering in Science Fiction – What Next?

You go home after a hard day’s work and settle in your favourite armchair to relax. To escape reality you read Edward M. Lerner’s story ‘A New Order of Things’ published in the May 2006 issue of Analog, an American science fiction magazine. And you come across:

“...but systems engineers mostly do NOT create systems.

*Mostly they ask questions. What are ALL the functions a system must perform, and are there tradeoffs between those functions? What other systems will this system interact with, and what is the nature of the interactions? Who will use the system, and how foolish are the users against whom this system will be protected?*

What? Serious systems engineering in science fiction? Are they there to replace the typical mad scientist? Or even the occasional wizard that magics himself into the genre? This is worse than having a bad hair day, isn’t it?

But systems engineers were not the first people to continually ask questions. If you go back to ancient Athens, there was a chap called Socrates (469-399 B.C.). He finally gained financial independence through a legacy from his father. Then he went round Athens, insistently questioning aristocratic young citizens about their unwarranted confidence in the truth of popular opinions, even though he often offered them no clear alternative teaching. Such activities affronted the parents of these young citizens so much so that eventually an Athenian jury found Socrates guilty of corrupting the youth and interfering with the religion of the city. They sentenced him to death.

Is this why systems engineers are so unpopular? They ask too many questions?

This almost begs for a systems engineering study into the effect of asking questions on society. Then you would have to ask questions about questions. In fact if you are not careful you could design a self-similar hierarchy or fractal about the role of questions of society. And then you would have to ask questions about the fractal.

I think my bad hair day just turned into a grey hair day. Time to give up!

The only consolation is Edward M. Lerner goes on to write:

“*The only thing other engineers found worse than these interminable questions was deploying a system and THEN realising that the questions should have been asked.*”

O. B. Server
Events Diary

23 Nov 2007  The 2nd Autonomous Systems Conference
23 November 2007, The IET, Savoy Place, London, UK. Includes Keynote Speeches by Dr Bill Bardo, Director, SEAS DTC, UK and Prof. Phil Sutton, Director General, Research and Technology, MoD, UK. Details: www2.theiet.org/link.cfm?link=22777

28 Nov 07  How V&V Applies across the system lifecycle
INCOSE UK Bristol Local Group, UWE, Bristol. Details: www.incose.org.uk/bristol.htm

16 Jan 08  Space Systems Engineering – Synergies with Rail
Rail Interest Group meeting at UCL, London. Whilst the rail and space sectors appear to be very different, closer inspection reveals similarities and common challenges. This meeting will discuss these synergies, led by Professor Alan Smith of the UCL Centre of Systems Engineering. Details: www.incose.org.uk/riq.htm

INCOSE UK 1 Day event at the BAWA social club, north Bristol. This event is aimed at new or inexperienced Systems Engineers, who want to find out more about the Systems Engineering approach to problems; and more experienced systems engineers who feel a need to add something new to their toolbox but aren’t sure which of the many methods and techniques would be most suitable.

26-29 Jan 08  INCOSE 2008 International Workshop
The 2008 INCOSE International Workshop will be returning to the Embassy Suites of Albuquerque, New Mexico on 26 to 29 January 2008.

30 Jan 08  Interfaces, interaction and emergence
INCOSE UK Bristol Local Group, UWE, Bristol. Details: www.incose.org.uk/bristol.htm

26 Mar 08  So what is system architecting all about?
INCOSE UK Bristol Local Group, UWE, Bristol. Details: www.incose.org.uk/bristol.htm

7 – 8 Apr 08  Systems Thinking Workshop
This workshop at the University of Bristol will share different perspectives on systems thinking and bring together systems thinkers from different industries. The aim is to produce a statement on the future directions and challenges for researchers and practitioners through to 2030. If interested contact Joanna.Allsop@bristol.ac.uk

May 2008  INCOSE UK 1 Day Event in Midlands.
Further details will be announced nearer the event through Preview and ePreview.

28 May 08  Programme Management in a systems engineering environment
INCOSE UK Bristol Local Group, in association with the APM. Details: www.incose.org.uk/bristol.htm

15-19 Jun 08  Systems Engineering for the Planet

16 Jul 08  F111 Case Study workshop
INCOSE UK Bristol Local Group, UWE, Bristol. Details: www.incose.org.uk/bristol.htm

Sep 2008  INCOSE UK 1 Day Event in London
Further details will be announced nearer the event through Preview and ePreview.

12 – 13 Nov 08  INCOSE UK Autumn Assembly 2008
Further details will be announced nearer the event through Preview and ePreview.

If you have an event you would like to have publicised to the UK Systems Engineering Community through Preview or ePreview, or wish to contribute an article, please contact:

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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 also receive the quarterly Systems Engineering Journal, and INSIGHT, the INCOSE Newsletter.

Original articles, letters, thoughts or views on Systems Engineering or related events in the UK are welcomed. The Winter Edition of Preview will appear during February 2008. Contributions should be sent to the Editor, simon.hutton@headmark-analysis.co.uk (or to malcolmg@observe.uk.com after 1 December 2007) to arrive before 1st February 2008.

Alternatively write to Headmark Analysis, 8 Inglewood, Barrow-in-Furness, Cumbria LA13 9UN.

Remember - The deadline for the Winter Edition is 1st February 2008.