In Brief

International Symposium is Nearly Here

From the 15th until 19th of June 2008, the 18th Annual International Symposium (IS2008) will be held in Utrecht, the Netherlands. The theme of the symposium addresses the expanding scope of Systems Engineering application and responsibility, such as: safety & security, disaster control, resource efficiency, infrastructure, transportation, climate impact, water management, education & government, sustainable development... concerns about the impact of engineered systems and products on the environment.

It is still possible to register and book your place, visit www.incose.org/symp2008. Personal experience tells me that there are still hotel rooms to be had if you look in the right place.

Membership Rules Change

As you may know, our membership rules have been changed by Central Office. Future joiners will no longer all renew on the same date, but rather anniversary / renewal dates will occur 12 months from joining. Additionally, we will all have to pay extra if we require hard copies of the journal and INSIGHT Magazines. If you have not had an email to let you know this, it may be that we do not have your correct details. Please go to www.incoseonline.org.uk and provide them or change them yourself, could you also please email uk.admin@incose.org.

This change to the membership procedure started on 1st March this year, however current members will continue to have their renewal date on 1st June. Please read the articles on pages 6 and 7 for more details.

Rolls Royce and AWE Join UKAB

Membership of our UK Advisory Board continues to grow with the latest volunteer organisations being Rolls Royce and AWE. Read more in Andrew’s comments on page 4.

Editorial

This issue of Preview is very much about looking forwards.

Along with some reflections, our president discusses the massive amount that we have going on this year and in the future. Also in this issue there is a final press release before this month’s International Symposium, if your postie was quick it is still not too late to book if you have not already managed to do so.

Oh, and the healthy debate that I was looking for seems to be developing nicely, with Doug Cowper’s response to James Tower’s analysis of his SWOT.

Enjoy this edition, and as ever please write and express your opinions!

Malcolm Gardner
Editor
INCOSE UK
12 months ago my contribution to Preview commented on a range of INCOSE UK developments and progress. Today I could almost write the same again as yesterday’s developments bear fruit and today’s opportunities arise. Whilst that would be the easy way out, I think it better that I join those views together and give you a broader view of INCOSE UK as I enter the final months of my term of office.

For many in the organisation, events and local groups are the primary touch points that individual members have with the broader community and the chapter leadership. Over the years INCOSE UK has established a productive, high quality sequence of gatherings such as Spring Conference, Autumn Assemblies. SC07 was no exception to this structure and provided a wide range of insights and papers for us all to enjoy. It is worth commenting further on two of those activities.

**The Value of SE**

Prof Philip M’Pherson delighted us all with his paper and experiment on ‘The Value of Systems Engineering’, with interactive sessions that then fed further activity in the Autumn 07 event and will come to fruition at the International Symposium in Utrecht in June this year. This experiment is a valuable opportunity for engagement and for demonstrating value and innovation within our Systems community and my thanks to all who have participated through the questionnaires, the responses and the detailed conversations; my thanks also to Paul Davies for his support and encouragement to Philip. Philip’s presentation in Utrecht will offer new insights for the community at large and I would not be surprised if other chapters or communities within a wider INCOSE did not also take up the results and investigate further with their members and sponsors.

**The Consequences of the SC 07 Questionnaire**

The second aspect of SC07 that has played a part in structuring ongoing activities is the survey and questionnaire that many of the delegates completed during the event. Dr Ady James of UCL structured this survey, has completed his analysis and presents his results in this edition of Preview. Some of those findings form the basis for initiatives that have been progressed by INCOSE UK through the year:

- **INCOSE and Teaching and Learning** – as an International body, INCOSE is working with a number of organisations to define a common core curriculum for Systems Engineering and Rick Adcock the INCOSE UK Events Director, and part of the education team at the Defence Academy at Shrivenham, has been active in this definition. This activity plays directly into the role of INCOSE in providing a professional body or society for our members and offers a first step towards public recognition and professionalism. This aspiration to influence course structure and content and then provide an accreditation requires resources and commitment. It also offers a powerful incentive for other organisations that realise the importance of systems and an appropriate defined and recognised systems approach to co-operate with INCOSE and provide a body of expertise that enables the required recognition and influence. This is exactly what has happened in our relationships within the Engineering Council (UK) as I discuss later.

- **INCOSE and Research Dissemination and Funding** – once again a strong desire from members for INCOSE to be involved with and influence the research agenda. Here our current activities are more muted, although the development of a ‘Systems Engineering State of the Nation’ report will enable INCOSE UK to evidence various aspects of Systems Engineering practice within the UK and to highlight areas of requirement, shortfalls etc that could be picked up by the research community. By addressing who is doing what, a broad picture of UK capability will be possible. Of course, through the UKAB INCOSE UK is already firmly established within the academic community and we are working closely together to provide the necessary direction.

- **INCOSE as a Professional Body** – the questionnaire shows a broad spectrum of opinion regarding this topic and Ady’s analysis suggests that the results may mask a concern about the difficulties of the task rather than the potential benefits accruing from becoming a professional society. The issue of Professional Society and Professionalism is a difficult one, but a number of events have occurred which give great confidence that a middle ground can be found and developed that provides for significant professional recognition, through established UK designations and at the same time integrate well with the broader international INCOSE initiative of CSEP and its extensions.

**Systems Engineering Ourselves**

As we reflect on the success of the Autumn event last year, one of the endearing memories is the enthusiasm of the members for the System Dynamics work will be completed over the summer and all being well there will be opportunities for detailed presentation at the Autumn Event this year (in November).

**INCOSE UK in 2008 and Beyond**

We have departed from the traditional Spring event this year for two inter-related reasons. Firstly, I and the Board took a decision to support the International Symposium in Utrecht and reduce the competition to the IS08 by not holding a formal activity and to experiment with differing event formats. This supports the second reason for departure from the norm and allows us to establish a portfolio of event types that INCOSE UK can deliver with confidence.
To that end, 2008 sees a series of 1 day events covering a range of different topics, hosted in different parts of the UK by the INCOSE UK Local Groups. These are still national, available to all events, just more locally focused. Our event in January attracted a full house to Bristol, whilst the recent event in Loughborough had a wide range of Technology focused speakers considering issues of lifecycle management, technology insertion, and the processes and issues associated with incremental development.

If successful, these types of event will offer future boards a range of activities and local expertise that can confidently host an event, so extending our opportunities to engage and disseminate Systems Engineering experience and debate within the INCOSE UK family. With a range of Working Groups, Special Interest Groups and Local Groups, there are many opportunities for these events across the country in the future and I am looking forward to a range of activities discussing such topics as transport, in service support and systems architectures.

Our event schedule this year will culminate in an Autumn gathering in late November and include as always our AGM, whilst internationally, INCOSE UK continues to play a significant role in INCOSE events. Region III is hosting the International Symposium in Utrecht this year (www.incose.org/symposium2008) and a fascinating technical programme and visitors programme is assured.

Looking further ahead, 2009 sees the first international hosting of the Steven’s Systems Engineering Research Conference at Loughborough as well as our own Spring Conference.

So, much to anticipate and contribute to – become engaged, I’m certain there are many budding authors and contributors in our membership, this is your opportunity.

The Value of High Quality Technical Content

Our conferences and events work for many reasons, a primary one being their technical content, and recent months have seen the continued use and development of our products and publications. Under the technical guidance of Andrew Farncombe and Hazel Woodcock the Z guides have developed and new titles are in preparation to extend their value and usefulness.

The INCOSE UK Competencies Guide for Systems Engineering is now in wide use within the Ministry of Defence as their de facto standard and as a model for their re-skilling activities; for a number of our UKAB members that guide and associated annex forms a significant element of staff development processes and the underpinning education needs definition. Authors, editors and reviewers for these publications are always welcome and with our diverse membership community (both individual and corporate) many opportunities exist to contribute to the technical content of INCOSE UK.

The increasingly broad technical direction of INCOSE UK is reflected in our corporate subjects and topics addressed by our members, our corporate supporters and the working groups within the organisation. INCOSE in the main has over 50 working groups acting to promote the discipline and application of Systems Engineering and access to that body of knowledge is a key discriminator for our members for personal development and for their employers and employment. This bedrock of expertise also provides a firm foundation for our technical team to build upon and draw from in terms of event themes, conference development and workshop activities.

This body of knowledge and expertise is also of great interest and value to other organisations with an interest or growing understanding of the importance of systems. It forms an important element of any relationship building activity and relationships are key to our development as individuals, organisations and society in the round.

INCOSE UK now acts as a focal point for the systems engineering relationships of over 700 members (about 10% currently of the worldwide INCOSE membership) and 23 Corporate members on the UK Advisory Board (UKAB). This represents significant growth and development and poses many challenges – of which more later - but first let me share some of the relationship developments that have occurred over the past 12 months and the opportunities that arise.

Professional Recognition

Aspirations of increased and improved professional recognition for the individual and the discipline have been considered for some time. Several years ago a Memorandum of Understanding was signed between ourselves and the Institute of Engineering and Technology (the old IEE), which, it was hoped, would promote co-operation and a positive exchange of ideas and values with respect to Systems Engineering. To date we have co-operated on several joint 1 day events and members of the UK Board enjoy senior positions within the IET Systems Engineering Professional Network. In the round however this relationship has been a dormant rather than active construct.

To develop the case for Systems Engineering recognition further, the INCOSE UK Board entered discussions with the UK Engineering Council (EC), which resulted in our being accepted as an Affiliate Member of that national council in the middle of 2007. This enables us to work with, and be a party to, activities, workshops and initiatives (including an upcoming workshop on the 4th June). It also opens the concept of ‘buddying’ with a full member institute of the EC which in turn offers opportunities to co-operate and collaborate in a range of areas.

Institute of Measurement and Control

During the autumn of last year INCOSE UK was approached by the Institute of Measurement and Control, with regard to this budding concept, and we were asked to consider a collaboration with them. Since that time a number of working groups have met and established a broad range of common features and interests between the two organisations, including detailed support and review of an ongoing IMC initiative, which their recognition of the importance of systems to their members had already begun.

As a result INCOSE UK and the IMC have recently signed a Memorandum of Understanding which outlines several areas of potential collaboration and co-operation; immediate opportunities include contributions to conferences and events, publication routes through the respective journal and transactions, infrastructure resources in London and opportunities to explore the mechanisms and support systems necessary to award a Chartered designation and accreditation for the systems engineering community.

This MoU offers significant opportunities for co-operation and value to both organisation member sets. It does not however introduce any notion of merger or union, nor indeed a need for exclusivity in the relationship; it is accepted that each organisation may enter into other bi-lateral or multi-lateral arrangements that benefit their member communities.

To progress these broader recognition issues further, INCOSE UK has organised and sponsored a detailed briefing and discussion workshop gathering together the Royal Academy of Engineering, the EC, the IET, IMC and INCOSE (UK and Central). We will debate a range of issues and initiatives concerning professionalisation of the discipline, the standards and qualifications necessary to align INCOSE Certification Programmes with UK Institute Fellowship status and initial
forays into Chartered designations and accreditations. Our own INCOSE Certification programme is being extended and this workshop enables the UK to influence significantly those extensions to ensure the right level of qualification and experience is identified and supported, is understood by the UK professional bodies as being of value and the outcomes developed in way to be beneficial to all. This workshop took place on the 16th May and more details and outcomes from it will be available shortly.

I believe that this initiative has great potential and offers significant opportunities for integration and understanding between national and international bodies for our discipline and will afford real benefits to our members and to those systems oriented members of other bodies such as the IMC and IET. I hope also that this initiative is seen as a benefit for our Corporate supporters as well as our individual members.

The UK Advisory Board

The UKAB has grown significantly over the past 12 months and it has been a pleasure to welcome each new organisation to the INCOSE UK Team. The spread of corporate members is growing too and although there remains a bias towards the aerospace and defence domain, the Advisory Board contains strong voices from the non-defence domains, academia and tool vendors – for which we are all grateful. Within this UKAB growth, it has been a particular pleasure to welcome our newest members, Rolls Royce and AWE.

Within RR I know that Richard has been playing a very long and patient game to generate the appropriate support and critical mass, whilst the inclusion of AWE within our team offers opportunities for the exchange of internationally recognised best practice in a wide range of fields (such as safety and assurance, modelling and simulation, integration).

It was a pleasure for Doug and I to join AWE at Aldermaston for the signing ceremony (see photograph below) and to see the work being undertaken and the development of their systems engineering skillset.

Supporting our Future

Now, all this success and growth comes at a price. There are challenges for us all to ensure that INCOSE UK stays on a firm footing, delivers value to its members and develops (and yes competes) as an organisation. With 700+ individual members and a large corporate support base, the UK Board have decided that the time is appropriate to engage professional services to support the organisation. Through Peter Lister’s contacts and experience, INCOSE UK have engaged Dot the Eye to establish a professional secretariat, the duties of which will develop on an incremental basis and are discussed in Peter’s article later in this issue of Preview.

DTE have already supported INCOSE UK in the organisation of events and event registration, they have been instrumental in facilitating the workshop of the 16th May and will be taking a leading role in the membership renewals activity in June. The Board believes that the establishment of a professional secretariat will enable Board members to concentrate on more strategic issues than is currently the case, offer improved organisational interfaces with the members and ease the workload on INCOSE officers (in what is after all a volunteer organisation). The ongoing implementation will result in some changes to the Board structure which have yet to be finalised, but the position of Operations Director (or equivalent) is likely to be initiated soon.

... and Finally

Finally, many will have heard about or even experienced the issues of Terminal 5 and its setting to work. Many may also have watched Newsnight on the Friday evening of that launch week and watched Allen Fairbairn discuss some of the issues of complex systems, their setting to work and incremental delivery opportunities with Gavin Essler and Prof Heinz Woolf. I would like to thank Allen for stepping into that particular breach so rapidly and for supplying an experienced Systems view to the BBC. That we were asked in the first place – via our web site and the contact details therein – says much for our improving visibility and our increasing responsiveness to such requests. All our activities and initiatives are aimed at maintaining that momentum and continuing the development our discipline.

I would also like to take this opportunity to thank all my fellow Board members for their support, energy and encouragement and particularly our Communications Director, Gordon Woods, for his contribution to the success of INCOSE UK over the past few years. Gordon has recently resigned from the Board and we all wish him well in his future activities.

A long article that I hope has contained something of interest for everyone and I’d be delighted to discuss any aspect of the organisation further; if you have something to offer, get involved.

Andrew Daw
President
INCOSE UK
Andrew.daw@baesystems.com
andrewjdaw@tiscali.co.uk

I anticipate that all our UKAB members will contribute significantly to the development of current and forthcoming Working Groups within our community and to INCOSE UK in the round.

AWE Join the INCOSE UKAB
(Photo © Ministry of Defence 2008)

18th Annual International Symposium of INCOSE, 6th Biennial European Systems Engineering Conference
INCOSE 2008
Systems Engineering for the Planet
The Netherlands
15-19 June
Websites
International Symposium... there is still time to register

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

Engineering best practice improves planet
INCOSE 2008 focuses on quality and environmental responsibility

From the 15th until 19th of June 2008, the 18th Annual International Symposium (IS2008) will be held in Utrecht, the Netherlands. The INCOSE International Symposium provides the premier annual international forum for participants from government, industry and academia 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 5-days event.

This year’s theme focuses concern on achieving balanced solutions that account for the social, technological, economic, environmental, and political constraints, in engineered solutions. Speakers will address the ways in which these concerns challenge the defence industry for security and terrorism; the transportation industry; and the space industry for earth oriented satellite systems.

Engineers will also explore ways in which they can apply systems approaches to manage resource scarcity, sustainable development, prevent and repair environmental damage, ensure safety and security, and resolve social imbalances. Other topics include technology insertion, process improvements and organizational governance of the systems we make, manage, operate and maintain over their life cycle in their respective environment 'locally or globally' to the benefit of companies and to society as a whole.

The closing plenary speaker will be Dr. Jean Botti from EADS. Dr. Jean Botti will deliver a speech about “Aerospace and the Environment - a Global Systems Innovation Challenge”. Dr. Jean J. Botti is Chief Technical Officer (CTO) of EADS and a member of the EADS Executive Committee. Prior to assuming this position, Dr. Botti served as executive director Delphi Corporation. In 2002, he managed the newly created the Corporate Dynamics & Propulsion Innovation Centre as the Chief Technologist. He was awarded the General Motors President Council Award in 1998 and has been elected to the rank of Fellow of the Society of Automotive Engineers. He is a member of various engineering and technology societies, and the Centre National Recherche Technologique (CNRT) in Belfort, France.

There is still time to register, see more at www.incose.org/symp2008

Letters to the Editor

Dear Editor,

With regard to James Tower's letter published in the last edition of Preview about the Competencies Session SWOT analysis carried out at last year's Autumn Assembly, I thank him for his comments re the use of the SWOT tool. However, we deliberately tailored the use of the tool to meet the needs and time constraints of the event and although some of the outputs may not have been categorised correctly, there were still some very useful outcomes which are being fed into phase 3 of the competencies work. Watch this space for further updates.

I would also like to encourage James and other INCOSE members who have skills in facilitating these types of workshops to be involved in these events to ensure we do use the tools efficiently. We can always use good facilitators at our working groups and events, for example the Autumn Assembly to be held in November 2008.

Yours Sincerely,
Dr Doug Cowper
President Elect UK Chapter

Membership Memos

Membership numbers exceed all expectations

Our UK membership total is now 752 (at 27 May 08) which as we approach the end of the old membership year compares very favourably with the 565 that we had almost exactly 12 months ago (26 May 07). An increase of almost 200! Rumour has it that we are currently the largest chapter in INCOSE.

Lost members

Whether they are actually lost or not we have no idea, but each year we seem to lose touch with a small number. If you are reading this we must still have your postal address, but did you also receive a copy of ePreview by email? If not you have probably changed your email address and not told us. If you would like to receive INCOSE mail by email, either business or home then please let us know.

John Mead (john.mead@incose.org)
Administrator
INCOSE UK
Changes to Membership Arrangements

As mentioned in the last ePreview, INCOSE has changed the way that membership payments are collected and we in the UK Chapter must align our arrangements to match. Instead of the fixed annual renewal date of June 1st each year, renewals now take place as follows: those who joined before March 1st 2008, will be asked to renew on the 1st June as previously. Anyone who has joined since March 1st 2008 will be asked to renew on the anniversary of their joining date. Lapsed members who rejoin will be renewed for a year commencing from the date of rejoining.

Clearly there are a lot of members (over 750 now), who will be renewing on 1st June this year. Rates are unchanged at £72 per annum for cheque or card payments, £58 for Direct Debits, and £20 for student members. Individual members qualify for a Senior category if they are at least 64 years of age the time of their membership renewal and have maintained their individual membership for the five membership years prior to applying for the Senior category. Rates for the Senior category are £36 for cheque or card payment, or £34 for payment by Direct Debit.

The other change to the membership arrangements is that from March 1st for new members, and from June 1st for renewing members, hard copies of the SE Journal and Insight will only be available at an additional charge of £18 and £12 per annum respectively. Both of these publications are available to members on-line via the main INCOSE web site (www.incose.org) if you do not wish to pay for hard copies. The environmentally conscious amongst you may feel that airfreighting paper around the world is not a sustainable option, but INCOSE has taken this decision primarily to avoid increasing membership fees. INCOSE UK’s own newsletter, Preview, will continue to be delivered as hard copy to all UK Chapter members at no additional charge.

In the long term the new renewal arrangements should make things easier, but the short notice of the changes has caught us out at the UK Chapter. In particular, anyone who has joined via the UK Chapter during March will have been charged for 15 months membership as per the old fixed renewal date arrangement. From March 1st INCOSE CO has worked to the new arrangement and so they have only signed people up for 12 months from date of joining. We will of course be rectifying the situation, by offering refunds, however we ask those concerned to be patient while we get things organised for an orderly response.

Peter Lister
Finance Director
INCOSE UK

INCOSE UK Secretariat

By the time you read this you should be aware that Dot The Eye, who have been providing event on-line event registration for us since AA07, are also behind the transformation of the renewal process. This is all part of a wider plan to centralise and professionalise all of our secretariat functions over the next 9 months.

John Mead has been holding the fort for about 12 years, and his desire to reduce his commitment to INCOSE UK and play more golf has been thwarted by the increasing workload generated from over 750 individual and 23 UKAB members. Our solution is to engage Dot The Eye on a wider remit. The concept is to have them as a single point of contact (e-mail, phone number, address), and empower them to manage other suppliers on our behalf. The prime example so far is the engagement of an accountancy firm to provide bookkeeping services to reduce my work-load and leave me with more time to relax, cut the grass, or even think about INCOSE strategy!

Dot The Eye has run the secretariat for the International Data Link Society for about 3 years. The IDLSoc operate a very similar model to INCOSE, and from the outset it has been run via a comprehensive website. It was clear that INCOSE UK could learn from this experience, however INCOSE is a different organisation and the differences have to be addressed. It is no accident that Dot The Eye are located only a few miles from where I live and work in Somerset. Without close liaison over the initial set up period, the transition would be much more difficult. We have had several meetings in the last 8 months working through various aspects of INCOSE operations, and there are more to come.

Once we have got the basics under control there will be an opportunity to look at additional services that can be provided to INCOSE UK officers and members. For example, the database that underpins the incoseonline website enables data to be pooled and shared, and this could be used to good effect by Local Groups.

The aim is to support all our volunteers by minimizing their administrative burden and allowing them to concentrate on the technical content of their activities.

This will be achieved at little more cost than our existing arrangements, excluding additional functions such as the bookkeeping. The efficiencies from using web technology, help to reduce costs while at the same time allow us to handle the increase in membership and larger events. It is easily affordable within our current income, but more importantly we could not afford to carry on as we were.

Change is always uncomfortable, but I hope that you will embrace the webalisation of the INCOSE secretariat. We have not lost the personal touch, Emma Jane and her team are ready to help on the phone or by e-mail if you have a query. If you have any questions or suggestions regarding the secretariat please let me know.

Peter Lister
Finance Director
INCOSE UK
In an obscure science fiction book, the kind you have to dig out the dust rather than just blow the dust off the covers, the author says of mathematics: “…you are attempting to apply verbal anthropomorphic logic to a field in which it is not pertinent.”

Wow! There are some big words in that lot. But it boils down to you not being able to use normal words to describe maths.

Yet, every engineer uses maths in one form or another to help with building, maintaining and disposing of systems, even if it cannot be truly a reflection of the real world. Take measuring the circumference of a circle as an example. If the radius, r, is of unit distance, then everyone knows the circumference is 2πr. And everyone knows that π is 3.14159265… (ad nauseum). Of course it’s not accurately measurable and in the good old days engineers used the fraction 22/7 to approximate it. It was good enough for what they wanted to do. Whilst n is a concept that is not susceptible to any of the human senses, it still helps us to understand the world around us.

We go on to similarly approximate other awkward numbers like e and the square root of 2. Then we come to negative numbers. You know those like -1 etc. What do they mean in the real world? Well, if measuring distance in one direction is considered positive, then measuring in the opposite direction has to be negative. Sensible isn’t it?

Then there is the square root of -1. Mathematicians tend to use the symbol i for this. So what does i represent in reality? It’s certainly not measurable, even roughly, in any traditional physical sense. This is probably why it is part of a set called complex or imaginary numbers. Well there was this clever chap called Argand who pointed out that you could use i as a unit along the y axis in a traditional x – y graph. Even better, using this Argand diagram you could show phase shifts as calculated by using imaginary numbers. This led engineers to use this for things like evaluating electric circuits with current, inductance and capacitance.

Of course it was natural for mathematicians to try and extend complex numbers because… well mathematicians are just like that. Even Irish ones! The answer is commemorated on a plaque hanging on Brougham Bridge over the Royal Canal in Dublin.

What use could engineers make of not only one square root of -1, but three separate square roots of -1? Well if complex numbers could be used to describe 2-D space, why not use quaternions to describe 4-D space? This is exactly what they were used for until the theory of vectors and matrices matured into a useable and an easier to understand tool.

Even so, quaternions are still used today. Why? They solve a particularly nasty problem in the spherical co-ordinate system evaluations and some computations are faster that the equivalent ones in matrix theory, which can be important for real time systems.

So why do we treat data and maths as the real world?

Because… well because… err… I have real difficulty in answering this.

My best guess (and it is a guess) is that maths modelling of the real world comes up with answers that are so like the real world, we think of the maths model as the real world. How wrong this is!

For instance, take all that number theory above. Giuseppe Peano came up with a set of five axioms, namely:

1. There is a natural number 0.
2. Every natural number a has a natural number successor, denoted by S(a).
3. There is no natural number whose successor is 0.
4. Distinct natural numbers have distinct successors: if a ≠ b, then S(a) ≠ S(b).
5. If a property is possessed by 0 and also by the successor of every natural number which possesses it, then it is possessed by all natural numbers.

From these, you can step by grueling logical step derive all the numbers and more that I have described above. So mathematicians have succeeded in simplifying their tool of trade (i.e. numbers) to a very simple description. True, this leads to some very complicated and sophisticated theories that end up being very useful. Even so the simplicity has a lot to recommend it.

Don’t you wish we could do the same for systems engineering? Answers on a postcard to...

One final note… given the above and other things, I believe mathematics is more of an art than engineering. Go, figure!

O. B. Server
UK Advisory Board (UKAB)

INCOSE UK is supported by the following organisations that make up the UK Advisory Board. The UKAB is chaired by Ayman El-Fatatry, of BAE Systems, and advises the Board on aims and strategy, and co-ordinates working group activities with the Technical Director, Andrew Farncombe.

**UKAB Contacts**

<table>
<thead>
<tr>
<th>Company</th>
<th>Contact Name</th>
<th>Email Address</th>
<th>Telephone</th>
</tr>
</thead>
<tbody>
<tr>
<td>UCL</td>
<td>Ady James</td>
<td><a href="mailto:amj@mssl.ucl.ac.uk">amj@mssl.ucl.ac.uk</a></td>
<td>01483 204115</td>
</tr>
<tr>
<td>BAE Systems</td>
<td>Ayman El-Fatatry</td>
<td><a href="mailto:a.el-fatatry@lboro.ac.uk">a.el-fatatry@lboro.ac.uk</a></td>
<td>01509 635203</td>
</tr>
<tr>
<td>MOD DE&amp;S</td>
<td>David Hawken</td>
<td><a href="mailto:desia-2@mod.uk">desia-2@mod.uk</a></td>
<td>0117 913 5028</td>
</tr>
<tr>
<td>Thales</td>
<td>Jocelyn Stoves</td>
<td><a href="mailto:jo.stoves@thalesgroup.com">jo.stoves@thalesgroup.com</a></td>
<td>0118 823 8238</td>
</tr>
<tr>
<td>Atkins</td>
<td>Michael Wilkinson</td>
<td><a href="mailto:mike.wilkinson@atkinsglobal.com">mike.wilkinson@atkinsglobal.com</a></td>
<td>01252 738574</td>
</tr>
<tr>
<td>General Dynamics UK Limited</td>
<td>Sandra Hudson</td>
<td><a href="mailto:sandra.hudson@generaldynamics.uk.com">sandra.hudson@generaldynamics.uk.com</a></td>
<td>01424 798099</td>
</tr>
<tr>
<td>Ultra Electronics</td>
<td>Shane Bennison</td>
<td><a href="mailto:shane.bennison@ultra-ccs.com">shane.bennison@ultra-ccs.com</a></td>
<td>01628 538464</td>
</tr>
<tr>
<td>Detica</td>
<td>Tony Klein</td>
<td><a href="mailto:tony.klein@detica.com">tony.klein@detica.com</a></td>
<td>01483 816121</td>
</tr>
<tr>
<td>EADS Astrium</td>
<td>Peter Glider</td>
<td><a href="mailto:peter.glider@astrrium.eads.net">peter.glider@astrrium.eads.net</a></td>
<td>0230270 4539</td>
</tr>
<tr>
<td>Loughborough University</td>
<td>John Hooper</td>
<td><a href="mailto:j.g.hooper@lboro.ac.uk">j.g.hooper@lboro.ac.uk</a></td>
<td>01509 227024</td>
</tr>
<tr>
<td>HMGCC</td>
<td>Eric Maycraft</td>
<td><a href="mailto:ericcm@hmgcc.gov.uk">ericcm@hmgcc.gov.uk</a></td>
<td>01908 510970 ext 7230</td>
</tr>
<tr>
<td>Selex Sensors &amp; Airborne Systems</td>
<td>Kevin Littler</td>
<td><a href="mailto:kevin.littler@selex-sas.com">kevin.littler@selex-sas.com</a></td>
<td>01268 883983</td>
</tr>
<tr>
<td>Telelogic UK Ltd</td>
<td>Hazel Woodcock</td>
<td><a href="mailto:hazel.woodcock@telelogic.com">hazel.woodcock@telelogic.com</a></td>
<td>01865 784285</td>
</tr>
<tr>
<td>DSTL</td>
<td>David Oxenham</td>
<td><a href="mailto:daoxenham@dstl.gov.uk">daoxenham@dstl.gov.uk</a></td>
<td>01980 614609</td>
</tr>
<tr>
<td>The Salamander Organisation Ltd.</td>
<td>Robert Eyre</td>
<td><a href="mailto:bob.eyre@tsorg.com">bob.eyre@tsorg.com</a></td>
<td>0870 161 1700</td>
</tr>
<tr>
<td>Vega Group PLC</td>
<td>Paul King</td>
<td><a href="mailto:paul.king@vega.co.uk">paul.king@vega.co.uk</a></td>
<td>01707 391999</td>
</tr>
<tr>
<td>GCHQ</td>
<td>Robert Stevens</td>
<td><a href="mailto:rgsteve@gchq.gsi.gov.uk">rgsteve@gchq.gsi.gov.uk</a></td>
<td>01242 221491</td>
</tr>
<tr>
<td>Halcrow</td>
<td>Steve West</td>
<td><a href="mailto:wests@halcrow.com">wests@halcrow.com</a></td>
<td>020 7602 7282</td>
</tr>
<tr>
<td>University of Bristol</td>
<td>Patrick Godfrey</td>
<td><a href="mailto:patrick.godfrey@bristol.ac.uk">patrick.godfrey@bristol.ac.uk</a></td>
<td>0117 33 17061</td>
</tr>
<tr>
<td>Harmonic Ltd</td>
<td>Dave Keep</td>
<td><a href="mailto:dave.keep@harmonicltd.co.uk">dave.keep@harmonicltd.co.uk</a></td>
<td>01460 256500</td>
</tr>
<tr>
<td>QinetiQ</td>
<td>David Venn</td>
<td><a href="mailto:dvenn@qinetiq.com">dvenn@qinetiq.com</a></td>
<td>01305 212399</td>
</tr>
<tr>
<td>AWE</td>
<td>Kerry Barker</td>
<td><a href="mailto:kerry.barker@awe.co.uk">kerry.barker@awe.co.uk</a></td>
<td>0118 981 4111</td>
</tr>
<tr>
<td>Rolls Royce</td>
<td>Richard Beasley</td>
<td><a href="mailto:richard.beasely@rolls-royce.com">richard.beasely@rolls-royce.com</a></td>
<td>020 7222 9020</td>
</tr>
</tbody>
</table>
Local Groups and Working Groups

As the president said in his notes earlier in this issue, our working groups and local groups are the life-blood of INCOSE UK. Here they are, along with what they do and who to get in touch with if you are interested in finding out more. Some of the groups are no longer active, if you would like to resurrect one of these groups, or have an idea for another group that you think may help then get in touch with any of the UK board (drop the editor a line at malcolm@obsgroup.uk.com if you would like me to pass on a message).

The Architecture Working Group

The aims of the AWG are to:

- To provide guidance and advice to UK systems engineering community on architecture practice;
- To exert influence over the use of architecture concepts within the UK systems engineering community; and
- To liaise with other systems engineering groups involved in architecture work.

Participation in the AWG is open to all, by invitation of the Chairmen.

If you wish to participate in the AWG, then email register@ukawg.org.

The Bristol Group

The original INCOSE local group in Bristol has arisen Phoenix like from the flames of its previous incarnation. The group exists to:

- 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.

Contact Details for the group:
Chair: Rick Adcock, email: r.d.adcock@cranfield.ac.uk

The In Service Systems Working Group

This group has recently been established and will advise the INCOSE UK Chapter Board on:

- The difficulties encountered in practice in applying authoritative guidance on SE, including the INCOSE SE Handbook, to systems which are in service;
- Best current practice in adapting SE guidance to overcome these difficulties; and
- Additional work that the INCOSE UK Chapter might initiate to assist its members further in overcoming these difficulties.

The Working Group aims to complete this task by Autumn 2008.

Chair: Bruce Elliott, email: bruce.elliott@arbutus-tc.co.uk

The South Coast Group

This group is currently being formed and is looking for support. The group would like to gauge interest, so please contact one of the committee members above if you are based around the South Coast region, might attend one of our forthcoming events and are interested getting involved or just finding out more.

Contact Details for the group:
John Potter, email: john.potter@roke.co.uk

The Railway Interest Group

Another very active group, the RIG exists:

- 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; and
- To promote awareness of INCOSE UK and encourage membership within the rail industry.

Note: In pursuing its objectives the Group shall take a broad view of rail, including heavy rail, metros and light rail and including both the operational railway and its supply chain.

Contact Details for the group:
Chair: Bruce Elliott, email: bruce.elliott@arbutus-tc.co.uk

The Technology Life Cycle Working Group

This group is currently being formed, its area of interest is how systems engineering can be used to better:

- Identify emerging technologies;
- Facilitate insertion of emerging technology into products and services to minimize disruption and optimize benefits;
- Determine the probable life cycle of these technologies and their significant transition points;
- Recommend methods to utilize the maturing technologies effectively and efficiently over their useful life cycle;
- Transition technologies among sectors;
- Recommend and/or issue guidelines on how to disengage from or replace obsolescing technologies at an optimal point for a given service or product instantiation or aspect of a system; and
- Recommend and/or issue guidelines on how best to dispose of obsolescent technologies in a manner beneficial to all stakeholders.

Chair: Dr Ayman El-Fatatry, email: A.El-Fatatry@lboro.ac.uk

Scotland

This group is currently forming and will be formally launching soon. To find out more, or to get involved, please get in touch with Hermine.

Contact Details for this Group:
Hermine Schnetler, email: hs@roe.ac.uk

Dormant Groups

The following groups are inactive or have no current chair:
- The East Midlands Group
- London Regional Group
- The Stevenage Group
SYSTEM ENGINEERING & SAFETY ENGINEERING OPPORTUNITIES

MAJOR AEROSPACE / AVIONICS PROGRAMME
EAST MIDLANDS - COMPETITIVE SALARIES + BENEFITS + RE-LOCATION

We are exclusively representing a Client based in the East Midlands who has an immediate requirement for experienced Systems Engineers to join their Systems Engineering team for work on a major Aerospace / Avionics Programme. With the capability to design, manufacture and integrate avionics systems, our Client is a specialist within the Aerospace industry. These opportunities will provide the successful Candidates with the unique opportunity to work on one of the UK's most prestigious projects.

Lead Systems Engineer (Ref 0603): Full systems lifecycle experience required within a major development environment. Sharing responsibilities with the Chief Engineer, you will be required to participate and lead top level design covering all Systems Engineering disciplines (design, architecture, integration, test and flight test, including laboratory and field tests).

Lead Avionics Platform Engineer (Ref 0808): To lead all aspects of avionic platforms including study, analysis, modification and design combined the ability to act as Airworthiness authority on behalf of the Client. With a background in aeronautical/aerospace engineering you will be required to become the SME (Subject Matter Expert) on the whole avionic platform including aeromechanic, mechanical systems, propulsion systems and flight science.

Systems Engineer (Ref 0606): Knowledge and experience of the full system engineering lifecycle including requirements management, systems engineering processes, interface control, product development, verification and qualification. This role will also require the successful candidate to provide support to a major sub-contractor for successful delivery of a significant subsystem which will include requirements, architecture, design specifications, ICD’s and test plans.

Systems Engineer (Ref 0805): Working as part of the Client Systems Engineering team, this role will require the successful candidate to have responsibility for systems engineering and integration activities. As part of a small, niche team, you will become capable to independently design, develop and qualify modifications to subsystems and provide systems integration expertise to the full aerospace system.

Safety Engineer (Ref 0818): Lead all safety activities on behalf of the Client including flight safety. Acting as a company signatory for safety certificates, you will support the establishment of a safety organisation, provide expert judgement and guidance as an independent safety expert and perform safety related activities as part of the development, integration, trials and qualification effort.

In return, our Client will offer very competitive remuneration packages to reflect the responsibilities of each post - £35,000 to £50,000 basic plus benefits including pension, healthcare, 25 days holiday and relocation assistance, if required.

Interested? To learn more about these roles and to gain a detailed Job Brief, please apply in confidence with your CV, salary details and a covering letter to sg@rtc.co.uk quoting the reference number you are interested in above.

For an informal discussion, please do not hesitate to contact Scott George at Real Time Consultants on 01926 313133 Ext 2811.

RTC was established in 1980 to focus on the technical and scientific markets and has successfully developed a niche position within the Defence Industry. RTC has been delivering high calibre recruitment solutions ever since, making us one of the more trusted and genuinely experienced consultancies operating within the scientific market.

Our clients benefit from our knowledge, experience, pro-active approach and ability to provide high-demand individuals with rare and highly sought-after skills.

To view many other immediate opportunities please visit www.rtc.co.uk
The next national INCOSE UK event will be our annual Autumn Assembly on the 24th and 25th November 2008. It will be held at the Heythrop Park Hotel and Country Club near Chipping Norton in Oxfordshire (visit: http://www.heythroppark.co.uk). This year’s Assembly will have the theme of ‘Best Practice in Systems Engineering’.

Traditionally, Autumn Assemblies have an interactive and ‘delegate involvement’ emphasis and this year’s event will be no exception. There will be a variety of formats with ‘master class’ type sessions run by acknowledged experts in their fields, combined with ‘hands on’ syndicates and workshops.

The following topics will be covered:

- Architectures
- Capability-based Systems Engineering
- Human Factors and its Integration with SE
- Requirements
- Systems Engineering and Project Management
- Systems Engineering for In-Service Systems
- Test, Evaluation and Putting-to-Service
- The Professionalisation of Systems Engineering

An event flyer containing further information will be available in July.

There is no INCOSE UK Spring Conference in 2008, we hope you will all take the opportunity to visit the International Conference in Utrecht instead. The Spring Conference will return in 2009 and we hope to make it bigger and better than ever. The previously published dates for April 2009 have been withdrawn as we try to fit our conference into the increasingly busy spring schedule. Expect an announcement soon on the dates and venue for this event.

Planned Events
An updated INCOSE UK events calendar is shown below.

<table>
<thead>
<tr>
<th>Date</th>
<th>Type</th>
<th>Location</th>
<th>Theme</th>
</tr>
</thead>
<tbody>
<tr>
<td>15-19 June</td>
<td>INCOSE International</td>
<td>The Netherlands</td>
<td>SE for the Planet</td>
</tr>
<tr>
<td>2008</td>
<td>Symposium</td>
<td></td>
<td></td>
</tr>
<tr>
<td>24-25 Nov</td>
<td>INCOSE UK Autumn</td>
<td>Heythrop Park</td>
<td>Systems Engineering Best practice,</td>
</tr>
<tr>
<td>2008</td>
<td>Assembly</td>
<td></td>
<td>(includes INCOSE UK AGM)</td>
</tr>
<tr>
<td>Jan/Feb 2009</td>
<td>1-Day Symposium</td>
<td>Opportunity for local communities to help run a 1 day event, with support from UK events committee</td>
<td></td>
</tr>
<tr>
<td>April 2009</td>
<td>INCOSE UK Annual</td>
<td>Conference on Systems Engineering Research (CSER)</td>
<td>Systems Engineering for In-Service Systems</td>
</tr>
<tr>
<td>Spring</td>
<td>Conference</td>
<td></td>
<td></td>
</tr>
<tr>
<td>April 2009</td>
<td>Conference on Systems</td>
<td><a href="http://cserv.lboro.ac.uk/">http://cserv.lboro.ac.uk/</a></td>
<td></td>
</tr>
<tr>
<td>May/June 2009</td>
<td>1-Day Symposium</td>
<td>Conference on Systems Engineering Research (CSER)</td>
<td>Systems Engineering for In-Service Systems</td>
</tr>
<tr>
<td>Sept/Oct 2009</td>
<td>1-Day Symposium</td>
<td>Conference on Systems Engineering Research (CSER)</td>
<td>Systems Engineering for In-Service Systems</td>
</tr>
<tr>
<td>Nov 2009</td>
<td>INCOSE UK Autumn</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Assembly and AGM</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Events Notices
The proposed joint seminar with the IET in October has been postponed. The forthcoming Autumn Assembly will include a session by the INCOSE UK Architectures Working Group.

Note: we would like to continue the 1-day events into 2009. Local members in Bristol and Loughborough have already taken up the challenge of helping to organise a national 1-day event in their area. These events are run under the UK events team, with fully support given in budgeting, organisation and on-line registration. Local organisers are asked to come up with a theme and content and local organising support to help run the event. If you think you might be interested, contact me at r.d.adcock@incose.org for more details.

Rick Adcock
Events Director
INCOSE UK