



preview

International Council On Systems Engineering UK Chapter Newsletter

UK chapter wins INCOSE president's award for the most outstanding chapter

The UK Chapter of the International Council of Systems Engineering (INCOSE) has won the prestigious PRESIDENT'S AWARD, awarded each year to the chapter that best embodies the goals and standards of the organisation. The UK Chapter also receives a Gold Circle Award for the second year running, recognition of a chapter that "exceeds INCOSE's standards for local service and contributions". The awards reflect the achievements of the UK Chapter during 2004, and will be presented at INCOSE's International Symposium at Rochester, NY, USA, in July 2005.

The UK Chapter is the first and so

far only chapter outside the USA to receive these two top awards of the international Systems Engineering community. UK Chapter President Mr Hillary Sillitto of Thales said "This award reflects enormous credit on the entire membership of the UK chapter, and on British systems engineering as a whole. It makes us the best in the world (at least for a while)!" Immediate past president Prof Phil John, of RMCS Shrivenham, added "I hope it will stimulate enthusiastic involvement by our members (current and new) in INCOSE activities within the UK and worldwide".

Just because it is now the best

does not mean it will rest on its laurels. This year it will launch a "competency framework" for systems engineering, to start setting professional standards for the discipline. It is working on making systems engineering more accessible to the non-specialist. It is setting up a structure to allow it to respond to government policy consultations. Members will help to update INCOSE's "Systems Engineering Handbook", the international "how to do it" guide to systems engineering. And UK members hold key posts in INCOSE's international organisation.

INCOSE Press Release

First booking received for spring conference 2005!!!

That is what I like to see! Support Shop tell me that they received the first booking for The Spring Conference last Saturday March 12th. I think that there should be a prize for this considering all of the difficulties that people that book late give us. Doug Cowper was first a couple of events back and I think Simon Hutton was first last time. Presidents are notoriously late bookers so come on Hillary prove me wrong - We still need the paperwork done. If I proposed a prize for Simon or Doug it would rightly be claimed that they had some internal knowledge which gave them an advantage. The first booker this year is even a relatively new member - So well done Mark! Cannot promise a prize though but you can certainly claim a beer!

I suppose the recent push to get the brochure finalised will eventually have been worth it. Should be with Support Shop to distribute this Friday (March 18th) if all plans work out but they cannot do over three and a half thousand all in one day although they will do their best. All members will receive three copies and two of those are for you to distribute, preferably to other organisations than your own but distribute somehow! I hope you all sent loads of electronic flyers? Please send yours to other engineers that

you know as soon as they arrive. This will be done long before you read this I hope if not better late than never - Do it now please!

May I make the regular plea for everyone to book early - it really does permit us to get things sorted with the hotel, the printers the CD producers etc, etc, etc. You may notice that we do have limited capacity this time as we have filled up some of the conference room space with exhibitors. There is a high MOD content in the programme - they have been concentrating on Interoperability for many years and may have a lot to teach us. Also a lot may attend from just down the road at Abbey Wood and make it a sell out before the date!

We hope that you like the programme and if you are producing a paper and would like it on the CD you do need to get it into Dipesh by the date he gives you or it will proceed without you. I expect that you will have seen the programme before you read this so will know that there is lots of defence and lots of rail and other interesting application areas such as space and farming and other transport etc. There is still more on that MLU or LMU or whatever it is. I would think that you all know it inside out by now but people keep

asking for it. Above all there is heaps of INTEROPERABILITY so at least nearly every one is on the advertised theme! Well done to all of you that offered papers but we were in the happy state of having too many so there was a choice to be made and it should not put you off of submitting it again next time if you were not selected, perhaps the extra time for a bit of extra polish will help.

We start with tutorials again and Peter Lister has had the choice on the website for weeks so now that the registration form with prices etc has also been there for a while please get your bookings in. You did not have to wait for the brochure the information is put on there by Stuart Cornes as soon as we let him have it and this will continue right up to the event and I suppose afterwards as well, as someone usually has a few event photos to display.

We cannot promise Jazz bands and dancing this time but we are expecting a good conference in all its elements so book now and ensure your place. Hope to see you all there. Swindon Marriott it is which made us very welcome and looked after us all for the Autumn event and I trust they will again. See you all there?

John Mead
UK Administrator

April 2005

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In profile - Allen Fairbairn, Secretary - INCOSE UK



"How did I get into Systems Engineering? Well, I'm one of those systems engineers by discovery", says Allen Fairbairn, the UK Chapter's secretary, former chapter president and winner of the INCOSE Founder award in 2004. "There are many in INCOSE like me, folk who discovered after the event that solutions and approaches they were obliged to develop and use in the day job were part of what others called Systems Engineering."

"I started my working life as a mechanical engineering apprentice at a power station with the old nationalised power company (CEGB) but I always wanted to know more. I was fascinated by the idea of the national grid system and joined a grid control centre after graduating in electrical engineering in 1974. I then moved down to systems technical branch in the London headquarters, where they took what I would now call a whole systems view of the national power grid."

Allen left the CEGB in 1977 for the construction industry. "I was much happier working as a project engineer with technical things to do and projects to complete to some sort of predetermined time-scale. My first team designed and installed a 132kV a.c. submarine power cable across the Zanzibar Channel - a World record distance for the voltage."

"I think I acquired my engineering confidence on that project, being constantly exposed to new responsibilities without prior training and having to act on newly emerging information. I believe I was drawing on engineering intuition and a nascent appreciation of projects as systems. I could never regard the projects I worked on as some vaguely co-ordinated collection of parts that got dumped on the owner at the end of the project, together with some hastily compiled operating instructions prepared by the subcontractors, which were, usually, little more than sales brochures. When I

suggested we should prepare some overall operating instructions, I was told that was the owner's job and there was no budget for it anyway."

Allen's largest project was the Channel Tunnel, where he ended up as Systems Engineering Manager. "I started off in 1985 doing the outline design and cost estimates for the whole of the electrical and mechanical works on the UK side. In 1986 I moved over to the contractor's side and ended up in something called General Studies and Safety (GS&S), where all of the work was dumped that didn't neatly fit anywhere else. So we got things like tunnel diameter optimisation studies to carry out - a nightmare of inter-discipline trade offs to be performed years ahead of detailed design for most of the relevant systems."

"Our work in GS&S inevitably took on board most other interdisciplinary studies. We ended up determining the key transport system parameters which were then flowed down as more detailed criteria specific to implementing departments and disciplines. Slowly, we began to realise that our work was becoming key to the technical success of the project. It wasn't going to be any good having the tunnels built on time if the trains couldn't go through within the prescribed transit time, something which we rapidly found was heavily dependent upon a large number of diverse parameters and their interactions. We had a bit of a selling job to do to the rest of the project, but in the main, we kept a low profile and insisted only on parameters that really mattered, which we ended up tracking as design criteria from outline design through to commissioning. This way we built up our credibility capital and kept our powder dry! We felt we had achieved something when the Rolling Stock director reportedly told the Executive Board one week that the tunnels were only there to stop his trains from getting wet! Somebody else, we felt, had finally understood that we were building a transport system, not just a couple of railway tunnels and associated infrastructure."

"Some way through the design phase, our name was changed to Systems Department and I remember being asked by yet another new French colleague joining the project if this was where the systems engineering was carried out. Replying in the positive, since I didn't know anywhere else it might be located, opened my eyes to

the possibility of some help. I now had a name for what we were doing and contacted my engineering institution, the IEE, to ask what they could tell me about "systems engineering". They replied by inviting me onto the M5 (Systems Engineering) committee panel, as it was then known. As a body they've been about as helpful and just as ignorant of the benefits of a Guide to Systems Engineering in the intervening 15 years or so to date".

"However, joining IEE M5 did bring me into contact with Derek Hitchins and, in 1994, the link with INCOSE. I joined up immediately, at the inaugural Swindon meeting, since here was an organisation that was both dedicated to and did seem to know what it was doing to promote systems engineering; why they even had a web site, even if they did lack an agreed definition of systems engineering! I volunteered for the membership secretary's post at the inaugural meeting on the basis that the Defence and Aerospace guys claimed they really were interested in getting the message out to other business sectors and I have been a committee (now Board) member ever since".

"There has always been a strong spirit of voluntary support within the UK Chapter and within the wider INCOSE community. When I attended my first International conference in Vancouver 1998, I realised that INCOSE was my professional "home". There was, and still is, a tangible sense of mission - we have a discipline that can make a difference, if only we can get the message out. I remember once being sent the reviews of a draft systems engineering paper I was asked to do for the IEE. "The author is clearly one of those who thinks that all problems can be solved by taking a systems approach" . . . Well, yes, actually!"

"I wouldn't have incurred such reviewer wrath had I not suggested that the technical success of the Channel Tunnel in contrast to its commercial failure was basically down to a failure to apply a systems approach to the latter as well as to the former. Dealing with this disparity has become my professional focus now. IEE M5 also brought me into contact with John Boardman and his soft systems methodologies for enterprises as well as products. Over the past eight years or so, we have developed and sought to apply this thinking seamlessly to product, process and enterprise alike. There are strong points of contact with the System of Systems movement which is now big in the States,

where John is now based, and I am developing systems thinking and its relationship with what some call the new sciences. In business circles this is called co-evolutionary systems or complexity thinking applied to enterprises."

"Looking back on the Channel Tunnel project, I still draw lessons from it. Being a joint venture, there was nominal centralised control but, in effect, a number of loosely connected, self-contained "sub-projects" each with a strong sense of overall engineering purpose but with the freedom to develop their own solutions in their own back yard. These days we speak about the limitations of hierarchical, centralised control and the need rather to give overall direction and support to relatively autonomous, loosely coupled units, self-organised into the systems of an SoS or viewed as dynamic, co-evolving systems of the wider enterprise. There's a book somewhere in all of these lessons from the Channel Tunnel project but the story still isn't finished yet."

"After the Brighton International Symposium in 1999 I set up the SSIG - Soft Systems Interest Group within INCOSE, having created a soft systems track session which proved to be the most strongly voted for in the feedback questionnaire. There was a lot of initial interest both within the UK and INCOSE worldwide but together with Jack Ring and some others at Melbourne in 2001, the IEWG - Intelligent Enterprise Working Group was formed, into which I rolled the soft systems topics. The IEWG has made some good initial progress but is faltering a little under the sheer breadth of its scope. It may well be time to reconsider how best to structure the diversity of interest in what we might call enterprise systemics - the application of systems thinking and practice at the enterprise level and I have recently been talking to Ashok Jain, the Associate Director for the SE Application sectors within INCOSE about all of this."

"How do I feel about winning the INCOSE Founders award? Very, very surprised but, on reflection, honoured because I see it also as a Chapter award. Under its succession of presidents, the UK chapter has made huge contributions both to INCOSE's internationalism and to its regional focus. There are many "firsts" down to us as a chapter right up to the present day with the UK CAB (Corporate Advisory Board) structure. Mostly, what I do is to push the boundaries (many of which

In profile next time, Prof Alan Smith, New Academic Liaison

are only apparent) and leave it to others to consolidate afterwards!
As a Board member I have recently been tasked to look into

certain topics under Hillary's brief to keep us all busy with something. One of these is certification for systems engineers, which already

seems to have kicked off in the US with a tick the box mentality – a sort of CMM for individuals., which is not, generally, my idea of how

to do things. Watch this space.

President's corner



The really, really good news as we go to press is that INCOSE Central have selected us to receive this year's President's Award. The award is based on both an "objective" measure of activity and outputs, and a subjective assessment of how the chapter is working towards INCOSE's goals and objectives. You should have seen the press release and award letter by now, and Paul Davies' article gives more detail. This award reflects great credit on every single member of the UK chapter for their participation, enthusiasm and commitment. I would specially like to thank Pete Lister and Paul Davies for establishing the financial and organisational structure on which this success was built, and Phil John for leading us in the year it was achieved. But really it is an award for the whole chapter and we can all take pleasure in it – and use it

as evidence to present to all our stakeholders – bosses, colleagues, customers - that what we are doing is worthwhile, and is valued and respected by our international peer group.

In spite, or perhaps because, of this success, my priority now is to develop our strategy for the coming years. I would like to maintain the standard we have just set for ourselves, make sure our efforts and enthusiasm are well directed, and make sure there is enough guidance and monitoring for the chapter's activities but not too much. This last is important, given that our efforts seem to be disproportionately more effective when a group of our members agrees on something they want to achieve together, and then work out for themselves what to do and how to do it.

Strategy is a bit, or perhaps a lot, like system architecting. You have to immerse yourself in issues and absorb the important detail, while keeping in touch with the big picture, until the strong patterns and structures become clear. You select what seems to be a stable framework and start building around it. If one doesn't work you try another. The output should be a "strategic architecture": vision, aims and plans for the future of this complex "organismic system" called INCOSE UK.

We are part way through the process, some of which is about

educating the "new boy" (me). We have a good picture of where we have come from, where we are now and what we are trying to do; of what seems to work and what doesn't; and of what metrics seem to be useful. The good news is that when we look carefully at the membership engagement statistics, we seem to have the characteristics, not of a normal professional body but of a very active and enthusiastic "club". This is something we should try to maintain.

The clarity of purpose I would like to achieve is beginning to appear, but will need a lot more discussion and consensus-building over the next few months. In the meantime, we have made some quick adjustments to roles and responsibilities in the Board to accommodate peoples' changing personal circumstances, to increase our attention to some of our key external relationships, and to free up a bit of time for new projects and longer term thinking. Simon is putting time and effort into improving the way we communicate with members, trying to work out how we can better support local group organisers, and working with Stuart Cornes to keep the website current. Dipesh has established the "peer review group" whose first job was to formally peer review the papers for SC05 – thanks to all concerned.

Doug is doing an excellent job on the newsletter – we are particularly grateful to his new employers for their whole-hearted support. A lot of other people are working really hard also on all sorts of things. You'll see evidence for some of these efforts in other articles in this issue, in the excellent programme for the Spring Conference, in the start of planning for EuSEC 06 next year, and the good batch of UK papers selected for the Rochester conference. Thanks to all of you who are contributing to the continuing success and vitality of the chapter, and to your employers and families for supporting your efforts.

As always, we would like to do more than we are able to. If you would like to get more involved in however small or large a way, please contact one of the Board and we'll try to put you in touch with like-minded members. Come to the Spring conference; support your local group. For the ambitious and energetic, we have as I write a couple of senior vacancies on the Board which we want to fill with new faces rather than by reshuffling the old ones. And the members' survey is still on the website; if you have not yet done so, please try to find a few minutes to fill it in to tell us how you would like the Chapter to evolve.

Hillary Sillitto
President of the UK Chapter

Events calendar

May

5th May

AFCEA London
Presentation on FIT.
The evening is open to members and their guests; it is only £27p.a. to join and starts at 6pm with the bar open, dinner at 6.45 and presentation at 8 pm until 9.30. Take a look at the AFCEA web www.afcea.org.uk and if interested please book in advance.

12th May 2005

Introduction to Requirements Course, London
www.iee.org/events/intro-req.cfm

9th - 11th May 2005

INCOSE UK Spring Conference
Come and enjoy a 3 day mix of tutorials, networking, refereed papers, panels, working groups, conference dinner, and more.
Marriot Hotel, Swindon

July

10th - 15th July 2005

INCOSE 2005, 15th International Symposium, Rochester, USA

17th - 21st July 2005

Twenty-third International Conference of the System Dynamics Society, The Seaport Hotel, Boston
<http://www.systemdynamics.org>

Nov

7th - 8th Nov 2005

INCOSE UK Autumn Assembly, Venue TBA

10th -11th May 2005

Introduction to UML Course
London
The latest in the IEE series of training courses aimed at the Systems Engineering industry.
www.iee.org/events/uml.cfm

If you have an event you would like published in Preview then please contact:

dcowper@sula.co.uk

INCOSE annual survey 2005

He uses statistics as a drunken man uses lamp posts -- for support rather than illumination

Andrew Lang (1844 – 1912)

If the first INCOSE UK Annual Membership Survey tells us anything, it is that systems engineers don't have time to read e-mails, let alone respond to surveys! I would like to thank the 30 members who did contribute, and whilst I am told that a 7% response is good for a marketing mail shot, I had hoped that more of our 425 members would leap at this opportunity to express their views on what is really important to the UK systems engineering community. INCOSE is run by a small group of enthusiastic members, and this survey aims to provide some guidance on where our limited resources are best focused to realise most value. Over time, the survey also gives an indication on how we are performing, so a representative set of statistics is quite important! I am going to leave the survey form on the web site until the beginning of May (<http://www.incose.org.uk/survey05.htm>), and I would be grateful if you found time to participate over the next few weeks.

In spite of the small number of

adding value – figure 1.4 suggests this may be true, and an indication of future success may be to increase the proportion that have been members for more than 2 years.

Membership funding is split equally between individuals and

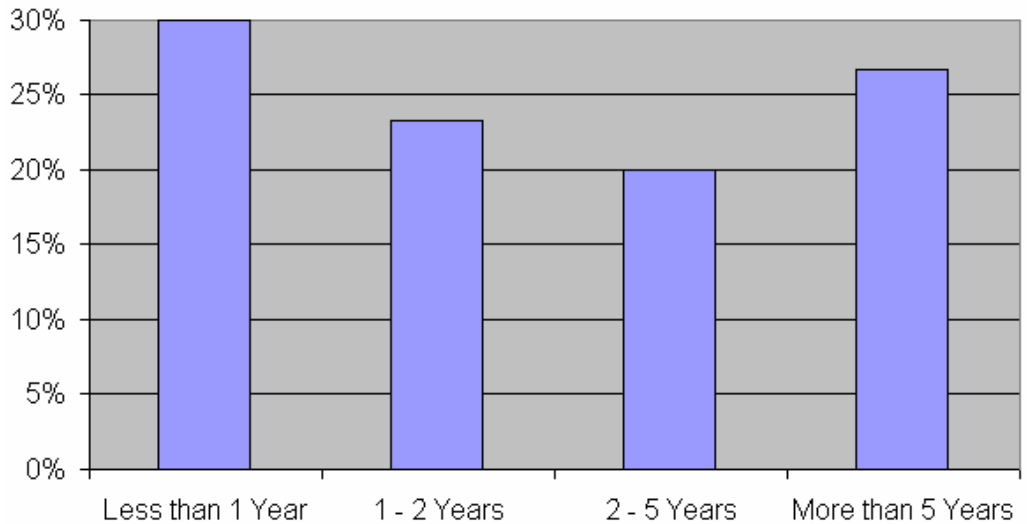
employers, and it is reassuring that the majority (83%) will probably or definitely renewing your membership. 7% will not be renewing this year, which means we will lose 30 members this year assuming the figures are representative.

Your replies to the question on

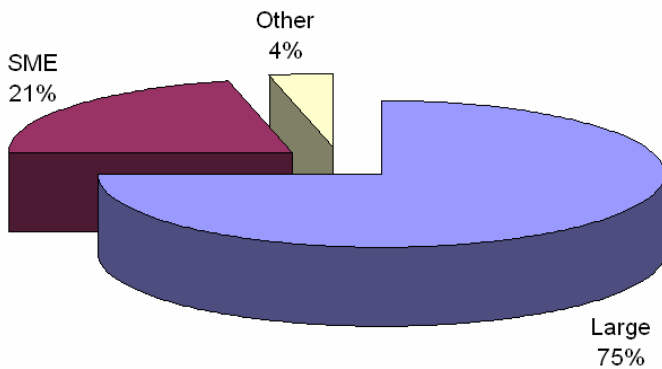
(www.incose.org.uk) is useful or very useful to 80%, but it is interesting that a mere 10% visit the web site weekly – the majority (67%) only visit the web site occasionally or not at all.

89% of you find INCOSE products

1.4 How long have you been an INCOSE Member?



1.3 Organisation Size



interests suggests the top three topics are requirements, systems analysis, and process and management, as shown in figure 1.6. It may be of note that the front end of the life cycle gets the greatest interest, with system operation, maintenance and support being of least interest.

We seem to have communications about right, although there were many useful suggestions to improve the way we promulgate information.

84% are happy or very happy with the information you get, and Preview is read with interest or occasionally by 97%. The web site

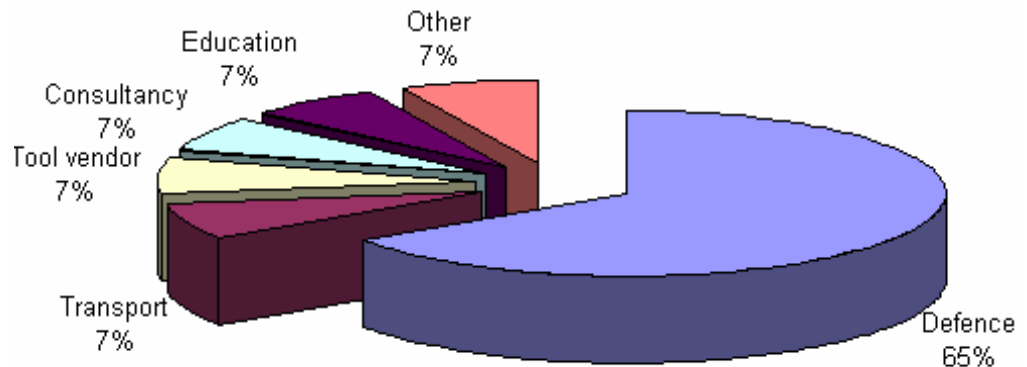
useful or very useful, and the results suggest that Insight and the SE Journal are the most popular products, with the tools database and SECAM being bottom of the list, as shown in figure 3.1. I am not sure if the new membership CD scored poorly because it is a recent product – it will be interesting to follow this one over the years.

The section on participation yielded some interesting figures. 86% feel there are sufficient opportunities to participate, although 28% have never attended a conference. The main reasons for not attending future conferences include a lack of time (50%), ex-

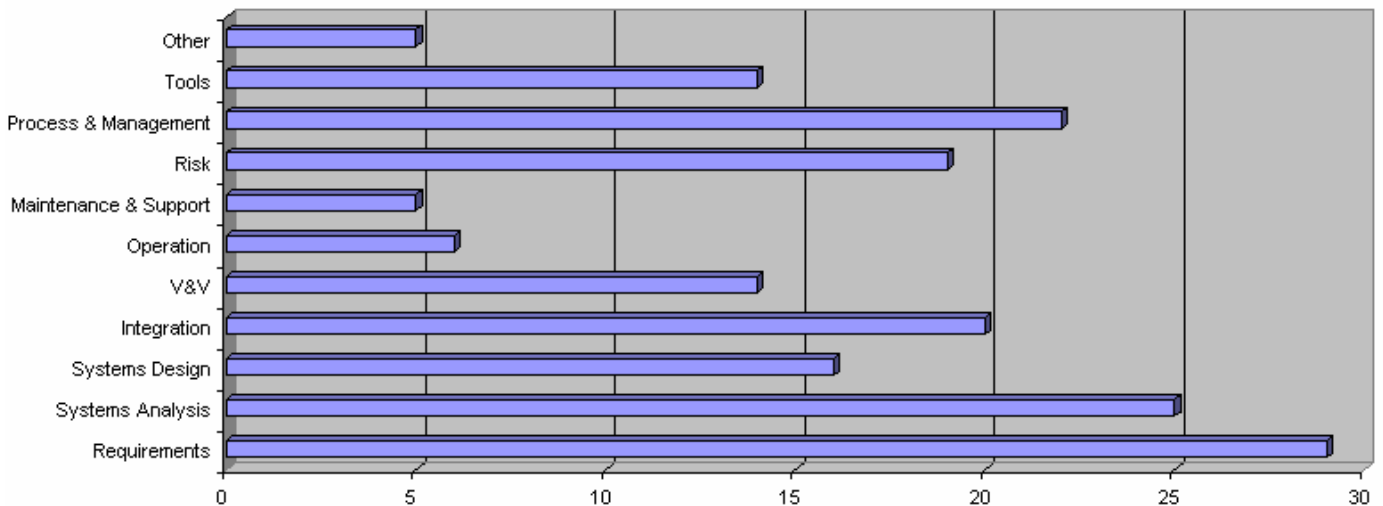
replies the results do give an interesting profile of the membership. A third owned up to being Systems Engineers – the rest being management (20%), consultants (20%) or technically employed (17%). As shown in figures 1.3 and 1.3b the vast majority of you work for large organisations in the defence sector, and 41% work for UKAB organisations. This does seem to reinforce the belief that the SME and non-defence sectors are not widely applying or benefiting from systems engineering.

Over half have been members for less than 2 years. One of our concerns is that we lose a lot of members in the early years by not

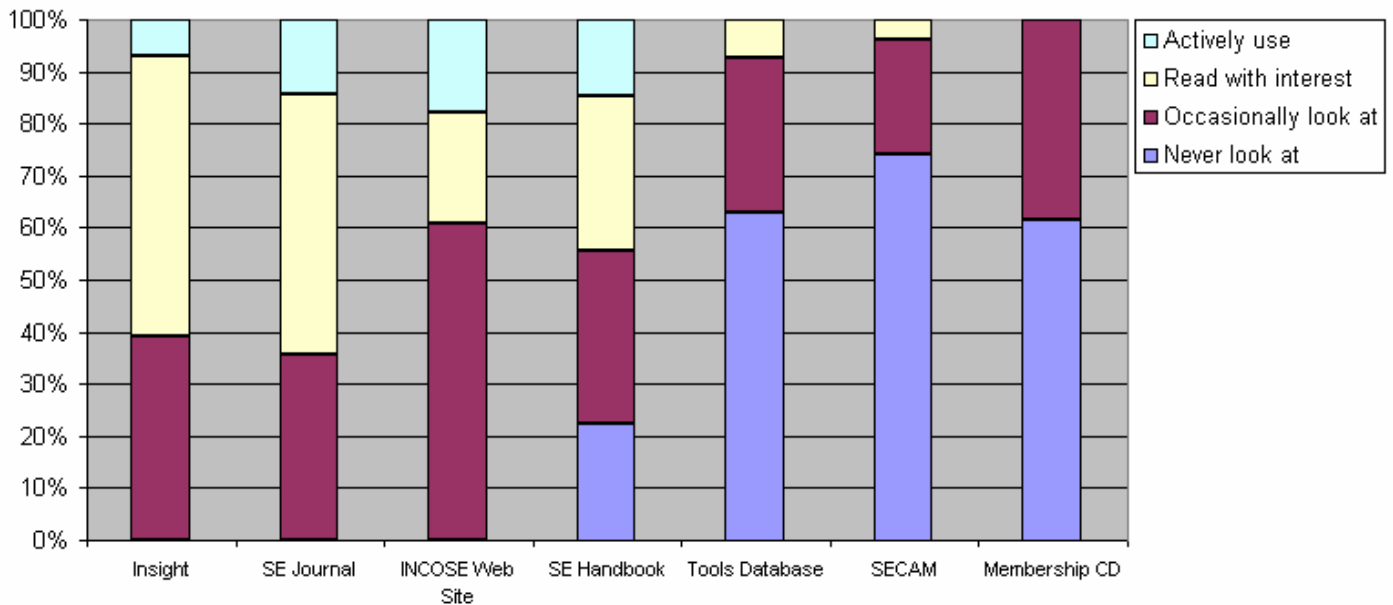
1.3b Organisation Domain



1.6 What are your main Systems Engineering interests?



3.1 How Useful are the following products or benefits?



cessive cost (25%) and being geographically remote (11%). Perhaps we should be looking at a series of cheaper, shorter events dotted around the country, possibly enabled by our local groups. It is reassuring that half of you are close to a local group, and would participate if you had the opportunity.

Finally, the average overall satisfaction score of 6.4 suggests that you are all satisfied with INCOSE UK, but we could probably do better!

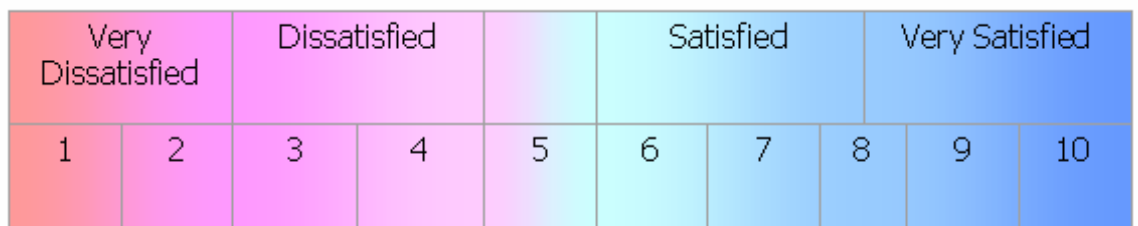
I hope you have found these results of interest, and I hope any-

one who believes they do not represent the real state of INCOSE UK expresses their views through Preview. The Board will be using these figures and any additional com-

ments to ensure our efforts are correctly targeted, but the statistics will only be representative if more than 30 out of 425 take time to reply - I look forward to your

completed forms!

Simon Hutton
CMC Chair
Principal Consultant, 3SL



Average Score 6.4

INCOSE professional certification programme

INCOSE established its Professional Certification Program in March 2004 to provide a formal method for recognizing the knowledge and experience of systems engineers. Certification is valid for three years from the date awarded, and may be renewed in three-year intervals. In order to become Certified you need a BSc / BEng degree or equivalent, 5 years experience in systems engineering, three letters of recommendation and to pass an examination which is based on the Systems Engineering Handbook. The examination, which is two hours long and consists of 120 multiple-choice questions, is administered by an independent test organization. Applicants without a technical degree can be accepted,

provided that they have the appropriate additional work experience. Applicants will be able to apply for Certification in the next few months.

In the future, the scheme is likely to be extended to include a number of advanced levels that may be achieved after the foundation level has been attained. The advanced levels currently planned are Systems Engineering Management, Systems Engineering Specialist, Systems Engineering Enterprise Processes and Systems Engineering Fellow. Certification for System-of-Systems Architects is also under consideration.

Within INCOSE UK, we are considering how Certification can be made to work with our recognised "Chartered Engineer" status.

Through our Memorandum of Understanding (MoU) with the IEE, we are starting to tackle the issue of how to assess CEng candidates who have done "systems engineering" degrees or who have worked as "systems engineers". The Engineering Institutions currently have no way of assessing the credibility of such courses or of the experience and we are exploring a number of possible solutions to this, including:

1. IEE (and possibly other Engineering Institutions) to award CEng to systems engineers based on some accreditation criteria that are influenced or under-written by INCOSE UK.
2. INCOSE UK partnership with IEE - and potentially other institutions - to give a "systems engineer"

competency certificate to someone who has already achieved CEng status from any chartered professional institution.

3. INCOSE UK to seek to establish an independent means of chartering Systems Engineers. There are clearly a number of advantages and disadvantages to each of these approaches and members are encouraged to submit their views on these or any other possible alternatives to Doug Cowper: dcowper@sula.co.uk.

Samantha Brown
INCOSE Technical Director
Deputy Chairman, Systems Engineering Council
BAE SYSTEMS

Dues increase

You may be aware that INCOSE dues as charged by Central Office will be increased from 1 June 2005 to \$105. This is the first increase in dues since at least 1994, and reflects the widening gap between the services provided by INCOSE and the costs of supplying them. It is interesting to note that the main INCOSE finances mirror our own in that the funds generated from events and corporate involvement make an important contribution to the overall budget.

The cost of paying dues in the UK was originally set to match the value in US\$, however because of the fluctuation in exchange rate we set the UK price slightly higher to avoid losing money over the membership year. Recently, the fall in the US\$ has meant that the

cost of paying dues to Central Office has reduced significantly over the last 18 months.

The Board discussed the dues increase and considered a range of options. We could have kept the £60 charge, which currently equates roughly to the \$105 charged by Central Office, however this would have resulted in a reduction of about £4,500 in our income compared with last year. It is also likely that the US\$ will strengthen which would leave us even further out of pocket when Central Office requests payment from us in January 2006.

We could have increased the UK charge to a level that provides a similar margin to that currently obtained. This would have raised the UK charge to about £80, which was felt to be rather too high -

notwithstanding the proposals at the AGM to increase the contribution from members. One of the considerations was that if the cost of renewing in the UK rose too high, then more members would be inclined to renew directly with the US, and thus erode the benefits of a higher margin.

In the event, we have decided on a half-way house, and at the same time encourage members to pay by Direct Debit. Over 100 members currently pay by Direct Debit, and this has the benefit of improving cash flow as well as minimising our costs in collecting dues. The result is that we will be charging £72 per year (£18 per quarter for new members), with a discounted price of £68 for Direct Debit payers (for a full year only). Student membership increases to

£20 per annum, but please note this is only available for members who spend at least 75% of their time in education. If you have a full time job and study part time then the full membership rate applies.

Please remember that subscription payments made in the UK can be claimed against tax (a saving of 28% for standard rate tax payers and 40% for higher rate tax payers). This means that if you recover the tax, membership will actually cost you less in the UK than renewing via the US. What a bargain!

Peter Lister
Treasurer
peter.lister@siemens.com

Key messages from the 2005 international workshop

The International Workshop, INCOSE's annual "business meeting," provides members the opportunity to come together and collaborate on a broad range of projects. In January 2005, over two hundred working group members and leaders from across INCOSE gathered in Tampa, Florida, USA making this the largest workshop in INCOSE's history. Highlights included the Board of Directors plenary reports on results from 2004 and plans for the coming year, workshops to finalize the new INCOSE technical infrastructure, and the awarding of the first INCOSE Certified Systems Engineering Professional (CSEP) certificates during the banquet.

The opening and technical plenary briefings are now avail-

able in the Members' Area at <http://www.incose.org/membersonly.html>. As you review the materials from the workshop, if you find a topic of interest, please contact the project lead. Project teams and working groups are working hard on a variety of efforts such as updating the INCOSE metrics primer, reworking the tools database, reviewing the Systems Modeling Language (SysML), and supporting many international standards. Your contributions can certainly make a difference as we strive to advance INCOSE and the systems engineering profession.

Reviewing Agenda 2006. Heinz Stoewer, INCOSE President for 2004-2006, opened the International Workshop with his observa-

tions of achievements and remaining issues to realize the vision of "Agenda 2006." Establishing the INCOSE vision for 2006 and beyond, this agenda highlights three key themes:

1. *High value products and services for INCOSE (the prerequisites).* Maintaining focus upon products and services is key to responding to the needs of our stakeholders. INCOSE must continue to prioritize its energies and efforts to advance the major projects in 2005.
2. *Outreach, outreach, outreach! (the enablers).* Current outreach initiatives include focused efforts in commercial sectors, international growth, and academic and R&D com-

munities. With a new, more targeted effort to reach executive leadership and a broad drive to improve our marketing and public relation efforts, much work remains.

3. *Organizational development (the engine).* While our "engine" has been working well, there is, in the spirit of a "learning organization," always room for improvement. We need to continue to develop and support new leaders at all levels of the organization. We must support and reinforce our chapters, the mainstay of INCOSE. We must ensure that our technical infrastructure becomes even more open and inviting to all

those who wish to participate. And, we must continue to advance within our strategic framework.

INCOSE added over one thousand members in 2004, growing by approximately twenty percent (though this growth was focused largely in six chapters). Heinz challenged everyone present to continue or expand their focus upon chapter needs, and supporting their tasks of making INCOSE attractive to our members.

Heinz closed his comments by thanking the many dedicated volunteers working throughout INCOSE. We have made very significant progress on Agenda 2006 but much remains to be discussed, decided, and implemented.

Advancing the INCOSE Major Projects. Due to the diligence of the project teams, INCOSE has moved forward on the five major projects over the past year.

... The classification of INCOSE products has been completed. Thanks to the team led by Dick Wray, Steve Sutton, and Gundars Osvalds, all INCOSE products are now categorized for access on the web and were provided to members as part of the first-ever Member CD distributed with the October 2004 issue of INSIGHT.

... Version 1 of the Technical Vision is nearing release after stimulating discussions carried out in Portland, Toulouse, and online. Harry Crisp will continue to lead this project as we work with other organizations to generate a shared technical vision for systems engineering.

... The inaugural group of forty-two Certified Systems Engineering Professionals, who passed the beta test and met the other program criteria, were recognized at the International Workshop banquet. The certification team is applying lessons learned from the beta process as we prepare for full program launch in the first half of 2005.

... Work continues on version 3 of the Systems Engineering Handbook. Release of this critical product is currently scheduled for February 2006.

... Under the leadership of Dennis Buede, version 1 of the Guide to the SE Body of Knowledge is nearing release. As we work to deploy and maintain version 1, Al Motley has taken the lead on version 2 and is gathering requirements for the next generation G2SEBoK.

To maintain focus on the existing projects, INCOSE has decided to

not adopt any additional major projects for 2005. Instead, we will focus efforts on the remaining four projects which represent priority needs for our many stakeholders.

Finalizing the Technical Infrastructure. During the opening plenary, INCOSE's Technical Director Samantha Brown reviewed the need for the technical infrastructure to advance the knowledge base of SE ("Grow"), share our knowledge base ("Share"), and provide technical authority ("Govern"). Samantha thanked the dedicated members of the Technical Board for their many contributions to advance INCOSE's technical foundation. With the new Technical Leadership Team now in place, INCOSE held two special workshops open to all members to review the technical mapping matrix formed by application sectors (where we do systems engineering) and enablers (what we do). Four hours of hard work and spirited discussion generated general agreement with the new structure and a wealth of input and feedback. The Technical Leadership Team will now work to digest that input, finalize the technical mapping matrix, and complete the organization while supporting the work already underway in many working groups.

In conjunction with the new technical mapping matrix, INCOSE will be updating the member database so that members can register their interests, experience, and willingness to participate in INCOSE projects. Current plans call for the initial system to be in place before the 2005 International Symposium so that we can better connect and inform members within specific focus areas and involve members in projects of interest.

Appointing Associate Directors. To better meet the challenges as INCOSE moves forward, INCOSE is identifying certain key focus areas that require special attention. For these key areas, INCOSE is seeking out and appointing Associate Directors with specific skills to lead these efforts. These individuals are not formal members of the Board, instead advising the Board and supporting elected Directors. During the International Workshop, INCOSE announced three new appointments:

... David Paul has been appointed Associate Director Communications, Marketing. Current president of the San Francisco Bay Area Chapter, David will bring his expertise as a professor teaching strategic business management at Cal State Hayward to INCOSE's strategic marketing challenges.

... Cecilia Haskins has been appointed Associate Director Communications, Public Relations. Cecilia is well known within INCOSE as a leader of the Chapters Committee, a leader in Region III, and an INCOSE Ambassador. Cecilia will be building upon her efforts with the 2004 International Symposium to make public relations a key component of our strategic communications efforts.

... David Wright has been appointed Associate Director, Leadership Development. Having just completed his term as Chair of the Member Board, David will implement a system to identify, develop, and exploit (in the positive sense) the leadership abilities of INCOSE members for the benefit of the individual and the organization at all levels.

Please welcome these members to their new roles. They look forward to your input and support as they begin to work these key tasks.

Leveraging INCOSE Connect. Developed as part of the new INCOSE website, INCOSE Connect supports distributed, asynchronous collaboration through document repositories, discussion threads, calendars, action items, decision histories, and more. During the workshop, INCOSE held three introductory sessions to help teams take advantage of this new resource. All INCOSE members will receive accounts in March 2005 when INCOSE Connect is integrated with the online member database. In the

interim, project, committee, and chapter leaders can request workspaces and accounts for team members by sending a list of members and email addresses to comms@incose.org. Those interested in more information on INCOSE Connect can review the workshop presentation in the Members' Area.

Launching SEA-NET. SEA-NET (Systems Engineering & Architecting Network for Research) is an INCOSE sponsored international inter-university network of doctoral student researchers and mentors working in the field of systems engineering and architecting. Four universities are participating in the 2005 pilot that will help to shape a full program for a research network. The seven participating doctoral students, their mentors, INCOSE Fellows, and senior leaders met for two days to discuss their research and explore themes and synergies for the network. Participants will continue to collaborate throughout the year as INCOSE explores how to open the program to all interested universities.

Announcing Future International Events. Please mark your calendars and join us for the 2005 International Symposium in Rochester, New York (10-15 July), the 2006 International Workshop at in Scottsdale, Arizona (28 January - 1 February), the 2006 IS in Orlando, Florida (8-14 July), and the 2007 IS in San Diego (24-28 June).

Questions and comments in regards to this note should be directed to David Long, david.long@incose.org.

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Will the real systems engineering stand up, please?

I couldn't help noticing the contrast between three of the articles appearing in February's excellent Preview newsletter. First, there was the President's Corner, in which Hillary, our new President, extolled the virtues of the Japanese lean, volume supply system that had provided his latest four-wheel drive car – not a Toyota! (Actually, mine is!) These self-optimizing supply systems are indeed highly successful examples of commercial systems engineering. Their global organizations have clear goals and objectives: economic survival; continual innovation; enhanced quality through *kaizen*; progressively reducing unit production costs through minimization of work-in-progress, use of just-in-time, market pull, *heijunka*, etc. The supply system is designed, and operates, as a unified whole: it includes the market, the consumer, and even the recycling of obsolescent vehicles.

The Japanese experience clearly extols excellence in systems engineering, but equally clearly it is not about engineering, *per se*, since the same approach to lean volume supply can be applied to all kinds of goods, including brown goods, white goods and food-stuffs. Instead it is about integrating and optimizing a distributed supply chain made up of companies, contracts, procedures, transport systems, IT systems, managers, teams of workers, marketers, salesmen, consumers, etc., with parts, assemblies and full products flowing through the supply system like boluses of food through an alimentary canal.

The second article that caught my eye was Simon Hutton's *Smart Acquisition, Smart Requirements*. The Smart Requirements Model, it emerges, is a "method for capturing, engineering and managing requirements based on the principles of systems engineering." I wonder what those systems engineering principles were?

Smart Procurement, as it started out in 1997, was intended to capitalize on the enormous success of commercial systems engineering, as epitomized by the Japanese car industry. The idea was to introduce commercial practices so as to procure better defence products much more quickly and cheaply. Clearly not engineering either, then, but another supply system. Commercial-off-the-Shelf (COTS) products were envisaged, which could help to bring down procurement cycles from 20+ years to as little as four-to-six years for major projects. Somehow, the idea got around that Smart Procurement was synonymous with systems engineering, although for the life of me, I cannot see the

connection.

Smart Procurement didn't work as well as expected. So, in time-honoured fashion, it was re-invented as Smart Acquisition. Even so, it still does not appear to be unequivocally successful: the following is taken from the National Audit Office MOD Major Projects Report 2004.

The project performance recorded in the Major Projects Report 2003 was among the most disappointing in the history of the Report. ... there were also worrying signs that the performance of newer projects begun since the introduction of Smart Acquisition was starting to deteriorate. Many of the problems on these newer projects were caused by the failure to apply consistently the sensible principles underpinning Smart Acquisition in both the way the projects were planned and have subsequently been progressed ...

Looking at Smart Acquisition today, do we see systems engineering? Well, it is not obvious. Instead, *Smart Acquisition, Smart Requirements* presented "management speak:" Customer 1 and Customer 2; Initial Gate and Main Gate; Through Life Management Plan; Equipment Capability Customer; etc., etc. These are surely indicators of management consultants and civil servants trying to control the practices, processes and products of defence contractors: they do not bear any apparent resemblance to commercial systems engineering, Japanese style. Or am I missing something?

And so to the third article: Peter Bolton's erudite exposé on systems science. He was looking at my earlier proposition that it should be possible to establish open systems science as an underpinning for systems engineering. Peter, at least, felt that it should be possible in principle. If he is right, then we should no longer have to debate whether something like Smart Acquisition is closet systems engineering, or not; it would be obvious and apparent, since the whole systems engineering process, supposing there were one, would be scientifically sound, open to scrutiny, optimal and provable.

As the first two articles showed, systems engineering is not engineering. It can guide engineering, but systems engineering is not about technology and manufacturing – that is the engineer's domain.

Engineers are not equipped to design people-centred, socio-technical systems such as command & control systems, police and emergency services, air traffic management, and defence ca-

pabilities. Yet these are bread and butter to systems engineering, where a system can be a team of people, a product, a process, or a procedure, and where there need be neither technology nor manufacturing.

Establishing a sound national energy policy. Designing a major hydroelectric scheme. Planning the socioeconomic recovery of a nation ravaged by conflict. Systems engineering can do, and has done, so much more that it tends to leave engineering behind. It works in a fundamentally different way to engineering, which is largely based on Cartesian reduction and the application of specific technologies to achieve some defined function or purpose. Engineering is great. I am an engineer, and I love it. But it is not systems engineering. Different subject. Different discipline. Different rules.

Systems engineering is about synthesis – bringing parts together to make wholes. It is not directly concerned with the technology – there may not be any – but instead it is concerned with how the parts interact and behave, and in so doing how they contribute to the properties, capabilities and behaviours of the whole. And having said all that, it must be evident that systems engineering can synthesize, say, a whole avionics system, or a whole radar system, from its many parts, can optimize the functional and physical architectures, and can specify the whole and its many interacting parts. So, yes, along with many other things, it can work for engineering – but it is not engineering.

System science underpins systems engineering. System science is the science of "wholes;" it embraces the physical and the life sciences, and concerns itself with the way in which whole systems behave and exhibit properties that are not exclusively attributable to any of their parts. Regulation in whole, open systems is primarily derived from dynamic interactions: cybernetic control is secondary.

A defence capability might be viewed as a "whole system." Its performance and effectiveness depend upon all the parts working together, and in just the right way. Many of those parts are teams of people. Some parts may be weapon systems – people deploying weapons; communication systems – people sharing information; command and control systems – people making informed decisions and passing orders to formations; and so on. System science concerns itself with the way all the parts interact/behave, and how the "capability" operates, functions, adapts and behaves as a unified whole, especially when combating an opposing force. And systems

science is very much concerned with the people as well as their technology.

During the middle decades of the 20th Century, systems engineering was believed to be almost magical in its ability to solve complex problems and to create complex, innovative systems such as Apollo, Polaris, Trident, etc. Defence companies, in particular, developed systems methods and methodologies that were treated as confidential, because of the commercial advantage they might afford competitors. Systems engineers, guardians of the corporate secrets, were considered as an elite. As a result, just "how you went about systems engineering," the classic systems methodology, never really came into the public domain. It was not developed and rarely taught in non-defence universities.

Creating a generic systems methodology – the "how" of systems engineering – is not that easy. It has to be problem, scale, type and solution independent, so that it can be applied to any problem. (Systems engineering, after all the dust has settled, is – and always has been – about solving complex problems.) And, even more difficult, although it must be system-scientifically sound, there should be no overt "heavy" science or mathematics in the systems methodology – the average system practitioner is instantly turned off by having to go back to science and maths basics. What they would like, instead, is a straightforward process, well supported by tools, that allows them to progress from problem to optimal system solution systematically, swiftly and effectively.

I have been working on a systems methodology that is tool supported, and which generally meets the criteria outline in the previous paragraph. It is system theoretic, mathematically provable, yet the system science and mathematics are embedded in the tools and methods from which the systems methodology is formed. Practitioners do, however, need to learn how to apply the tools and methods. Some (obviously contrived) FAQs follow:

- ... Is the systems methodology generic? Well, yes, but the process requires domain and operational experts to provide information. No domain knowledge: no effective solution system.
- ... Is the systems methodology fully tool supported? Well, yes again, but there is considerable room for improvement. Some current commercial tools, notably STELLA™, are

employed in ways never envisaged by the tool vendors.

- ... Is there a systems methodological language? Not really, although a variety of terms require clear definition. SysML does not help - yet.
- ... Does the systems methodology conform to ISO15288? Not as far as I can envisage. I can see little relationship between the systems engineering that I have practised for 50+ years and ISO15288, which appears to be about engineering management.
- ... What does the systems methodology look like? It can be represented in a variety of ways: as a paradigm; as a process model; as a behaviour diagram; as a series of procedures; as a succession of interacting methodologies going from soft and messy to hard and focused; etc.

Figure 1 shows two views of the systems methodology. The diagram at left is formed from two established paradigms: the top half shows the General Problem Solving Paradigm (GPSP), an approach to dealing with any abstract problem; the bottom half contains the more familiar Systems Engineering Problem-solving Paradigm (SEPP). Reference Models are generic, systems-theoretic models of systems that can be used as "scaffolds" upon which to construct particular solution systems.

The paradigmatic view indicates a sequence of activities, but does not show how they might be undertaken. In contrast, the diagram at right shows how the systems methodology is forged from linked activities, techniques and strategies. It starts by probing the problem space, using issue symptoms as the probes. Both views of the systems methodology suggest that systems engineering does not start with customer requirements; instead, it starts with understanding the problem - which does sound rather more sensible.

Figure 2 presents the Systems Methodology as a so-called Behaviour Diagram. The centre column displays the main functions and processes. The left hand column identifies inputs needed to enable/activate the corresponding function/process. The right hand column shows the output from each function/process.

As a Behaviour Diagram, the Systems Methodology presents as

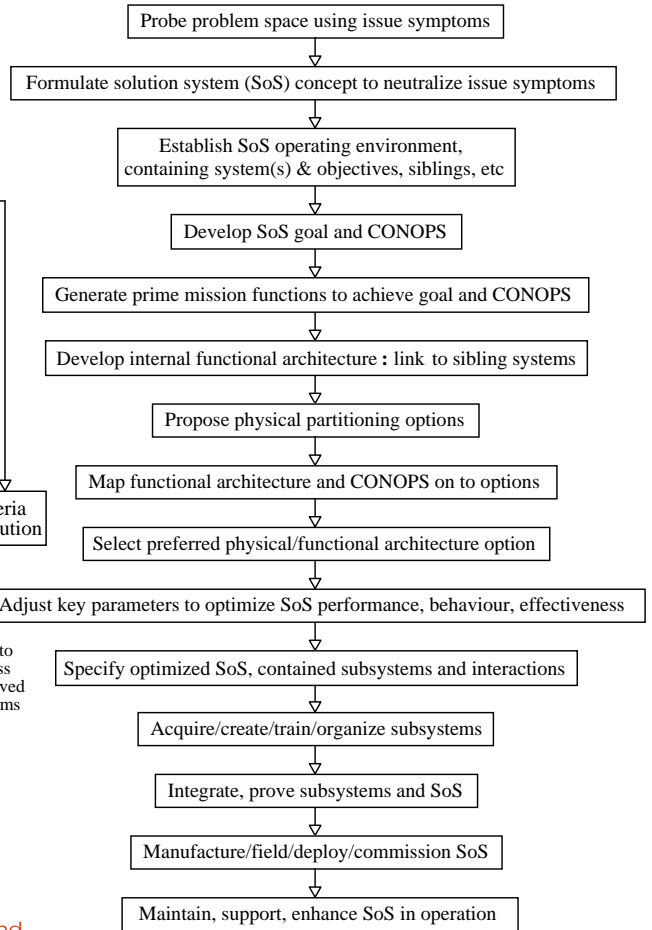
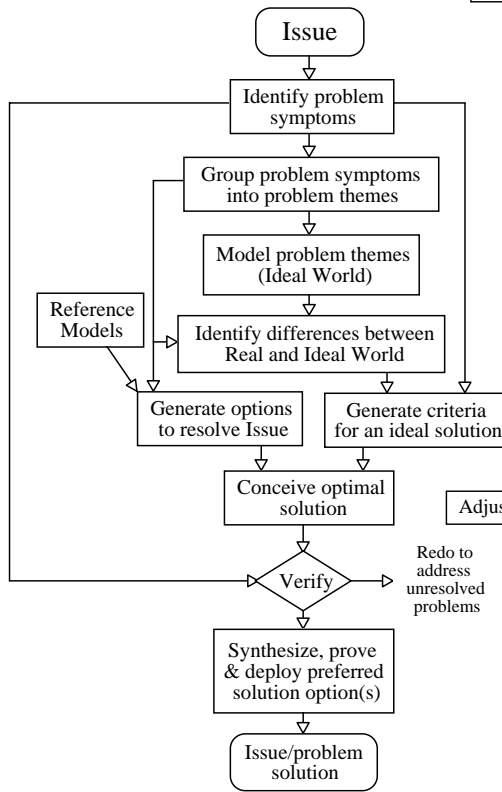


Figure 1 - Systems Methodology - Paradigm and Process Views. SoS: Solution System. CONOPS: Concept of Operations

a seven-step process. Each step is a methodology in its own right, and each methodology employs one or more system tools, techniques and methods¹. The output column shows the principal products that accrue as the Systems Methodology proceeds.

As you might expect, there is a lot more to the Systems Methodology. You can explore, and challenge it if you will, on <http://www.hitichins.net/SysMethodology.html>, where you will also see it applied to the creation of a future network enabled/network centric land force. By the way, this site is a free systems engineering resource for INCOSE members.

What does the Systems Methodology indicate that systems engineering is really about?

1. Creating optimum solutions to complex issues and problems: that is important—the world really needs a way of doing that.
2. Creating order and stability from disorder and instability.
3. Exploring problem spaces, and conceiving, designing and implementing solutions, in a structured, planned and organized manner.

Continued..

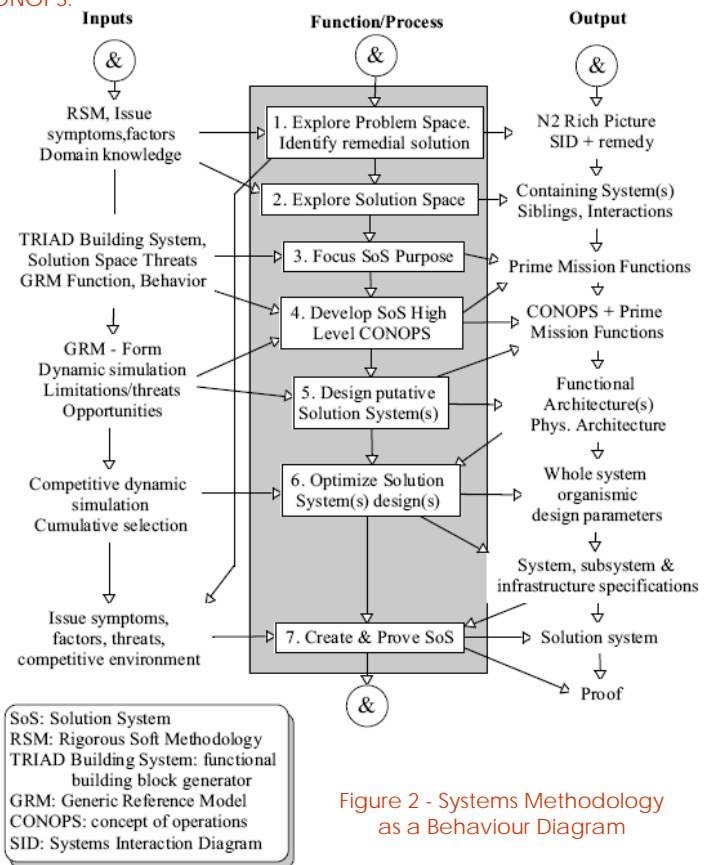


Figure 2 - Systems Methodology as a Behaviour Diagram

4. A discipline in its own right, but one that invokes cooperation with other skills and disciplines from both the problem and solution domains. So, in applying the Systems Methodology, systems practitioners would require the active cooperation and involvement of problem domain experts, and solution domain operational, technological and threat/risk experts.
 5. Running the full gamut from soft to hard, from messy problem to hard, purposeful solution. Soft and hard are seen as ends of an entropic spectrum, with conceiving, designing, optimizing and creating progressively reducing entropy throughout the systems engineering process, or systems methodology.
- At a more prosaic level, application of the systems methodology develops a number of systems engineering products:
- ... An exploration, bounding and elaboration of the problem space, identifying the issue symptoms and the loci of possible causes. Hence...
 -an exposition of the problem themes compared with the ideal world (SID)
 - ... A dynamically modelled conceptual remedy, or remedial solution, to the complex problem(s)
 - ... An elaborated solution space in which to situate a conceptual remedy
 - ... A dynamically modelled concept of operations within that solution space
 - ... A set of prime mission functions appropriate to purpose and threat, with which to manifest and sustain the concept of operations
 - ... A set of internal functions and behaviours to establish, maintain and resource the solution system and to service the prime mission functions
 - ... A functional architecture, organizing the two types of function (minimal configuration entropy)
 - ... Optional physical partitioning schemas
 - ... An optimum mapping of functional on to physical architectures
 - ... A dynamic interactive model of the whole, open, optimized system and its balanced parts – the design – interacting in its solution space with other open systems
 - ... A matched set of specifications

tions for the whole, its parts, interconnections and interactions

... An integrated set of parts and interconnections working in a simulated operational environment, provably solving the original complex problem

These “products” emerge from the application of the systems methodology in a natural, seemingly inevitable sequence, as the design of the solution system is progressively conceived, developed, elaborated, specified and proved. They indicate, perhaps more than process models and behaviour diagrams, what systems engineering is about.

Which encourages me to return to the previous articles - I can readily imagine that such systems engineering products exist for Japanese volume supply systems, but I am less certain about Smart Procurement/Smart Acquisition. Smart Acquisition may have morphed into its present form for good and sound socio-political reasons, but systems engineering, and better, faster, cheaper? I don't think so.

Derek Hitchins

¹ Hitchins, D. K., *Advanced Systems Thinking, Engineering and Management*, Artech House, MA, 2003



If you have a question you would like answered by our panel of experts or a point of view you would like to share with Preview readers then please send to:

dcowper@sula.co.uk

or write to:

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Old Crown House,
Market Street,
Wotton-Under Edge,
Glos. GL12 7AE

Annual accounts

Those who attended the AGM will know that we did not have a finalised set of accounts available at the time. We do now, and the headline figures are presented in the tables for Income and Expenditure and Balance Sheet. What they show is that overall our income and expenditure have risen, and that allowing for last years exceptional adjustments (£22,844 under other operating income) our operating income was slightly lower.

The increase in administrative costs reflects the increased level of work carried out by John Mead, and a long awaited rate increase for his services. These were offset to some extent by lower direct costs (hire of event facilities), including recovery of VAT on these elements. Most of the turnover increase is due to the inclusion of VAT on our event charges from the end of 2003, since the actual scale of the events in 2003/04 was broadly the same as for 2002/03.

The surplus feeds into the total accumulated funds, which increased last year to £56,538. We have now placed £40,000 in an interest bearing account, and the income from this will feed into our current account next year.

Overall, the position could be described as “business as usual”; we are maintaining a secure level of funds. Unless we develop additional revenue earning activities there is unlikely to be any significant change in the next financial

year which ends on 31 May 2005.

If any member wants more information, or would like to see a full copy of the accounts, then please contact me.

Peter Lister
Treasurer
peter.lister@siemens.com

Income and Expenditure	2003/2004	2002/2003
Turnover	£89,124	£85,505
Cost of Sales	(£42,090)	(£46,002)
Gross surplus	£47,034	£40,503
Administrative expenses	(£38,188)	(£29,331)
Other operating income	£100	£22,844
Surplus on ordinary activities before taxation	£8,946	£34,016
Tax on surplus on ordinary activities	--	--
Surplus on ordinary activities after taxation	£8,946	£34,016

Balance Sheet	2003/2004	2002/2003
Current Assets		
Debtors	£23,393	£25,973
Cash at bank and in hand	£59,385	£45,862
	£82,778	£71,835
Creditors: amounts falling due within one year	(£26,240)	(£24,243)
Total assets less current liabilities	£56,538	£47,592
Total accumulated funds	£56,538	£47,592

Chapter metrics

Someone asked at the AGM what we were going to do about metrics. We have now decided.

Metrics are always contentious, partly because they are abused by managers who don't understand their value or their limitations. We were advised "to be very careful with the metrics we chose in case the choice caused us problems". But metrics don't cause problems - inappropriate targets cause problems.

The INCOSE metrics primer makes a very clear statement: "measure the process not the people". Why? Because if they are being measured, intelligent people will very quickly work out how to present their metrics to keep the boss (you!) off their backs! And if you employ stupid people, you should find this out by more direct means. Systems engineering metrics provide obtain objective data on status and trends, to allow the team to understand what's actually going on and what to do next.

Metrics can tell you three things:

- ... Is your plan working (within expected variations);
- ... Is it producing the expected outcomes?
- ... Is anything that you are not actively managing being unintentionally destabilised by

your actions?

The last is the most interesting, and has led to the concept of the "balanced scorecard", now widely used in management circles but (in my experience at least) not much at programme level by either programme managers or systems engineers. That's a shame, because the balanced scorecard is a good example of systems thinking.

This frames the real point of this article: metrics for INCOSE UK. These measures seem to be appropriate to guide the management of the UK Chapter.

Membership

... number

... % renewals

Financial

... annual revenue surplus

... cash reserve

Chapter award points

... as defined in the "Chapter Report" spreadsheet that is the basis for the chapter awards (see below)

Member activity

... "member event days" - 1 member participating in 1 INCOSE event on 1 calendar day scores 1 point.

Specific targets will not be set

since this is not appropriate for a volunteer organisation, and overall control leads to dysfunctional behaviour. However the following general goals can be stated:

Membership: maintain and if possible increase year on year
Member retention: maintain and if possible improve

Financial position: cash positive in normal operations; maintain a cash reserve sufficient to survive a complete failure of an event; invest from reserves to achieve agreed strategic objectives and to start up new revenue generating activities.

Chapter award points: maintain or improve on the "gold award" level achieved in 2003 and 2004.

Member activity: strive to increase both in absolute terms and in proportion to membership.

The Chapter Report is quite a complex set of measures - something like a balanced scorecard - designed by INCOSE Centre to measure, guide and prioritise chapter activities. You can score a maximum of 18,700 points in eight categories. A score of 8,000 is the threshold for a Gold Circle award. We were one of only four chapters to get a gold circle award last year. Last year we claimed over 11,000 points but were allowed just under 9,000. This year we claimed

over 12,000 points, on the same basis as the points we were actually allowed last year.

Paul Davies has done a fantastic job two years running compiling the report at the turn of the year. This is a lot of work, and involves pulling together a lot of evidence from all over the place, and frantic e-mails to people he thinks might have done something.

This year we want to make his job easier by collecting information as it happens. Most of the points are based on Chapter activities that the Board has full knowledge of. However there are several categories that measure individual members' activity - notably promoting systems engineering to other organisations, articles in non-INCOSE publications, and meeting other chapters. Paul will set up and publicise a system to collect this information and supporting evidence as it happens.

It appears we are consistently among the top four INCOSE chapters in the world - let's work together to keep it that way!

Hillary Sillitto

INCOSE UK Chapter president
Hillary.g.sillitto@uk.thalesgroup.com

Around the regions

Bristol

Wednesday 29th September 2004 marked a turning point, or rather a returning point in the cause of systems engineering in the west country, as the Bristol Local Group held its re-launch event at the University of the West of England, Bristol. The event, themed "21st Century Systems Engineering Challenges" attracted an audience of over 40 attendees, both members and non-members (in some cases lapsed members who just needed a bit of a reminder), covering a broad cross-section of local industry and academia.

The event featured two thought provoking presentations. The first, from Gordon Warnes of Rolls-Royce Defence Aerospace, described how systems engineering is seen as a key enabler of the move from a traditional business (where the answer to every problem turns out to be a gas turbine) to a service oriented business (where concepts such as "power by the hour" need to be supported). It was particularly pleasing to see that this move to through life sys-

tem development has highlighted the level of systems engineering that was going on anyway, even if it wasn't necessarily labelled that way.

The second presentation from Hillary Sillitto of THALES (and president-elect of INCOSE UK) was an exploration of some of the current "hot topics" that the great and the good of INCOSE have been debating in recent months (and probably for the last couple of decades too). This presentation revolved around definitions of systems engineering, and the activities that its practitioners perform. It provided a fascinating demonstration of just how intangible the concepts of systems engineering really are when subjected to scrutiny - one attendee was heard remarking that he "loves the way that it's all so flexible and up for discussion".

As is usual at INCOSE events, there were plenty of lively comments and observations from the floor, and early feedback suggests that the event was well received.

We hope to see everyone at the

next event, plus all those who said they couldn't make it this time!

Ian Gibson
(on behalf of the Bristol Local Group).

How do you get involved with regional activity?

Are you looking to participate in local INCOSE activities?

Are you looking to set up a regional group?

For more information about regional activities or how to go about setting up a regional group, please contact:

Simon Hutton on 01229 838867
or
email: simon.hutton@threesl.com

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Please send cheque (payable to INCOSE UK) and delivery details to Simon Hutton, Structured Software Systems Ltd, Craven House, Barrow-in-Furness, Cumbria, LA14 2RJ.

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