



# INCOSE UK Newsletter

## Roll Up for the Main Attraction

Admire the feats of balancing needed to ensure that Systems Engineering Capability Modelling is used a tool for process improvement rather than a hurdle for supplier selection.

Thrill to the new opportunities for applying UML to Systems Engineering – all performed without the aid of a safety net.

Watch as we juggle with priorities in the debate on Human Factors in Systems Engineering. Join in and help to formulate future policy.

Cheer your champion as INCOSE UK referees the interface between industry and academia, and with any luck this will be the only bout in history with a win-win outcome.

Apologies for the Barnum and Bailey approach, but there is much to shout about at the Autumn Assembly this year. Everyone on our mailing list should have seen the brochure by now (and very nice it looks too), but if not go to our website ([www.incose.org.uk](http://www.incose.org.uk)) and download one, or contact John Mead (his details are at the end of this Newsletter). In the brochure you will find details of the attractions highlighted above, and the presenters from all corners of industry and academia who will be involved.

More presenters are being signed up as I write this and so I am looking forward to some serious debate. You could wait and read the summaries on the website, but it won't be the same as being there and putting your own views and asking questions. And in two of the sessions you will have the opportunity influence future policy.

The rates charged for the event are in keeping with the value that we perceive can be gained from the content. The price is much lower than commercially based events, and is set to ensure that we can raise enough to underwrite future events (such as the UK Symposium). We are also offering half price concessions to student

members to encourage their involvement. In case you were wondering, all the organisers, including myself, are paying to attend the event – there are no free-loaders at INCOSE UK events!

We are very grateful for the sponsorship that we have obtained from BAE SYSTEMS, Thompson Racal Defence and Nickleby HFE Ltd. This has all helped to ensure that we have been able to advertise the event and commit to a contract to the hotel without putting too much pressure on the Chapter cash flow. If there are any other potential sponsors out there, it is not too late, and in any case there is always the Annual Symposium in May.

I can't promise sawdust, sequins and a troupe of clowns, but I can promise the best show in town for anyone with an interest in Systems Engineering. Like all the best shows there will be plenty of opportunity for audience participation – oh yes there is! There is still time to register so fill in the registration form right now. I look forward to meeting you there.

*Pete Lister*

*President of the UK Chapter of INCOSE.*

## The ICSE 2000 Conference, Coventry

I paid a brief visit to the ICSE conference in Coventry to extol the virtues of INCOSE membership to the assembled crowd. Professor Keith Burnham, who is one of the ICSE organising committee, kindly invited INCOSE to set out its stall at the opening plenary session of the conference. Most of the technical sessions are run in four streams, so the plenary was the best place to get noticed.

After the plenary session I, Paul Davies (UK Chapter President Elect), Mike Yates and John Clouet (INCOSE President Elect), attended a brief meeting with some of the ICSE organising committee. The ICSE conference has a tri-annual rotation between UK (Coventry), Poland

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(Wroclaw) and the US (Las Vegas). At last year's Las Vegas conference, John Clouet had masterminded an INCOSE track. It was agreed that John would speak to the German Chapter of INCOSE at the EuSEC conference later that week about putting up a session for Poland. Paul and I agreed on behalf of the UK Chapter that we would look at arranging an INCOSE session for the next Coventry conference in 2003.

The ICSE conference seems to attract a high level of academic interest, as well as industrial partners of the Universities involved. In Coventry's case this includes Jaguar, who were there in strength (including an appearance of one of the latest XKR sports cars). Unfortunately I did not have time to attend any of the technical sessions, but my impression of the papers on offer was that the emphasis was on application areas rather than systems engineering process, which is pretty well the reverse of a typical INCOSE Symposium. Also, the ICSE committee are solely concerned with setting up the annual conference, unlike INCOSE which provides a range of services and events.

INCOSE UK hopes to develop stronger and more fruitful ties with academia, and this is the basis for one of the sessions at the Autumn Assembly. The ICSE conference committee, with representatives from several UK Universities that have an interest in Systems and Systems Engineering, represents a useful interface to explore some of the possibilities. I hope that when 2003 comes round that we will be able to call upon a strong INCOSE team to support the INCOSE session at ICSE. In the meantime we will be trying to involve Professor Burnham, and his students, in INCOSE local events.

*Pete Lister*

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## Advance Call for Papers for the UK Chapter Spring Symposium 2001

**MAY 14 – 16, 2001**

Systems Engineering for the Third Millennium – Developing the Art and Science to face new challenges.

Engineering evolved during the latter half of the second millennium as a process for harnessing technology to produce products to support human-centric activity. As engineering became more specialised, society's expectations of it increased. This fostered the need for an overarching process to co-ordinate and integrate engineering and related activities. From these beginnings, systems engineering has emerged in the last 50 years.

Systems engineering is the interface between engineering and its customers: commerce and society. It has proved so useful and successful that it has been adopted by non-engineering, more human-oriented

disciplines. In order to meet the challenges of these new applications, systems engineering has broadened its tool set of methods to embrace "soft" methods, many of which were originally developed in the human sciences. Thus systems engineering has evolved to provide an integrating conceptual framework for understanding stakeholder (including customer and user) needs; for exploring the solution space to determine the preferred solution; and for co-ordinating all the specialist activities that are needed to realise the selected solution.

The discipline of systems engineering now straddles the traditional boundary between the Sciences and Humanities. It has become subject to complex, sometimes contradictory influences. During the 2001 Spring Symposium we would like to explore both the achievements of systems engineering and the challenges facing it.

- What is the current state of systems engineering?
- How will it develop in the future?
- What are the driving forces behind the development of systems engineering
- What new skills do systems engineers need to acquire?
- What new process concepts need to be developed to formalise the application of SE beyond the traditional 'hard' systems boundaries?
- What emerging technologies can be exploited to enhance systems engineering tool capabilities?

Papers are invited that illustrate and illuminate these issues and will stimulate debate and action. A selection panel comprised of INCOSE "greybeards" will review offered papers and make a selection based on relevance, interest and variety to ensure a successful symposium. Each selected paper will be published in the Symposium Proceedings and its author will be invited to give a 20-minute symposium presentation to convey the essence of their paper. A formal call for papers will be distributed shortly with submission details and timetable. This is advance warning to get you thinking.

If you have any ideas or suggestions for papers, session titles, or anything else relevant to the Symposium please contact **Mike Prince** at [Michael.prince@baesystems.com](mailto:Michael.prince@baesystems.com). We would also welcome volunteers who are prepared to take on the role of session chair and/or reviewer.

*Mike Prince*

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## Are There Any EIA-632 Users Out There?

I have recently been grappling with EIA-632 - Processes for Engineering a System to see how it can be applied to

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the development of a company wide Systems Engineering Process. Even after the first cursory read some 6 months ago I was convinced that EIA-632 incorporated the same sort of SE concepts that have coloured my thinking for several years. Now, having read it more carefully, and having attempted to utilise some of the 33 process requirements that it contains, I am even more convinced that it talks a lot of sense.

Of course it isn't all good news. The standard contains more than a little of the committee-speak that makes many standards less accessible than they should be. Some of the lists of typical activities are fairly hard to read, and it is easy to see how someone new to Systems Engineering might well give up and try something simpler. But I have found that persistence pays off, especially if you focus on the pictures in the Appendices at the back. This approach is easier if you download the presentation prepared by James N Martin that can be found at <http://www.geia.org/eoc/G47/page5.htm>.

Essentially, EIA-632 manages to explain how to apply a building block technique to the multi-layered development models associated with large-scale system developments. Each building block is a system development process that obtains its requirements from the preceding block (or at the top-most level the end customer for the system). Given that my first target is a Requirements Management Process, the main interest for me is the diagram that illustrates how requirements are related through the building block. Barring a few variations in the use of terms, this reflects a similar picture to that which I have evolved over the years of how requirements flow down from the initial source requirements to the requirements that specify the subsystems that comprise the system.

I have seen more than one example of a project that has had enormous difficulty with requirements management simply because there was little understanding of the transition states that apply to requirement flow-down.

# Stock Clearance Sale!

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- 1998      Systems Engineering - A Matter of Choice

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The usual result is an ever growing heap of requirements 'mulch', which is a very apt term because the result is an amorphous mass that stops things growing. Often this mulch gets swept under the carpet and forgotten because the amount of effort that was expended creating it is something of an embarrassment. It is then left to the usual bunch of 'heroes' to work long hours sorting things out as best they can. As one whose brain fades when working much past 6:00 pm this scenario is not for me!

To get to the point of this ramble, during my investigations I contacted James Martin, who played a major role in the development of EIA-632. In the course of our e-mail exchanges he said that he was able to offer a two day seminar on EIA-632, and had done so to other European Chapters. He had been advised that there was little call for such seminars in the UK, but I said that I would approach the membership and find out if this was true. Clearly there would be a charge, but if 15 people or so attended costs would be well within the normal range for engineering seminars. As you might have guessed, I would be most interested in attending, and if my current work proceeds there are probably others at my company who would have a 'need-to-know'. If there is anyone else who would be interested, please contact me at [listerp@plcsun.siemens.co.uk](mailto:listerp@plcsun.siemens.co.uk).

If you have not tried EIA-632 then give it a try. Copies can be obtained from Global Engineering Documents at <http://global.ihs.com/>, for a rather eye-watering \$141. But if you are in the business of engineering or procuring large systems then it will be money well spent. Of course it doesn't suit the soft systems people, and why should it? If you engineer smaller systems then the concepts are still worth consideration, and I bet you will find that at least some of the 33 requirements will apply to what you do.

*Pete Lister*

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## More From Minneapolis

As a first-time attendee at an INCOSE symposium (and a first-time member of INCOSE) these are my impressions of INCOSE 2000 in Minneapolis.

After the haze of jet lag cleared first impressions were good. >From the imposing hotel venue to being given a black bag at registration including a great tome of papers (and a first look through to check my paper was there), I could see that the event was well organised. The good start continued at the plenary session with an evocative keynote address from space shuttle astronaut Jack Lousma.

What struck me most were the variety of activities on offer and the wealth of information to be had. There were paper presentations, panel sessions, debates, tutorials, exhibition stands and technical interest and working

groups. There was also the opportunity to network with other systems professionals from around the world and tap into the combined knowledge and experience of the delegates.

For me personally it was a great opportunity to present a technical paper in front of an international audience. I also enjoyed manning our company's stand in the Exhibits Hall and meeting other systems professionals. The theme of our stand was Systems Engineering in the year 2020 and we enjoyed receiving the varied feedback and ideas from visitors to our stand.

And it wasn't all work. The location in downtown Minneapolis meant it was easy to sample the delights of this pleasant and lively city.

What could be improved? I thought that the panel sessions could be improved by allowing more time for debate and participation from the audience. In many instances I found them indistinguishable from the paper presentation sessions.

All in all it's an experience I would recommend to anyone. So if you feel you can contribute in some way to INCOSE 2001 and can persuade your boss to pay your airfare then I would urge you to attend.

*Stephen Chorley*  
*Systems Engineer*  
*BAE SYSTEMS*

Many thanks to Stephen for passing on his personal views of the Minneapolis symposium. If you have sampled a systems engineering event of any type we would be interested in publishing your impressions and feedback. Whether you have chanced upon something good or were disappointed we would like to know. Send your contributions to me at [listerp@plcsun.siemens.co.uk](mailto:listerp@plcsun.siemens.co.uk), or by snail mail to Siemens Transportation Ltd, 4 Highlands Court, Cranmore Avenue, Shirley, Solihull, B90 4LE.

*Pete Lister*

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## Revised Submission Deadline for INCOSE 2001

If you thought that you had missed the boat for submitting a paper to INCOSE 2001 at Melbourne, then we have some good news for you. The submission deadline has been extended to 17 November 2000. Look at the web site (accessible via [www.incose.org](http://www.incose.org)) for details, and get writing!

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## Planning for Europe in 2004

Terje Fossness has been stirring Region III into action to start thinking about a European venue for the

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International Symposium in 2004. His plan is to prepare a regional proposal for presentation at the International Workshop in January 2001. Four committee members are needed from the start of proposal activity. Their commitment to the job would span 4 years until wrap-up of the symposium. The following are needed:

- Symposium Chair
- Technical Program Chair
- Patrons Chair
- Marketing Chair

Committee members should be selected based on their qualifications to fill the respective position on the committee, their commitment to stay with the project for 4 years, and current membership of INCOSE. Geographical position is not a major consideration.

The initial team of 4 will be joined within 2 years by additional committee members to handle international and local assignments related to facilities, exhibitors, finance, and other operational tasks.

Terje has proposed a self-nomination and election process to fill these positions. The initial committee will be elected by the current officers of the chapters in the region plus regional directors. Terje Fossnes volunteered to collect nominations, which should include a resume of the skills the person brings to their position, and an assertion of their commitment for the next 4 years. The schedule is as follows:

- Receive self-nominations by 20 October
- Send out ballots by 1 November
- Inform of results by 9 November

European Chapters have been asked to propose sites with full justifications by 2 January 2001, so that the proposal to the International Workshop can be completed.

It all sounds very challenging, and offers the potential for a Europe-wide collaboration. If you wish to be considered for any of the roles, or have any suggestions for venues, please contact Terje Fossnes at [tefossne@online.no](mailto:tefossne@online.no). I can tell you that there are not too many self-nominations at present, and those of us active at the Chapter level are a little wary of overstretching ourselves, so the field is wide open.

*Pete Lister*

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## Your Last Chance to Renew at the Old Price

The membership renewals continue to trickle in, with more than a few new members besides. John Mead sent out personal reminders to all those who had not renewed by September, but in case you have missed or ignored

the prompt, here is another reason to think about renewing. You may recall from a couple of Newsletters ago that I revealed that the membership rates had to go up because of the declining exchange rate with the dollar. That decline has continued, and now we have had to adjust the subscription to avoid actually losing money on each member. As you may be aware, the chapter only retains \$20 of the \$80 fee, so there isn't too much margin for error.

We have already revised the rates for new joiners at the quarterly break points, but we will hold on the old £54 rate for annual membership until Christmas for those who have not yet renewed. The new annual rate is £60, which means that anyone joining in September, October or November will have to pay £45. December, January and February joiners will be charged £30. Those joining in the last quarter (March, April and May) pay £75 which covers the final quarter and the whole of the next year. The only consolation is that you would be paying even more if we were tied to the Euro – whether that constitutes a recommendation to stay out of the single currency I leave to you to judge.

Of course no-one likes paying subscriptions, but I think that INCOSE still represents good value for money. I know in my own case I make much more use of the material that I obtain through my INCOSE membership than that obtained from the IEE, and the IEE costs twice as much.

*Pete Lister*

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## Local Events – Reports and Advance Notices

### INAUGURAL MEETING FOR BIRMINGHAM LOCAL GROUP

Around 14 people turned out on September 11, one of the hottest days of the year, when everyone was scurrying around trying to find a petrol station that had any supplies, to hear John Clouet tell us about the Yucca Mountain project. It was very nice to see the Bristol Christophers (Davies and Dean) who managed to find enough petrol to make the journey up the M5 to join us at the meeting.

Fortified by coffee and biscuits, provided by our hosts at TRW Shirley, we heard about the mind boggling task to find safe way of storing all the high and low level nuclear waste produced in the US. Much of this material is currently being stored in rapidly filling ponds at virtually every nuclear facility, but the regulatory and political influences on the project mean that it is moving slowly (13 years in Tech Eval). Even when the system is put into place it will take 24 years to store away all the waste material (70,000 tonnes plus) which will arrive at the rate

of around 12 shipments per day, every day, during that time.

To add to the technical difficulty of the programme, just imagine that your prime requirements are enshrined in law (and yet keep changing) and that you are expected to exceed by a factor of 2 or 3 the performance requirements. Also imagine a project where the process validation phase will last at least 50 years in order to be sure that the original design calculations were realistic. At that point (presuming that a future energy crisis has not driven people to mine the accumulated fissile material) the repository will be sealed. It is dubious whether there will be anyone still around to monitor whether the project met its design requirements by ensuring that less than 30 - 40 mRem of additional radioactivity escapes after 500,000 years. Just for comparison the current background radioactivity in the area contributes 350 mRem.

John gave us a fascinating insight into a problem that could not really have been tackled without adopting a Systems Engineering approach that allows a full analysis of the problem to prove that the proposed design will meet the requirements. Somewhat tongue in cheek John said that he thought this project would keep him busy until his retirement - I would think that there will be opportunities for his great grandchildren as well.

To round off the evening, Peter Lister gave a presentation on the benefits of INCOSE that will hopefully persuade a few of the 'new faces' to join up. Many thanks to Mike Yates of TRW who organised the venue and persuaded TRW to underwrite the costs for using their magnificent lecture theatre. Thanks are also due to Paul Davies for finding the time to keep us on track with the meeting arrangements.

*Pete Lister*

## SOUTHAMPTON AREA

A meeting was held at BAE SYSTEMS, Christchurch on 11 November.

The main talk was on Systems Engineering in the Commercial Telecomms Industry given by Martin Warner, from Lucent Technologies who is Chair of the INCOSE Telecomms Working Group.

Martin is working on developments for the third generation (3G) mobile telecomms systems. 3G mobile will provide voice, internet, video and other services on portable devices, such as WAP phones, with very high data rates. He went through the overall design of these systems, their advantages over the current systems and the role of Systems Engineering in the industry.

The business environment for commercial telecomms has changed a lot over the last ten years and Martin was



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able to contrast it with the military world, where he previously worked. The major differences are:

- Size of Project: most projects cost \$1Bn, which is paid by the developer not the customer
- Timescales: about 2 years for major development: time to market is the main driver for development
- Competition: there are four or five big players all developing products to the same specifications
- Cost of end product: is the 'only cost', cost of development is almost irrelevant
- No customer detailed requirements: the systems have to meet regulatory telecomms specs, of which there are hundreds.
- Facilities over functions: all systems have to provide the basic functions, but it is the extra features that one supplier has over another that sells the product

Martin then went through the process they have used to specify and develop the systems. This included the way they have reduced the time-scales and improved the quality of specifications through process improvement and tool support on a system with over 8000 requirements.

Following the talk, we had a short promotion for the INCOSE Telecomms Working Group, a discussion of other Working Groups and an advert for the Autumn Assembly.

We are currently planning the next local meeting in the Southampton area for February 2001.

*John Davies*

Contact John at [john.k.davies@baesystems.com](mailto:john.k.davies@baesystems.com) if you want to know more about the Southampton group and future meetings.

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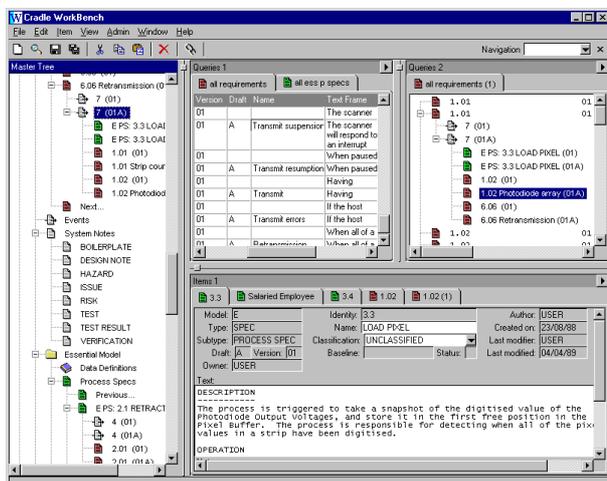
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