INCOSE UK Newsletter

More Fun than A Barrel of Monkeys

I find that there's just time to plug our event one more time before it is upon us… We knew there would be an Autumn Assembly, we were then told the dates, next came the event schedule, speakers and times and all the detail that makes it work. And now finally for those that weren't convinced by all this we have "Alternative Abingdon", a guide for those taking two days out of the office for no apparent reason! Ladies and gentlemen INCOSEUK On Tour presents a more complete event than ever before, not only do we challenge you professionally but culturally and sportingly (?) as well. I would not suggest that you be anywhere other than the Autumn Assembly but just look at the fringe benefits of coming to Abingdon, I'll say no more, just read the "Alternative Abingdon" article by John Mead.

Guy Tugwell CMC Chair

President's Corner

As usual in President's Corner, I have been considering what to recommend for an SE reading list. For this issue of the Newsletter, I have been looking at the new issue of the SE Handbook (see separate article). That ought to be enough reading for at least 3 Newsletter issues!

I haven't got around to reviewing the draft of the SEBOK (Guide to the Systems Engineering Body of Knowledge) which is rumoured to be available from the Working Group. I would be extremely interested to hear from anyone who has. I am hoping that the UK can be represented on the reviewing caucus, and hope that someone will volunteer.

The Systems Engineering Applications Technical Committee (SEATC) of INCOSE has been its usual active self, and has also cottoned on to the existence of the SEBOK. I quote from their newsletter: "In short, application domains are where SE happens. Our Standards TC and our Processes TC are doing excellent jobs defining what should happen. SEATC is where we describe what really does happen and how it is tailored on the job.

Domain Tailoring for SEBoK and SE Handbook:

As you know, one of our cross-domain projects is to create sections for the SEBoK and the SE Handbook on the subject of tailoring for specific domains. Please send your ideas to Ralph Godau at ralphgodau@optushome.com.au. Here is a short list of tailoring subjects:

- Focus on domain-specific requirements
- Use domain-specific terminology
- Rely on SE already in the domain
- Rely on domain-specific tribal knowledge and tools
- Evaluate risks of omitting specific SE steps

Please add to this list and send your ideas to Ralph. We can then write a paragraph on each subject with one or two examples."

So: all those out there from the UK rail, motor vehicle, telecommunications, mining, IT, nuclear reprocessing, environmental and any other non-defence industries I haven't thought of: why not get in touch and do a 'worked example' of how the SEBoK might work (or not!) for you? You ought even to be able to convince your boss that there is business benefit in doing it!

The Corporate Membership scheme for employers' participation in an INCOSE UK Advisory Board is nearing fruition – we have held a meeting with candidate first members, and I hope to be able to report some good news at the Autumn Assembly.

I have also taken part in a meeting between the INCOSE Director for strategic development, Bill Ewald, and representatives of the IEE, including Steve Wilmott who is the head of their PeNSE (Professional electronic

Network on Systems Engineering), and Stuart Arnold who is both INCOSE's liaison with IEE and IEE's liaison with us. The meeting was informal, a scene-setting exercise with an objective of future co-operation on Systems Engineering issues. For example, accreditation of SE skills is about to become a hot topic, and maybe even (longer-term) provision of Chartered Engineer status as an SE. If you would like more information about IEE's agenda, see their website http://www.iee.org/oncomms/pn/systemseng/aboutus.cfm.

THE SYSTEMS ENGINEERING HANDBOOK

Have you taken a look at the new Systems Engineering Handbook yet? Subtitled 'A "How-to" Guide for All Engineers", Version 2.0 is now available as a free download from the Members Area of the INCOSE website, www.incose.org. If, like me, you had forgotten the login and password details, the helpful hint that they are printed on your 2002 membership card is worth remembering.

The SE Handbook is 372 pages long (when A4 formatted), so I wouldn't recommend ploughing your way through all of it in one go. However, it is something well worth dipping into when you encounter a job that you aren't sure how to address for the first time. Each SE job is broken down into:

A   What needs to be done? (what to do, acting on what, why, and by whom)

B   How to do it? (Steps; Input & Output; Criteria for completion; Metrics; Methods & Techniques; Available Tools; Examples.

The sections on Risk Management and on Metrics are particularly good. But they are quite exhaustive, some might say heavy-handed, so you need to skim over to section 5 which starts to talk about tailoring the SE processes to the needs of the project and the effort available. I hesitate to suggest that the Handbook be made bigger, but it could do with more detail here!

There's even a description of what's in it on the website (perversely, in a different area) from which I quote:

"The INCOSE Systems Engineering Handbook provides a description of the key process activities performed by systems engineers. It describes in some detail the purpose for each process activity, what needs to be done, and how it can be done. The intended audience is primarily the new systems engineer, an engineer in another discipline who needs to perform some systems engineering functions, or a more-experienced systems engineer who needs a convenient reference. The intent is to provide enough information for the user to determine whether a given process activity is appropriate in supporting the business objective(s) on the program or project they support, and how to go about implementing the process activity.

…

"The INCOSE System Engineering Handbook is not a specification of what must be done on a program, but rather a "how to" guide to perform most of the processes likely to needed on any program, government or commercial. It does discuss the current status and plans for several system engineering specifications.

Some highlights of items covered by the handbook are:

1   Overview of Systems Engineering, the Systems Engineering Process, and what systems engineers *do*

2   How to "Tailor" the systems engineering process to suit program needs

3   The elements of typical government and commercial project lifecycles and the types of system engineering activities usually performed during each element

4   Detailed descriptions of systems engineering process activities. Some examples are:

- Defining needs, operational concept, and requirements

- Functional analysis, decomposition, and allocation; functional requirements

- System modeling, systems analysis, and tradeoff studies

- System architecture synthesis and cost effectiveness analyses

- Writing good requirements and specifications; specification trees

- Requirements allocation, traceability, and control

- Design constraints

- Defining, refining, and integrating a product's physical configuration

- Prototyping, Integration, and Verification

- System Engineering Product and Process control

- Configuration and Data Management; Technical Performance Measurement

- Steps in organizing and running Integrated Product & Process Teams

- Measuring an organization's System Engineering Capability

- Risk Management approaches

- Engineering technical reviews and their purposes

5   Many useful techniques for systems engineers are covered, including:

- Functional "thread" analysis involving use of stimulus-condition-response threads for specifications, development, testing, and reviews

- Metrics and Tools - such as: N-squared charts, QFD, Timeline analysis, and Functional Flow Diagrams

- How to prepare and use Activity Network Diagrams and professional quality project and task schedules
- Use of the internet by systems engineers"

The Handbook represents a major overhaul from the previous edition, and is largely due to superhuman efforts from the INCOSE Working Group set up to create, edit and publish it, led by Dick Wray of Lockheed Martin. It is claimed compliant with EIA-632 and EIA-731; i.e. not necessarily consistent with ISO15288 nor CMMI. However, 632 and 15288 are quite strong on what should be done, but not how to do it; and 731 and CMMI are strong on specific practices, but not necessarily on work products nor on how they are joined up. So as a complementary volume, I commend the SE Handbook to you all.

Paul Davies

Alternative Abingdon
or
What we could be doing there!

For the partners who have come along for the ride and have not appreciated how much fun Systems Engineering can be. Or just anyone who could not give a toss about Intelligent Enterprises, or even those who cannot find the golf course!

The Four Pillars Hotel offers a wealth of information on local attractions. I did not do a full scan but picked up some in case any one wanted to know. No one has so far asked so here it is for all of you.

The National Trust has "Buscot & Coleshill" model agricultural estate not too far away where you can see features of environmental significance. This includes a river restoration project, 345 hectares of woodland managed by NT and the forestry commission for nature conservation, a reed bed system powered by solar panels to treat all its waste water. If you do not find this very lively to watch but are still keen on doing things in an environmentally friendly manner there is an organic box vegetable scheme for you. Could be very relaxing on a summer's day!

If you are more into shopping but he only ever gives you half enough money try the Outlet shopping at McArthurGlen Great Western, near Swindon " over 100 stores with up to 50% off!" Got to be better than Systems Engineering Standards. Make sure you get back in time for our event dinner with exciting after dinner speaker.

Or there is Cotswold Wildlife Park and Gardens. Just the place to take a leisurely stroll among the Rhino and Zebra. Alternatively being fought out at the Four Pillars - SE and PM working together in harmony. What would you rather do?

If, given the time of the year, the weather is too inclement yet you do not want to hang around in the hotel go where it is wet on the inside! The Living Rainforest – worth turning up early on Sunday for. WoW " One of the best places to see exotic plants and wildlife in the South" I do not think this means Southern Hemisphere 'cos I suspect there are some better places there.

If all else fails bring your golf clubs, because there must be golf course somewhere.

Just up the road actually!

John Mead

Intelligent Enterprises – What Are They?

The Autumn Assembly this year will be kicking off on the morning of Monday the 11th November with a session on Intelligent Enterprises. In this brief article, Allen Fairbairn, who will be chairing the session, gives an introduction to what is meant by Enterprise Intelligence and explains why he - and others – think that the discipline of Systems Engineering is inevitably involved. Allen is co-chair of INCOSE's recently formed Working Group on Intelligent Enterprises (IEWG) and is a Past President of the UK chapter of INCOSE.

SMART INDIVIDUALS, DUMB ORGANIZATIONS?

The classic British view of people and organisations is "Smart individuals, dumb organisations." So, if we're so good at recognising dumb organisations, presumably we would be able to distinguish an intelligent one if we saw

one and if so, what properties do we think an intelligent one might exhibit?

These questions and others related to enterprise intelligence are not rhetorical. The IEWG co-chairs and many of the WG founder members are convinced that urgent exploration of the subject is necessary. The next issue of INSIGHT will have IE's as a theme and the WG is raising its profile in this and other ways as quickly as possible because world, professional and technological issues are changing so fast in this unique application area that the WG wants all INCOSE members to be aware of the issues and opportunities facing our profession and potentially each member's respective career.

INCOSE's IEWG

The Intelligent Enterprises Working Group (IEWG) was formed just over a year ago to explore the context, content, structure and behaviour of a specific kind of system called an intelligent enterprise. By enterprise we mean two or more people attempting through collaborative efforts to satisfy stakeholder demands in the best balanced interests of its stakeholders. By intelligent we mean that such an enterprise exhibits the ability to self-adapt to changes - in its context, internal capabilities and stakeholder interests - with responses appropriate for the longer term as well as the shorter term all the while honouring the principles of systems and society. (You can see that we have been spending a lot of time on the definitions phase, which is, of course, far from over!)

Common observations and experiences – and not just cynicism - tell us that most enterprises are not intelligent or even systems. Rather, they are often loose collections of local, selfish maximisations popularly called silo's or fiefdoms that both isolate their incumbents and suppress basic freedoms such as the freedom to innovate - to make rules rather than to follow rules - or they enforce mimicking of other's "best practices," none of which provides any solid basis on which to build a robust, adaptable business. Jack Ring, the US co chair of the IEWG, refers to such enterprises as "Adult Detention Facilities."

In this context, "organisations" get in the way of the job and real progress often depends on effective work-arounds – "to beat the system" Many inconsistencies are conscious e.g. managers who know that a plan or budget is impossible but cannot be seen to be saying so. Malicious compliance becomes the glue that holds such an enterprise together – people say one thing but do another – and working life in practice comprises holding the two things in tension. As if it wasn't a sufficient challenge just to do the job!

By contrast, enterprises can be appreciated and properly understood as systems only when they are operated and evolved toward a purpose and in accordance with some fairly general systems principles (could you name four of them?).

For such enterprise "systems" the principles and practices of a sufficiently broadly based systems engineering, properly applied, can and will improve the

effectiveness of that enterprise dramatically, not least by paying attention to the form of the enterprise itself. Moreover, the practice of SE is an enterprise in itself, thus the effectiveness of SE can be improved dramatically as well. There is plenty of room for improvement both in the practice and in the management of SE (e.g. selecting and committing the right amount of the right kind of SE for the situation at hand).

The principles and archetypes pertinent to the exploration work of the IEWG are those generally termed complex, adaptive systems. We are, therefore, considering the implications of systems engineering complex, adaptive systems. Further, we must understand not only explicit relationships among system elements but also implicit behaviours that arise when one relationship affects other relationships rather than elements. Implicit systems, particularly those not directly observable and measurable are sometimes called soft systems.

Finally, we must learn how to make systems partly from those wonderful but hugely unpredictable elements called humans. **No longer can we design systems to be just operated by people.** We must design systems composed of people and design system evolution schemes that will be both operated and populated by people.

A PRACTICAL PROJECT

The IEWG's ambitions may appear to pose a large scale, glacial speed research project. In fact, it may reduce to a relatively quick process of rapid prototyping and evaluation powered by current techniques of knowledge production, sharing, burnishing, categorising and utilisation. More will be said in the IEWG theme articles of INSIGHT, including the chaotic form of organisation that is being used to give focus to our activities. Meanwhile, a few of us in the UK are looking to establish our own practical project, of which much more will be said at the Autumn Assembly.

INTELLIGENCE EXERCISE FOR AN INTELLIGENT ENTERPRISE

As an example of the way in which things have developed thus far, but need to go much further – and quickly - take the current appreciation of a need for delivery systems to be designed just as much as the deliverables themselves. This phenomenon has been recognised and some developed practices described in various papers at recent INCOSE Symposia. Some folk have even gone as far as to suggest that there might be interaction and trade off between the two – it must be something to do with the space program and all of these huge delivery systems with tiny payloads perched on the top.

However, at a Panel discussion in Las Vegas 2002, the question was asked "Is SE Evolving Fast Enough" and David Wright, one of the Panel speakers, will be speaking to us at the Autumn Assembly about aspects of that discussion and the particular points that he has to make about interaction of systems with the operating or organisational environment.

Now the title of that Panel discussion was very appropriate for any discussion about IE's and it was no accident that all of the speakers were members of the IEWG. Things in the business environment are changing very quickly for most of us and it is quite conceivable that many companies in the future, probably large companies, which cannot change and adapt fast enough will probably falter if not actually fail, with all of the human cost involved. An intelligent enterprise, above all else, survives. "The purpose of a business is to stay in business," as my old Business Studies lecturer used to pummel us with - not just to make a profit. I think Arnold Weinstock would have benefited from attending his lectures.

The point is that SE must not just evolve; it must evolve fast enough and sufficiently broadly in order to be of benefit to companies experiencing the buffeting of rapid change. Half-baked techniques used in the past – BPR, for instance, and ERP now have just made things worse. And it's no use looking to any of the other project or general management based techniques for an answer, because none of them has ever been sufficiently systemic in nature. Only thorough-going systems based techniques have the potential to be of assistance.

Since going international, INCOSE has been reasonably well disposed to adopt a much broader view of systems engineering, seeing it more as a member of the growing family of systems based approaches developed during the last century and not just as the discipline invented by the US Military in the 1950's, which the US INCOSE web site actually continued to proclaim until as late as 1997. True SE, as the founding president of the UK Chapter Derek Hitchins termed it, is well placed to be an important vehicle in putting together a powerful portfolio of systems based techniques for solving many of the problems facing commerce and organisations that do things - people based systems, where the whole enterprise is the system of interest not just the bit that gets designed and delivered. This is the basic aim of the IEWG within INCOSE – to forecast the need for and to develop those systems based techniques that can solve tomorrow's problems and, not least, to prepare and equip INCOSE members for that challenge. (By the way, if you think you see a possible stalking horse in the aims of the IEWG for INCOSE's more general role in the future, then don't tell anybody else because most folk don't spot a stalking horse until it has galloped past them).

RMT & LSA Engineer
Certification Engineer   Hastings

Already a major force in our field, General Dynamics UK is part of the General Dynamics Corporation, the world's sixth largest defence contractor. We have recently secured several major new contracts - with many more in the pipeline. For the people who work for us, this means a challenging future within a fast moving business at the forefront of military and avionics systems engineering. To help us fuel our ambitious expansion plans, we are now looking to recruit the following key individuals:

RMT & LSA ENGINEER
£26,000-£36,000 + Excellent Benefits

In this position, you will manage RMT and LSA programmes, influencing design to improve and promote adequate system RMT attributes and conducting systems analysis. Candidates should be educated to at least 'A' Level standard in Maths and Physics (although an engineering degree would be preferable). With a good general knowledge of electronics including bus communications, you should have a minimum of 2 years' relevant experience in RMT & LSA. In addition, you will ideally have a knowledge of MIL-STD's 470, 785, 1388, 1629, 1843, 2165 or DEF-STANs 00-13, 00-40, 00-41, 00-42, 00-60. Familiarity with Microsoft Office products and an ability to take a full 'systems' view will be essential. Ref: RMT/LSA/INCOSE

CERTIFICATION ENGINEER
£30,000 - £40,000 + Excellent Benefits

In this position, you will be responsible for monitoring and reporting on the design certification process, including tracking, collating and performing preliminary reviews of supporting evidence, as well as status monitoring and reporting on project progress to certification milestones. Liaising with project development teams, you will also provide recommendations for approval as well as providing advice on requirements for Safety and Cerification processes and procedures. Responsibilities within this role could grow to include Certification Authority (full approval of design certification). With a minimum of 5 years' experience in Defence Avionics, candidates should be educated to degree level in an engineering discipline and have a solid background in multi-disciplined engineering. Ideally, you will also have a knowledge of Design Authority, Defence Certification Requirements and Safety Standards. Computer literate with a keen eye for detail, you should have excellent communication skills and a professional, flexible attitude. Ref: CE/INCOSE

In the first instance, please send your CV (quoting the appropriate reference) to Debbe Wordley, Assistant HR Officer - Avionics, General Dynamics (UK) Ltd., Castleham Road, St Leonards on sea, East Sussex. TN38 9NJ. Fax: 01424 851520. E-mail: debbe.wordley@generaldynamics.uk.com

No agency CV's please.

GENERAL DYNAMICS
United Kingdom Ltd.

As an example of what we mean by future needs, consider the case of developing a new product for market, knowing that by the time it becomes available, development work must already have started on its replacement. It's no use just applying systems engineering techniques to the product alone, as tends to be the majority case today. Unless the development and delivery process and the supporting organisation are all involved simultaneously in the systems engineering effort, their dependencies and interactions exposed and subjected to the test of utility relative to clearly defined survival based goals for the organisation, then we would assert that the organisation and its processes and its products will tend to fall more and more behind in the competition stakes. There is, in fact, no other possible outcome. Lean, agile businesses of the type that will tend to prosper in the future cannot possibly afford to carry passengers or support vested interests such as those represented by fixed organisational forms – the protection of fiefdoms, for instance, or the scope to continue conducting business by saying one thing to customers but another to shareholders, employees, suppliers or other stakeholders. "Yes, we can reduce our prices by 20% with our Mark II version since you have asked us to match those of our competitors (but who is going to tell the staff, shareholders and suppliers that they will have to take the hit?). In the future, unless a company has already anticipated the need for and is already planning to build into the Mark II version a 20% price reduction while it is still developing the Mark I version, that company will inevitably fall behind. And to get this far ahead in the game means **collaboration**, involving and engaging all stakeholders in meaningful and unequivocal dialogue about the simultaneous engineering of product, process and supporting organisation in order to achieve mutually agreed, realistic goals.

The present, very flawed answer of large businesses to the huge competitive forces that buffet them is to merge or acquire new competencies through take-overs. Just look at the history of GEC Macaroni since Weinstock for an example of this dynamic in action. Alternatively, count the number of de-mergers occurring at the same time as mergers (BT is a good example). Just as you don't benefit from the contents by simply buying the book, the answer is not just to acquire or shed competencies but to align and apply them in a systemic way to problems and challenges correctly identified and solutions structured as strategic goals which best fit stakeholder requirements.

We will be looking at model forms of achieving the necessary concurrency of useful effort required of IE's during the IE session at the Autumn Assembly. We will also be discussing some practical ways in which some of us might start to collaborate on an IE project, to assemble and organise competencies capable of

responding quickly and in a sustainable way to the increasingly volatile demands of the marketplace.

Money Matters

Matthew Chittick has been our Treasurer for about 5 years and recently he decided that it was time to stand down. I foolishly offered to take on the role if no other volunteer was forthcoming. There being no queue of volunteers for the job, Paul Davies called my bluff last month, and as a result I travelled to Malvern last week to take charge of the accumulated INCOSE UK financial information.

The accounts provide quite an interesting view of the history of INCOSE UK. From the accumulated receipts and payments you can see where we held our events, who provided tutorials, who joined the Chapter, who left and many other details of our chequered history. I can now see what the term "Forensic Accountancy" means, and appreciate how much effort must be put into successful money laundering systems!

The material that Matt handed over included the audited accounts for the year ending 31 May 2002. Suffice to say that we continue to maintain a sound financial position, showing a £6,500 margin on our turnover of around £65,000 for the year – slightly ahead of last year's result. We also had an extremely healthy cash balance of around £50,000 at the year-end. This is not quite as large as it seems, because we still owe around £10,000 to INCOSE central for their $60 of each annual subscription that we collect. Nevertheless we are now in a position where we have funds that can be used to further our objectives in new ways, at the same time as holding enough reserves to underwrite major events.

In the past we have made available copies of the accounts to all members at the AGM, but in view of the lack of interest in the past I propose to provide copies on request. I will provide a summary of the accounts for presentation at the AGM. Any member who wants a copy of the accounts, or has any other queries relating to INCOSE UK finances, then please contact me at:

peter.lister@siemens.com
Work Telephone: 0121 713 4311

Finally I must express our thanks to Matt for his efforts over the last 5 years and to Qinetiq for allowing him to help us. Matt had the benefit of being an accountant in his day-job, whereas I have to work from first principles. I will let you know whether a Systems Engineering background helps one to cope with the intricacies of the financial world.

Peter Lister
Treasurer and Past President

The riskiest part of systems development is often . . . . . software development.

How do you manage that risk? . . . . . . by ensuring estimates are realistic.

How do you know plans are realistic? . . . . . by measuring productivity, both planned and historical.

How do you measure productivity? . . . . by using processes based on quantitative project measures.

Where can you get expert advice and tools? . . .

Quantitative Software Management

British Standards Institution Promote ISO 15288 For Systems Engineering

The British Standards Institution are promoting the adoption of "ISO 15288 -Lifecycle management - system life cycle processes" which is due to be launched this month. This standard, which has been developed by Stuart Arnold and other members of INCOSE and interested parties, sees a definite push towards a truly common worldwide standard for systems engineers and is already being used extensively, albeit in its draft form, throughout industry today.

As part of this initiative, the BSI are delivering a number of courses concerned with "Process modelling for systems engineering" which uses ISO 15288 as the core reference model for the course. These courses are aimed at organisations committed to adopting the forthcoming ISO 15288, which address Life Cycle Management and System Life Cycle Processes.

For more details, see the BSI website at:

`http://www.bsi-global.com/`
`Portfolio+of+Products+and+Services/`
`Events+Seminars`
`/Process+Modelling/index.xalter .`

Doug Cowper
University College London
Centre for Systems Engineering

Back to School

Do you have a TV, video or mobile phone, maybe even a Personal Computer? Have you ever wondered who designed it in the first place, how it's made, what makes it tick? Who can conceive such things? Technology is now so advanced that often our children understand more than we do. If we can nurture this from a young age, our children may be able to solve problems we can only

dream of. We need these people to Engineer our Future. Who will they be, and how will they be trained?

Engineering is fundamental to all societies, independent of their technological capabilities or the age that they live in. Engineers were as valuable thousands of years ago with the building of Stonehenge and the great pyramids as they are today. In fact they were probable more valued then than they are now. Ask Joe Public who is responsible for any functional device (hi-tech or otherwise) and they will probably say "a scientist". Ask what an engineer does and, invariably, the answer will be "fix cars", "repair video recorders" and so on.

There are many reasons for this misconception, ranging from only a small percentage of the public having an engineering background, to lack of engineering input to education. Some of these issues are being taken on board by, amongst others, the IEE and the Engineering Council, who have identified that one of the keys to changing this mindset is to get involved with educating schoolchildren. This lack of recognition of engineers is caused, partially, by the lack of appreciation as to the nature of engineering starting right at the primary school-child level. Engineering, however, is taught to schoolchildren as early as primary school but the problem is that nobody (including many teachers) realises this.

An upcoming series of talks will show how two entities as disparate as the National Curriculum and the world of engineering can actually be related together by looking at best industrial engineering practice and, indeed ISO standards! The truth is that engineering is taught at all levels of school, but the problem that we face is to get both pupils and teachers to understand and appreciate this connection. If the myth of "spanners and oily rags" is to be dispelled, then we must look to the next generation of society help them to appreciate the true role of the engineer.

For more information see the events section, Sylvanus P Thompson Lectures.

Francesca Hodges

Praxis Critical Systems Ltd

20 Manvers Street

Bath BA1 1PX

Events

REVEAL Requirements Engineering Course

Praxis are running their next requirements engineering course

24th - 27th February 2003

This course will be held in Bath. The price per person is £1,600 + VAT, this includes lunch and refreshments each day, and course documentation.

Any queries, contact:

Tel: (01225) 466991

DDL: (01225) 823820

Fax: (01225) 469006

E-mail: `francesca.hodges@praxis-cs.co.uk`

SYLVANUS P THOMPSON LECTURES

|				
Tuesday 5 November 2002	7.00	E Midlands Nottingham	Simon Parr Email: **Sparr@iee.org**	Sherwood Room, Toby Carvery, Wollaton, Nottingham NG8 2NR
Wednesday 6 November 2002	7.30	Cambridge	Mike Froggatt Email: **Mike_froggatt@scee.net**	Reddaway Room, Fitzwilliam College, Huntingdon Road, Cambridge CB3 0DG
Thursday 7 November 2002	6.30	Essex	Amanda Virassamy-Poulle Email: **Avirassa@iee.org**	Telford Lecture Theatre, BAE Systems Advanced Technology Centre, Great Baddow, Chelmsford
Tuesday, 28 January 2003	6.00	London		IEE Savoy Place, London WC2R 0BL
Wednesday19 February 2003	6.00	N Ireland Belfast	Nuala Sheerin Email: **Nualasheerin@mac.com**	Wellington Park Hotel, Malone Road, Belfast
Thursday 20 February 2003	tbc	Irish Dublin	Sinead Mullins Email: **Sinead.mullins@synopsys.com**	tbc
Tuesday 11 March 2003	tbc	W Wales Swansea	Mike Brownsword Email: **mike@brass-bullet.co.uk**	tbc

Cradle-*4*

From concept to creation...

Web Access, Extended UML and Dynamic Verification
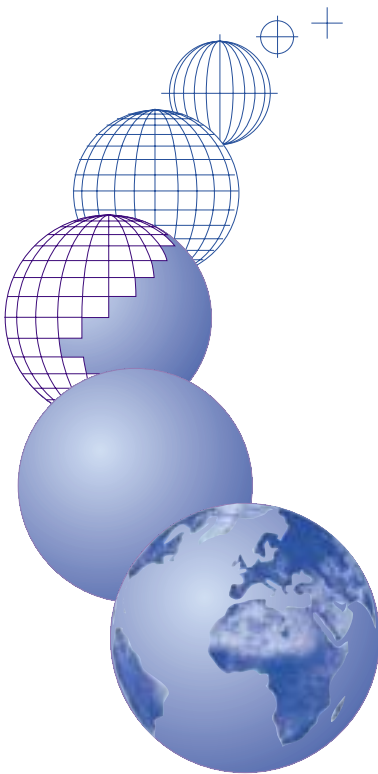
Cradle-4 is the scalable, integrated solution for your systems engineering projects. It supports small or large, distributed or local, simple or complex developments in a single framework that blends with your existing desktop and SE tools, and links to corporate PDM / EDM / documentation systems.

Built on redesigned UIs and new analysis tools, Cradle is an incremental solution that grows with you. Start with requirements management, and add system modelling, architecture definition, performance assessment, timeline simulation, metrics, interface and test / acceptance management as needed.
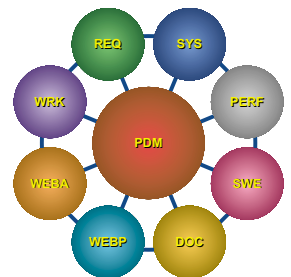
- Capture requirements, fast, with programmable parser and Word / Excel plug-ins
- Engineer the requirements and generate URD / SRD / ORD documents
- Built acceptance test cases and publish RTMs and PVMs
- Build UML and functional models and allocate requirements into them
- Evaluate alternative architectures and run performance assessments on them
- Build test plans and test specifications and publish for distributed comments
- Allocate requirements and models to the architecture and simulate behaviour
- Characterise system interfaces, and model and simulate protocol transfers
- Generate SDS / SSDS documents and interface control documentation
- Conduct software / hardware allocation and generate implementation specs
- Build UML / structured software models, code generate / reverse engineer code
- Manage test definition and execution, integration test and acceptance
- Manage the process with metrics, built-in CM, electronic / distributed reviews, alerts, annotations and e-mail links

Support stakeholders with customised tool interfaces, queries, views, forms, documents - all built by point-and click tools, no scripting!

Publish requirements and models to website or document, or provide interactive view/edit access to them from users' web browsers.

Build product and system breakdown structures and link to corporate PDM / EDM systems.

Contact Details

President of the UK Chapter

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Past President of the UK Chapter and Treasurer

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**Instruction to
your Bank or
Building Society
to pay Direct Debits.**

DIRECT Debit

Originator's Identification Number

| 6 | 3 | 0 | 1 | 4 | 6 |

Please fill in the form and send it to:
J D Mead, The INCOSE UK Administrator, 20 Beehive Lane, Binfield, Berks, RG12 8TU

To: The Manager (please enter the name and address of your bank)

Bank/Building Society

Address

Postcode

Name(s) of account holder(s)

Reference Number (Membership Number)

Branch Sort Code
(from the top right hand corner of your cheque)

☐☐ — ☐☐ — ☐☐

Instruction to your Bank or Building Society

Please pay INCOSE UK Direct Debits from the account detailed on this instruction subject to the safeguards assured by The Direct Debit Guarantee. I understand that this instruction may remain with INCOSE UK and, if so, details will be passed electronically to my Bank/Building Society.

Bank or Building Society account number

☐☐☐☐☐☐☐☐

Signature(s) _____

Date _____

Banks and Building Societies may not accept Direct Debit Instructions for some types of account

The Direct Debit Guarantee

DIRECT Debit

- This Guarantee is offered by all Banks and Building Societies that take part in the Direct Debit Scheme. The efficiency and security of the Scheme is monitored and protected by your own Bank or Building Society.

- If the amounts to be paid or the payment dates change INCOSE UK will notify you 14 days in advance of your account being debited or as otherwise agreed.

- If an error is made by INCOSE UK or your Bank or Building Society, you are guaranteed a full and immediate refund from your branch of the amount paid.

- You can cancel a Direct Debit at any time by writing to your Bank or Building Society. Please also send a copy of your letter to the Administrator at INCOSE UK.