



preview



International Council On Systems Engineering UK Chapter Newsletter

Autumn assembly 2005 – how was it for you?



Andrew Farncombe
INCOSE UK Technical Director
and MC

We only managed to persuade 25 of the attendees to complete and return an event questionnaire so although I will endeavour to reflect their comments correctly, with undoubtedly a slightly personal bias, it will still be a minority view. We had just short of 70 attendees although not all of them for both days, Monday being the marginally better attended. It just so happens that 70 was the number for break even point on the finances so our treasurer Peter, now finance director of course, is still awaiting the outcome and the speed at which

some companies pay these days it may take a while.

As usual we wish that we could afford to offer free places to speakers etc, but were pleased that we did not at this event as we would then definitely not have covered costs. Board members are usually expected to pay and they do a lot more work for the SE cause than the occasional speaker so we try to strike a balance that the majority are happy with because we need to include everyone.

May we thank those that distributed flyers and brochures whether hard copy, electronically or both. It really is necessary that as many of you as possible do it. It would cost a fortune to reach the number that we can do as members otherwise and you are able to target people who may be interested. Scientifically collected evidence shows that although someone may not respond to the first invitation it is still worth asking up to five times as this will occasionally produce a positive response. So I was disappointed to see a few "no I did not distribute because several others were doing it". Just do it quicker, slower or to a different audience -please.

The food at the dinner was much complimented although several did not like the dinner venue it was a bit like dining in

an aircraft hangar wasn't it with lighting that was designed for displaying motor cars in, not for dining. We omitted to ask about the After Dinner speaker on the questionnaire but no one aired a negative in my hearing and there were many compliments. The accommodation at Burleigh Court was also complimented and it was not far away. Do you know that lack of bar was not commented on and to think how much you normally drink! Hope you were able to enjoy the Bucks Fizz and the wine!

It is difficult to sum up the technical sessions in a sentence even when I have your comments to help me but I will try. Choosing the Session which you found most interesting produced the highest following for Competences followed closely by Safety Engineering v Systems Engineering.

Session 1 Safety v system collected generally very good comments with only a few pointers where things could have been improved.

Session 3A Standards was of



Prof. Heinz Stoewer
INCOSE President

course well presented –Jon was entertaining as always you said and I also found his team were pretty good too and a number of you volunteered to do more work in this area –even though some omitted to add their name to the form.

Session 3B Automotive attracted probably the smallest attendance due maybe to its being paralleled with Standards which everyone needs. It also collected a higher percentage of 10 out of 10 marks than any other.

The popular top choice for interest was the Competences led by Allen and it was widely approved of for its wide range of views expressed and Continued...



Delegates in a Break Out Session

December 2005

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the inclusion of education, courses available etc. However folk were still looking for answers which are not readily available yet and thankfully several volunteered to contribute more to this topic- and some even left their names!

Session 4A - I did struggle to understand how you managed to get your company to pay for you to have time off to help produce single page leaflets for INCOSE but when I saw the enthusiasm with which you all dived in and threw ideas around it became a little clearer!

Considering the efforts that some of the session chairs went through in getting their session together, ranging from taking over from the original session leader part way through to having your offices broken into and computers nicked -twice!, being away for two weeks before hand and having speakers drop out last minute etc shows a lot of dedication for which we thank them all.

If any of you had positive after-thoughts about volunteering for particular working activities please email Paul on

paul.davies@uk.thalesgroup.com and he will advise as appropriate.

As to your answers at the end where we asked for opinion on the style and content there was general approval with an occasional "boring topics" and satisfaction with the prices too, although on everything there is always one. It was encouraging to see how many plan to attend the Spring Thing -must stop calling it that - but disappointing how many are planning a paper for the European event in Edinburgh in September. Want to do a trial run at

the Spring Thing?

Surprisingly, given the topics here were described as boring by some, many of the same were suggested for the Spring Thing although perhaps those to get more than one mention were Business case for SE and Intelligent Enterprise which we did not do. I will provide a copy of the collated sheets to the full events committee and we will chew over your opinions in planning future events.

Thanks.

John Mead
UK Chapter Administrator

The integration authority MODAF challenge

Background

Following the successful conclusion of the project to develop the MOD architectural framework (MODAF), the IA is embarking on an initial phase of implementation prior to a more widespread rollout of the framework. The early focus is on seeing the framework employed in the many areas where MOD agencies and industry are already engaged in architectural work. This 'bedding-in' of the framework has started and the early benefits of increased coherence are already being felt. However we are keen that appreciation of MODAF is not the sole preserve of the traditional 'early adopters' or seen to be exclusively technical.

Spreading the Word

We recognise that the full benefits of MODAF adoption will only be achieved if there is strong top-level commitment to the value and utility of a critical subset of MODAF views. To develop this commitment we are keen to demonstrate the power of the framework in supporting the work of key decision makers and the breadth of departmental business. We also want to get the full involvement of the wide community of architectural modellers and those in related work (in both MOD and industry) and to do so in an enjoyable and unusual manner; we have therefore decided to offer a competition for the best use of MODAF.

The Competition

The Head of the Integration Authority is offering a crate of

champagne to the individual, team or organisation that in the opinion of a panel of senior stakeholders provides the best exemplar set of MODAF views. There are no restrictions on who may enter and we are keen to see entries from MOD, Industry, tool vendors, academia

& research organisations, groups of like-minded individuals and enthusiastic individuals - this list is not intended to be exhaustive!

The winning entries will conform to the MODAF specification and will combine a highly effective presentation and "style" with a focused representation of the underlying information. Entries should demonstrate "a system on a page" with a minimum of two views to describe 2 or more of the following levels:

1. A capability area on a page
2. A programme on a page
3. A system or project on a page
4. A subsystem on a page
5. A crew station or console on a page

Rules of the Competition

1. Entries must be submitted to the Technical Director¹ of the Integration Authority by 28th April 2006.
2. The judges' decision is final. (If no entry is judged good enough, the judges reserve the right to drink some or all of the

champagne themselves!)

3. Entries shall be a portfolio that illustrates at least 2 levels for individual entries and 3 levels including a "capability area" for team and organisation entries.

4. Entries shall use a minimum of 2 MODAF views for each level and may choose to use more. There is no upper limit.

5. Entries must be real, reasonably complete, ideally unclassified, and show the current or near future epoch.

6. The set of views for each level shall be presented on a single sheet of paper, A3 or A4, single or double

sided.

7. The same set of MODAF views and style of presentation shall be used for every level.

8. Entries should be submitted as good quality colour prints on paper of the entrant's choice, and in electronic form compatible with Adobe Acrobat or Microsoft Office.

9. The judges will assess both the hard copy submitted by the entrant and a copy printed from the electronic entry on an Inkjet printer at medium quality on normal photocopier paper.

10. All views of any level must be mutually consistent.

11. It is preferred but not mandatory that views at different levels

shall be hierarchically related to each other.

12. The winner will be announced on the 15th May 2006. Prizes will be presented and entries displayed at the next INCOSE UK Bristol Local Group meeting, or other suitable opportunity.

13. The competition is open to Individuals, Teams and "Organisations".

14. Team entries must be from a maximum of 6 named individuals. Teams must certify that they were not explicitly funded by their employer to participate in the competition, and that no work was done on their entries (including reprographics) other than by the named team members.

15. There are no limits on the resource that may be devoted to organisational entries except that individual and team entrants may not also participate in an "organisational" entry.

16. There is no limit on the number of entries that may be submitted by any team, individual or organisation.

17. Entrants and their employers will retain full rights to use and modify their material. However by entering the competition they agree to the use of their entry, in whole or in part, with appropriate acknowledgement, in style guides and MODAF promotional and training material.

18. The best individual, team and organisational entry will receive a bottle of champagne with the overall winning entry receiving a case.



INCOSE uk communications team

The last edition of Preview outlined the new INCOSE UK team-based board structure. The Communications Team is primarily responsible for liaising with members and external organizations, and

provides support to the local groups. We are looking to achieve this through three prioritised themes:

Theme 1 - Mechanisms

It is important that we have the right mechanisms set up and under some control before we move any further. Our main areas of effort at present are:

Preview. Doug Cowper cur-

rently manages to produce this excellent newsletter every 2 months. We have decided to produce Preview every 3 months, giving you more time to contribute so Doug has the opportunity to

make things even better! Publication dates will be December, March, June and September, with deadlines on the 15th of each preceding month.

E-Preview. With Preview moving to a three month cycle, we need a mechanism to promulgate time sensitive information, and to keep you involved. The first edition of E-Preview, our new e-mail bulletin, was issued during November. This will be circulated every 2-3 weeks to all e-mail addresses held by John Mead – if you haven't seen E-Preview, you may wish to check John holds your current e-mail address!

Web Site. Our web site (www.incose.org.uk) provides details of events, products and information. Stuart Cornes does a sterling job as our web-master, and we are looking to build on the current site through a review of the structure and content, to ensure the right information is readily available with minimal administrative overhead.

Liaison. The Communications Team also co-ordinates our liaisons with other professional organisations. We are looking to build on our good relationship with IEE, to advertise and co-host events, and we will be investigating similar opportunities with other professional organisations.

Theme 2 - Participation

Once we have our mechanisms in place, we can support greater participation by you, the members. After all, INCOSE provides systems engineers with an opportunity to share ideas and to develop best practices, and that will only happen if everyone participates somehow. The ideas we are looking at include:

Preview Articles. We need to encourage more original articles from members, to share experiences and develop best practices. We will also look to add book reviews, and other themed articles that will be of interest.

Annual Questionnaire. We started this survey last year, to understand what added value INCOSE membership brings. Although only 30 of you responded to the first survey, the results did give some useful indications. Over time we should be able to see trends and identify where we are doing well and where we are losing ground. This year we are giving you an incentive to participate! All completed questionnaires will go into a raffle - first prize will be free admission to the Spring Conference 2006, worth over £400. The survey will be available on-line at www.incose.org.uk/survey05.

Local Groups. We have active groups running in Bristol, Midlands, London and Stevenage, and the beginnings of local groups in Scotland and the South Coast. These

local groups provide members with an ideal opportunity to contribute, either as an organiser, a presenter or as a regular attendee. Further details of each group can be found on the web site.

Discussion Forum. For the future, we will be looking at alternative ways of promoting regular participation through a web-based discussion forum.

Knowledge Base. Another idea for the future is a web-based members only area that contains a range of indexed references, papers, presentations and guidance.

Theme 3 - Visibility

The lowest priority theme at present, but only because we need to sort the basics out first! Although we do not currently proactively market INCOSE to the wider engineering community, there are some areas of activity worth mentioning:

Promotional Material. We are going to make a small selection of promotional material (pens, book marks) available for use at local group events. In the future we may look at some material specific to INCOSE UK, but we would have to be sure there is a benefit associated with the cost.

Display Stand. The local groups have suggested we have a display to advertise INCOSE to non-members at local group events. I

am hoping we can put together a large INCOSE UK Display Stand for use at conferences, with the component parts suitable as stand-alone displays held by each local group.

Corporate Image. Dipesh Patel is taking a top-down look at our corporate image, to make sure we present INCOSE UK in an appropriate, professional and consistent way.

Awards. The chapter currently holds three awards, including the best INCOSE chapter award from last year. We will circulate these for display at local group events and conferences to show everyone how well our Chapter does, thanks to the whole membership community.

I hope I have given you some idea of what the Communications Team are working on. We are not a big team, and like most we have to keep our employers and our families happy as well – surprisingly, our Chapter President priorities are often overruled by my wife! Any help or ideas will be most welcome, particularly to co-ordinate E-Preview content and to manage the display stand project. Finally, think about contributing an article to Preview, and don't forget to support your Local Group!

Happy Christmas!

Simon Hutton
Communications Director

President's corner



I am delighted to welcome Andrew Daw as our new President Elect, and greatly look forward to

working with him over the coming years.

My own news is that I have taken over from Peter Brook as head of the Integration Authority, for a 2 or 3 year period. The job presents tremendous challenges and opportunities, introducing effective "system of systems engineering" across and beyond the DPA's portfolio, and giving me an chance as the DPA's Systems Engineering Development Partner to implement some of the ideas I have developed while working on the other side of the fence. You can be assured INCOSE is already getting an increased profile within the MOD.

The INCOSE UK Autumn Assembly was a good event in terms of the breadth and quality of discussion

and the wide range of interests (i.e. non-defence!) represented. The turn-out was less than we had hoped, and Paul Davies and his events team are doing a lessons learnt exercise. Your input to this would be useful.

I trust you are content with the recent re-organisation and the underlying intent. I am beginning to feel confident that it is gaining "traction", but would welcome your feedback on this. It has certainly been successful in engaging a larger circle of members as "activists". This is really important, since the Chapter's success depends critically on the quality and enthusiasm of your contribution. The major "strategic" initiative for next year is of course the EuSEC 06

conference in Edinburgh, which is taking up a lot of Paul's time. At a more local level, the Communications Committee activities, the one-page-guides, and the emerging South Coast local group are our three immediate priorities. Paul Davies will be collating the "Chapters' Award" package over the next couple of months and if you are aware of any activities that contribute to our score please let Paul know. I am sure he has no desire to work over Christmas so early inputs will be appreciated. I will be at the INCOSE International Workshop in January. I hope to see some of you there if not before.

Hillary Sillitto
President of the UK Chapter

Advertise in preVIEW

If you are looking to contact the Systems Engineering Community in the UK, why not place an advertisement in preview? For more information about our competitive rates please contact:

John Mead on 01344 422325 or email: john.mead9@ntlworld.com

Systems engineering and the battle of Britain



This year was the 65th anniversary of the Battle of Britain. I guess it was good timing that saw me meeting up with Prof. John at Shrivenham, together with some Granada TV programme developers. Turned out that they were making a film in the series "Battlefield Detectives," to be shown shortly on Channel 4. They had come to Shrivenham because they believed that that RAF Fighter Command at that time was an early example of systems engineering, so where better to find out how it was done?

To be honest, it wasn't obvious to me at first that there was much relationship between the Battle of Britain and systems engineering. After all, the term "systems engineering" wasn't even invented until 1941. Still, anything for a challenge – but, first a recap...

The Battle of Britain was at its most fierce, and most crucial, during the periods 8th to 18th of August, the first phase and 19th August to 5th September, the second phase. During these two crucial phases, the strategy of the German Luftwaffe was to crush the UK's air defence, so that the Germans could then proceed unhindered with bombing and invasion – Operation Sea Lion they called it. To achieve their aim, they attacked ground radars, RAF fighters in the air and on the ground, and airfields, with their fuel and ammunition dumps, air-

craft factories...

Under Air Marshall Hugh Dowding's direction, RAF Fighter Command had set up a new command and control system. The C2

for instance, the Luftwaffe lost some 69 aircraft to the RAF's 39 - 31 of these were lost in the air, and 8 on the ground.

The German High Command had expected the air defence of the UK to be crushed within a few days only. Faced with such stern, even desperate, resistance, they switched their strategy to night bombing of our major cities and manufacturing centres. Several questions remain, however:

1. How long could Fighter Command have lasted if the Luftwaffe had continued to attack the RAF bases and radars, instead of switching to bombing London and other cities?
2. Can the Battle of Britain be reasonably classified as a "win" for the UK, or not?

And there is a third question. At the time, there was fierce debate at high level about Fighter Command's tactics. AVM Keith Parks, AOC 11 Group, did not throw everything he had at each German raid. Instead he sent up only a few of his 20-21 squadrons of Hurricanes and Spitfires, to harry the Luftwaffe formations of bombers with fighter escorts. The idea was to break up the formations,

ground, with all the fighters gathered at one forward base.

So, the third question is:

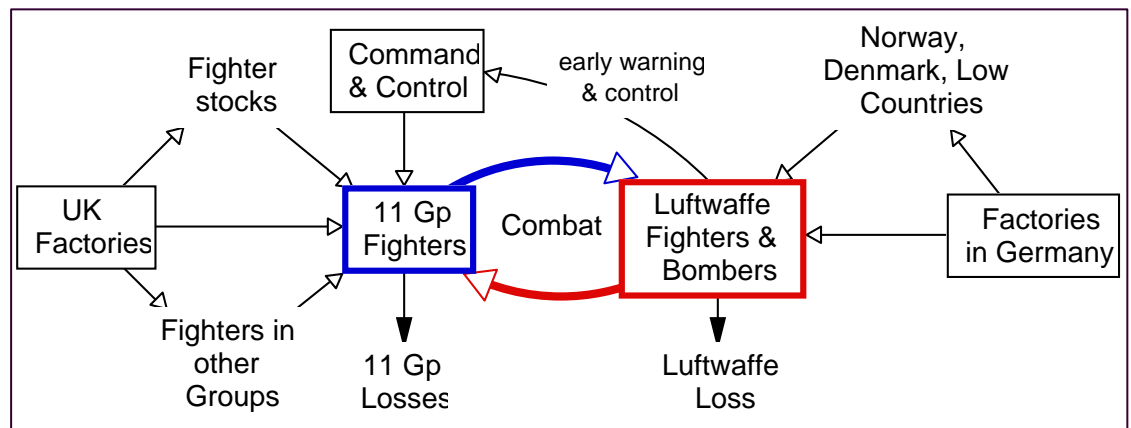
3. Was the strategy employed by Dowding and Parks, of conserving RAF fighter aircraft resources in anticipation of prolonged activities better, or worse, than the Big Wing concept - which would have contributed most in the long run...?

These questions were to be addressed within a space of no more than 1 month. In a moment of weakness I offered to build a dynamic simulation of the Battle of Britain - talk about "fools rush in..."

How to proceed? I started by looking up all the statistics I could find on numbers of aircraft, daily casualty statistics, locations of squadrons, radars, etc., etc. In this I was greatly helped by Stephen Bungay, something of an authority on the Battle of Britain. You may remember his presentation at the Swindon Steam Museum during INCOSE's 10th anniversary "do." Naturally, he was involved with the making of the TV programme.

Then came the simulation model, which was made up from a number of interlocking parts:

- ✦ Some 20 fighter squadrons of



system used the new Chain Home and Chain Home Low radars as its eyes to get advanced warning of German raids. These early radars did not work well over the land, however, and the Royal Observer Corps "told" Fighter Command about enemy and friendly aircraft over England. The ROC was also invaluable in providing raid-size estimates - at which the fledgling radars were none too accurate.

No. 11 Group of Fighter Command covered the south and south east of England, and it was here that the aerial combat was at its fiercest. Both sides lost heavily, and both sides tried to make up for their losses by bringing in new aircraft and new aircrews. On August 18th,

detering them, and enabling stragglers to be picked off. He similarly resisted the temptation to take on roving bands of LW Bf109s, choosing instead to conserve his fighter forces for the offensives yet to come.

Trafford Leigh-Mallory, AOC 12 Gp., supported by the redoubtable Douglas Bader, advocated the "Big Wing." This would necessitate gathering together as many of FC's fighters as possible and going out en masse to meet, and hopefully destroy, the raiding Luftwaffe in one major air battle. The Big Wing concept carried risks: inevitably many casualties would be incurred, and the Big Wing would be vulnerable on the

No 11 Group, totalling about 320 Spitfires and Hurricanes, together with pilots, ground maintenance, repair, refuelling, rearming, etc.

- ✦ Chain Home Radars
 - ✦ RAF Sector stations
 - ✦ Pilot Training facilities providing a stream of new pilots
 - ✦ Fighter manufacturing facilities
 - ✦ Luftwaffe squadrons in France with some 1200 fighters and bombers
 - ✦ And, famously, the typical English summer weather
- The whole lot fitted together after the fashion of the diagram. Weather was a major factor, as

the Luftwaffe needed clear conditions for bombing. Happily, the weather was not too obliging in that respect.

Having got the simulation working, the plan was to "tune" it so that it matched the known statistics of aircraft losses from 8th August to 5th September. Once tuned, it would be possible to simulate further months of combat, allowing for changeable weather, re-supplies, etc., and to see how the course of the battle might have gone – had the Luftwaffe continued attacking RAF Fighter Command. (Predicting the, then, future is not really feasible, of course, any more than predicting the future now is possible. The best you can hope for is a SWAG – a scientific wild-arsed guess.)

The known statistics of casualties looked like the trace of a fiddler's elbow:

It may be my imagination, but I seem to see the beginnings of a butterfly shape appearing in that chart - suggesting that the real-world situation may have been "on the edge of chaos," to use the popular expression. And the simulation model was also very finely balanced; simply changing random number seeds could result in major changes to simulated casualty results over a 30-day simulated run. (For the technically minded, the time interval, dt, for the simulation was 15 seconds, so 30 days necessitated a fair bit of calculation.)

The only way to make the simulation behave like the real world was to drive it – i.e., take on the role of Keith Parks, AOC No. 11 Group, and to adopt somewhat unpredictable tactics. One scheme that made the model correspond to the real world was

ceived them, so they could then be rested, and could wait to receive new aircraft and pilots. Meanwhile a different set of two or three squadrons could be scrambled on successive days, and so on. With some 20 squadrons in the Group, and allowing for weather breaks, it could take ten days or more to complete the cycle.

One key attribute of this tactic, as the simulation showed, was that it limited RAF casualties. If two squadrons were sent up, then the maximum number of fighters at risk was only two squadrons' worth – perhaps 30 fighters. And here was the risk of using the Big Wing. Sure, the RAF could have inflicted great damage on the Luftwaffe with the Big Wing, but only at the expense of great casualties to the RAF. As the Luftwaffe outnumbered the RAF by about four to one, the Luftwaffe could afford the losses – the much smaller RAF fighter force could not. Had the proponents of the Big Wing had their way, No. 11 Group would surely have been wiped out. Or, so the simulation indicated.

And Parks' tactic was possible only because of the Chain Home Radar. Using the radar enabled Parks and his controllers to direct their few squadrons to the point where the enemy attack crossed the southern coast. The radar was, in effect, a Force Multiplier. Without the radar, the RAF would have needed many more squadrons airborne and on patrol, so that some at least would be in the right spot to engage the incoming enemy. With the radar, and much to the surprise of the Luftwaffe, the RAF's fighter squadrons kept appearing in just the right place at just the right time – much to the puzzlement of the Luftwaffe, who did not know about the Chain Home radar.

Using the radar as his early warning enable Parks, with his tactics of force conservation, to match the Luftwaffe – just. On average, the Luftwaffe lost three aircraft to 11 Group's two. And for downed German crews, the war was over, while downed RAF crews could, with luck, return to base within hours. The situation was, however, finely balanced on a knife-edge.

Using the simulation, it was possible to generate the likely pattern of events over the next few months – had the Luftwaffe not changed its strategy. The weather would have changed, of course, and that had to be allowed for. It was also important to represent the likely behaviour of the then forces. For instance, would the rest of Fighter Command reinforce the diminishing numbers in



No.11 Group? Similarly, would the Luftwaffe transfer more aircraft from their operations in Denmark and Holland to bolster their air force in France?

The outcome was not quite as expected. Had reinforcements not been allowed on either side, the Luftwaffe would have overrun No. 11 Group in just over two months, according to the simulation. However, with reinforcements allowed, the situation reversed, and the Luftwaffe effectively ran out of aircraft after some three and a half months. Both figures should be taken with a large pinch of salt, of course. No commander in his right mind would continue attacking until he ran completely out of aircraft and crews. And no defending commander would run himself down to zero aircraft without trying different tactics, either.

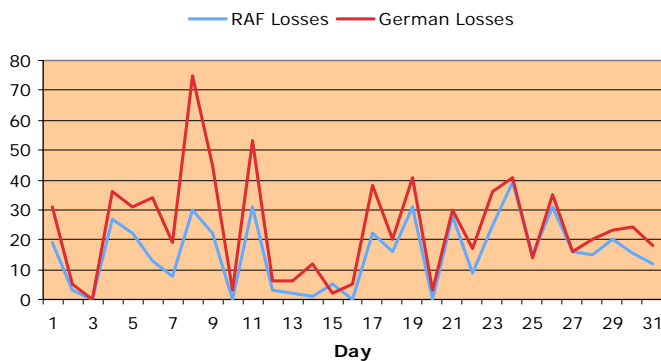
Taking stock, then, it seems that – had the Luftwaffe maintained their aim of defeating the RAF, and particularly No. 11 Group - they would most probably have failed or given up.

Was the Battle of Britain a victory for the RAF? Most assuredly: the aggressor was deterred, and Operation Sea Lion never went ahead. That is a victory in anyone's book

And was it systems engineering? Fighter Command, thanks to Dowding had developed a Command & Control System that offered just enough of a Force Multiplier to redress the odds. The Chain Home radar was just good enough, the Control and Reporting System was just fast enough, and the fighters were just quick enough when scrambled to reach height and position as the enemy arrived. These various system parts were coupled together, and their operators trained and retrained until the overall system was just swift enough, and had sufficient capacity, to cope. Coupled with Parks brilliant tactics, No. 11 Group was just able to stem the flow and survive in the process. The whole system, with its many parts, worked as a unified whole - it was created that way, and I guess that it really was systems engineering - of the highest calibre.

Prof Derek Hitchins

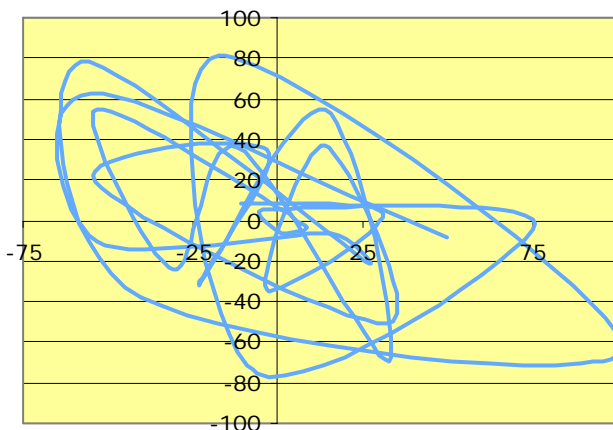
**Relative Aircraft Losses:
8th August - 5th September**



Tuning the simulation to behave like the known statistics proved impracticable. There was just too much variability, as a phase-plane diagram of the known statistics shows:

to send up only two or three squadrons at a time against even quite large raids of Luftwaffe fighters and bombers. The squadrons that were scrambled not only inflicted casualties, but also re-

**Combined RAF and LW A/C Losses
– Phase Plane Chart**



Events calendar

2006 Jan

28th Jan - 1st Feb 2006

INCOSE International Workshop,
Scottsdale, Arizona.
www.incose.org/iw2006/

Apr/May

TBC

INCOSE UK "Spring thing" venue
TBD

July

9th - 13th July 2006

INCOSE International Symposium,
Orlando, Florida

Sept

17th - 21st Sept 2006

EUSEC 2006, Edinburgh

If you have an event you would like published in Preview then please contact:
dcowper@sula.co.uk

In brief

The 5th EUSEC—Edinburgh 2006

We are full steam ahead for the 5th EUSEC, 17-21 September 2006, and have confirmed the venue and signed the contract (picture). Calls for papers, tutorials, sponsorship, exhibitors and 'Toolvendor Challenge' participants should all be announced before Christmas.

Paul Davies
INCOSE UK Chapter Events Director
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paul.davies@uk.thalesgroup.com

The g2sebok

The long awaited SEBOK is now available and can be found on line at <http://g2sebok.incose.org/>

Hillary Sillitto
President of the UK Chapter



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

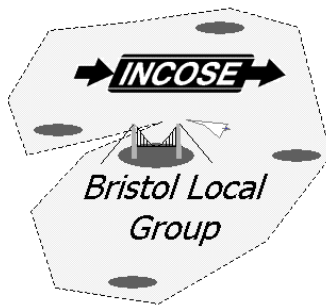
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Wotton-Under Edge,
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Around the regions

Bristol



**Report on Meeting 28th September 2005
"The Tool Vendors' Response to Architectural Frameworks"**

In June, Bristol Local Group held the first of two meetings on Architectural Frameworks in general and MoDAF in particular, with contributions from MoD and academia. This, the second meeting, was the tool vendors' turn to put their point of view. Forty-six people were present to hear three excellent speakers giving their diverse views.

Fran Thom, from Artisan, showed how UML, SysML and MoDAF formed a natural progression, each being founded on the strengths and wide acceptance of the previous. The strength of a tool is to make systems expressed in MoDAF form readable and usable by a wider audience than those who fully understand UML. This can be achieved by tailoring the language and the visibility of information to the type of user.

Toby Sumpter, from The Salamander Organisation, warned about the potential divisiveness of the MoDAF views if individual views are owned by different parts of MoD – as their names suggest will happen. The tools need to be able to present a holistic view, being interpretable by soldiers as well as technicians to give a common understanding of the system and its operation.

Martin Owen, from Telelogic, showed how requirements and design needed to work together, albeit not necessarily supported in the same tool but in an integrated suite. In this way both high and low level design could be appropriately accommodated, both driven from linked requirement sets.

As there hadn't been much time for questions at the first meeting, Dave Mawby and Ian Bailey, from the MoDAF team, and Rick Adcock, from Cranfield University, joined the three presenters to answer questions from the audience, summarised below.

1. **Where are we today with MoDAF?** The Internet version of Issue 1 has been placed on the web today.
2. **Are there frameworks for use in commercial areas where there is no coordinated customer?** Architecture frameworks did not arise in defence (eg Zachman) and are really only a way of presenting the business rules of whatever industry you are in.
3. **Is there a security view?** Whilst

there are some in TOGAF (The Open Group Architecture Framework), there isn't one in MoDAF. Security will percolate the whole model, possibly as attributes of information, rather than be confined to a separate view.

4. **Is the static MoDAF analysis suitable for the fast-moving battle-space, where the soldier taking initiative causes the unexpected?** It is possible to build dynamics that bridge between static states.
5. **Do the different models in the Telelogic scheme force consistency, as a single model would?** The various models are built on a common data model (or meta-model) in different data repositories. There are active links between them.
6. **MoD personnel change posts frequently; will MoDAF-related work need to be undertaken by outside contractors?** There is already a lot of outsourcing and, yes, it is difficult to get new skills into the MoD. It is hoped that MoDAF will assist MoD personnel to express what they want in a consistent way, rather than them necessarily being skilled in the capture process. The source of information would need to be captured, but the source would not need to be the one to capture it.
7. **The tendency for people to shy away from learning the models**
8. **If each organisation has the freedom to choose what they capture about a system, how will this benefit integration of independently acquired systems?** Exemplar guides will be produced to show how to achieve particular tasks; this should encourage consistency. However, one view was that a project cannot be required to capture more information than is currently useful to it. This was in contrast to another view that there may have to be certain mandated information recorded. "We have thrown you a dictionary, now you have to learn how to write novels"
9. **What about Configuration Management?** This is still a massive problem, currently without taxonomy.
10. **Is there cooperation between tool vendors?** MoDAF mandates how to store information, so one tool can put data into the repository and another take it out. Vendors will compete on the usability of their tools, not on the information they will produce.

Bob Dale
(on behalf of the INCOSE Bristol Local Group)

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