

CHAIRMAN'S COLUMN

CONTENTS

Welcome to the 21st century. As I said at the AGM and in my column of the Winter 2001 newsletter, I have two major aims for my Chairmanship: to ensure that the Society serves it's members in the best possible way and to improve the communication within the Society.

The review of the Society that I announced in the last newsletter is well underway and on target for me to present it to the members at the next AGM. Part of that review is to consider communication. However, there is another problem - isn't there always! Just like Mr Micawber our expenditure exceeds our income! We have been considering various ways to resolve this. The major expenditure is the newsletter, which currently costs around £2,400 p.a. and our major income is from the Conference. We are loathe to change the membership fee system, which has worked well since the inception of the Society but we also consider a good newsletter essential. So, the solution is to move with the times and send the newsletter out electronically. This has two benefits: it will, obviously save us money therefore we can leave the fees as they are and, it also solves another concern of mine – how we keep in touch with those members whose membership has lapsed. We will “pilot” the scheme first and ask you all please to let us have your views.

By the way, the “E” newsletter does copy well in black and white for those of you who, like me, have difficulty with screens.

I would like to welcome Arthur Griffiths back after his period of sickness, he is, he tells me, fit and well and ‘raring’ to go. He has put this newsletter together and I am sure that there is something of interest for everyone. I was particularly interested in the article on software as I spent a number of years in the now defunct DPTCAN trying to find a way of estimating the cost of software. I have recently re-visited the problem and I am not convinced that things have improved in that field since the ‘Eighties’. I am beginning to believe that the ‘low risk approach to software procurement is to pick a well-respected contractor, give them the spec, and pay the bill on delivery. What one might call “Cost Plus”!!! What do you think?

I look forward to seeing you at the Conference, which I am sure, will be, as usual an interesting and thought provoking event and I hope you will stay for the AGM which follows.

Chairman's Column	1
Always Expect the Unexpected	2
Software Comes of Age, Slowly	3
Fuel Cell Technology	4
SCAF Newsround	6
Letters to the Editor	9
Future Events	10

Editor:
Arthur Griffiths.

Any request to reproduce material from the Newsletter should be addressed to the Editors.

ALWAYS EXPECT THE UNEXPECTED

Enron's collapse should remind us that no accounting or valuation technique can disguise the inherent riskiness of business

At its heart, business is a gamble. The peasant farmer who plants a crop to sell next year and the semiconductor boss who commits his company to a \$2bn chip plant are both placing the same bet: that there will be enough customers, at the right price, for what they produce.

Most of the time the gamble pays off. But sometimes it fails. And when it does, disaster ensues.

This fundamental uncertainty at the centre of business is so unsettling that most of the time we choose to ignore it. We have developed techniques to analyse and manage the risks it implies and we tell ourselves that these have made the gamble go away. They have not.

There is a more disturbing twist. The techniques that we have invented can themselves distort or conceal the underlying risks. And, exploited to the full, they can produce businesses that are concealed time-bombs.

This is a good moment, therefore, to remember the gamble inherent in business activity and to explore how the techniques we use to mitigate it can themselves lead us into danger.

Take a routine business calculation. Every day, thousands of managers all over the world attempt to calculate the value of an investment by placing a value today on all the cash it is likely to generate over its life.

To do this there are a number of technical approaches and much scope for disagreement over which is best. The arguments miss the point. The techniques are fine. But all of them rely on the ability to predict cash flows years into the future.

Yet, we cannot sometimes predict cash flows even a few weeks ahead. The inability to guess the future is only part of the problem. A much bigger drawback is the temptation to invent the future we want. It is all too easy to manipulate future estimates to produce a desirable present value.

One large company has already stopped using discounted cash flow calculations to put a value on technological innovations because its scientists had got too good at "gaming the system": adjusting the forecasts to produce the present value needed for project approval.

When company or project collapses come out of the blue, the cause is often wishful thinking about future income streams or an underestimate of the future costs of obligations.

Just vowing not to misuse cost estimates and the techniques we use to measure and manage risk is not enough. Even scrupulous caution will not save us if we place too much faith in techniques that are inherently limited.

The solution is not to invent even more sophisticated measures of risk or even more elaborate means of parcelling it out to others. It is to face up to the inherent riskiness of business and to understand where the vulnerabilities lie.

Simpler calculations of the value of an investment will, in the end, work better if they expose the factors that will make the difference between success and failure.

The underlying challenge is to accept the inherent uncertainty rather than covering it up with a layer of apparently rigorous calculation.

Trying too hard to eliminate the uncertainty altogether may expose us to still greater dangers by placing too much faith in analysis that will always be vulnerable to wishful thinking or outright manipulation.

Edited from an article by Peter Martin in the Financial Times.

SOFTWARE COMES OF AGE, SLOWLY

*Software programmes allow us to take increasing control of our working lives.
Yet little has changed in software development over the past 30 years.*

The transition from mechanical calculator to electronic computer began in the 1960s at universities that developed computers to help them solve mathematical problems. In many ways, the professors' original intention of simply trying to automate a routine process still holds true today.

Early applications for software were in the 'back office' administrative areas where repetitive processes were routinely carried out. Applications handled historical data such as the recording of figures for accounting purposes and the batch processing of stock and manufacturing information. The tedium of this type of work was relieved by more efficient software packages that offered significant savings in time and therefore cost. Not surprisingly in these pioneering days, information technology was as well known for reducing head counts as it was for counting.

Many of the software programmes at the time were written in the Cobol programming language and virtually all were bespoke. Remember those huge environmentally controlled rooms housing mainframe computers and cupboards full of interchangeable disks.

At this point software development reached a virtual crossroad. The scientific and engineering communities were using analogue computers to process real-time data but as digital computers became more powerful they were able to apply them to continuous processes.

Today, software is at the heart of information technology. The availability of cheap powerful digital computers coupled with smart software, has enabled us all to apply computing to every aspect of our lives.

In engineering, most of the primordial real-time programmes focussed on process control as both programmers and end-users realised the potential of working with 'live' data. The military were quick to realise the advantages of the intelligence these programmes could bring and were pioneers of many software packages. At the same time, many companies came to the fore in software development. Remember Ferranti? They were well known as a producer of both software and hardware. ICL were doing their own thing too alongside IBM who were tops at the time. In the technical and scientific arena, companies such as Texas Instruments and Perkin Elmer were key players in software development.

As far as software goes there have been no startling discoveries for decades. After all, software is basically a set of instructions telling the computer what to do – we have simply got cleverer at finding ways to writing those instructions as well as being more imaginative in what we ask the computer to do.

It might not appear so but most innovations have followed a logical progression. The challenge today is to ensure the product delivers on its promises of integration with technology. Convergence is key. Seamless integration with other systems and devices is a major target for most software developers.

In the software industry it is simply not economically practical to test software to death. As in other products there will be an acceptable level of error and this will be understood providing ease of use and reliability.

Edited from an article by Ian McMath in Engineering TECHNOLOGY and with thanks to John Higgins, Director General of the Computing Services and Software Association (CSSA).

FUEL CELL TECHNOLOGY

Fuel cells, in theory, offer the ultimate in 'green' energy production: an efficient, quiet and non-polluting power source. Though the technology behind them has existed for over 150 years, it is only now, that they are emerging as a viable energy source for the future.

A fuel cell is an electromechanical device that converts chemical energy from a fuel directly into electrical energy. Operating on the same principle as a battery, it comprises an electrolyte surrounding two electrodes. Oxygen passes over one electrode and fuel (generally hydrogen) over the other, generating electricity, water and heat. Hydrogen is fed into the anode of the fuel cell while oxygen enters the fuel through the cathode.

Encouraged by a catalyst, the hydrogen atom is split into a proton and an electron, which take separate paths to the electrolyte. The electrons create a separate current that can be utilised before they return to the cathode, to be reunited with the hydrogen and oxygen in a molecule of water.

The chemical combination of the molecules of fuel and oxidiser is more efficient and far cleaner than the traditional combustion process. Indeed a fuel cell powered by pure hydrogen and oxygen will emit only water vapour. A fuel cell system that includes a fuel reformer can run on any hydrocarbon fuel such as natural gas or petrol. Though the reforming process may produce CO and hydrocarbon emissions at extremely low levels such a system would be far less harmful than the cleanest fuel combustion process.

Different Types of Fuel Cells

There are five principal types of fuel cells, generally distinguished by electrolyte material. Alkaline fuel cells (AFCs) contain a liquid alkaline electrolyte and can achieve power generating efficiencies of up to 70% (as used by NASA). Solid oxide fuel cells (SOFCs) use a hard ceramic material instead of liquid electrolyte, allowing operating temperatures as high as 980°C. Power generating efficiencies could reach 60%, meaning such cells have enormous potential as large scale, high power applications such as industrial electricity generating stations.

Proton exchange membrane fuel cells (PEMFCs) contain a solid polymer electrolyte and boast a relatively low operating temperature of under 100°C. Their high power density and ability to quickly vary their output to meet shifts in demand make them well suited to applications such as automobiles where quick start up is required.

Phosphoric acid fuel cells (PAFCs) utilise a phosphoric acid electrolyte and are the first type of fuel cell to be commercially available. Hundreds of the systems have been installed throughout the world in homes, hospitals, nursing homes, hotels and schools. Operating at temperatures of around 200°C, PAFCs generate electricity at more than 40% efficiency.

Molten carbonate fuel cells (MCFCs) use a carbonate salt electrolyte that becomes molten at an operating temperature of around 650°C. Such cells can run on a wide variety of fuels as diverse as marine diesel and carbon monoxide. To date MCFCs have been successfully installed in stationary applications in Japan and Italy.

Potential Applications

Fuel cells have the potential to revolutionise power production by replacing a wide range of traditional power sources. They could be used to provide electricity for commercial and residential buildings through stationary power plants producing several megawatts of power, though the direct current that they produce would need to be inverted to alternating current for grid connected applications. Smaller fuel cell power plants could soon be installed in individual buildings to provide heat and power. Such cells would be of particular benefit that have no access to primary grid power.

Problems to Overcome

There remains a number of technical and engineering challenges to resolve before widespread commercialisation of fuel cells can be achieved. The main problem is the expense of fuel cells in relation to existing power sources. Because relatively few fuel cells are currently being manufactured, no economies of scale exist and optimised production techniques have yet to be developed. Additionally, though fuel cells are essentially straightforward, the hardware required to operate them is prohibitively complex and will take both time and money to successfully develop. Fuel flexibility is another barrier to the widespread success of fuel cells. Only fuel cells that run on readily available

hydrocarbon fossil fuels could be considered viable commercial products. Thus, more efficient reformers and innovations that reduce the cost of traditional fuel reformation are sorely needed.

British Fuel Cell Projects

A number of British companies including Rolls Royce, Alstom and Advantica Technology are conducting fuel cell research and development projects. However, comparatively low levels of investment mean that the UK is trailing other nations – most notably the US, Canada and Japan – in the race to implement and market fuel cell technology.

Links

www.fuelcells.org
www.nfrcr.uci.edu/

Edited from an article by Sam Dukes in Engineering TECHNOLOGY

SCAF Newsround

SMS ships SDRC

Ship Missile Systems (SMS), a Ministry of Defence integrated project team, has selected US software solution company SDRC as the preferred supplier for the MoD's new document and product data management system.

The deal will involve Metaphase software being installed to provide document and configuration management on SMS's shared data environment through service provider Datel Defence. The modular nature of metaphase allows additional capabilities to be readily introduced matching the MoD requirement to start simple and grow the solution through experience.

SMS and its industrial partners BAE SYSTEMS, Alenia Marconi Systems and Matra BAe Dynamics will now operate a shared data environment which will reduce the MoD's costs and reduce the time taken to introduce systems into service.

Engineering TECHNOLOGY

HMS FEARLESS – Last of the RN steam ships

They call her the lion and for one last time she roared. With two mighty blasts of her horn, HMS Fearless made her way slowly into Portsmouth Harbour for the final time on the 29th March 2002.

For 37 years, Fearless has taken sailors, soldiers and marines around the world, putting them ashore on hostile soil.

It needed four tugs to bring the grand old lady of the fleet to rest alongside a quay in the dockyard. The wind tore her decommissioning pennant – a 518ft thin white ensign from the mast.

The armed forces pulled out all the stops for Fearless' last entry into Portsmouth. On the flight deck the Royal Marines Band ran through martial tunes – its drummer struggling to control his drum in the 40-knot gust of wind. In the Solent, her tiny landing craft bobbed around as a mark of respect. Overhead, first a RAF Jaguar, then a Hawk, then the helicopters of the commandos' air support unit zoomed past.

Fearless' trusty boilers let off a final belch of steam which billowed over the 1000 people waiting at the quayside.

Portsmouth News

QinetiQ Floatation Plans Shelved

The government has torn up plans to float its defence technology research organisation, QinetiQ, opting instead for a public private partnership (PPP) to take the business forward.

The floatation plan was part of the governments plan to cut its £23bn annual defence budget. The current PPP proposals will mollify critics of the floatation – including MPs, defence companies and QinetiQ staff.

PFI Report

A 17th Century Story on Building Costs

Mr Robert Gillespie has recently applied for planning permission to build a 39 room mansion close to Marlow in Buckinghamshire. His costs are said to be the region of £4M and it is interesting to note how these costs compare with other large buildings completed in the 17th Century.

DENHAM Place, a 17th century house in Buckinghamshire compares in size to Mr Gillespie's but certainly not in price. Built near the pretty village of Denham between 1688 and 1701 for the aristocrat Sir Roger Hill, the brick house cost a total of £5,591 16 shillings and 9d to build – around £576,000 today. It was designed and constructed by the mason William Stanton whose fee was £214.

Stanton's assistant received £98 and glazier Joshua Price was paid £150 and the carver who worked on the chapel charged £26.

In the construction of Chicheley Hall, another stately home built nearby between 1720 and 1724, archives record that it cost the owner Sir John Chester £108 to plaster the hall and staircase, £15 for the stair banisters and £10 to polish the marble pillars.

The palace at Litchfield cost £3,972 in 1689. A total of £6,585 10 shillings and 2d was spent to construct Wilsnow Hall in Buckinghamshire, Sir Christopher Wren's only country house.

Architects in the 17th and 18th century were far cheaper than they are today, usually taking a commission of around 2½ to 5 per cent of the total cost of construction. The figure today is between 10 and 15 per cent.

Capability Brown, the celebrated landscape gardener charged 8d per acre for a preparatory survey.

Sunday Times

One Illustrious Career Not Enough ?

To the people of Newmarket in Suffolk the name of Lord Admiral Rouse is very familiar but for many of us we may not be so familiar with his interesting life.

He joined the Royal Navy at the young age of 10 years and went through the ranks for the next 28 years to become Admiral. He then retired from the Navy and spent the next 41 years in the Horse Racing World. He was famous for the introduction of handicapping horses which made racing so much fairer. He was responsible for all the rules and regulations of racing and indeed was the dictator of 'the turf' at the time.

Cheveley Parish News

LETTERS TO THE EDITOR

Dear Editor,

Following the recent SCAF seminar on 'Affordability' I would like to put forward some thoughts which may provoke a debate through your paper.

As cost engineers and forecasters we understand the problems relating to deriving a sound estimate. We know all estimates are subject to tolerance/error bands. Refining the estimate to reduce these is not, to my mind, addressing the question of affordability.

Managing programmes within prescribed budgets is also known to programme managers. How many times has a programme been slipped so that its cost profile enables the total cost of all programmes to match the total budget available.

The affordability debate should address the issue of why money is spent on one project and not another. In this scenario it is not that the estimate of Project A has a smaller error band than Project B, but something that Project A was offering that was more attractive to the purchaser that ensured its selection.

Clearly finance has a part to play in the affordability debate but not the "goodness" of the estimate. Given that there is a finite budget some programmes/projects will have to be forgone. It is how the selection of project(s) which falls into this latter category that the affordability debate should seek to find the solution.

Not to trivialise the issue but to illustrate it, consider two people with fairly comparable incomes. One drives around in a Rolls Royce and the other in a Ford. What issues did the Rolls Royce driver consider in his affordability process. Was he perhaps prepared to live in a more modest house, or take less expensive holidays? It surely was not that the estimate for the Rolls Royce was to closer tolerance that that for the Ford.

Therefore we have to seek elsewhere for what metric or methodology is used in making affordability decisions and not how good an estimate is, although that may play a part in it. I do not profess to have the answers but am willing to take part in any debate.

Yours truly

D P Byramji
QinetiQ Consulting
22nd February 2002

Letter to all SCAF Members,

The Chairman mentioned in his column in the last newsletter that he had asked me to conduct a review of future directions of the Society and how it can best serve the membership. If you have any views on these topics I would be grateful to hear from you.

david.daniel@talk21.com

SCAF Future Events

13th June 2002

How much does software really cost ?

The Conference Centre, QinetiQ, Farnborough

**25th September 2002
Bristol**

19th Annual Conference and Annual General Meeting

Costing for Low Intensity Conflicts
MoD Abbey Wood, Bristol

**12th November 2002
Bristol**

Costing for Defence Procurement Agency IPTs

MoD Abbey Wood, Bristol

**27th November 2002
Bath**

Costing for Defence Logistics Organisation IPTs

HQ DLO Ensleigh, Bath

Other events by Associated Societies

21-24th May 2002

ISPA 24th Annual Conference, San Diego, California

25-27th June 2002

European Aerospace Cost Engineering (EACE) seminar, ESRIN, Frascati, Italy

27-31st July 2002

9th ISPE/CE2002 Conference and Exhibition on Concurrent Cost Engineering, Cranfield University, Bedford

13-15th November 2002

PRICE Systems European Symposium, London

19th SCAF Annual Conference

25th September 2002

at

The Conference Theatre
Defence Procurement Agency, MoD Abbey Wood
Bristol

Theme: Costing for Low Intensity Conflicts

Call for Papers

Papers are cordially invited from members and non-members
for presentation at the Annual Conference

Registration of papers and a brief synopsis should be forwarded to the Secretary by 1st
August 2002. *For further information please contact the Secretary:*

Mike Storey, Specialist Procurement Services, Defence Procurement Agency, MoD
Abbey Wood, Bristol BS34 8JH Tel: 0117-91-32756

Please send any articles, letters or any other ideas for
inclusion in the newsletter to:

Arthur Griffiths
Vice Chairman & Editor, SCAF
C/O HVR Consulting Services Ltd
Selborne House
Mill Lane
Alton
Hants
GU34 2QJ

Tel: 01420-87977
Fax: 01420-89819
email: arthur.griffiths@hvr-csl.co.uk

Visit our Web Site at www.scaf.org.uk