



Requirements Quarterly

Contents

<i>RE-soundings</i>	1	RESG Special Event: Halligan at the Old Crown	9
From the Editor	1	Is there Anything Left to Know About RE?	10
Chairman's Message	2	<i>RE-verberations</i>	11
<i>RE-treats</i>	2	Task-Based User Interfaces	11
RESG – Making Your Requirements Knowledge Count: Working in RE	2	Know What You Can't Do As Well!	12
RESG – Postgraduate Workshop	3	Real User Goals, or Your Mother Wouldn't Like It	12
RESG – Goal Tutorial	3	<i>RE-readings</i>	14
RESG – Social Networking for Virtual RE	3	Integrated Design and Engineering as a Business Improvement Process	14
RESG – Industry Event	3	<i>RE-partee</i>	15
22nd International Conference on Advanced Information Systems Engineering	3	Keyboard Inspiration!	15
<i>RE-member</i>	4	Why Did the Chicken Cross the Road?	15
RESG Annual General Meeting 2009	4	<i>RE-sources</i>	16
BCS Member Convention	5	Books, Papers	16
<i>RE-writings</i>	5	Media Electronica	16
IEEE "RE09" Requirements Engineering Conference	5	<i>RE-actors</i>	16
<i>RE-flections</i>	7	The committee of the RESG	16
Book Launch: Requirements Engineering	7		

RE-soundings

From the Editor

I had hoped that this Newsletter would be with you shortly after July's AGM. Unfortunately the best plans are often the ones that fail in the most spectacular ways – ask any project manager! My apologies, but I do promise to resume normal service for 2010.

This Edition is an eclectic mix of reports from recent RESG Events, feedback from RE09, and a couple of short articles reflecting on aspects of Requirements Engineering, showing that we are a diverse and interesting profession that can still smile at our occasional inability to get things right.

There is also some useful background to the revolution of 'corporate' BCS (The Chartered Institute for IT) from Alistair Mavin. It explains why we have a new RESG logo adorning the cover of RQ, and it will be interesting to see how we and our profession develop over the next few years in this new progressive culture.

Change is in the air as we constructively question our role and methodologies, and as always your comments and feedback are welcome, either through our website or the pages of RQ – see page 16 for an incentive to make a meaningful contribution to the next edition of Requirements Quarterly!

Simon Hutton, Headmark Analysis

Chairman's Message

We were lucky enough at the AGM and Annual Party to be back at Imperial college, and what is more the main speaker was Professor Bashar Nuseibeh, who spoke – or rather, facilitated – inspirationally about the nature of RE, whether it was Engineering, and what if anything needed to be done in the field.

15 years ago, back in 1994 when villages had pubs with warm beer, cricket on the common and a post office that sold everything from driving licenses to passport application forms, two very fresh-faced young PhD students marched into BCS HQ and proposed a “Requirements Engineering” specialist group. In those days, SGs appeared and vanished rather like protons and antiprotons in empty space – they happened quite easily all the time, and often didn't last long.

The fresh-faced students were Bashar and Neil Maiden – now both professors, and what is more their research assistants are now distinguished consultants and researchers and university teachers in their own right, and *their* students are now giving interesting, cutting-edge talks on the latest in RE.

Requirements happen in some form on every project, public and private; and they are written and read by everyone – project managers, business managers, marketing people, product managers, clerks, operators of every description, contractors, suppliers, testers, quality assurers, configuration managers and more.

The only thing is, hardly any of these people do requirements as a full-time job, and hardly anybody outside Germany has the job title “Requirements Engineer”. We won't revisit the lamentations for the low status of engineering in the land of Isambard Kingdom Brunel, nor for the deplorable usage of the honourable name of Engineer to mean “plumbing technician”. The fact of the matter is, everybody thinks they know how to write and manage a requirement as it looks such a simple task.

Only it isn't. It takes hundreds and hundreds of pages to explain it even at an elementary level in a textbook, and it takes days of training to give people a basic range of skills. Of course it then takes years for people to become really proficient.

So how is “RE” actually being practised today? Very widely; and quite often, not particularly well. The most experienced industries – aerospace, telecommunications, defence for example – have strict standards and templates, and know how to drive Requirements Management tools competently. They know about prioritisation and status tracking and traceability and impact analysis. They still often don't do higher-level things like goals and rationale in much detail, which is a pity, because these analyses can prevent many misconceptions. But on the whole they do a good job. The same can't be said for some other industries, where the requirements are sometimes sketchy at best.

Researchers may think it terrible that there is still a problem of dissemination of requirements knowledge; or to put it another way, still a yawning gap between “best practice” or the latest research concepts (please choose one), and what actually happens in industry and commerce. At least industry generally agrees that requirements are necessary, not least for contracts; in commerce, a brief Business Case may be the only thing before implementation.

So, what is there left to do in RE? Perhaps nothing very much, academically; but in practice, to come down to earth, to realize the enormous problems that many projects face, how many constraints they have, how little requirements knowledge there often is, how much time pressure, and how helpful it would be for projects to sketch their stakeholders, their goals, their project's rationale on the back of a napkin.

I rather suspect this will be enough to keep us busy for another 15 years.

Ian Alexander, Scenario Plus, July 2009

RE-treats

For further details of all RESG events, see www.resg.org.uk

RESG – Making Your Requirements Knowledge Count: Working in RE

2.00pm – 4.00pm, 11th November 2009.

Large Lecture Theatre, University of Westminster, 115 New Cavendish Street, London W1W 6UW

Nearest tube stations are Oxford Circus (Central, Bakerloo, Victoria), Warren St. (Victoria, Northern),

Great Portland St. (Circle, Hammersmith & City, Metropolitan).

This event is for computer science students and others who want to know more about the professional life of engineers whose current jobs involve significant requirements engineering activities.

The event will take the form of a panel. Invited panellists are:

- Phil Cantor (Senior Product Manager, Cash Management at SmartStream Technologies)

- Keith Derham (Systems Integration Analyst at Barclays Capital)
- Ileri Ibarra (Senior Safety Consultant at RPS Group - Functional Safety, H&S and Environmental Risk Management)
- Vesna Music (Principal Systems Engineer at Delphi Diesel Systems)

They will talk about their experiences and respond to questions from the audience.

Attendance is free and open to all. For further details contact Ljerka Beus-Dukic at L.Beus-Dukic@westminster.ac.uk.

RESG – Postgraduate Workshop

January 2010, Imperial College London

Further details will be available prior to the event through RQ and on our web site www.resg.ork.uk. For further information of to express an interest in supporting contact the organisers:

Dalal Alrajeh (dalal.alrajeh@imperial.ac.uk) or

Will Heaven (wjh00@doc.ic.ac.uk).

RESG – Goal Tutorial

March 2010, Imperial College London

Further details will be available prior to the event through RQ and on our web site www.resg.ork.uk. For further information of to express an interest in supporting contact the organisers:

Ljerka Beus-Dukic (L.Beus-Dukic@wmin.ac.uk) or

Ian Alexander (iany@scenarioplus.org.uk).

ACM Symposium on Applied Computing (SAC 2010)

22-26 March 2010, Sierre, Switzerland

For the past twenty-four years the ACM Symposium on Applied Computing (SAC) has been a primary gathering forum for applied computer scientists, computer engineers, software engineers, and application developers from around the world.

The Third Edition of the Requirements Engineering Track (RE-Track'10) is part of the SAC 2010, sponsored by the ACM Special Interest Group on Applied Computing (SIGAPP), and is hosted by the University of Applied Sciences, Western Switzerland (HES-SO) and Ecole Polytechnique Fédérale de Lausanne (EPFL), Switzerland.

The objective of the Requirements Engineering track is to explore different advances in requirement

engineering in a general way, its relation with different areas, reducing the gap between software engineering solutions and the way one specific domain of knowledge was seen up to given point.

Further details may be found at www.acm.org/conferences/sac/sac2010, or contact the track organizer, Maria Lencastre, at maria@dsc.upe.br.

RESG – Social Networking for Virtual RE

April 2010, Open University, Milton Keynes

Further details will be available prior to the event, and will be provided through RQ and on our web site www.resg.ork.uk.

RESG – Industry Event

2.00pm, 14th April 2010

Bournemouth University

Further details will be available prior to the event through RQ and on our web site www.resg.ork.uk. For further information of to express an interest in supporting contact the organiser Cornelius Ncube (cncube@bournemouth.ac.uk).

22nd International Conference on Advanced Information Systems Engineering (CAiSE'2010)

June 7– 11, 2010 Hammamet, Tunisia

This year's special theme is "Evolving information systems".

Modern information systems are the result of the interconnection of systems of many organizations, are running in variable contexts, and require both a lightweight approach to interoperability and the capability to actively react to changing requirements and failures. In addition, users of information systems are becoming more and more mobile and ubiquitous, requiring the system to adapt to their varying usage contexts and goals.

The evolution of an information system should be a continuous process rather than a single step, and it should be inherently supported by the system itself and the design of the information system should consider evolution as an inherent property of the system.

The Call for Papers (PDF version) can be downloaded from the CAiSE website at www.caise2010.rnu.tn. The submission deadline is 30 November 2009, and Conference Proceedings will be published in Springer Lecture Notes in Computer Science (LNCS).

RE-member

RESG Annual General Meeting 2009

The RESG Annual General Meeting was held at Imperial College, London, on 9th July 2009. An Audience of over 30 members were treated to two research presentations by Ben Jennings of UCL and Kris Welsh of Lancaster University, and a thought provoking discussion prompted Bashar Nuseibeh that is summarised later in this Newsletter. As RESG Chair, Ian Alexander presented the following Annual Report.



The Attentive RESG AGM Audience

During the year July 2008 – July 2009, the RESG organized the following events:

- RE Education and Training (REET'08), 9 September 2008, Barcelona
- Making your requirements knowledge count: working in RE, 5 November 2008, University of Westminster
- Postgraduate RE student event, December 2008, Imperial College London
- Brown-Field RE, 12 February 2009, Misys, Paddington
- Creativity Tutorial, March 2009, City University London
- Pub Evening with Robert Halligan, 29 April 2009, The Old Crown
- Book launch, *Discovering Requirements*, Alexander & Beus-Dukic, 2 April 2009, UCL
- Book launch, *Requirements Engineering*, van Lamswerde, 8 May 2009, UCL

Three copies of the RESG newsletter, Requirements Quarterly, were issued and are archived on the website:

- RQ49: October 2008
- RQ50: January 2009
- RQ51: April 2009

Four committee meetings took place:

- 1st October 2008, Imperial College London
- 11th December 2008, University of Westminster

- 2nd April 2009, University of Westminster
- 9th July 2009, Imperial College London

A budget for 09/10 will be submitted by the new date 1st September for approval by BCS.

The executive committee for the forthcoming year was approved, as listed on the back cover of RQ. The new members of the Committee are **Camilo Fitzgerald** of University College London (Publicity Officer) and **Shehan Gunewardene** of CAP Gemini/Aspire.



Your RESG Committee hard at work...

A varied programme of events – free and paid, academic and industrial, central and regional, is being planned for next year.

We are particularly pleased to welcome two Regional Officers to the committee, and we hope to hold regional events in both the North West and the South West in collaboration with BCS local groups.

We note the rise in fashion of business analysis: committee members are already collaborating with the IIBA, and we look forward to working productively together with the new BCS Business Change SG on events of mutual interest.



Ben Jennings Entertains!

The RESG continues to be run entirely by unpaid volunteers, from both academia and industry, for the benefit of the UK communities involved in requirements research, business analysis, systems modelling, and the many roles that use requirements in system, software and product development.

Ian Alexander, RESG Chair

BCS Member Convention

The Royal Society, 23rd September 2009

One advantage of being a RESG Committee Member is the opportunity to participate in BCS Specialist Group events and to represent the RESG community to other Groups. Alistair Mavin reports from the recent BCS Member Convention.



One of the main messages of the event was that BCS has been rebranded. BCS is now to be referred to as “The Institute” (definitely *not* “The Society”) and has a new strap line; “The Chartered Institute for IT”. There are new logos, a new website and lots going on with the Certified IT Professional (CITP) programme, amongst other things. There are new templates for Specialist Group websites, which should be reflected in a shiny new RESG site soon. As part of the publicity push, posters are on the London Underground and there are two BCS branded London Taxis, one of which was on show outside the Royal Society. Regional advertising and publicity is also being rolled-out.

BCS currently has around 70,000 members, but this is only about 7% of the UK’s IT workforce. Hence there is plenty of potential for BCS to grow. A recurrent theme of the convention was that coordination between SGs and regional groups is being encouraged. To this end, the new BCS website will include lists of speakers available to all regional and specialist groups.

The Interaction Specialist Group in particular is keen to collaborate with other SGs, and would clearly have some synergy with the RESG. There is a new *Business Change Specialist Group* (BCSG), which was launched in July 2009. The chair of the BCSG asserted that “there are no IT projects, only business projects”. It seems likely that there could be collaboration between the RESG and the BCSG.

A “BCS Academy” is being set up in junction with CPHC (Council of Professors and Heads of Computing) and UKCRC (UK Computer Research Committee) to promote “Computing as a Discipline” and “The Learned Society”. The BCS Academy will be inclusive of the education, business and government sectors. There were some side debates about whether BCS was an “IT” discipline or a “Computing” discipline. Some delegates clearly felt such distinctions were very important.

The Board of BCS and all member groups are being restructured (the top level is already in place) and they are seeking input from member groups. BCS are streamlining and improving the finance system. BCS is being increasingly involved in Government (for example advising on Data Protection). BCS are also “world leaders in *Green IT*”. There are four main projects for BCS for the coming year: *Information Dividend*, *Savvy Citizen*, *Information Trailblazers* and *Public Information Broadcasts*. The central BCS team are keen to involve the membership in the changes and reiterated several times that they would welcome any input from members of specialist groups.

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RE-writings

IEEE “RE09” Requirements Engineering Conference



The IEEE Requirements Engineering Conference RE09 was held in Atlanta, Georgia, on 31st Aug – 4th September 2009. Alistair Mavin and Pete Sawyer share their experiences.

Tutorials and Workshops

The Monday and Tuesday of RE week were given over to workshops and tutorials. Workshops included *REET* (RE Education and Training), *REV* (RE Visualization) and *MaRK* (Managing Requirements Knowledge), all of which had representation from RESG in the form of **Ljerka Beus-Dukic**, **Bashar Nuseibeh** or **Pete Sawyer**.

As usual, the workshops required us all to work rather than only to sit passively through paper sessions. All were fun but MaRK was particularly interesting for Pete and Bashar. Bashar’s talk on the potential that the NLP technique *Pre-supposition Analysis* has for uncovering tacit knowledge generated particularly interest.

Meanwhile **Alistair Mavin** (Mav) attended **Ivy Hooks’ Interface Requirements Allocation and Trace** tutorial on Tuesday. Hooks stated at various points during the session: “I don’t know anything that drives a system more than its interfaces – or constrains it”, “Problems come in through interfaces”, and “If you really want to break something, go to an interface”. The essence of her approach is that where two systems interface, neither spec should include the interface definition. Rather, the interface definition should be

held in a separate document, to which both specs should refer. However, in a cautionary note, Hooks pointed out of one client with whom she'd worked: "Like 99.992% of engineers, he didn't want to document anything."

Main Conference

During the opening session of the main conference, a summary was provided of the diverse geographical range of submissions and attendees. As usual, *RE* attracted a healthy mix of industry and academia, with a truly global distribution. There were 170 submissions and 40 papers accepted. Interestingly, only two were accepted from the UK (as it happens, authors of both papers are RESG members: Pete Sawyer and Mav).



The first keynote speaker was **Dave West** of Forrester Research, who discussed *Agile* and its implications for RE. He claimed that "everyone is doing agile", but from what I was hearing, all this really seems to mean is that

everyone is doing teamwork, close contact and interaction. He suggested "large teams just don't work" and "projects over \$10 million will fail" These assertions beg the question 'How could you develop a large complex system with a small team?' I felt he made no attempt to answer this, other than a totally unsubstantiated claim that Agile could be applied to *any* project. Later, West said "Consensus is a waste of time – just do it and then change it if people don't like it", which seemed to be totally at odds with his earlier mantra of teamwork and close contact. One aspect of Agile that many would appreciate is the idea that any requests for documentation items should be added to a "backlog" and a decision made on whether they should be delivered. In essence, if a document adds no value, don't produce it. Hallelujah to that!

When presenting *Bridging the Gap Between Usability and Requirements Engineering* **Juho Heiskari** asserted that "Usability is more than just user interface design" and concluded that we need new ways to converge usability engineering and requirements engineering. **Ashlee Holbrook** presented on *Toward Automated Requirements Satisfaction Assessment*. Tracing shows whether requirements and designs elements are related. Satisfaction assessments show whether requirements are *completely* satisfied. Holbrook advocates "automated" satisfaction assessment, suggesting that there is no overhead on the people doing the assessment and that they are easier to verify.

Not content with a full day workshop, *REET* also had a panel session. **Don Gause** quoted a client saying "It takes 3 years to take a college graduate and turn them into a useful engineer" – soft skills in particular take time to learn. **Jane Cleland-Huang** recommends small group exercises for more practical/realistic experience. In particular, Cleland-Huang suggests that giving feedback in the classroom is difficult and can be seen

as being critical, whereas small groups can critique each other's work. **Joy Beatty** warned that gaining management buy-in is not easy, since they just want a "quick fix". The solution? Set measurable goals and track them (such as project success rates and long term behavioural changes). Various alternatives to training were discussed, including Mentoring, Workshops and Requirements Centres of Excellence. **Erik Simmons** reminded us that Education and Training are two different things and that in industry training is more common than education. Cleland-Huang advocates using a whole suite of different fun activities for different learning points. When teaching RE to an unsuspecting audience, **Dave Callele** deliberately gives students a vague problem statement to make them fail – it stresses them, but they learn from the experience.

Manuel Reis Monteiro and **Christof Ebert** spoke on *Improving the Exchange of Requirements and Specifications Between Business Partners*. This paper was about *RIF* (Requirements Interchange Format), which has become the *de facto* standard in Germany, allowing "different tools to speak the same language". Ebert claimed improved efficiency and supplier management, reduced cost and a reduction in the rate of change of requirements from 70% to 15%.



The second keynote speaker was **Jim Helbsleb** of Carnegie Mellon University, who spoke on *Diminishing Prospects for an Engineering Discipline of Requirements*. Helbsleb quoted numerous definitions of "engineering" and warned that the use of this term has a number of disadvantages: it creates aspirations and expectations that can't (and possibly *shouldn't*) be fulfilled; hides alternatives and/or forces them into the background, and; locks in a single way to proceed. So why is RE as "engineering" becoming more difficult? There are many reasons: software is in everything; software enables and encourages complexity; more of life is lived through computers; more contexts are created, controlled and manipulated by computers; the side-effects are often more important than the intended effects, and; designed systems and social systems co-evolve (systems lead to change in behaviour, which can prompt further systems). Helbsleb wondered whether, in this context, we should now be asking "how can I set up a socio-technical system that will allow users, consultants, businesses and everyone else to cooperatively build what all the stakeholders need?..." (even though these needs are currently unknowable and evolving). Many of the key issues in determining the functionality of socio-technical systems are not amenable to traditional engineering approaches. As a result, Helbsleb argues "RE is now more difficult and also more important than it ever was".

Daryl Plummer of Gartner Group delivered a keynote address on *Cloud Computing*. Cloud

Computing “is a style of computing where scalable and elastic IT-related capabilities are provided ‘as a service’ to external customers using internet technologies”.... “Cloud computing is *intended* to change the way people live their lives”. Plummer divides the population into two groups: *Digital Natives* were born into the age of PCs, whilst *Digital Immigrants* were born earlier and had to learn. The majority in the room were clearly Digital Immigrants. A central tenet of Cloud Computing is that price is disconnected from cost and reconnected to *value*.

There was a somewhat “lively” *RE’s Next Top Model* panel session organised by **Oly Gotel** and **Jane Cleland-Huang**. As usual, Gotel and Cleland-Huang ran an event that was both entertaining and thought-provoking. The session involved a range of modelling techniques competing for the audience’s vote by addressing an evolving requirements engineering project. The joint winners were “plain old text” and rich pictures. However, the stewards are still involved in an investigation into the accuracy of the clappometer employed during this session, and rumours of conspiracy were rife.

As a result of the energetic crowd in the *Next Top Model* session, the *Lessons Learned* speakers were periodically drowned out by raucous laughter and clapping from the adjacent room. Luckily for some, the *Lessons Learned* room served as excellent sound insulation for the *Evolving Systems* speakers. Fittingly, the *Evolving Systems* session had to do some dynamic adaptation as the *Bad Mac Fairy* crashed the MacBooks of first **Carlo Ghezzi** and then **Pete Sawyer****. **Krzysztof Wnuk** gave his talk early to save Carlo and Petes’ blushes.

The final keynote speaker was **Alistair Sutcliffe** of Manchester University who spoke on *People, Machines and Domains: Bridging the Gulfs between Worlds*. Sutcliffe’s talk was at the philosophical end of the RE scale, and he discussed issues such as the *Theory of Mind*. The main message Sutcliffe delivered was that RE is all about finding “common ground”, but

he warned that it can be difficult to establish common ground for complex systems.

The mini-tutorial on *How to Write and Read a Scientific Evaluation Paper* included among others, **Roel Wieringa**. Wieringa has made it a personal mission to up the RE community’s game in terms of how we conduct design evaluations, collect and analyse the data, and make claims about our results that are sound and defensible. As a community, we haven’t been very good at this, but we’re slowly getting better, thanks in part to events like this.

Meanwhile the RESG’s very own **Alistair Mavin** was talking about *EARS*. There was nothing Mickey Mouse about Mav’s *EARS*, which stand for *Easy Approach to Requirements Syntax*. He was talking about the set of structured templates that he and his co-authors have piloted at Rolls-Royce to try to impose some order and rigour on the way black-box requirements are written. Using examples from a standards document, he showed how 5 templates could accommodate almost all the requirements types that he sees at that level at R-R. Mav fielded questions from a mix of industrial folk figuring out how they could apply *EARS* in their business, and academics trying to sniff out ways to get at Mav’s results and let their fancy NLP tools loose on them. Mav clearly enjoyed himself after the previous evening’s frustrations wandering the vast halls of Atlanta’s Aquarium; all that water making him thirsty as he searched for the bar.



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(with contributions by Pete Sawyer)

** Maybe they should buy PCs

RE-flections

Book Launch: Requirements Engineering

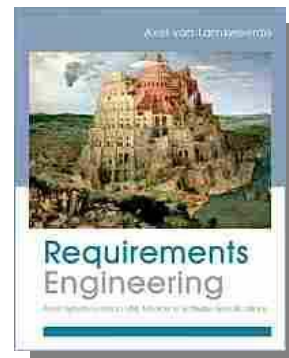
Axel van Lamsweerde

8 May 2009, UCL

Prof. Anthony Finkelstein opened the proceedings, welcoming everyone to UCL.

Prof. Jeff Kramer of Imperial College said that RE combined stakeholders talking about requirements and understanding the domain, usually informally, to produce a formal testable specification. RE spanned the full range from vague to informal to formal. Amidst this confused mediaeval scenery, Sir Axel in

his shining armour rode into battle, undaunted by 25 years of campaigning, to banish the dragons.

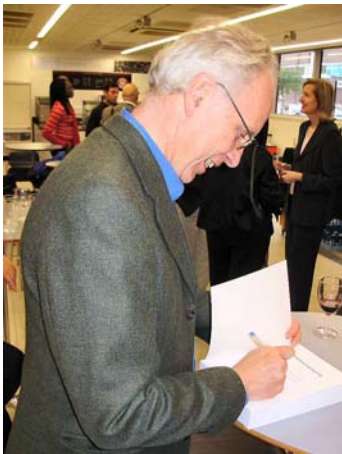


GORE stands for Goal-Oriented RE: goal decomposition, assignment to agents, resolution of obstacles and conflicts. Axel had written an enormous number of major papers. The thread had been hard to follow, but now it was all in one volume, a comprehensive description. It was a huge accomplishment, a major benefit for students, practitioners and researchers.

Prof. van Lamsweerde thanked everyone. His aim was to provide material for a university-level RE course.

There are, he said, two kinds of textbook. There are very high level summaries for practitioners and students; and there are books on languages and notations, such as UML (with its semantics, if any). But there is little on how to build systems, and less on RE. In general, neither kind of textbook is suitable for MSc courses.

A university course, said van Lamsweerde, must be sound, precise, and cover the whole of RE, not only goals. The book defines solid, replicable RE techniques for model construction, with procedures, heuristics, tactics, modelling patterns, and even “bad smells” – common mistakes made by students.



Axel van Lamsweerde

3 running case studies illustrate the book: a library system, a train control system and a meeting scheduler. There is also a section on a coal mining system.

A major decision was to hide the formal techniques of the KAOS method until the last section. They underlie every part of the book, but remain concealed, just as Monsieur Jourdain in Molière’s *Bourgeois Gentilhomme* spoke prose without ever knowing it. (The play satirises social climbing: you can’t be a gentleman if you aren’t born to be one – but perhaps you can have a good try.)

The book complies with UML wherever possible. Obviously UML does not provide a viable goal modelling notation, but sequence diagrams, statecharts and so on are drawn in UML.

The three parts of the book cover the fundamentals of RE, with a brief mention of informal elicitation

techniques; building models for RE; and (the advanced bit) analyzing and exploiting models. Thus the heart of the book is modelling.

Many kinds of model, mostly related to goals, are described: goals, risks (for specific goals), operations, threats (anti-goals), conceptual objects (class diagrams from goals), scenarios, agents and so on.

The final part of the book covers both semi-formal methods like threat analysis, and fully formal analysis: a real-time temporal logic. “This is when the Greek letters finally become visible”, joked van Lamsweerde.

The book’s website “http://eu.wiley.com/college/van_lamsweerde” (yes, that’s a space) will provide course slides, case studies, access to a free version of the Objectiver goal modelling tool, and other resources.

The hard part of writing the book, said van Lamsweerde, was

- a) hiding the formal layer;
- b) replicating techniques published by other authors!
- c) coping with inaccuracies in the RE literature – same name/different concept v same concept/different name (e.g. system, domain, requirement, specification, non-functional), and successive approximation (publish papers correcting your own previous papers), he said glancing sternly at the other academics in the room.

van Lamsweerde finished by explaining the goal concepts hidden in Pieter Brueghel the Elder’s painting of the Tower of Babel (ca 1563) on the cover of his book. The peak hidden in the clouds is the unrealizable *Achieve* goal. The whole is an unsuccessful project. The building work on the left is a *Maintain* goal. A tiny Model is just visible near the bottom left of the tower, where multiple Stakeholders also lurk. Multi-language Specifications are on show at bottom right. It was the archetypal nightmare project.



<http://en.wikipedia.org/wiki/File:Brueghel-tower-of-babel.jpg>
Freely licensed file from Wikimedia Commons

Prof. van Lamsweerde thanked **Emmanuel Letier** (now at UCL, and on the RESG committee) for his major contribution to Part II of the book especially; Robert Darimont for his work on patterns; and his wife Dominique for her patience.

RESG Special Event: Halligan at the Old Crown

A Systems Engineer's Take on Requirements

New Oxford Street, 29 April 2009

One of the key forms of analysis that could cheaply and effectively improve the quality of requirements is a proper focus on social and cultural factors, such as brand differentiation – or equally, brand similarity – that would contribute to the success of products. So argued **Robert Halligan** in one of many cogent proposals in his pub talk.

We had an **immediate impromptu illustration** of this truth when several participants turned up late, for a very particular reason. They had gone for a drink in the Crown, an old pub a few doors up from the Old Crown. Now the Old Crown is a far older pub, and so confident is it in its brand that it hardly bothers to display its identity: it is a handsome old building with real fireplaces, tall windows and shiny wooden floors. The (New) Crown, however, is happy to assert its Crown-ness, and displays a large traditional inn-sign. This brings in a steady stream of (Old) Crown customers.



Robert Halligan (with wineglass) speaking in the upstairs room at the Old Crown

You can see that similarity and difference could be vital success factors in many businesses, yet they don't often turn up in requirements standards and templates.

Halligan, if you don't know him, is a distinguished systems engineer from Australia. His company, Project Performance International (www.ppi-int.com) teaches and consults "on six continents". His website includes pages on Brazilian Bars & Restaurants of the World: speaking Portuguese is among his accomplishments.

He suggested that RE is not working very well today, as it is the second phase of a 3-decade cycle.

- In the first decade, it was just finding its feet.
- In the second, it has been preaching the message.
- In the third, it will make requirements far more effective, far more widely.

The essence of RE is that the problem-solving process is the same in all domains, he suggested. But User Requirement capture and validation are both still done rather badly in industry.

There is a tendency to "farm for requirements" – people throw various elicitation techniques at projects, collecting vague or ill-conceived requirements which are not well focussed on goals. They are not aimed at solving problems, and they are often almost unvalidated. They are nowhere near answering the question "what is to be engineered in a solution?".

"Agile" is a very interesting response to this. You run a cycle: develop, expose, get feedback. This is an "enormously inefficient" way of getting requirements, said Halligan. It involves frequent rearchitecting, as Agile experts are starting to acknowledge.

There is a severe imbalance of elicitation and analysis, argued Halligan: a lack of methods to identify specific issues effectively. Dialogue with stakeholders is indeed vital, but it must be followed by focussed analysis.

Halligan suggested at least a dozen types of analysis. Each of these, he suggested, could contribute to chasing down missed or vague requirements from a different direction (and so, lead to far more complete specs). In practice, these analyses lead to "losing 90%" of the initial "design" requirements that clients provide, replacing them with real user requirements.

Such analysis methods include:

1. Stakeholder analysis
2. Context analysis
3. Life-cycle analysis (for the Big Picture)
4. States and Modes analysis (again, these uncover the Big Picture of the assumed design context)
5. Use Cases – "a form of functional analysis, but quite immature", weak on validation, and poor on multiple-user, concurrent-use systems
6. Human Factors analysis – eg what happens if the human is stressed. This leads to more requirements to cope with varying conditions
7. Data Modelling
8. Legislation, Culture, Branding (including Similarity and Differentiation, as mentioned earlier), Social Custom. He described an awful social gaffe he made on a course in South Korea, where he gave out red pens and asked participants to write their names on cards. Everybody looked uncomfortable, nobody wrote. Seeing your name in red is a premonition of death: he had asked everyone

to write their death certificates. Small wonder they were unenthusiastic.

9. Out-of-Range analysis – could a value tied to this requirement lead to an associated out-of-range requirement?
10. Stakeholder Value analysis – this leads directly to Measures of Effectiveness and trade-offs (evaluation of candidate designs against goals/proposed requirements)
11. “What could go wrong here?” analysis
12. Keyword search – e.g. are there ambiguities introduced with words like “at a minimum”?

A few up-front methods also make a huge difference, Halligan claimed. Adopting measurable standards for requirements, and standards for writing individual requirements are two of these. A proper enterprise glossary is another. And a decent template for requirement specs would be a great help in many industries too.

Methods from the software industry are quite often based on small, single-user problems, and these don't scale well. Use Cases and Agile are two already mentioned. Systems engineering is used to solving far larger problems, and it has “tools” which can readily be scaled-down to solve smaller problems.

Use Cases, for instance, were devised for simple one-user-does-one-thing situations. But in large systems (think of a warship, perhaps) scenarios may have many levels (say, whole fleet down to individual equipment) and involve many people working on many tasks.

System life-cycles, too, can cope with complex iterations and feedback loops not dreamed of in Agile. Products may be brought out in many variants; developed continually; and designed to interface with other products which are themselves evolving. The requirements are part of a larger network of design and market constraints.

The good news is that software methods are broadening and deepening to cope. Use Cases are becoming multi-level, for example, Halligan observed.

Ian Alexander thanked Robert Halligan for a most stimulating talk.

A lively discussion at once broke out, touching on requirement trade-offs; how to cope with large, long-lived software systems like financial software; why a handover of responsibility from requirement analysts to others is disastrous (and why an integrated project team is better); whether requirements (did we mean goals?) come before or after design; and much more.

We would have continued until midnight, but the room was booked after our slot by the Creative Poker Girls or something, and indeed we had a couple of wonderfully lively interruptions by confused and party-dressed young women. It was a great evening.

The bar downstairs was positively buzzing as we left. But I didn't look into the (New) Crown to see how it was getting on.

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Is there Anything Left to Know About RE?

One of the highlights of the RESG AGM this year was a thought provoking discussion with Professor Bashar Nuseibeh. Although billed as a presentation on what is left to discover about Requirements Engineering, Bashar rather cunningly claimed to have done little preparation and instead gave a series of hooks that provoked a response from an enthusiastic audience.

Bashar recalled that as a researcher in the 90's life in the RE world was exciting – there were few books and plenty of conferences on RE. By contrast ICSE 2009 in Vancouver had few papers dedicated to Requirements Engineering. Bashar questioned if this is sensible because there is still evidence that the practice of RE is still not good – do we really know everything, but just don't do it?

To explore reasons why RE is not practiced as well as it could Bashar suggested that the Engineering in RE could put people off.

Are we Engineers, or are we Analysts? Even Analyst is not a good description. As a relatively mature discipline Requirements still suffers from too many ideas and interpretations, and does need a simple definition.

Originally RE was seen as being broad based covering a range of lifecycles and disciplines. **Will Heaven** suggested that this has contributed to the poor practice – RE has been absorbed into other disciplines and is not taught as a discrete subject. **Ian Alexander** agreed, noting that there is a lot of RE taught, but not as RE. In discussion the audience agreed that in practice RE is a transient profession that practitioners tend to pick up as necessary without a deep understanding. But it was also agreed that there does need to be a specialist element. **Ljerka Beus-Dukic** reminded us that there needs to be a core to develop the methods and educate the wider community.

It was also suggested that in an increasingly agile world the traditional concept of requirements may not make sense any more. Rather than articulate and define requirements, perhaps we are more about solving problems and using these solutions to drive the design.

Bashar used his current research in Mobile Device Privacy Management to raise the idea of different requirements for different personalities, recognising that users often have different behaviour when using a device, or even different behaviour in different circumstances. Techniques include experience analysis using memory phrases during a scenario, showing that different techniques continue to evolve to support changing consumer markets.

Business transformation and business change are also areas that have seen a greater association with Information Systems design and so RE. Bashar noted that the past 15 years has seen tools developed to better understand business needs and to define requirements in spite of a general stakeholder inability to think in non-system terms. But as the business context and needs change and systems become adaptive then the concept of a system meeting defined requirements is perhaps out-dated.

This led the audience to explore transverse requirements. Ian Alexander pointed out that there are not a lot of books specifically on Requirements, but plenty on Usability, Safety, Security, Human Factors etc. Bashar responded by suggested that the Requirements Engineer is in a privileged position because the work cuts across disciplines and

influences decisions on problem understanding and trade-off.

It was agreed that the RE community needs to pursue these ideas. Bashar concluded by responding to the question “Is RE Dying?” with the answer “Probably not, but we probably didn’t really know what it was in the first place!”



Bashar provokes the AGM

As always, this year’s AGM was an enjoyable mix of RESG business and thought provoking presentations and discussions, all conducted in a friendly atmosphere. A good cross-section of practitioners and academics ensured Bashar found a willing audience prepared to accept his introductory challenge to explore the future of our profession.

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RE-verberations

Task-Based User Interfaces

- Number 27 in an occasional series on what people do when they don’t do Requirements!

In the August 2009 issue of *IEEE Computer*, Charles Rich writes on “Building Task-Based User Interfaces with ANSI/CEA-2018”.

This new standard “*is motivated by the current usability crisis in computer-controlled electronic products*”.

Ah, usability crisis. Not at all the same thing as the 1970s software crisis, then? Definitely not the same problem that should have been solved by structured programming, object-oriented design, service-oriented architecture, integrated life-cycle support or requirements management, then? No, I thought not.

Rich elucidates on what is meant by Task Guidance:

“One way to think about the guidance that a task-based UI provides is in terms of the questions a user can ask the system, such as

- *What can/should I do next?*
- *How can I do <task>?*
- *When should I do <task>?*
- *Why did you do <task>?*
- *What are the inputs/outputs of <task>?*
- *Did <task> succeed?”*

Clearly, any resemblance to the Journalist’s Six Questions method in RE is purely coincidental. And, of course, User Interface problems have nothing to do with discovering requirements. And task decomposition hierarchies have nothing to do with hierarchies of use cases, or for those with long memories, functional decomposition in structured analysis and design.

However, concedes Rich, “much work remains to be done before ANSI/CEA-2018 and task-based UIs are likely to have a noticeable impact on the usability crisis”. Ah yes. Yes indeed.

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Know What You Can't Do As Well!

The Times recently reported on a new service from the Highways Agency that allows live traffic information to be accessed via mobile phones.



Improvements to the Highways Agency website allow the information to be accessed from mobile phones through a newly constructed mobile platform. The site gives details of any unplanned incidents and shows where motorways and major trunk roads are flowing freely.

The website received high traffic during February's severe weather. More than a million visitors checked the state of the roads with queries about their journey. This prompted the Highways Agency to identify a stakeholder need – drivers want real time traffic information when they experience problems on the roads.



What's happening?!

Denise Plumpton, Highways Agency director of information said: "Thousands of people already take advantage of our website to check the latest traffic information before they leave; now we are making that same information much easier to access when people are away from their PC too."

Fantastic – I can now receive live updates on traffic information whilst on the road, using my mobile phone. A stakeholder requirement satisfied by the Highways Agency. Or is it?

We should also bear in mind that Amendment 4 (2003) to the Road Vehicles (Construction and Use) Regulations 1986 requires, as I am sure you already know, that "*No person shall drive a motor vehicle on a road if he is using a hand-held mobile telephone*".

In satisfying a perceived requirement by motorists to access up-to-date traffic information the Highways Agency has provided a solution that may not legal - a constraint.

Constraints and Non-Functional Requirements are often the hardest aspect of any set of requirements to get right, but they need to be defined in a complete and measurable form. By comparison I would suggest that it is relatively straight-forward to identify the operational stakeholders and to elicit goals, needs and functionality, and to develop a set of measurable stakeholder requirements.

Constraints, in particular legislation and regulations, may not be linked to a clearly defined stakeholder, making it difficult to ensure all relevant constraints have been identified. We often have to identify iconic stakeholders that will never be directly engaged but will participate through the legislation, regulations or standards that they maintain. Common examples of Constraints related to data security may include the Freedom of Information Act, the Data Protection Act, ISO27001 Information Security Standard, and EC Data Retention Regulations. We may also have local standards and regulations introduced through Customer or Provider policies. All may introduce functional requirements or goals, but they will introduce constraints on the design and implementation.

You can also guarantee that they will invariably contradict each other, and without a real stakeholder to consult it is difficult to know how to reconcile conflicts between constraints.

And very often the constraints can become the drivers to a successful design, because they cannot easily be traded. In my example the solution to the requirement for up-to-date traffic information cannot be used by the Driver unless he stops the vehicle, which may be unacceptable. And the line "I'm sorry Officer, I was reading the Highways Agency Website – they provide some really useful information!" might not get you out of a fixed penalty.

I guess I shall have to be old fashioned and continue to use the radio so thoughtfully provided in my car – it meets my needs and it is legal!

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Real User Goals, or

Your Mother Wouldn't Like It

I'd like it to be really simple, said the greying man at the coffee table to the earnest smiling thirty-something woman in the smart blue dress and matching contact lenses.

You know, plug it in, switch it on, press Play, switch it off, he continued, with an air of pleading, mixed with a feeling that he didn't know much about art or computers, but he knew what he liked.

Hmm, said the market survey woman. *But what if someone wants the machine to stand by or hibernate when they press the Power button? Or even to restart?*

The man at the coffee table twitched nervously and looked at his nearly empty coffee cup. There were another 50 minutes to go in the survey interview, and he was out of his depth already. The bright young woman was smiling encouragingly and saying something.

Well, my video recorder, I mean my digital errm, my ...

Your set-top box with built-in hard disk and online connection for video on demand, program guide and watch-again? suggested the market survey woman, soothingly.

The thin man at the coffee table coughed nervously and finished the last of his almost cold coffee.

Ahem, yes, he agreed, putting a brave face on it. The set-top box just goes yellow when I turn it off. It makes a whirring noise all the time even when it's off. Once when I came down in the middle of the night ...

It was in Standby Mode, finished the marketer hastily. And it wouldn't like to be switched off completely. But the situation with computers is entirely different. This conversation wasn't going the way she wanted. How was she going to get anything solid from this chap with his empty coffee cup?

Well, it needs to be simple, he was saying.

We're working very hard to make it simple and clear, said the interviewer testily. The product has won a Clear Speech award and we used a household name cartoonist to illustrate the User Manual.

The interviewee wondered if he might ask for another cup of coffee, and whether it was worth trying to explain what the product should be like.

H'hm. It must be simple or my mother won't be able to use it.

The woman in the designer dress from the seconds rail at Belinda's Boutique reflected that she had a whole lot more of this interview to work through, and she had already mentally struck out nearly all the questions on the sheet.

Could we get your mother in to the test suite? she purred seductively, putting on her best customer relations smile.

Test suite, repeated the thin man in the very clean Country Casuals checked shirt and beige chinos with matching belt from the mail order catalogue. He had thought about the brushed pigskin all-terrain shoes with front and back scuff guards and breathable waterproof lining, but had decided against them.

No, I don't think my mother would like a test suite. Images of men in mediaeval executioners' masks with a room full of racks, chains, manacles and things covered in iron spikes came involuntarily to his mind.

Well, how can we find out what your mother would like? Asked Marketing as patiently as she could

manage. This approach certainly wasn't in the interviewing and knowledge elicitation training pack.

You could go and see how she uses the machines in her kitchen, said survey subject number seventeen, helpfully. Now he was on firmer ground.

She never sets the clock on anything. Her microwave always flashes 0:00 because she turns it off at the mains when she has finished with it. The only program she ever uses on her washing machine is Standard Wash, even when she only has a couple of dishcloths to do. I tried showing her the Economy program and the Save Water button but she said she didn't know if they would do a proper wash, and mightn't they ruin the laundry? She always sets the fan oven to medium and she puts anything she wants cooked hotter on the top shelf of the oven. I tried explaining to her that the fan keeps all parts of the oven at the same temperature, but her nanny had explained to her when she was a girl that ovens were hotter at the top, so ...

The designer dress was starting to feel quite tight under the arms, and she was uncomfortably aware that she was sweating. Perhaps it wouldn't show if she kept her arms down.

And what would be the equivalent for our product? she murmured, mainly to herself.

My mother would like a big ON/OFF switch that lights up when it's on, and goes out when it's off, said Country Casuals helpfully. *Otherwise she turns it off at the mains and then I have to spend half an hour resetting it.*

The woman with the Business Administration and Marketing diploma reflected that she had quite a good degree, and could probably get a well-paid job in accountancy. Or she could become a solo round-the-world yachtswoman. Or join the British Antarctic Survey and spend months all by herself drilling deep holes in what was left of the world's ice. Anything that didn't involve listening to any more of this stuff.

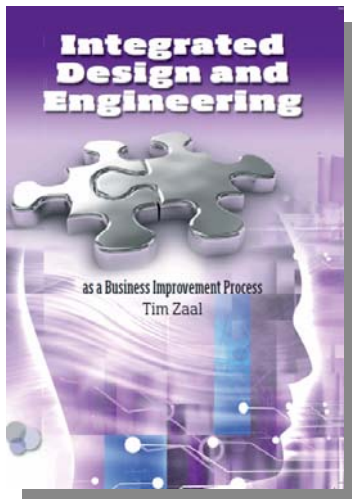
And what about all the other functionality, she inquired drily, with whatever was left of her interviewing persona.

Functionality? said the thin man in the clean chinos, starting to quite enjoy himself. *My mother doesn't want any of that. As I said, if you just take all the buttons off the front of the box and give her a big Run button on the remote, she'll be quite happy. It'll be a big improvement on the current model.*

The interviewer smiled wanly at her subject, wrote "Powers Down when power button off", "Minimal UI", and "Large RUN button" in the USER GOALS section of the interview form, gave him a sealed envelope with his name on it containing a small cheque, and fled.

RE-readings

Integrated Design and Engineering as a Business Improvement Process



Tim Zaal

Maj Engineering Publishing, 2009

When asked to consider a review of this book for RQ, my first reaction was to decline as it seemed to be too broad to be of interest to our requirements engineering community. Thanks, however, to an excellent publishing agent called Sally Tickner I found myself browsing the pages of a sample copy, and was pleased to discover that the book provides a useful view on the crucial role requirements can play in product innovation.

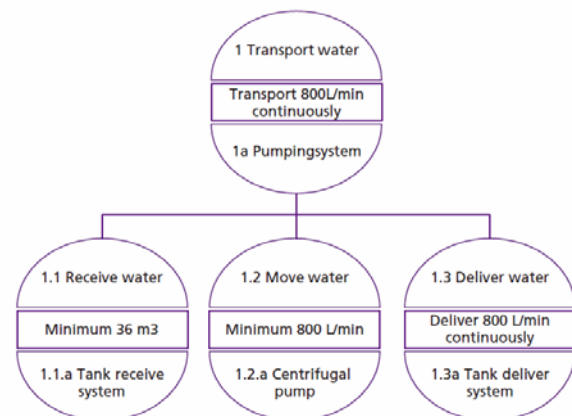
Tim Zaal is a lecturer at the University of Utrecht, in the manufacturing industry-facing department of integrated design. His book is targeted at business, with an emphasis on profitably delivering innovation and new products to rapidly changing markets. No prior knowledge is assumed and the ideas are introduced gradually and illustrated with practical examples.

Zaal contends that development of new innovations and products is always both a challenging and a difficult process. Challenging because it enables us to exploit new ways, challenges and possibilities, and difficult because it requires choices to be made, which exclude other challenges and possibilities. Each choice or possibility in the design process also means financial consequences or a specific cost price and so impacts upon future profitability. Well designed products promise profit, whilst a poor design can even result in losses.

The opening chapters apply this philosophy to explain the business case for having an Integrated Design and Engineering (IDE) way of working. The benefits of an integrated process and supporting organisation and

tools are covered, leading into the details of integrated development teams and IDE data models to address the main issue of information integration. Even at this early stage the tendency to apply a plethora of techniques and tools becomes noticeable. We are introduced to the Belbin Problem Solving team roles, the Self Perception Matrix, Myers/Briggs Type Indicators, Concurrent Engineering and Lean Development Processes in the Chapter on Team Building. Although the book may be overloaded in techniques, it does provide a useful overview and I am confident that most of us will discover something new and potentially useful.

For example, I am quite taken by the Function-Product or Hamburger Model Zaal proposes as a way of visualising functional decomposition. I must confess to being a luddite who still uses DFD and IDEF models, and the Hamburger Model attempts to combine functions, performance and potential solutions, as illustrated below. You will, I hope, see from the example where the Hamburger analogy comes from without resorting to Zaal's explanation!



Example of Zaal's Hamburger Model

Being hierarchical it does fail to handle interfaces well, and does not make it obvious where one solution may cover several functions, but it is an interesting progression of a functional decomposition.

Chapter 4 is of particular interest to the Requirements Engineer – How to Map the Client's Demands and Wishes. Zaal asserts that 'mapping the correct wishes of the client is one of the most difficult phases in the whole design process', but also notes that 'new products are still created out of the blue by a creative wave'. Irrespective of the style of the creative phase, he does remind us that comparing client wishes and expectations to the product design is important to avoid misunderstandings.

As this book aims to present IDE as a business process the chapter does include marketing as aspects of good product definition, including selling price and

consumer demands and wishes. This is a relevant step for the Requirements Engineer moving from a purely technical role to a project oriented role when margins and timescales become as important as the Specification.

This chapter covers useful techniques for encouraging stakeholders to think in a functional manner, and for mapping client wishes to the design. Quality Function Deployment and the Kano Model are covered in some detail with good illustrations to explain the concepts.

The remainder of the book explains how the product design process is applied throughout the life cycle,

again following the trend of introducing several techniques to demonstrate how to apply the process.

Practitioners and students will find that Zaal provides a clear and helpful introduction to Integrated Design and Engineering across the product life cycle. The book is easy to read with the techniques illustrated by relevant examples and has helpful exercises with answers at the back. Overall an excellent introduction and a fascinating insight into the world of product design

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RE-partee

Keyboard Inspiration!

Some thoughts for you to ponder when next staring at your keyboard in search of inspiration!

- 'Stewardesses' is the longest word typed with only the left hand.
- 'Lollipop' is the longest word typed with your right hand.
- No word in the English language rhymes with month, orange, silver, or purple.
- 'Dreamt' is the only English word that ends in the letters 'mt'.

- The sentence: 'The quick brown fox jumps over the lazy dog' uses every letter of the alphabet.
- There are only four words in the English language which end in 'dous': tremendous, horrendous, stupendous, and hazardous
- There are two words in the English language that have all five vowels in order: 'abstemious' and 'facetious.'
- TYPEWRITER is the longest word that can be made using the letters only on one row of the keyboard

Why Did the Chicken Cross the Road?

Some celebrity responses:

CAPTAIN KIRK

To boldly go where no chicken has gone before.

FOX MULDER

You saw it cross the road with your own eyes! How many more chickens have to cross before you believe it?

BILL GATES

I have just released eChicken 2003, which will not only cross roads, but will lay eggs, file your important documents, and balance your checkbook - and Internet Explorer is an inextricable part of eChicken.

ALBERT EINSTEIN

Did the chicken really cross the road or did the road move beneath the chicken?

COLIN POWELL

Now at the left of the screen, you clearly see the satellite image of the chicken crossing the road.

SIGMUND FREUD

The fact that you are at all concerned that the chicken crossed the road reveals your underlying sexual insecurity.

VOLTAIRE

I may not agree with what the chicken did, but I will defend to the death its right to do it.

GRANDPA SIMPSON

In my day, we didn't ask why the chicken crossed the road. Someone told us that the chicken crossed the road, and that was good enough for us.

RE-sources

Books, Papers

RQ archive at the RESG website:
<http://www.resg.org.uk>

Al Davis' bibliography of requirements papers:
<http://www.uccs.edu/~adavis/reqbib.htm>

Ian Alexander's archive of requirements book reviews:
<http://easyweb.easynet.co.uk/~iany/reviews/reviews.htm>

Scenario Plus – free tools and templates:
<http://www.scenarioplus.org.uk>

CREWS web site:
<http://sunsite.informatik.rwth-aachen.de/CREWS/>

Requirements Engineering, Student Newsletter:
www.cc.gatech.edu/computing/SW_Eng/resnews.html

IFIP Working Group 2.9 (Software RE):
http://www.cis.gsu.edu/~wrobins/ifip2_9/

Requirements Engineering Journal (REJ):
<http://rej.co.umist.ac.uk/>

RE resource centre at UTS (Australia):
<http://research.it.uts.edu.au/re/>

Volere template:
<http://www.volere.co.uk>

DACS Gold Practices:
<http://www.goldpractices.com/practices/mr/index.php>

Software Requirements Engineering Articles (India):
<http://www.requirements.in>

Media Electronica

RESG Mailing List
http://www.resg.org.uk/mailling_list.html

RE-online
<http://discuss.it.uts.edu.au/mailman/listinfo/re-online>

ReRequirements Networking Group
www.requirementsnetwork.com

RE Yahoo Group
<http://groups.yahoo.com/group/Requirements-Engineering/>

RE-actors

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Contributing to RQ

To contribute to RQ please send contributions to Simon Hutton (simon.hutton@headmark-analysis.co.uk). Submissions must be in electronic form, preferably as plain ASCII text or rtf. As an incentive, a copy of Tim Zaal's recent book 'Integrated Design and Engineering as a Business Improvement Process' will be awarded for the best contribution to RQ 53!

The deadline for RQ 53 (January 2010) is Friday 18th December 2009

Joining the RESG

Visit <http://www.resg.org.uk/> for membership details, or email membership-RESG@open.ac.uk