

Technology Management

The newsletter of the Centre for Technology Management (CTM)

November 2012

New fleet management tool for the Ministry of Defence

As part of the KT-Box programme, Clive Kerr and Simon Ford have developed a new tool for the Ministry of Defence. Their work addresses the challenge of planning technology upgrades during the operational through-life of the Type 23 Frigates until 2035. The tool has two primary functions:

- supporting decision-making and analysis in preparing the upkeep plan for the fleet
- providing a mechanism for reporting on and communicating the plan

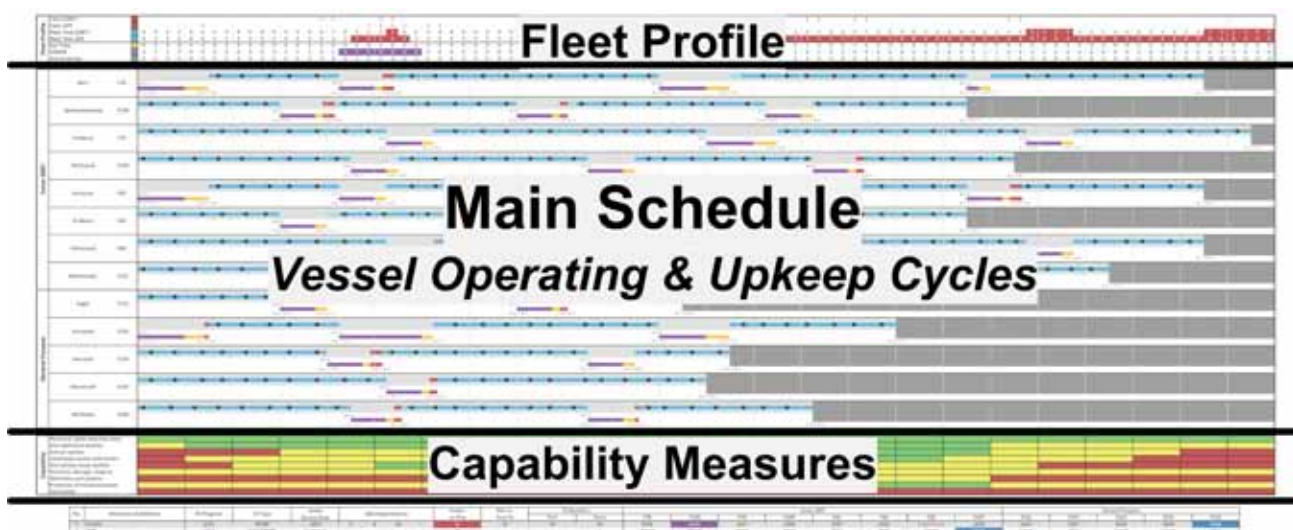
It is designed to help MoD managers reach a compromise between the competing demands of operational availability and the need to update capabilities and carry out maintenance. Another key feature is its ability to outline future capability requirements, show product development options and align these with the associated technology upgrade paths against a timeline.

Managers at the MoD also face the sometimes challenging task of presenting business cases to senior decision-makers in order to get sign-off for future capability enhancements. The highly visual form of the output gives them a way to structure, compare, contrast and present supporting evidence clearly and concisely.

The visual canvas of the tool has four components:

- The **main schedule** which plots the fleet time elements (fleet time periods, non-taskable fleet time, fleet time support periods) and non-fleet time elements (refit periods, docking periods, sea trials) across the whole of the Type 23 fleet.
- The **fleet profile** which shows a running total of the number of vessels in different states of operation and highlights any potential scheduling conflicts.
- The **capability measures** which provide an indication of the targets for future capability assessments showing areas of major/minor deficiencies.
- The **technology upgrade projects**, in the form of a look-up table which contains the data relating to the alterations and additions to the ship systems and equipment, that are planned to be fitted during the various docking and refit periods of the maintenance cycles.

Convinced of the potential benefits, the MoD is now conducting a stakeholder consultation exercise so that the tool can be brought into full operational use. Although currently configured for the defence industry, there is enormous potential to deploy the principles in other sectors which have similar combinations of a complex product service system, high value assets and long service life, such as transport or utilities. To find out more, please contact Clive Kerr: civk2@cam.ac.uk



Executive education goes from strength to strength

CTM has always tried to disseminate the results of its research in a variety of ways. Key amongst these are short courses, aimed at practising managers in the field of technology and innovation management. In the early days of the Centre, we restricted ourselves to specific themes where the original research had already been carried out, such as make or buy strategy and new product introduction. Over recent years, many new ideas and methods have been developed and the number of courses has grown as a result. Additional subjects now include roadmapping, technology intelligence, valuing and selecting technology projects, and visualisation to support strategy. However, the main area of growth has been for



Delegates at our new two-day course, 'Realising the potential of early stage technologies'.

longer courses which present an integrated understanding of the field and address the key issues in a practical way.

Following the consistent popularity of our three-day 'Technology and innovation management' course, we ran a new two-day course in September, focusing on the challenges of managing emerging technology for business benefit: 'Realising the potential of early stage technologies'. The course was delivered by a team of seven CTM researchers, covering key concepts and methods applicable to early stage technological innovation. The course was oversubscribed, attended by 25 participants from a range of industry sectors. The experiences that participants are able to share is a key part of the course, with activities and discussion sessions allowing for the exchange of best practice. This exchange also prompts ideas that shape the research programmes of the future.

We also create bespoke courses for partner organisations – both academic and industrial. We have recently had delegations from the Zeppelin University in Germany and Doshisha University in Japan, in addition to our annual programme for Rolls-Royce manufacturing engineers, which is now open to other firms.

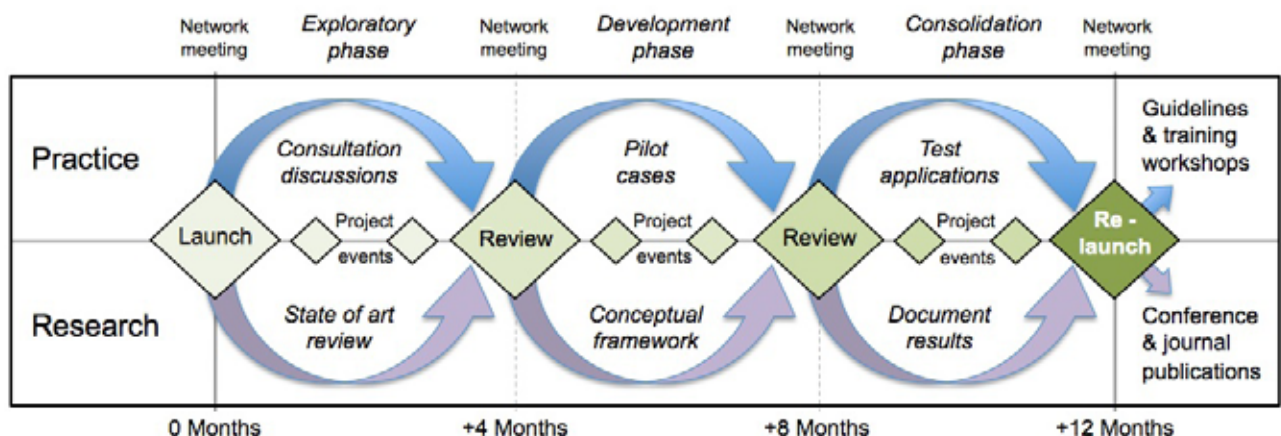
See <http://www.ifm.eng.cam.ac.uk/research/ctm/events/> for the list of forthcoming courses or email ctm-enquiries@eng.cam.ac.uk for more information.

A STIMulating opportunity - a new forum for research and practice

A new collaborative industry-university programme will be launched on 21 November at IfM in Cambridge, focusing on **Strategic Technology and Innovation Management (STIM)**. This rolling annual programme will bring together research and practice to provide participants with:

- Access to a network of firms from a range of industry sectors to share experience in a regular series of consortium meetings.
- The opportunity to influence the direction of research and development, with the associated early benefits gained through provision of access for case studies and application pilots.
- Support for transfer and application of methods developed in the form of guidance notes and training packages.

If you are a senior technology and/or innovation manager and would like to join the programme, please contact Rob Phaal (rp108@cam.ac.uk) for more information.



CTM conference news

Over the summer, our RAs and PhD students have been busy attending and presenting their research work at conferences.

In June, PhD student, Victor Ortiz, presented 'New product co-development acquiring and implementing new technologies' at the 19th IPDM conference at the University of Manchester. Participants from European and US universities presented more than 130 papers, covering a range of topics such as 'networks and alliances in product development', 'open innovation' and 'product development strategy and performance'.

In July, Dr Simon Ford attended the IEEE SOSE 2012, the 7th International Conference on Systems of Systems Engineering in Genova, Italy. He gave a plenary talk in which he provided an overview of the Road2SoS project, and also presented a paper based on work developed in the project, 'System-of-system Approaches and Challenges for Multi-site Manufacturing'.

Another of CTM's PhD student, Laurens Chaskel, participated in the 22nd European Summer Doctoral School on Technology Management organised by EIASM (European Institute for Advanced Studies in Management), held at Twente University in Enschede/Netherlands, 'Organising Innovation and Entrepreneurship', in August. Laurens presented his research on the 'Integration of technology protection in early-stage research, in both commercial and academic

contexts'. Also, at Twente University in Enschede/Netherlands, two of our PhD students, Laurens Chaskel and Clemens Chaskel, participated in a strategy workshop regarding the further development of the EITIMdoc network community of doctoral students. EITIMdoc serves as a community and networking tool for doctoral students from EITIM (European Institute for Technology and Innovation Management) partner universities, in which the CTM has been involved since 2000.

In September, doctoral students, Chung-Lin Tsai and David Weiss presented papers at the International Conference on Manufacturing Research (ICMR 2012) in Birmingham. Chung-Lin Tsai's paper was on 'Industry platform strategies for market expansion' and David Weiss presented on 'New perspectives on Open Innovation: The role of relative proximity on open innovation implementation in UK high-tech SMEs'.

Man Hang Yip, a doctoral student, presented a working paper co-authored with Robert Phaal and David Probert, titled 'Stakeholder engagement in early stage product-service system development for healthcare informatics' in the European Operations Management Association (EUROMA) – The Fifth Annual Service Operations Management Forum (SOMF). The two-day conference on 'The future of services in a connected world' was held in Cambridge, UK in September.

Goodbye

We bid farewell to three of our recent visitors:

Leonardo Augusto from the University of São Paulo, **Yi-Wen Yang** from the National Taiwan University of Science and Technology and **Changyong Lee** from Seoul National University.

And welcome

Robert Baron is an academic visitor from ETH Zurich under the supervision of Tim Minshall. He will be writing his master's thesis here until the end of March 2013. His research interest focuses on the incubation of new ventures in personal manufacturing.



Dominik Deradjat is a visiting student from RWTH Aachen University working on his master's thesis under the supervision of Tim Minshall. His research focuses on innovation between



R&D departments of large multinational companies and university research institutes.

Shuichi Ishida is a visiting scholar from Ritsumeikan University, Kyoto, Japan, specialising in management systems studies. His research interest is in the strategic implementation of organisational behaviour in terms of semi-open innovation.



Ahmed Mashhour is a first-year PhD student under the supervision of David Probert and Rob Phaal, working on the resilience of industrial systems



with a focus on public safety networks. Ahmed has a first degree in Electronic and Electrical Engineering with honours from Egypt and an MSc in Communications Research (Telecommunications pathway) from University College London. He has worked for more than four years at Systel Telecom, a major public safety organisation in Egypt, specialising in mission critical communication networks.

Technology management research at Cambridge

- Strategic technology management
- R&D project selection
- Software sourcing in manufacturing
- Enhancing creativity in new product development
- New product introduction collaboration
- Technology management: a process approach
- Technology selection
- Technology evolution in hi-tech firms
- Innovation management in hi-tech firms
- Emergence of technology based industry
- Technology scanning and intelligence
- Technology acquisition
- Technology protection
- Strategic make-or-buy
- Industrial make-or-buy decisions
- Sustainability and technology insertion
- Technology valuation
- Technology foresight

Update on Road2SoS

The EU FP7 Road2SoS project is now halfway through and roadmapping workshops have been conducted in each of the four project domains. The first roadmapping workshop, on multi-site manufacturing, was held on 13th September in Brussels. On the 25th September, CEA in Paris played host to the multi-modal traffic workshop, followed by the smart grid and distributed energy workshop the next day. The final workshop on emergency and crisis management was held on 26th October in Madrid. The content of each workshop is currently being analysed, then we will disseminate the results and develop of case studies. Thankyou to everyone who participated in the workshops.

PhD case study - can you help?

Does your company design, develop or deliver equipment, IT systems, services or solutions to the healthcare, wellness, therapeutic and beauty industries? If so, and you have been involved in a new development project in the past five years, would you be interested in participating in a 90-minute case interview for a PhD research project on 'Stakeholders' engagement in early stage new product-service system development process'? Please contact Yip (mhy29@cam.ac.uk) for more information.

Recent CTM publications

Van der Hoven, C., Probert, D., Phaal, R. and Goffin, K., (2012), 'Dynamic Technology Leadership: The Adaptive Role of the CTO', *Research-Technology Management*, 55(5), Sep-Oct, pp.24-33.

Mortara, L. and Ford, S., (2012), 'Planning for acquisitions: a step-by-step approach', *The Partner*, London, Partnership Sourcing Limited.

Mortara, L. and Ford, S., (2012), 'Technology Acquisitions. A guided approach to technology acquisition and protection decisions', ISBN: 978-1-902546-39-1.

Phaal, R., Farrukh, C. and Probert, D., (2012), 'Strategisches Roadmapping – Die Verknüpfung von Management, Technologie und Markt', Translated by M. Eppler, In *Werkzeuge des Wandels – Die 30 wirksamsten Tools des Change Managements*, Ed. H. Roehl, B. Winkler, M. Eppler and C. Fröhlich, Schäffer-Poeschel, Stuttgart, ISBN 978-3-7910-3124-8, pp. 132-140.

Ringland, G., Lustig, P. and Phaal, R., (2012), 'Here be dragons – navigating in an uncertain world', *The Choir Press*, UK, ISBN 978-0-9562190-5-3.

Diary 2012/13 www.ifm.eng.cam.ac.uk/events

November 2012

22	<i>Valuing and selecting technology projects</i>	One-day workshop IfM, Cambridge
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April 2013

9 - 11	<i>Technology and innovation management</i>	Three-day course Jesus College, Cambridge
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May 2013

21	<i>IfM briefing day</i>	One-day briefing IfM, Cambridge
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Contact us

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