Conference reports

Time Compression Technologies
TCT '98
Nottingham, 13-14 October 1998

TCT '98 brought together over 350 delegates from many countries (over 90% from industry) to share their experience of time-compression techniques. The scale of interest and the energy of interaction between delegates were significant. Topics included:

- Management issues
- Concurrent engineering & the reduction of time-to-market
- Impact of TCTs on SMEs
- PDM
- CAD/CAM
- Rapid prototyping
- Fast replication processes for metal and plastic
- Rapid tooling materials
- Future developments

There were 40 papers in two parallel streams of applications and new technical research. The delegates included several Centre member companies: British Aerospace MA&A, Federal-Mogul Technology, GEC-Marconi and Rolls Royce Aerospace.

An overview of the Centre presented by Tony Venus highlighted the technology management and NPI research work and outputs. Tony also presented some of his own research in applying foundry sand technology as a rapid tooling material and process. There was a good opportunity for networking and many new contacts were interested in the work and outputs of the Centre.

Tony Venus
University of Cambridge

Strategic Management of the Manufacturing Value Chain
International Federation for Information Processing (IFIP)
University of Strathclyde, Troon, August 25-28, 1998

This conference brought together leading researchers to explore state of the art developments and research in this area. Sixty-five papers across the following themes were presented: strategic manufacturing, manufacturing networks, process modelling, supply chain management, information systems, performance measurement, production planning and control and agile manufacturing. Common issues were:

- Value of inter-organisational networks and technology's role in them
- Industrial, government and academic collaboration to create wealth in a country's economy
- Dynamic resource management using optimised technology

Laura Cañez
University of Cambridge

Quarterly Diary

December

7th	5-7.30pm	Evening Workshop Cambridge	*New approaches to manufacturing training*	

January

19th	5-7.30pm	Evening Workshop Cambridge	*Technology strategy-linking technology to business objectives*	
28th	10am-4pm	Day Forum Cambridge	*New Product Introduction*	

February

9th	5-7.30pm	Evening Workshop Cambridge	*Successful planning using technology route maps*	

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I𝒻M Institute for Manufacturing

Technology Management

November 1998

UNIVERSITY OF CAMBRIDGE

Centre for Technology Management

Centre benefits from range of new initiatives

The Centre has recently seen a number of new initiatives which promise to provide extra value for our technology management community. The **Institute for Manufacturing**, of which we form a part, was officially launched on October 19 at a reception at the House of Commons. The Minister for Science, Lord Sainsbury, emphasised the importance of industry and academia collaborating together to advance research, practice and education in areas such as technology management. A number of Centre members attended the launch, and the support of the new Institute will give us a very sound basis for further growth.

Activities

Two of our established activities, the **Forum** and **Network**, came together at a very productive joint meeting in Girton College, Cambridge on October 8. New areas for collaborative work between Network members were a key output of these discussions. A detailed report of the event is given inside.

We have just received the assessment for our recently completed EPSRC project *Technology Management: A Process Approach* and were delighted to have it graded as "a very significant contribution to the field". This will provide a secure basis for our current and future projects. On this theme we are currently submitting proposals under the Systems Engineering and Systems Integration programmes of

the EPSRC. The Centre has also submitted a proposal to the IMI Integrated Aerospace Manufacture programme, entitled *Technology capture and implementation in international aerospace collaborative business networks.*

The Centre is working in collaboration with the **European Commission**, in the area of *sustainable production.* This has included contributing to a workshop in Brussels on the concept of the virtual enterprise, which may provide scope for the extension of the Technology Management Network across Europe.

In addition, the Centre is undertaking a project to investigate how knowledge and technology management can support the shift to a more sustainable production system. This topic formed one of the themes at the 4th Cambridge Technology Management Symposium in July and includes issues relating to knowledge management in collaborative research networks. The project will include a review of the sustainability and knowledge
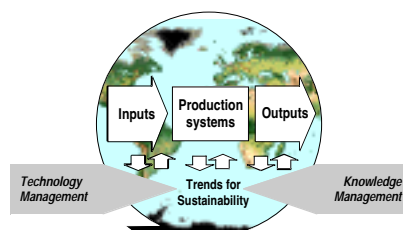
management literature, together with wide-ranging interviews across Europe with industrialists, academics and consultants. The aim is to identify relevant experience, and develop research concepts and knowledge management infrastructures for the Commission's 5th Framework collaborative research programme.

Workshops

Finally I should like to remind Centre members of their entitlement to two free places at our **evening workshops and forums** (see back page). These are very popular and although it may be a long journey for some of you, you are always very welcome.

David Probert
University of Cambridge

Contents

Technology management within British Aerospace Military Aircraft and Aerostructures

Research & Technology is treated as a project in its own right within MA&A. It is managed by the Technology Project Board comprising relevant senior directors and managers. At an operational level the programme is the responsibility of the Research and Technology Project Director. It is managed by the Head of Research and Development and an R&T Operations Manager through specific Technology Managers supported by a Business Management Group within the R&T project.

Outward looking

Our approach to the research, development and exploitation of technology is designed to support our business mission, policy and strategy. Whereas ten years ago our R&T might have been an insular activity loosely connected to business need, we have recently made major strides to integrate R&T as an enabler to business performance. Today our R&T is outward looking; for example 90% of our R&D activities involve partners of one form or another, and it is as likely to be directed at business process improvements as at specific aircraft product technologies.

Approach

Key to this transformation is a three tier approach to the management of R&T:

• **The Technology Plan** describes the technologies, how they will be developed and where they are intended to be applied, i.e. the plan provides technology route maps.

• **The Technology Planning Process** is a six stage process which plans an R&T activity from requirements capture through to technology insertion and support. The first two phases of the process concern requirements capture and assessment and define an annual,

structured process for the creation of the Technology Plan. The process is designed to collect and evaluate the needs of all stakeholders, identifying a balanced set of business benefits/opportunities and the options for their achievement. This allows measured judgements to be made on how available funding can be maximised, through for example partnerships, and targeted to deliver maximum business benefit.

• The Technology Planning Process was created during 1997. However it is recognised that the business is constantly changing and it is necessary to continually improve the process to ensure that it is harmonious with MA&A's other business processes. **Process improvement** is effected by holding annual workshops with stakeholders. Thus, on an annual cycle, we develop both the process for the creation of the plan and the plan for the following year.

Business need

The Technology Planning Process combines, through stakeholder involvement, the three perspectives of technology, business strategy and customer needs. The plan must link

R&T activity to business need, and be matched to the project timescales for technology insertion.

To maximise the value of R&T effort we use collector/demonstrator programmes to gather together and integrate individual technologies and to provide a clear focus for the R&T activity. These programmes are designed to be generic to allow them to feed into several projects. By balancing stakeholders' needs, decisions on how technology is acquired are assessed to determine whether R&T tasks will be achieved internally or via partnerships, thus maximising the value of R&T funding.

Prioritisation tool

The resulting options are then assessed using a prioritisation tool which produces a quantified ranked list of technology programmes for inclusion in the plan. The prioritisation tool captures all of the drivers for technology within our business. The drivers encompass technology drivers, strategic drivers and customer drivers in accordance with the overall ethos of technology management within MA&A. The

Network and Forum combine for a successful day

A successful second meeting of our Technology Management Network was held at Girton College Cambridge on Thursday October 8. On this occasion the Network meeting was incorporated into our regular Day Forum series. This combination produced a rich content that appealed to both audiences. The event was well supported by existing Network members and attracted many members new to the Network.

Review of the day

The purpose of the event was to review Network activities, enable members to interact and to hear from a range of academic and industrial speakers. These presentations provided the opportunity to learn about current research activities and industrial practice and explore current and emerging technology management issues in the discussion sessions that followed.

Tariq Durrani from the University of Strathclyde presented an overview of a new EPSRC funded research project: *An integrated technology strategy development process.* Another speaker was Professor Michael Best, Professor and Co-director of the Center for Industrial Competitiveness at the University of Massachusetts. His special interests are industrial competitiveness, sector strategies, manufacturing capabilities, technology management and regional development. His presentation, entitled *Cluster dynamics and regional growth and decline*, included a review of evolutionary technology management models in US manufacturing with examples from the Massachusetts region.

Three industrial speakers provided insights into their current industrial technology management practice. Richard Archer of The Automation Partnership discussed systems integration in a specialised, high technology company developing large, complex and flexible automation products for life science industries.

Eric Rudolph of Hoogovens Research and Development spoke about a range of technology management issues at Hoogovens including roadmapping and the development of a practical model for knowledge management.

Nick Try of Marconi Electronic Systems identified the importance of technology foresight and discussed several foresight tools that were being applied within Marconi to achieve improved business performance.

The day concluded with lively discussion in small groups on the themes of knowledge management, technology strategy, technology management metrics and business vision. A detailed review of the day will be sent to members soon.

Tony Venus
University of Cambridge

CTM web page

The CTM web pages (located at http://www-mmd.eng.cam.ac.uk/CTM/) are about to be updated. A new Network specific page will be added before Christmas and will be accessible from the CTM web site.

prioritisation tool was initially created in conjunction with Cambridge University and received a BAe Chairman's Award for Innovation in 1996. The tool is developed annually as part of the Technology Planning Process improvement activity.

The Technology Planning Process manages technology from requirements capture through to technology insertion and subsequent support. In order to review progress with time, MA&A have developed a set of maturity criteria for technology development that form a ten point scale. The maturity criteria have been benchmarked against those utilised in technology maturation in the US aerospace industry.

The technology is matured from enabling technologies in laboratory type environments, through generic demonstration environments to fully matured, platform specific technologies. As the technology matures, the involvement of the R&T community gradually declines

and the involvement of customer project people increases. The Technology Planning Process calls for reviews, as a minimum, at the end of each of its six stages. The review examines the plans, the process, the IT, the people, the organisation, the infrastructure, the product, external factors and communications related to the activity.

The Technology Plan is a powerful enabler in the exploitation of existing technology. The plan provides route maps for technology maturation. The visibility of the route maps across the business ensures that both the aircraft projects and the R&T community are aware of all technology development. This ensures that the opportunities for insertion of a particular technology into the aircraft projects are maximised and that the effort to mature the technology is minimised.

Christopher Watson
BAe Military Aircraft and Aerostructures