

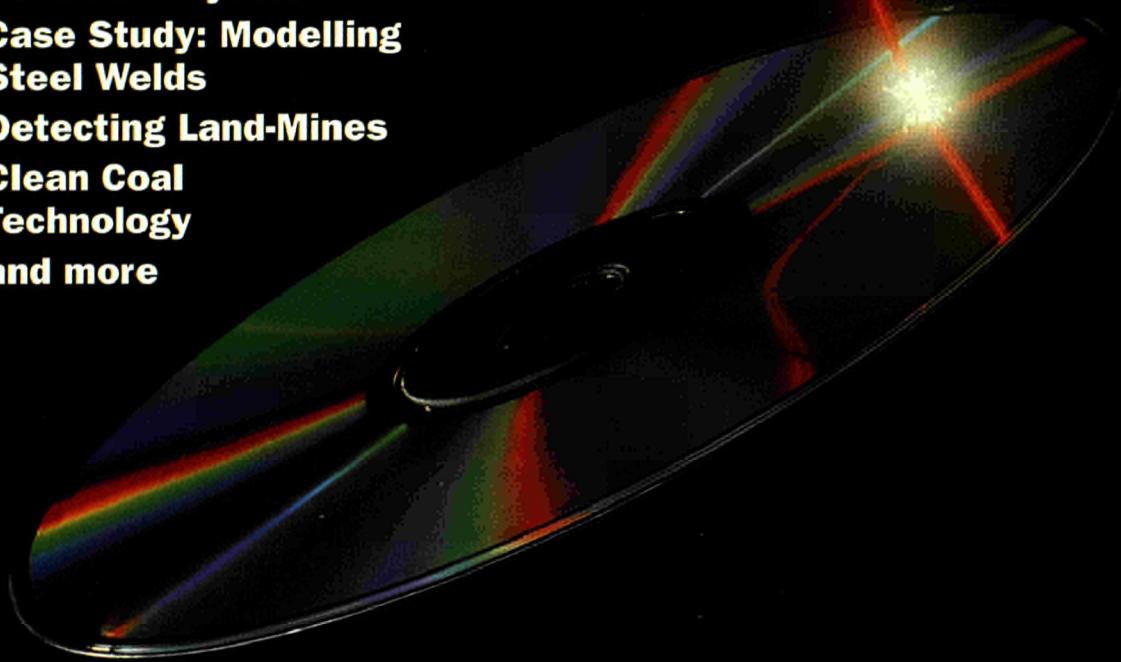
Innovation & Technology Transfer

3/96

Action *and* Interaction *in* Multimedia

plus

- Green Paper on Innovation: Positive Reactions
- Innovation Programme on the WWW
- Training and Dissemination Scheme Projects
- Case Study: Modelling Steel Welds
- Detecting Land-Mines
- Clean Coal Technology
- and more



ISSN 1013-6452



CONTENTS



Source: European Commission

The dawning of a multimedia world.
(Dossier, page 8)

POLICY NEWS

3-7

Innovation Green Paper: Positive Reactions ■
Priority Areas Proposed for European
Research ■ SMEs: A New Definition ■
Technology Transfer Regulation

DOSSIER:

8-13

MULTIMEDIA

INNOVATION PROGRAMME NEWS

14-18

Innovation Relay Centre Case Study ■ EIMS
Report: Consulting Engineering Services ■
Innovation Programme on the WWW ■ Training
and Dissemination Scheme Projects Launched ■
New Publications ■ Technology Transfer and
Validation Projects: software and video released

CASE STUDY

19

ECSC: Modelling Welds

PROGRAMME BRIEFING

20-22

JRC: Detecting Landmines ■ THERMIE:
Cleaner Coal

CONFERENCES AND PUBLICATIONS

23-24

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Towards a Thriving Multimedia Industry

The consultation period set for the European Commission's Green Paper on Innovation ends as this issue is published. The article on the facing page reports on the debate as *Innovation & Technology Transfer* went to press. Now the task for the Commission is to draw together all the reactions and opinions prompted by the Green Paper, and turn them into concrete and realistic proposals. These developments will be covered in future issues of *Innovation & Technology Transfer*.

One of the points stressed in the Green Paper is that innovation is not a matter that just concerns the research laboratory. This issue's dossier shows how the application of one new technology in particular - multimedia - depends on a symbiosis of technologists, industry, and the users, such as the education sector. Furthermore, having the right legal and regulatory environment - concerning copyright questions for example - will be a crucial factor governing future progress.

And as the dossier demonstrates, the resulting products could open up new approaches to teaching and advanced training, as well as offering new ways of looking at the arts and at history. Perhaps multimedia will come to be recognised as an art form itself.

Multimedia is a classic example that innovation is, in the words of the Green Paper, a social phenomenon. ■

ABOUT INNOVATION & TECHNOLOGY TRANSFER

Innovation & Technology Transfer is published six times a year in English, French and German by the European Commission's Innovation Programme, which aims to strengthen Europe's innovation infrastructure and disseminate research results to industry.

The emphasis is on timely news relevant to these objectives and in-depth 'Case Studies' of successful projects. Each issue also includes a major Dossier on one topic. Subscription is free - please fill out the request form on the back page and fax or post it back to DG XIII/D-2.

PUBLISHED BY:

European Commission, Directorate-General XIII

Telecommunications, Information Market
and Exploitation of Research

Directorate XIII-D

Dissemination and Exploitation of RTD Results,
Technology Transfer and Innovation

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WRITTEN AND PRODUCED BY:

European Service Network, Brussels

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Printed in Germany

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How to Get the Green Paper

The Green Paper on Innovation is published in all EC official languages as Supplement No. 5/95 of the *Bulletin of the European Union*. It is available at 7 ECU (excluding VAT) from Sales Agents of the Office for Official Publications of the European Communities.

It is also available for downloading from the World Wide Web, in all official languages. URL: <http://www.cordis.lu/cordis/grnpaper.htm>

Positive Feedback

The European Commission's Green Paper on Innovation has sparked a major debate across the European Union. Launched at the end of last year, the Green Paper includes an in-depth analysis of the problems facing innovators in Europe. It goes on to put forward a set of actions designed to overcome these problems.

The Commission fixed 10 May as the deadline for comments and responses to the Green Paper. Interest has been high. By the mid-point of the debate, in March, more than 20,000 copies had been distributed.

It is also available on the Internet, where users of the World Wide Web can browse through the text in any of the official EC languages and, if they wish, produce a copy on their own printer. So far, several thousand copies have been 'downloaded' by this route.

The Commission will draw up a report on the basis of all the reactions to the Green Paper. This will be accompanied by an outline plan of action for the future. The innovation issue is expected to be tabled by Commission President Jacques Santer at the European summit in Florence, Italy, on 21-22 June. The Research Council will also have an opportunity to see the Commission's plans at its meeting in June. The formulation of a detailed plan of action by the Commission will follow during the autumn.

Europe-wide Consultation

The debate on the Green Paper had passed the half-way point as this issue of *Innovation & Technology Transfer* went to press. At that stage a series of conferences in all Member

States, plus Norway and Iceland, was being organised by the Commission to provide fora for comments and expression of opinions on the Green Paper's analysis and proposals. In all, these conferences were expected to bring together more than 3,000 people for the pur-

Monetary Affairs and Industrial Policy, held a joint meeting in Strasbourg on 12 March to examine both R&D and economic policy aspects of the Green Paper. Edith Cresson and Martin Bangemann, Members of the Commission jointly responsible for the Green Paper, presented the thinking behind it and answered questions.

Various organisations and associations which bring national bodies together at European level were known to be preparing comments.

Also expected to comment was IRDAC, the Industrial R&D Advisory Committee, set up by the Commission to provide counsel on strategic and industrial questions related to Community research policy. The 24-

member committee includes prominent industrialists together with representatives of SMEs, trade unions, and research organisations. IRDAC began to examine the Green Paper at a meeting on 1 February attended by Mrs Cresson and Mr Bangemann, followed by a round-table discussion on 29 March.

Opinions had already been received from the managers of several of Europe's best-known enterprises. The Commission is also consulting individual SMEs, who were preparing opinions at the time of going to press. The series of conferences in the Member States, Norway and Iceland will provide ●●●

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... one of Europe's most remarkable paradoxes: goods, capital and services move around more easily than people and know-how.
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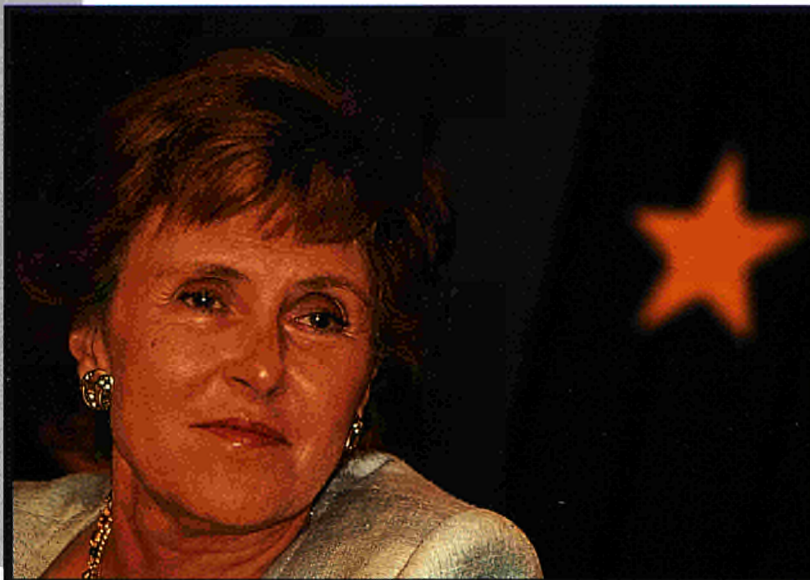
Green Paper on Innovation

pose of discussing innovation in Europe. A final summing-up conference was to take place in Rome on 29 May.

Examination of the Green Paper by the European Parliament, the Council of the European Union, the Economic and Social Committee and the Committee of the Regions was well under way. In each institution the Green Paper is first examined in detail by one or more standing committees which prepare the way for the final 'opinion' of the institution.

In the European Parliament, for example, the Committee on Research, Technological Development and Energy, and the Committee on Economic and

Edith Cresson, Member of the Commission responsible for science, research and development, human resources, education, training and youth, who launched the innovation Green Paper together with Commissioner Bangemann.



a further opportunity for enterprises, big and small, to have their say.

Emerging Patterns

Final conclusions will be drawn only after the 10 May deadline for comments. By the mid-point of the debate, however, a pattern was beginning to emerge from the views already received.

Almost all reactions to the Green Paper have been welcoming. In particular, there is widespread support for the Commission's perception of a 'European paradox' which urgently needs to be addressed. This paradox is that Europe's excellence in scientific research is not matched by equal excellence in taking advantage of these skills to create a competitive edge in high-technology sectors such as electronics and information technologies.

There is also strong support for the Commission's view that the promotion of innovation is not a matter just for the research laboratory and a few technology-minded enterprises. The Green Paper calls innovation 'a multi-faceted phenomenon'. Innovation involves not only new products but also new services, new methods of production, distribution and marketing, and the

Where Europe is Going Wrong - the Commission's Analysis

The situation in Europe is very mixed, according to the Green Paper. It cites several successful innovation-fostering schemes at national and regional level, supplemented by measures at European Community level. For example, recent years have seen the strengthening of research/industry cooperation and measures to facilitate the involvement of SMEs in the EC research framework programme, as well as the launch of the Innovation Programme.

This is not enough, however. The Green Paper presents a detailed analysis, documented by the results of statistical surveys and other data, to demonstrate that Europe is less well-placed than its main rivals.

Europe has an excellent scientific base, but is less successful than others in building on this to create new products and market shares. This is especially true in high-technology sectors. According to the Green Paper:

"Innovation in Europe is marking time. There are not enough new businesses, methods of open and participative organisation and management are not widely enough known, and there is a widespread reluctance to seek information.

On top of this, the research effort tends to be squandered, formalities are over-complex, a technical 'culture' is lacking, research, industry and training are compartmentalised, regulations are sometimes a deterrent, and public initiatives are not always well thought out. All this needs to be changed."

introduction of new techniques in the organisation of work.

To create a society where innovation flourishes will require the contribution of people in education, training, finance, the authorities at all levels (local, regional, national and European), as well as researchers and industrialists. The Green Paper makes a strong case for viewing the promotion of innovation as a matter for society as a whole.

Four preoccupations figure frequently among the comments received.

1. *The regional dimension.* There is support for networking as an aid to smaller businesses in the regions, and for the provision of expertise at the local level to assist SMEs. The aim must be to ensure that SMEs in the regions have access to the best technologies available, and that they have help in taking up these technologies.

2. *Simpler administrative rules and procedures, and better public support measures for innovation.* The focus is on the reduction or elimination of administrative formalities that can absorb so much of a manager's time, particularly in an SME. Administrations should also be forced to speed up their response times. Good cooperation between the private sector and public authorities needs to be fostered, so that public measures are designed to match the real needs. Given that the promotion of innovation involves the efforts of many people, effective coordination is a necessity.

3. *Finance for innovation.* Reactions to the Green Paper support the Commission's view that this is of central importance. Topics raised include risk capital, provision of guarantees, and the question of funding for enterprises based on new (and therefore, in the eyes of financial backers, unproven) technologies. This will involve measures predominantly at the national level.

What Should Be Done - the Commission's Proposals

The Green Paper puts forward approximately 130 specific measures, classified into thirteen 'Routes of Action' aiming to overcome the obstacles and handicaps to innovation identified by the Commission's analysis.

The Routes of Action are designed to pursue six fundamental objectives:

1. European research should be better matched to the needs of innovation.
2. Europe's citizens should be better attuned to innovation, through education and training, and through measures to facilitate the personal mobility of students and researchers.
3. Conditions for the financing of innovation should be improved.
4. The legal and regulatory environment should be made more favourable to innovation.
5. Enterprises, notably SMEs, should be encouraged to innovate.
6. The public authorities should adapt so as to foster innovation, for example by simplifying administrative procedures, and by promoting an 'innovation environment'.

For each measure, the Commission suggests what it considers to be the appropriate level for implementation - local, regional, national or Community.

4. *Orienting research so that it is more likely to lead to new products and services.* Proposals include increasing the share of GDP spent on R&D, favourable treatment for intangible investment, finding ways to target research, and improving the transfer of technologies to SMEs. In this context the Task Forces introduced by the Commission last year to strengthen co-operation between research and industry are seen as a necessary and timely development.

While these four themes are emerging strongly from the debate, some other propositions put forward in the Green Paper have so far attracted less attention. These include the proposals aiming to make better use of economic intelligence, to facilitate mobility of students and researchers, and to improve the legal and regulatory environment.

Choosing the Right Level

With subsidiarity in mind, the Commission is also seeking opinions on the appropriate 'level' for undertaking the various innovation-promoting

measures put forward in the Green Paper. Depending on the nature of the measure, the

that implementation at the Community level is not appropriate for some of the propo-

according to the Green Paper, especially for venture capital and 'intangible' investment (for example, investment in training). In areas such as these, the Community role may be to encourage Member States to adopt 'innovation-friendly' measures, and to provide a forum for the exchange of information on the pros and cons of different approaches.

The final weeks up to the 10 May deadline were expected to see an intensification of the debate as organisations involved in the innovation process finalise their responses. Themes which appeared of marginal interest in the early stages of the debate may emerge more strongly later, given that the majority of opinions and reactions are expected to arrive in the debate's closing weeks.

The Commission is hoping that a consensus will emerge out of the debate not only on the broad lines of action which Europe must follow to improve its capacity to innovate, but also on the conversion of the broad lines into practical and effective measures on the ground. □

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Research and technological development (R&TD) are not synonymous with innovation. Indeed, R&TD is arguably neither a necessary nor a sufficient condition for innovation. This is because innovation has to do as much with the context in which technology is used as with technology itself. To its credit, the Commission's Green Paper on Innovation recognises this.

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Draft report of the Committee on Research, Technological Development and Energy, European Parliament

Green Paper suggests the appropriate level - regional, national, or Community.

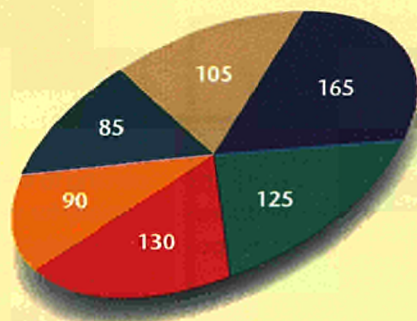
So far, reactions have confirmed the Commission's view

in the area of education and training. The same applies to proposals relating to tax. Tax regimes could be made more conducive to innovation, ac-

Priority Areas for European Research

The European Commission has proposed that European RTD be stimulated in five priority areas.

Proposed Extra Funding Breakdown (MECU)



- Aeronautics
- Educational multimedia
- Automobile RTD activities
- Transport intermodality and interoperability
- Environmental RTD (water-related)
- Environmental RTD (nuclear safety)

Total: 700 MECU

The proposal, put forward in February for a European Parliament and Council Decision, requests that funding within the Fourth Framework Programme be re-examined in the light of five priority areas. All of these areas have high job-creation potential and, because the associated technologies benefit many sectors of the economy, require 'special and urgent measures':

■ **Aeronautics:** air traffic is likely to double over the next 15 years. The potential market is estimated at over 17,000 new aircraft, representing an investment of some 1,000 billion ECU. There are 7,000 European enterprises in the sector, all

but 40 of which are SMEs, employing a total of around 400,000 people. The key challenges facing these companies are to produce aircraft which are powerful, safe and environmentally friendly.

■ **Multimedia Educational Software:** the approximately 350,000 schools in Europe today employ around 4.5 million teachers to educate 67 million pupils.

■ **Car of the Future:** the aim is to rapidly develop cars with zero or ultra-low emissions to meet environmental and health standards. The stakes are high - there are thousands of automotive equipment suppliers and subcontractors spread across the EU, many of them SMEs.

■ **Multi-Mode Transport:** transport and related industries employ eight million people and represent 7% of the EU's GNP. Europe loses around 120 billion ECU each year through traffic congestion. Intermodal transport must be developed through the use of appropriate technological solutions, including computers and telecommunications.

■ **Environmentally Friendly Technologies:** there are two specific themes: water technologies and nuclear safety. For the former, techniques for improving control of water resources threatened by human activities such as urban development and agriculture must be developed. When it comes to nuclear safety, innovative approaches to improving reactor safety, decommissioning techniques, waste processing, assessing the impact on

people and the environment and controlling the effects of past disasters must be developed. The situation in central and eastern Europe and the CIS countries in particular make these issues urgent.

Financing Co-ordination

All but the nuclear safety issue are being addressed by five of the EC's Industrial Task Forces. Launched over the past year, each Task Force focuses on improving the co-ordination across Europe of research in its specific area. For Multimedia Education Software, for example, this involves co-ordinating European programmes for research (Information Technology, Telematics Applications), multimedia (MEDIA II, INFO2000) and education and training (SOCRATES, LEONARDO DA VINCI)(1).

If adopted, the proposal will increase Community financing for the areas covered by these Task Forces. The money would come from a 700 MECU increase to the Fourth Framework Programme budget(2).

The Council of Ministers (Research) had their first exchange of views on the proposal at a meeting on 25 March. The European Parliament has also commenced its deliberations, but it is still too early to give precise indications about the timing of an eventual decision. □

(1) See the Dossiers of this issue and editions 6/95 (Information Technology RTD), 2/96 (Communications and Telematics RTD) and 1/96 (Education & Training Programmes).

(2) The original Council Decision adopting the Fourth Framework Programme provides for the possibility of increasing its budget by 700 MECU in mid-1996.

► SMES

New Definition

A proposal for a new, common definition of Europe's Small and Medium-sized Enterprises (SMEs) was recently adopted by the Commission.

The new definition will not, in principle, take effect for research programmes until the completion of a transition period, which ends on 31 December 1997. This means that the new definition will apply to the Fifth Framework Programme, which is due to commence in 1998. The Fourth Framework Programme's measures for SMEs, principally exploratory awards and co-operative research (CRAFT), will not be affected.

According to the new definition, an enterprise is:

■ **medium-sized** if it has 51-249 employees (inclusive) and an annual turnover not exceeding 40 MECU or an annual balance-sheet total of no more

Criteria	Current RTD Definition of an SME	After January 1998 (in principle)	
		Medium-Sized Enterprise	Small Enterprise
Number of Employees	< 500	51-249	< 50 (very small enterprises have less than 10 employees)
Turnover	< 38 MECU	< 40 MECU	< 7 MECU
or Balance Sheet	no criterion	< 27 MECU	< 5 MECU
Ownership	< 33% owned by non-SME except bank or venture capital company	< 25% owned by one or more non-SMEs except investment/venture capital company not exercising control	

than 27 MECU;

■ **small** if it has 50 employees or less and an annual turnover not exceeding 7 MECU or an annual balance-sheet total not exceeding 5 MECU;

■ **very small** if it has less than

10 employees.

A company need only meet one of the two financial criteria (turnover and balance sheet) to be an SME - in other words, a 100-employee company with a 37 MECU turnover and a 30

MECU balance sheet is medium-sized.

Lastly, all SMEs must be **independent** - they cannot be more than 25% owned or controlled by one enterprise, or jointly by several enterprises, which are themselves not SMEs.

The adopted Communication will be addressed as a recommendation to the Member States, the European Investment Bank and the European Investment Fund. □

► EUROPEAN COMPETITION LAW

Technology Transfer Agreements

April saw the Commission adopt a new Regulation on technology transfer agreements aimed at promoting innovation and technology transfer in the European Union by substantially simplifying the rules relating to patent licensing agreements.

The Regulation ensures the effective application of competition rules to technology licensing agreements, whilst avoiding unnecessary administrative procedures, guaranteeing the legal security of companies and contributing to the dissemination of new technologies.

Under the new Regulation:

■ an automatic exemption is granted for all licensing agreements which include territorial restrictions between parties or between licensees;

■ there are a number of obligations, which may lawfully be inserted by the contracting parties into the agreement, such as the licensor's right to terminate the agreement in the event of challenges by the licensee to the validity of the patent, and the obligation for the licensee to manufacture and commercialise the patented product;

■ a 'black list' of clauses or restrictions is established whose presence in an agreement

would preclude exemption by category;

■ an opposition procedure under which the exemption is extended to agreements including additional competition restrictions not expressly mentioned in the Regulation.

This increased flexibility is accompanied by a clear warning to companies holding strong market positions. The Commission is allowed to withdraw the advantage of the Regulation in cases where companies with a market share of 40% or more managed, thanks to exclusive licenses, to monopolise the

product market and prevent the access of third parties to new technologies.

Transitory arrangements have been made for the continuation of patent licensing agreements falling under the previous Regulation of 1984 in the period preceding the entry into force of the new Regulation. □

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Action and Interac



Source: European Commission

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The dawning of a multimedia world represents a radical change comparable with the first industrial revolution.

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European Commission White Paper, "Growth, competitiveness, employment: the challenges and ways forward into the 21st Century"

Multimedia represents the convergence of some of the largest and most important social and business activities - entertainment, education, media and computing. EU initiatives, ranging in scope from research to education, aim to ensure that Europe reaps as many benefits from multimedia in as many spheres of life as possible.

The only interaction anyone can have with a strip of celluloid film is to watch it. Translate those same images and sounds into digital data and put them into a computer, however, and something happens - they can be manipulated, combined with text and other audio-visual material, put in a database, and much more.

The material becomes multimedia, and the viewers become *users* - driving the plot of their favourite film, navigating their own path through training material or studying a society's music, architecture, science and language simultaneously, holistically.

The impact of widespread multimedia, therefore, will be felt beyond the boundaries of the entertainment and

computing industries. For example, its potential for improving education and training - and hence competitiveness in all industrial sectors - is enormous.

Within the framework of its Action Plan for a European information society (see Dossier, *edition 2/96*), the European Commission supports the European multimedia industry through:

- creating the right European legislative and regulatory environment by, for example, deregulating the telecommunications industry and updating Intellectual Property Right (IPR) law;
- supporting multimedia research and development;
- studying and promoting the use of multimedia in education and training;
- stimulating the multimedia market.

I. Enabling Technologies

The three RTD Programmes relevant to multimedia have been covered in the Dossiers of recent issues of *Innovation & Technology Transfer*: the Information Technologies programme (ESPRIT, see *edition 6/95*), the Advanced Communication Technologies and Services programme (ACTS, see *edition 2/96*) and the Telematics Applications programme (see *edition 2/96*).

ESPRIT's **Multimedia Systems Domain** focuses on the technologies and tools for implementing multimedia end-user systems. Demonstration is fundamental to this domain, so pilot schemes are targeted at applications in industry, commerce and the home. The domain concentrates on two 'RTD themes':

- **multimedia technologies** for the creation, manipulation, access and storage of multimedia information, and new strategies for information provision and presentation;
- **multimedia objects trading and IPR**

management technologies for the open distribution, trading and use of multimedia objects. Access to and use of digital material must be wide and easy, while IPR should be protected.

There are also Accompanying Measures to optimise interactions between users and developers.

Examples of recently launched projects include the **3D Multimedia Support Centre (3DMSC)** - making information, training, consultancy and 3D datasets available to European multimedia users and developers - and **HOMESTEAD II** - piloting applications in the home, particularly those based on CD-i technology (see 'Standards' box).

ACTS: Bandwidth for Multimedia

Today, multimedia is essentially provided on some sort of optical disc (see Box, facing page). Tomorrow, however,

tion in Multimedia

the broadband (or high-speed) communications networks being developed under the ACTS Programme will provide new methods for delivering multimedia into the home and office.

One of ACTS' six research areas is **Interactive Digital Multimedia Services**. All of the projects in this area are brought together in the ACTS 'Multimedia Services' Domain, where issues of common interest can be examined.

The projects are classified into three sub-domains:

- **Content Manipulation and Management** projects focus mainly on 3D acquisition, modelling and scene reconstruction, stereo/3D display; MPEG tools (see Box), algorithms and systems; facial feature tracking; animation technology, and more;
- **Interactive Distribution and Transmission** projects are examining inter-

active multimedia via cable and satellite; high definition, cinema-like distribution; preventing piracy and illegal copying, and more;

■ **Server-Based Multimedia Services** projects are developing standards for transmitting multimedia content; intelligent service interfaces; advanced navigation and dialogue tools, agent technology, and so on. ●●●

Context: Standards *The Digital Choice*

While compact discs all look the same, today's multimedia market is saturated with a bewildering array of standards.

Today, multimedia material arrives principally on compact discs (CDs). Originally invented for pure audio, CDs hold around 700 MB of data, are portable and robust, cost around 1 ECU to make and store data in a purely digital form. They were, therefore, the natural choice for delivering multimedia.

Two distinct formats for multimedia CDs dominate the market: **CD-ROM** and **CD-i** (CD-interactive). CD-ROMs were designed to run on personal computers, and represent the largest multimedia market segment - approximately 100 million CD-ROMs were manufactured world-wide in 1993, and an annual manufacturing growth of 150% is forecast.

CD-i players, on the other hand, are designed to plug into home TV sets, turning them into interactive, multimedia machines without keyboards. For this reason, CD-i has always emphasised high image quality, and for some time now has used dedicated hardware to deliver full-screen, full motion video (**FMV**) using the internationally recognised **MPEG-1** standard⁽¹⁾.

Most CD-ROMs produced during the same period, on the other hand, have relied on lower quality, software-only video processing, ensuring compatibil-



Source: European Commission

Compact discs are the natural choice for delivering today's multimedia. For large volumes of data, it is still faster to send a CD by 24-hour express courier than to use a commercially-available high speed Internet connection.

ity with as many PCs as possible. 'MPEG cards' for PCs are now increasingly common, however, bringing FMV to the CD-ROM market.

So when can multimedia developers produce 'one-format-fits-all' discs? Some emerging CD formats do offer hope: **Video CDs**, designed principally for films with only limited interactivity, include codes allowing CD-i players and some PCs to read them, while **Extended Architecture CD-ROM (CD-ROM XA)** provides full interactivity on both CD-i and PC, although the latter require a compatible drive. The original CD-ROM standard will still be compatible with 'XA' machines.

High Density, High Bandwidth

In the near future, multimedia will benefit from two technological advances: a high capacity optical disc known as the **digital video disc (DVD)** and faster on-line connections.

Although it will look like a standard CD, the recently announced DVD holds 4.7 gigabytes of data - nearly seven times the capacity of a CD and sufficient for over two hours of high-quality audio-video. Furthermore, this capacity may be doubled using 'two-layer' DVD.

Lastly, the creation of the **HTML** (Hypertext Mark-up Language) standard has brought multimedia to the Internet in the shape of the **World Wide Web (WWW)**. Experiments are also underway with **VRML** (Virtual Reality Mark-up Language), which specifies '3D spaces' rather than 2D documents.

On-line multimedia is bandwidth-hungry, however, and will need better infrastructure to take off. Trials now underway with 'cable TV modems' are demonstrating access speeds of 10 Mb/s, so the wait should not be long.

⁽¹⁾ MPEG-1 is the standard defined by the Motion Picture Expert Group for compressing/processing images at 1.5 Mb/s.

The Copyright Issue



Available from all EUR-OP Sales Agents (see most EC-sponsored publications for an address list). Catalogue Number: CD-NA-16128-xx-CE (where 'xx' = EN or FR), 21.5 ECU.

The question of copyright is a critical one for multimedia producers and authors. As yet, there are no internationally-recognised guidelines to help multimedia publishers and content-owners reach straightforward agreements. Identifying and obtaining the appropriate consents is time-consuming and sometimes costly.

As a result, much material is too expensive to be used in multimedia material. In fact, roughly half of the IMPACT 2 consortia found that it cost less to create their own still photos, moving footage, audio recordings, animation and computer graphics than to use existing material. It was also, of course, less restrictive in a creative sense.

All of these issues are dealt with in the book, "Practical Guide to Copyright for Multimedia Producers", produced by the European Commission's Legal Advisory Board for the Information Market (LAB) earlier this year. It will also be made available at the LAB's WWW site later this year (see Contacts box).

Finally, ESPRIT's **IMPRIMATUR** (Intellectual Multimedia Property Rights Model and Terminology for Universal Reference) project - launched last December - is working closely with similar projects in Japan and the US to establish international standards for copyright protection.

Telematics: Multimedia On-line

The Telematics Applications Programme is developing the multimedia telematics applications which will run on the infrastructure being developed by ACTS.

The Programme is very user-oriented. Companies planning to develop new on-line multimedia telematics tools and products should find that one of the Programme's 13 action lines



Source: European Commission

Multimedia on-line: the Telematics Applications programme is developing the technologies for tomorrow's high-speed networks.

is oriented towards their specific sector, whether it be health, transport, public services or libraries (to name just four).

The Programme also has three 'horizontal' (i.e., non sector-specific) action lines. Between them, they are devising tools for creating multimedia telematics applications, developing the necessary user environments, integrating new language processing methods, and much more.

II. The Multimedia Market

Because it marries what was once primarily an entertainment medium (audio-visual) with what used to be exclusively a working tool (computers), it is not surprising that multimedia has arrived via two paths. On the one hand, systems have been developed to add computing power to televisions; on the other hand, the computing industry has focused on producing computers with advanced audio-visual capabilities (see Box, page 9).

This dual approach means that the market is still fragmented, forcing multimedia content developers to publish their material on several platforms to reach the entire market. Obviously, this added cost makes many products non-viable.

The EC has focused on stimulating the multimedia content industry since 1988, when it launched the IMPACT (Information Market Policy Actions) Programme. The 64 MECU main phase (IMPACT II) finished last December, although certain initiatives are still ongoing. The aim was to establish and promote an internal market for advanced electronic information services. Activities included initiatives such as 'Standards for Open Information Interchange', 'Information Services for Business', 'Quality Assurance Methods for the Information Industry' and 'Interactive Multimedia Projects'.

The latter initiative resulted in 22 demonstration multimedia projects, including a companion guide for expectant

parents, a guide to European folk culture, the Flemish contribution to the genesis of European art, a tourist information system, a children's encyclopaedia, back injury prevention and much more (see Case Study, page 13).

IMPACT finished recently and the follow-up Programme - INFO2000 (see edition 6/95) published its draft work programme as *Innovation & Technology Transfer* went to press. Its proposed actions include:

- **stimulating demand and raising awareness** through MIDAS-NET⁽¹⁾ - a network of multimedia information demonstration and support organisations. These will act as proactive advisory centres, aimed at raising interest and assisting information users in business and industry (especially SMEs) as well as Europe's citizens (e.g. via libraries);
- **improving the exploitation of Europe's public sector information:** a Green Paper this year will initiate a public debate, and actions to help information directories interconnect will be supported;
- **catalysing the production of high-quality multimedia content** through two Calls for Proposals, the first of which is planned for the next few months⁽²⁾.

As *Innovation & Technology Transfer* went to press: (1) a Call for Proposals to establish the MIDAS-NET network was likely to be published in June. (2) the first Call for Proposals was expected to be published in June.

Case Study: ESPRIT

Portability for Profitability

Is it possible to find 'critical mass' in a fragmented multimedia market? Yes... virtually.

At present, the multimedia market is caught in a vicious circle: consumers are reluctant to invest because of a lack of titles for any one specific platform, while the publishers and electronics companies are hesitant because of this lack of consumer enthusiasm.

The problem acts like a brake on the entire industry. While the publishers of consumer multimedia titles wait for cross-platform multimedia standards to become a commercial reality, they must opt either to target users of a specific type of machine - often lowering their standards to obtain the largest market share - or to produce different versions for each platform.

Unless, that is, they prepare their material using the Common Publishing Format (CPF) developed by ESPRIT project, OSMOSE.

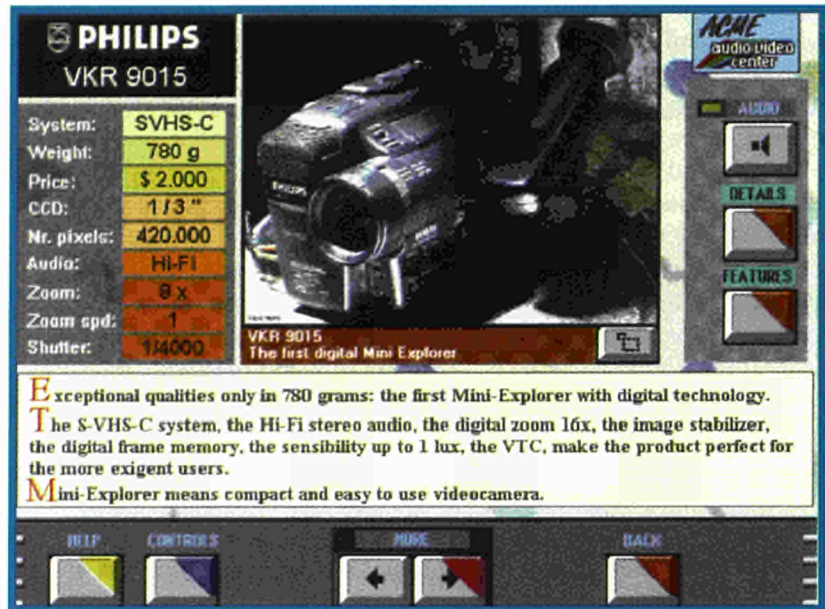
Vicious Circle, Virtual Answer

"Writing titles in CPF makes them portable across a number of delivery platforms," explains the project's coordinator Alexander Paalvast of Philips Interactive Media Systems. "Each title contains a small piece of platform-specific code that explains how to interpret CPF instructions. This 'virtual machine' is the same for each platform so the same CPF code can be used to write the main content."

OSMOSE has demonstrated CPF titles for CD-i and Multimedia PC (MPC). "Unlike other consortia in this field, we chose to focus on consumer-oriented interactive multimedia titles and platforms," explains Mr Paalvast. "Making one version of a title compatible with these leading platforms should increase the revenue-to-cost ratio in multimedia publishing. This, in turn, should increase the number of titles available for the platforms concerned, making multimedia systems more commercially attractive."

The OSMOSE project has also developed several tools to aid CPF title creation:

- 'Workbench', a text-oriented toolkit for writing and editing CPF scripts;



Another OSMOSE partner, Olivetti, created this 'Kiosk' point-of-sale application using authoring tools that they adapted to generate CPF code.

- 'Producer', a graphical interface for designing applications via a flow-chart method;
- 'Simulator', which allows an application to be tested at any stage without actually pressing a CD.

Singing for Joy

Another OSMOSE partner, the Multimedia Corporation, has already created a pilot title that is planned to become a marketable disc. The disc centres around a high definition television (HDTV) production of Mozart's *Così fan Tutte*, which has been converted to MPEG digital video. Interactive features have been added to allow the user to explore aspects of the work such as plot, characters and music.

Although OSMOSE successfully demonstrated CPF portability between CD-i and MPC platforms in the laboratory, the project came up against another 'standards' problem hindering its general release. "The problem is with audio-visuals for MPCs," explains Mr Paalvast. "Although MPEG-1 compression is obviously a standard recognised

by all MPEG cards, the code driving a particular card is proprietary and therefore incompatible with the virtual machine approach. Thankfully, this is about to change as standardised, software-only MPEG decoding becomes a reality on more powerful machines."

While CPF was designed for optical disc playing platforms, some members of the OSMOSE consortium are now looking at adapting it for creating applications designed to run on tomorrow's high-speed, on-line systems. Hopefully, work like theirs will help on-line multimedia escape the vicious circle.

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III. Multimedia for Education

Experience has shown that multimedia can improve the effectiveness of learning activities at home, school and the office. It can also address special needs, such as those of disabled people.

The strategic importance of both the multimedia industry and the education sector is reflected in all relevant EC activities (RTD, Education and Training, Information and Culture, etc.). DG XXII (Education, Training and Youth), for example, is currently organising a competition to encourage the potential users of educational multimedia packages - school pupils and teachers - to design their own multimedia presentations. Similarly, a number of recently announced Telematics Applications projects are oriented towards DG XXII programmes such as SOCRATES and LEONARDO (see *edition 1/96*).

The **Task Force on Multimedia Educational Software** was launched last year to further this sort of co-ordination and co-operation (see *edition 5/95*). Its Call for Expressions of Interest was published last June to gather ideas for European initiatives to develop the European market. The Call attracted over 5,000 responses from more than 2,200 different companies, institutions or individuals all over Europe and the ideas ranged from mathematics for primary school children to advanced training for medical specialists.

The ideas demonstrated the need for better dialogue between the industry and its users: educational institutions generally described the proposed content subject precisely, but described the technologies to be used more vaguely. Small SMEs, on the other hand, provided more detail on the technology's use, but were weaker on their educational approach.

Priorities for the Future

The Task Force's intermediate report, published earlier this year, suggests priorities for the relevant EC initiatives (Programmes, Structural Funds and Trans-European Networks, etc.). It also recommends that, by the year 2000:

- every teacher has access to multimedia tools and to training enabling their use and integration into teaching practices;
- every pupil has access to multimedia

teaching resources at school, a particular effort being made to cater for handicapped children;

- every primary and secondary school has at least one multimedia microcomputer per classroom, connected to local area, national and trans-European telematics networks;
- every adult has access to multimedia tools at work or during vocational training;
- every university has access to the very high-speed networks needed for exchanging and using multimedia educational materials;
- every public library offers, free of charge, access to telematics tools and services;
- every firm has access to a centre for multimedia educational resources, creating a virtual "open university for industry". □

“

Teachers are the most knowledgeable of user needs, they are the 'natural allies' for industry ... taking into account the relatively weak collaborative links between industry and the educational and training establishments, a special action enabling strong interaction by way of common projects between both actors seems to be justified ...

”

Analysis of Results of the Call for Expressions of Interest, Task Force for Multimedia Educational Software.

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Case Study: IMPACT

The Extended Exhibition

Producing "Journeys Through Victorian London" illustrated the challenges - and benefits - involved in developing sophisticated 'edutainment' multimedia packages.

Up until recently, museums only ever exhibited a small part of their collections," notes Roderic Leigh, Managing Director of Valkieser New Media. "Interactive multimedia offers them a completely new way of fulfilling their mission."

The Dutch company set out to test that hypothesis in early 1994 when they, the Museum of London and the Centre for International Technology and Education (CITE) launched a project with co-investment from the IMPACT programme.

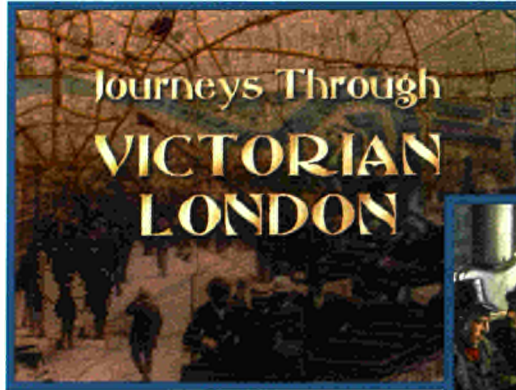
"The Victorian era is ideal for a multimedia product, because we have material in virtually every form - prints, paintings, photographs, even audio recordings and archive film footage," says Alex Werner, the Museum of London's curator for the 19th century. "We even incorporated some previously unknown films shot by the Lumière brothers that we discovered during the project."

Visual Style

This is reflected in the disc's graphic style - a multi-layered collage combining film with paintings, prints and photos. "As it's a very visual product we chose the CD-i format, which uses MPEG standards to provide high quality video," Mr Leigh adds. "Ironically, we're using state-of-the-art technology to display some of the world's first movies."

The disc is structured so that the material gets richer as one digs deeper. Users can explore Victorian London through themes (the 'Transport Revolution', 'Growth & Change', 'Royal London', etc.) or investigate London geographically through 31 different sites. They can also take a tour via the 'Encounters' section, where a selection of Londoners and visitors to the city (Dickens, Van Gogh, Marx, etc.) provide their own impressions.

"Dig even deeper and you'll find over 1,300 fact files, totalling around 100,000 words," reveals Mr Leigh. These fact files are crucial to Valkieser as



The start of an interactive voyage of discovery through 19th Century London.

Source: Museum of London



The graphic style of the presentation makes full use of the richness of multimedia: a multi-layered collage combining film with paintings, prints and photos.

they 'retool' the product for release on CD-ROM. "By itself, the CD-i is not commercially viable - we need to republish the material on different platforms to reach the largest audience," Mr Leigh notes. "We hope to release the CD-i before the autumn, and the CD-ROM by the end of the year."

Intellectual Property

Although the project had a rocky course - one of the initial partners withdrew over disagreements regarding cross-platform exploitation and intellectual property - the remaining partners worked well together.

"The project taught us how vital mutual respect and close co-operation are to success," Mr Leigh emphasises - a view shared by the Museum of London. "Mutual trust is paramount - each partner must focus on their core skills, and trust and respect those of their partners. We'd never embark on a similar project without the kind of collaboration that existed between the Museum of London and ourselves."

The museum's involvement was also crucial because much of the material came from their 19th century collection. "Acquiring non-exclusive world rights

for optical media is becoming so expensive that most profits can go to the copyright holder, rather than the publisher," adds Tom Evans of CITE. "This limits multimedia's potential in the present market."

Mr Leigh acknowledges the impetus provided by the EC. "I doubt, in fact, that we'd have launched the project without IMPACT's support. For me, these new media are not just a commercial product, they are a key to preserving Europe's cultural heritage."

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► CASE STUDY: INNOVATION RELAY CENTRE
THE INNOVATION PROGRAMME IN BRIEF

The Innovation Programme implements the Third of the four Activities of the Fourth Framework Programme (1994-1998). Run by DG XIII/D, the Innovation Programme encourages the exchange of research information and the absorption of new technologies by European companies. See edition 1/95 for a brief profile.

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A Promising Harvest

A research consortium - formed with the aid of the Innovation Programme's Innovation Relay Centre Network - aims to help European industry reap the benefits of a new crop, the crambe plant.

Non-food crops are enjoying increasing popularity as efficient and environmentally-friendly alternatives to synthetic and mineral sources of oil and other raw materials. Initial research has shown that *Crambe abyssinica* - a relative of the rape seed plant - provides high quality oil that biodegrades rapidly. This is a distinct advantage in dirty applications, such as chain saw operation, where splashes from traditional mineral oils can harm the environment and workers.

Impressed by these results, Mrs Elsie Tittone and her colleagues at ENESAD (*Etablissement National d'Enseignement Supérieur Agronomique de Dijon*) decided to establish a crambe crop in France. "Our aim was to explore the plant's full industrial potential and to identify new varieties most suited to these applications and to cultivation in Europe," she explains.

Co-ordinated Transnational Research

Realising that the ideal solution was to pool the expertise of various European research teams, ENESAD turned to ARIST (*Agence Régionale d'Information Scientifique et Technique*), which hosts the region's Innovation Relay Centre, or IRC (see edition 5/95). "We received invaluable information from the IRC - on both the relevant European programmes and the various types of proposals we could make," confirms Mrs Tittone.



Budding potential: the Concerted Action has helped to network experimental crambe crops, such as this one in France, with genetic research centres and industrial users across the EU.

ENESAD subsequently established a Concerted Action under the EC's FAIR programme⁽¹⁾. The 200,000 ECU, three-year project groups 13 research teams from six European countries. "The Concerted Action has given us a framework for the exchange of information," explains Mrs Tittone, the project's co-ordinator. "Since the project started in 1994, we have been able to establish a comprehensive overview of all aspects of crambe plant production. This has helped us to identify relationships between cultivation factors - such as genetic variation, which is being explored by our Dutch colleagues - and industrial applications - such as lubrication, which is being investigated in France and Italy."

Promising Results

As well as oil production, the project has explored uses for the crambe seed in the paper,

chemical, pharmaceutical and cattle-feed industries. "All these possibilities look promising but it is as a source of oil that the crambe plant is likely to have its most immediate success," says Mrs Tittone.

When the first samples of crambe oil were obtained from the French crop in 1995, the IRC helped again by identifying potential industrial test sites. "In every case, the users were impressed by the crambe oil's performance as a lubricant," says Mrs Tittone. "However, a number of production factors need to be improved and ENESAD hopes to collaborate in new EC projects to address these issues." □

⁽¹⁾ Concerted Actions under the EC's Specific RTD Programmes support the cost of networking research teams across the EU. FAIR is the Specific Programme for fisheries, agriculture and agro-industrial research. This Concerted Action is FAIR project R3 CT 94-2480.

► EIMS

Consulting Engineering Services

Can consultant engineers provide competitive solutions for innovative small firms?

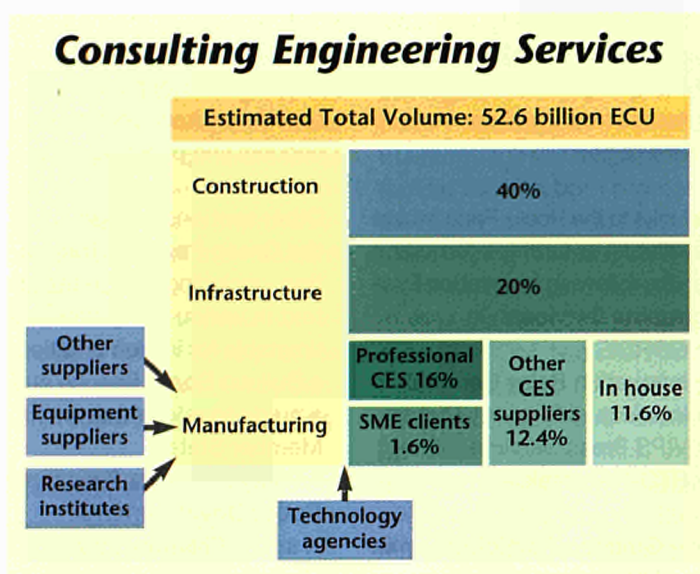
This was one of the questions addressed by a study carried out by the European Innovation Monitoring System (EIMS) in 1994. The resulting report⁽¹⁾ answers this question by citing an Italian company: "We use professional consulting engineering services whenever our forces are unavailable in quantitative or qualitative terms because it is the most effective solution for supporting our own internal engineering structure."

Data on the consulting engineering services (CES) sector is poor, a problem the EIMS study set out to address. It found, for example, that the market for CES grew at double digit rates in the 1980s and early 1990s, and by 1992 had reached over 50 billion ECU for the then 12 EU Member States.

This market is likely to continue to grow - albeit more slowly - over the next few years for two reasons:

- companies are increasingly using outside resources for peripheral problems (logistics, energy conservation, environment, etc.) because it allows them to concentrate on their core business and stay competitive;
- these peripheral tasks are becoming more complex, due to increasing competition right across industry and, more specifically, between the service suppliers.

What impact will this have on innovation? Because the con-



The EIMS report found that SMEs rarely benefit from CES.

sultants' reputations are built on providing reliable solutions, they tend to be reluctant to offer clients truly innovative solutions. Nevertheless, the study exemplifies how consulting engineers do drive innovation forward through:

- the qualifications and dynamism of their personnel;
- their alertness to national and European regulations;
- competitive improvements of processes and products, and tools and methodologies for better and less costly solutions.

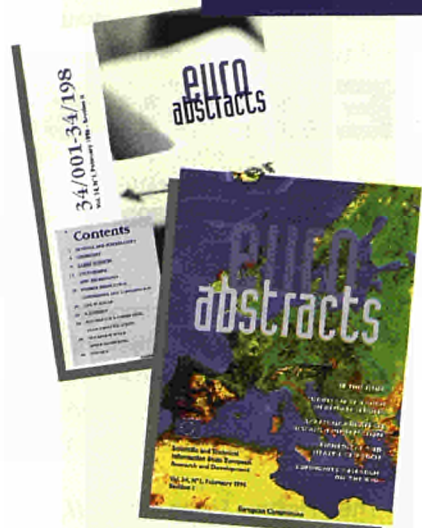
Barriers to SMEs

However, SMEs seem to be missing out on the benefits of CES. The study found that CES were often too expensive for SMEs, which often felt reluctant to pay outsiders for advice

in areas where they consider themselves experts. The one exception is for environmental consulting.

The apparent exclusion of SMEs from consulting engineering services will not only affect their competitiveness - it will mean that whatever positive impact CES can have on the innovation infrastructure could be lost for those sectors dominated by SMEs.

The study suggests that some services could be 'packaged' so as to be available at competitive prices to SMEs. The initial development cost would be spread over a larger number of sales, allowing SMEs to use CES in the same way as they use, for example, equipment suppliers. □



Euroabstracts Relunched

The 1995 Index of Euroabstracts is now available. It is a comprehensive directory of the publications emanating from the EC's RTD programmes during 1995.

For 1996, Euroabstracts has a new, twin-volume format and a new production schedule - six editions per year, plus the annual index. It has extended its coverage to include policy-related publications from the Member States and from other European and international research organisations.

See 'Publications Round-Up', page 18, for subscription information.

(1) "The Role of Consulting Engineering Services in Innovation", by the SEMA Group for the EIMS. Free of charge from the EIMS while stocks last.

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European Innovation On-line

The Innovation Programme now has a site on the World Wide Web (WWW).

As *Innovation & Technology Transfer* went to press the Innovation Programme was finalising the site's structure and planning to launch the site in May.

The Home Page (<http://www.cordis.lu/innovation/home.html>) introduces the Innovation Programme and its objectives, and, through a 'What's New' section, provides news of the latest developments (Calls for Proposals, recent publications, etc.)

The site's main sections are:

- An overview, information on the relevant Call(s) for Proposals (timing, details, results) and contact details for the following **Innovation Programme Activities**:
 - Technology Transfer and Technology Validation projects;
 - Regional Innovation Strategies (RITTS, RIS, Science parks);

- European Innovation Monitoring System (EIMS);
- European Networks and Services;
- Innovation Management Techniques (marketing innovation, technology watch, managing Intellectual Property Rights, quality management, design, value analysis);
- Financing Innovation;
- Increasing Awareness (see this page).

■ Links to the Home Page (where available) or further information on the following **Innovation Programme Services**:

- CORDIS;
- Innovation Relay Centres;
- Intellectual Property Rights;
- VIPS Press Service;
- RTD-Helpdesk.

■ A Guide to **Participation in the Innovation Programme**:

- Current Calls for Proposals,

including each open Call's Information Package;

- The Innovation Programme's Work Programme and the Council Decision establishing the Innovation Programme;
- Information Packages for each Innovation Programme activity;
- Submission guidelines - a checklist for submitting proposals, the rules for participation, a model contract, contract procedures and principles, etc.

Other sections include:

- **the Green Paper on Innovation** - including links to the full text in various languages, a timetable for implementation, a Bulletin Board Service and a guide to relevant events in Member States;
- An outline of other **European Policy Developments**;
- A set of **Frequently Asked Questions**;
- a contacts page and a Who's

Who;

- relevant publications and a guide to upcoming Innovation Programme events.

In the Pipeline

As *Innovation & Technology Transfer* went to press, the Innovation Programme was planning to add at least one more section over the summer - *Innovation & Technology Transfer*.

The on-line version of the magazine will allow users to browse whole editions and to search for articles by theme or subject (e.g., Information Society, Energy Technologies, etc.). Links in each article will take users to the relevant section within the rest of the Innovation Programme site, producing a wholly integrated information system. □

► TRAINING AND DISSEMINATION SCHEME

Improving Awareness

The first Training and Dissemination Scheme (TDS) projects launched under the Innovation Programme have begun their definition phases.



The TDS projects' global aim is to help develop a social environment favourable to innovation. The strategic aims are to develop methods for both increasing general awareness of science and technology and promoting the involvement of the public in the innovation process. To that end, individual projects will identify best practices and bring them, through a process of adapta-

tion and validation, to the point where they can be used in a wider range of contexts and countries.

As *Innovation & Technology Transfer* went to press the Commission had shortlisted eight proposals resulting from a Call for Proposals last September, and hoped to have the final decisions made by May. The proposals range from increasing awareness of the potential that

communication technologies offer for regional development to improving community education on life style and nutrition.

The selected projects will first begin a definition phase, which generally involves refining the work plan, gathering more information, examining the Intellectual Property Rights (IPR) situation, finding new partners and so on. The best possible conditions for implementing the

method at a European level will also be identified. The main phase of each project will probably begin towards the end of the year.

Awareness Scenario Workshops

In many ways, the precursor of the Innovation Programme's TDS projects was the Interfaces initiative of the VALUE II Programme (1992-1994). One successful Interfaces activity - the European Awareness Scenario Workshop (EASW) - may be expanded under the new scheme.

"The full title was 'EASW Sustainable Urban Living in the Coming Decades'", Paolo Martinez, of Fondazione IDIS, an Italian non-profit organisation dedicated to the diffusion and valorisation of scientific culture, explains. "It was similar to a TDS project because it took a concept pioneered in one country and developed and



Four scenarios for sustainable urban life:

intelligent house (hi-tech solutions for individuals), people's solar house (low-tech solutions for individuals), blocks of flats (hi-tech solutions at local authority level) and low-rise, high density housing (hi-tech solutions plus co-operation between residents and authorities).

Each workshop brought together four main groups of people - residents, technological experts, policy makers and representatives of the private sector. The two day workshop is not a simple talking shop - it is a highly structured event which enables these groups to exchange opinions, learn about the issues and generate ideas on how to implement sustainable solutions and improve living conditions in their residential area or city.

At the core of these workshops is 'Urban Ecology of the Future', a book written by Danish researcher Morten Elle.

A Kick-Start Across Europe

The partners created a large package of training and promotional material in all 11 official EU languages. The package can be used to both promote the EASW concept and to train those hoping to hold EASWs in their own town, and includes a multimedia self-training manual on CD-ROM, two short films ("From the Ideal Town to the Sustainable City" and "Green-Up Your Town", which was dubbed from the original Danish), the EASW Organisation Manual "Cookbook", "Urban Ecology of the Future", and more.

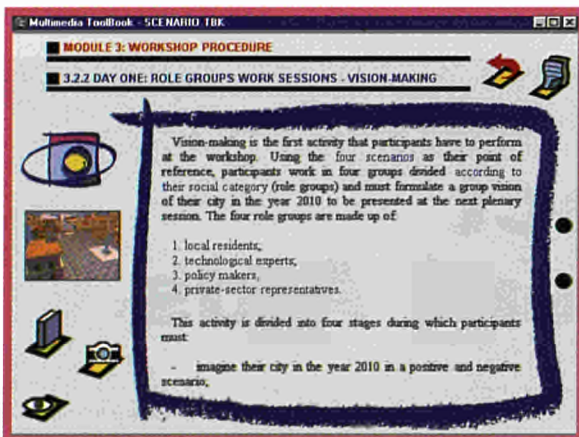
The package was tested by Fondazione IDIS during two training sessions they held in 1995. These sessions resulted in a Europe-wide network of 44 experts from 14 countries capable of carrying out EASWs. These experts have since then carried out well over 20 EASWs with national or regional funding.

In this way the European contribution was to adapt the methodology and develop tools so that it could be carried out in all European countries, and to give it a 'kick-start' by training a number of people to use it. The three organisations behind this success have now teamed up with a second Dutch organisation and a Portuguese university to propose a TDS project.

"FLEXIMODO proposes to adapt and expand the EASW concept to address a wider

range of themes, many of them identified as important by the participants of the original workshops," Mr Martinez adds. "Possible themes include mobility issues - such as traffic, transport and telematics - information provision, urban renewal and healthcare and welfare. We propose to draft appropriate tools for the selected themes, test them in workshops in Denmark, Italy, the Netherlands and Portugal, and train people in their use."

As *Innovation & Technology Transfer* went to press this proposal had made it into the shortlist, and technical discussions were under way between the Commission and the partners on the project's possible scope. □



The hypertext-based multimedia CD-ROM helps people prepare their own EASWs.

validated it for all of Europe."

The original awareness scenario workshop concept was pioneered by Ida Andersen of the Danish Board of Technology (DBT). She and Rob Bildebeek of the Dutch Centre for Technology and Policy Studies (TNO/STB) adapted the methodology for pan-European applications, while Fondazione IDIS was charged with developing ways of disseminating it across Europe.

It illustrates four possible development scenarios for urban life in the coming decades. The scenarios differ in the role they give to society and technology - one focuses on hi-tech individual solutions, for example, while another involves low-tech, co-operative and collective solutions. Each of these solutions, in turn, is described in terms of ecological themes such as the supply and use of energy and water.

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Ireland's Innovation Guide

'Source book for innovation - a guide to sources of information in Ireland' is designed to be especially useful to SMEs but its carefully cross-referenced information, detailing both national and European sources, will also meet the needs of a broad spectrum of industrial and commercial organisations.

Its nine chapters cover: RTD programmes, advice, technical assistance, market research, technology transfer, product development, patents, licensing, laboratories, universities, R&D organisations, sources of funding, publications and databases. For information on obtaining the guide - and other Innovation Programme publications - consult the 'Publications Round-Up'.

Publications Round-Up

Unless stated otherwise, the following publications are available from EUR-OP Sales Agents (see the back page of most EC-sponsored publications for a worldwide list) and prices are ex-VAT.

■ **'Country-specific' guides:**

- **'Source book for innovation - a guide to sources of information in Ireland'** (see above) - 112 pages, ISBN 92-827-5424-3, 13.5 ECU;

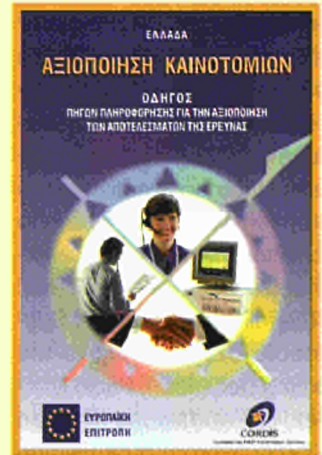
- **the other countries covered are Greece (see illustration), Italy, the Netherlands (see edition 6/95) and the UK (a updated edition has just been released).**

■ **Euroabstracts** (see page 15):

- **1995 annual index** - 212 pages, CD-AB-95-013-EN-C, 6 ECU;

- **1996 editions** - 10 ECU each or 63 ECU for an annual subscription (six editions plus index).

■ **A short leaflet entitled 'Protection and dissemination of results of EC funded research'** is available free of charge, in English, French and German, from the RTD Help Desk, fax: +352 4301 32 084.



The Greek guide to innovation support - 108 pages, ISBN 92-827-4520-1, 11.5 ECU.

New Project Management Aids

The role of the Innovation Programme's **Technology Transfer and Technology Validation Initiative** is not only to provide funding for specific 'Innovation Projects' (see edition 2/96) but also, more generally, to assist and promote good practice in transnational technology transfer. To this end, two new titles have recently been added to its collection of project management aids:

- a short video, entitled **'Transnational Technology Transfer Projects'**, outlines some essential factors for success using examples from real Innovation Projects. Amongst a

number of important points illustrated are the need to plan such projects according to end-users' needs and to set targets according to the initial conditions in each region or sector.

- the **'Contractor's Tool for Project Monitoring'** is a Windows-based software package. It may be used by definition phase projects to produce workplan proposals for the demonstration phase. Features at this level include suggestions for defining objectives and quantifiable results.

For projects in the demonstration phase, the tool's fea-

tures include a check-list of questions to help monitor progress. The resulting answers are processed to produce the obligatory six-monthly reports and other information required by the Commission.

Extensive help is provided throughout, and, wherever possible, the tool encourages standard terminology by providing choices of pre-defined responses. Though its use is not obligatory, the tool is expected to be popular with project coordinators because it streamlines the reporting procedure. This, in turn, will make it easier for the Initiative to assess its

projects' progress and hence disseminate best practice.

The software is currently being tested by Innovation Project consortia whose comments will help to shape the final version, due out in mid-September.

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Calculating Weld Safety

Forecasting how long a steel weld will last is critical to both the safety and the economics of welding. An ECSC-funded project now provides a new method of calculating the lifespan of a welded steel joint.

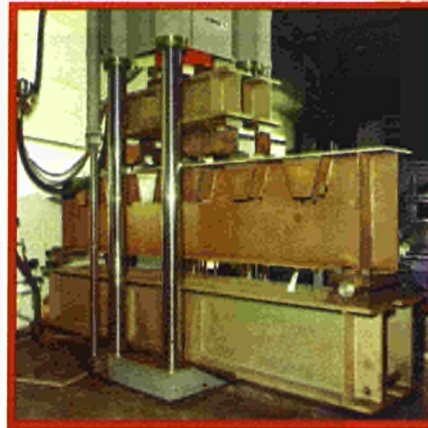
Damage to welded plant construction and equipment around the world costs millions of ECUs. Pipelines, reactors, agitators, boilers, exhaust systems and much more need to be repaired or replaced because welded joints fail to reach the end of their anticipated fatigue life.

The reason for this is that normal calculation procedures for ductile steel are inadequate. In essence, they cannot take into account the complex multi-axial stresses to which welded joints are exposed. Many designers and

Effective Equivalent Stress

One such calculation method has been developed by Professor Cetin Morris Sonsino at the Fraunhofer Institute in Darmstadt, Germany, with the help of a 285,600 ECU project funded by the European Coal and Steel Community (ECSC, see Dossier, *edition 1/95*). The project, which began in 1988 and lasted five and a half years, investigated the fatigue life of welded components under multi-axial deformations.

The new method involves a cal-



Developing new models of welded joint behaviour required combining experimental facilities and theoretical analysis methods.

span of welding joints, which had to cope with complex multi-axial loads and changes of the principle stress direction, were often acutely overestimated.

Industrial Partnership

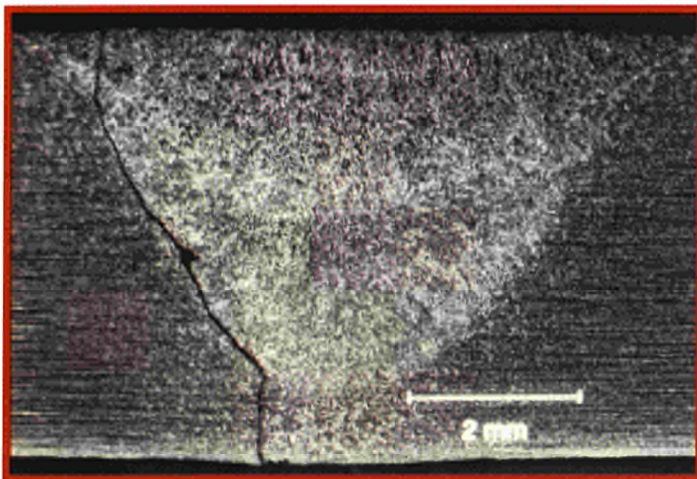
"In addition to the ECSC, which provided some of the funding, we had the support of local companies such as Mannesmann Röhrenwerke, which supplied us with seamless manufactured tubing, Kuhnle, Kopp und Kaush (KKK) and Lurgi, which assisted us with the development of the new computer software," explains Professor Sonsino.

The Fraunhofer Institute has also developed software to allow designers to use the calculation methods in their day-to-day work. The project's success will allow designers to optimise their plans without having to make allowances for undefined safety factors, leading to considerable savings in material.

The Fraunhofer Institute is now collaborating with the ECSC and the Welding Institute

in Cambridge, UK, to make the method a European industry standard under the relevant EUROCODE regulations.

Once the tolerance limits of ductile steels have been established, the Institute plans to turn its attention to aluminium welds. "At present, we know very little about the multi-axial strength of aluminium welded joints, but for reasons of energy savings, this lightweight material has an enormous future in the automotive and aerospace industries", notes Professor Sonsino. "We hope that the same approach, adapted to aluminium's properties, will produce the same benefits." □



The new modelling methods will help designers avoid cracks developing in welded joints (shown: a machined tube-tube connection).

manufacturers therefore use more and stronger welds than necessary in order to be absolutely sure of the safety of the finished product. Better lifetime calculation methods would therefore make manufacturing more efficient, reduce maintenance and repair costs, and improve safety.

calculation known as the 'hypothesis of effective equivalent stress'. This is based on a new approach which recognises that it is local shear strains or stresses which are responsible for the failure of critical component sectors.

Older methods were unable to quantify these factors with any certainty and as a result the life-

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► JOINT RESEARCH CENTRE

Detecting the 'Terror Weapon'

The JRC's European Microwave Signature Laboratory is becoming the focal point of efforts to develop an effective system for locating and identifying the millions of deadly land-mines which infest the zones of former military conflict. A new 'multisensor' system could be ready within two years.

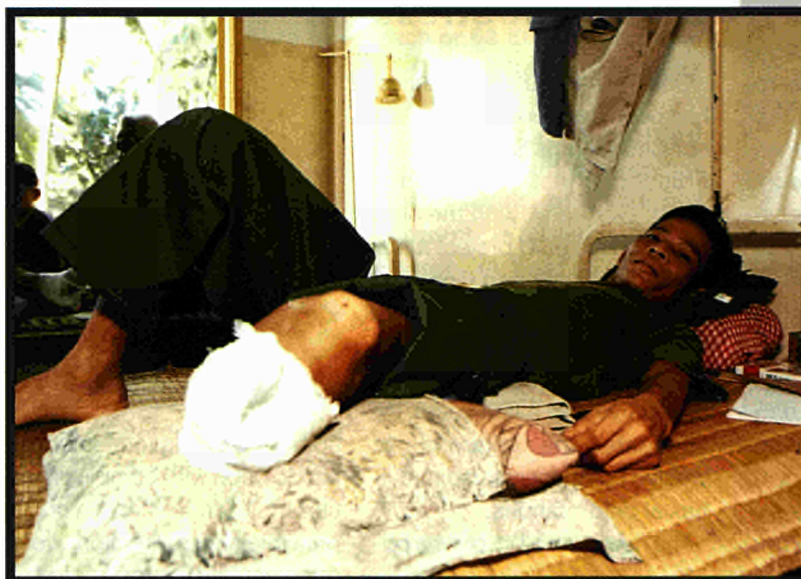
Land-mines are a human tragedy on an immense scale, blindly killing or injuring someone every 15 minutes. They also hold back countries from recovering from the devastation of warfare - around one third of Cambodia, for example, is still unusable due to their presence.

The land-mine issue is now high on the political agenda, with various international organisations, including the European Parliament, trying to restrict their manufacture and deployment. Even if these efforts are successful, however, the problem still remains of the land-mine legacy from the past.

As Boutros Boutros-Ghali, Secretary-General of the United Nations, noted last year at a conference in Vienna to review the 1980 UN Convention on Conventional Weapons, "The international community clears approximately 100,000 land-mines each year. During the same period, however, between 2 and 5 million more land-mines are laid ... If that trend continues, the international community will have to clear mines well into the third millennium and will have to suffer, between now and then, the loss of several million people who will be wounded or killed."

Detection the Key

The problem is that current de-mining methods are painstakingly slow and expensive. The present generation of mines are generally made of



plastic with a small metal component, making them difficult to detect with standard metal detectors. These detectors also give high 'false positive' results - any piece of metal buried in the ground becomes a possible mine until it is carefully unearthed, slowing progress considerably. Future designs are likely to be all-plastic.

Hence de-miners must inch their way across minefields on their stomachs, delicately probing each square metre of ground around 400 times with thin metal rods. One person can clear 20-50 metres per day at a cost of anything up to US\$1,000 per mine. The mine itself, however, can cost as little as US\$3. A better detection method is obviously needed.

Researchers at the EU's Joint Research Centre (JRC - see Dossier, edition 5/95) are now taking the lead in world-wide efforts to develop equipment

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Crippling people and countries: land-mines are both a human tragedy and a major brake on countries trying to recover from war.

Photo: Unicef/Darren Whiteside/Feb 1996

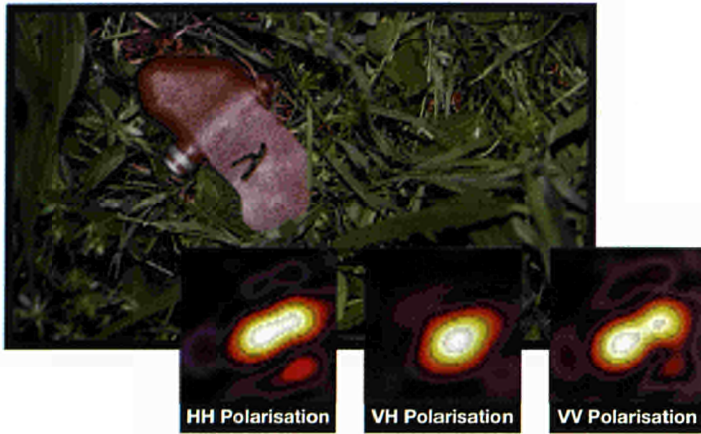
Major Accident Hazards Bureau

A Major Accident Hazards Bureau (MAHB) has been set up jointly by the European Commission's Environment and Research Directorates-General. Located at the JRC in Ispra (Italy), the MAHB will operate a major accident reporting system which will:

- record and analyse all major accidents notified to it by Member States;
- diffuse information on these accidents to the appropriate bodies in Member States;
- publish information which can improve performance in accident prevention and mitigation (i.e., disseminate the lessons learnt).

The Bureau has been set up to support the implementation of the so-called 'Seveso Directive' - the Directive on Major Accident Hazards of Certain Industrial Activities (82/510/EEC) - which focuses on the processing and storage of hazardous substances.

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Examining combinations of the horizontally (H) and vertically (V) polarised components of the reflected radar signal helps identify a butterfly mine, hidden in the grass.

that can effectively locate and identify anti-personnel mines. The JRC's European Microwave Signature Laboratory (EMSL), which specialises in 'radar fingerprinting', is being promoted as the centre of excellence in R&D work to help eliminate this long-term legacy of military conflict.

In 1994, the EMSL, which is part of the JRC's Institute for Remote Sensing Applications, launched a major study on the state of mine detection knowledge and technology in the world, with the support of Germany's Federal Ministry for Education, Science, Research and Technology.

The study, which has just been published, reports that:

- no commercial sensors that are presently available in EU countries meet the requirements;
- there is a need for a new technical solution for locating and identifying land-mines, particularly anti-personnel mines;
- the basic technologies for a new system already exist within EU research institutes and companies;
- only a combination of different sensor systems will be successful;
- an R&D programme to refine, combine and test out these sensing technologies could produce a prototype by 1998.

The study identified three sensor types which, if combined in one system, could



Edith Cresson (centre), Member of the Commission responsible for research, being shown through the EMSL, where the radar signatures of dummy land-mines (foreground) are being investigated.

meet the 99.9% reliability level needed for peace-time mine detection:

- a 3-axis Induction-Gradiometer, single or multi-frequency, which works using magnetic fields;
- an imaging polarimetric Surface Penetrating Radar;
- an imaging, polarisation-sensitive Infrared Sensor working in the middle- and/or thermal-infrared region.

A number of other sensor types have been identified which could also be applied for specific applications or in difficult terrain.

Co-ordinated Research

A co-ordinated European R&D programme is needed, the report concludes, to evolve these basic sensors into an integrated system which can cope with

the different conditions it will encounter in mine-infested regions around the world. Apart from developing, refining and combining the three sensor technologies, an important part of the research will involve building up a database of the 'signatures' which the various types of mines give to the different sensors.

"Environmental parameters such as soil, vegetation and weather can only be partially reconstructed in the laboratory," explains Dr A.J. Sieber, head of the JRC's Advanced Techniques Unit.

"Complementary field tests in real conditions - meaning in authentic mine-infested regions in areas such as Bosnia and Angola - are imperative to validate the signatures generated in laboratories. It is essential for

the detection system not only to locate the mines but also to clearly identify the type and composition of the device to ensure its safe elimination."

All of these elements then have to be integrated into one comprehensive system and incorporated into delivery systems which are robust, reliable and easy to use and maintain. "To get the 'quantum leap' we're looking for in mine detection performance, the package will need to be mobile, probably truck-mounted," Dr Sieber concludes. "The interpretation of air and space-borne images, linked to satellite Global Positioning Systems, will also be necessary to identify the location and geographical limits of mine infested areas." □



Technology Watch Publication

The JRC's Institute for Prospective Technological Studies (IPTS) has launched a new monthly publication to alert European decision-makers to the future social, economic and political implications of major technological issues and trends.

The "IPTS Report" brings together the thinking of the European Science & Technology Observatory Network, a group of national institutions dedicated to exploring the future implications of today's technological developments.

The first issue covers topics ranging from the use of DNA in data processing to the impact of personal communications technologies. The IPTS Report will be published 10 times per year and is available free of charge in English, French, German and Spanish.

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► THERMIE

Making Coal Greener

The world's largest circulating fluidised bed boiler, built with the support of the THERMIE Programme, is now producing energy for the south of France and demonstrating the environmental friendliness of this innovative technology.

C o n t a c t
 ■ Mr D. Levy,
 SOPROLIF

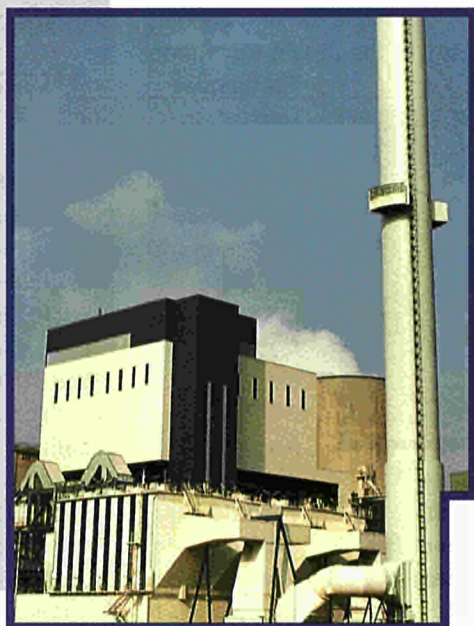
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The Gardenne site in France.

The 'Provence Clean Energy' THERMIE project was completed at the end of last year when a new 250 MWe circulating fluidised bed (CFB) boiler replaced an ageing unit within the Provence Power Station.

CFB technology is a variant of Fluidised Bed Combustion (FBC), which was first proposed in the late 1960s. A number of small scale (20-30MWt) FBC units have been developed and demonstrated around the world since then. The EU, however, is focusing on large-scale CFB units because they extract energy from poor quality, high-sulphur coal with greater efficiency and lower emissions.

"Coal accounts for almost 40% of energy production in the EU, and world-wide reserves are sufficient to last another two centuries," points out an official from DG XVII (Ener-

gy) of the European Commission. "Coal will obviously continue to make a major contribution to our energy supplies. The challenge is to render this as environmentally friendly as possible. The new unit in Provence is the largest use yet of CFB technology in the world, and therefore represents a major step in this direction."

The unit is also the latest in a series to come on-line in Europe over the past few years with the help of the THERMIE Programme, which aims to help innovative, clean and efficient energy technologies cross the 'demonstration barrier' to be introduced into the marketplace. The EC hopes that the Provence unit will pave the way towards even larger (500-600 MWe) CFB units for the next century.

More Complete Combustion

A CFB furnace burns crushed coal and limestone within a 'fluidised bed' - a mass of solid, inert particles (generally hot ash or sand), held in suspension by air blasted upwards from the bottom of the furnace.

The combustion and air flow continuously drives this hot, turbulent mass towards the top of the furnace, where a cyclone

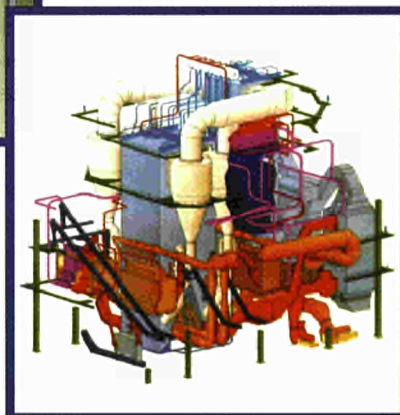
separates the solid particles from the gas. The particles are reinjected into the combustion chamber, while the gases pass through a series of heat exchangers and a dust collector before being discharged.

trogen oxides (NOx), thus reducing the plant's environmental impact significantly. Coal from the Provence region has a high sulphur content, so this technology is very appropriate. The Provence unit, for example, has a desulphurisation rate of over 95% and reduces NOx emissions by over 50%. Many countries have large reserves of this sort of coal, so CFB technology has a real future around the world.

The project brought together major industrial players from around Europe. The feasibility study was carried out with the participation of GEC ALTHOM Stein Industrie, which manufactured the boiler under licence from the German engineering company Lurgi.

The project itself was launched by Electricité de France (EDF) and Charbonnages de France (CDF), and is being operated by SOPROLIF, a joint venture between EDF, CDF, Stein Industrie, Lurgi and ENDESA, the Spanish power producing company. The entire cost amounted to around 230 MECU.

"THERMIE's support - around 20 MECU - was one of the reasons we elected to use this innovative technology," explains Daniel Levy, SOPROLIF's General Manager. "We probably would have used a more tried and tested technology without THERMIE's support." □



A 3D view of the CFB boiler.

separates the solid particles from the gas. The particles are reinjected into the combustion chamber, while the gases pass through a series of heat exchangers and a dust collector before being discharged.

By recirculating the particles, CFB units burn coal more completely and allow for efficient heat transfer, despite a relatively low furnace temperature of 850°C. This low combustion temperature both increases the absorption of sulphur dioxide (SO₂) by the limestone and minimises the formation of ni-

► CONFERENCES

Integrated Applications for Risk Assessment and Disaster Prevention for the Mediterranean 20-23 May, Malta

The theme of the European Association of Remote Sensing Laboratories' annual symposium is expected to attract representatives from Mediterranean institutes, universities and government departments. Remote sensing techniques can form part of an effective tool to mitigate disasters in the region. Presentations will cover:

- drought, desertification;
- floods, oil spills, algae blooms;
- saltwater intrusion, aquifer vulnerability;
- earthquakes, crop diseases, forest fires, etc.

In addition, round-table discussions will centre on the theme: 'Towards Creating Euro-Med Remote Sensing Networks'. Mediterranean countries are still in the process of setting up their remote sensing facilities and the conference's exhibition will provide a timely opportunity for the appropriate scientific and commercial sectors to meet.

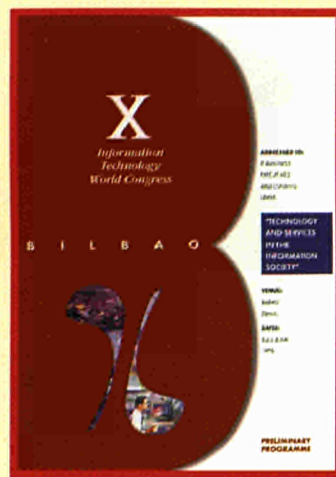
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10th Information Technology World Congress

3-5 June, Bilbao (Spain)

This biennial event, which dates back to 1978, is promoted by the World Information Technology and Services Alliance (WITSA) - an international organisation that brings together a large number of associations connected with computing and telecommunications. The last event, held in 1994 in Yokohama (Japan), was attended by more than 1,200 entrepreneurs in this sector from 55 countries.

The theme of this year's Congress - 'Technology and Services in the Information Society' - will bring together traditional IT companies, software and service providers, telecommunications operators, information suppliers and



leading users. New concepts, models and tools will be presented, to help companies to attain excellence through competitive strategies. Amongst the keynote speakers will be Martin Bangemann, European Commissioner for Industry, Information Technology and Telecommunications. Plenary sessions will be held on the following current issues:

- global infrastructures for the information society;
- IT products and services in a changing world market;
- are client/server computing systems meeting expectations?
- the user's view from the financial sector.

In addition, parallel sessions will cover: services, software, management and business, and communications.

Contact: Congress Secretariat
Tel: +34 4 427 75 21
Fax: +34 4 427 65 57
E-mail: itcongress@sedisi.es
WWW: <http://www.itcongress.sedisi.es>

Annual Conference on Biomedicine and Nanotechnology 6 June, Glasgow (Scotland)

The theme of this conference - organised by the Centre in Scotland for Nanotechnology under the auspices of the Technology Transfer Centre - is 'Advances in Drug Discovery Techniques'. Issues to be covered include: natural products, plant cell culture, marine sources, molecular reprogramming, advances in glycoproteomics, combinatorial chemistry, advanced screening and informatics, present and

future applications of automation, and more.

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SMEs in a Learning Society

20-21 June, London
Organised with support from the EC as part of the European Year of Lifelong Learning, the conference is being held by the Economic Development Unit of the University of North London. Its aim is to promote and stimulate the implementation of lifelong learning strategies for the competitive advantage of European SMEs.

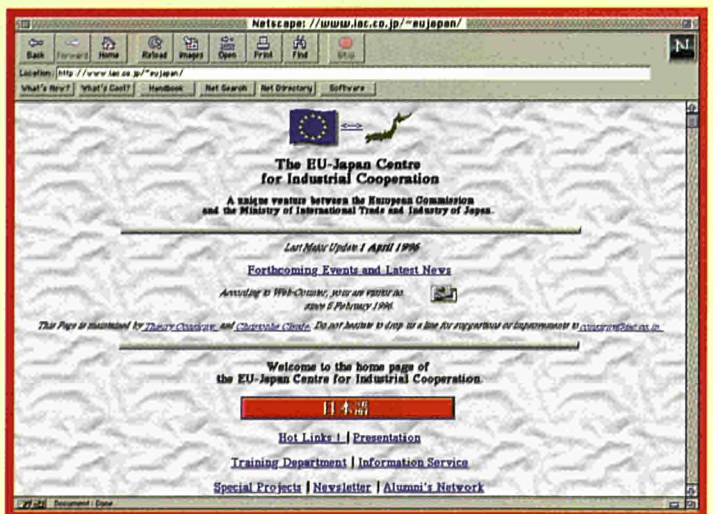
Three main themes will be addressed at the plenary sessions:

- SMEs as learning organisations;
- the context for new and in-

novative SMEs - the relevance of particular environments; ■ partnerships with SMEs. These themes will also permeate all workshop sessions, which include: SMEs: investing in people and their skills, internationalisation of SME networks, mechanisms for diffusing knowledge in smaller companies, policies for improving the environment for innovative SMEs, and much more. Subject to acceptance of an abstract, delegates will also have the opportunity to present specific projects, experiences and examples of best and innovative practices at the workshops.

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Course: Innovation and Product Development in Japan 23 June - 4 July, 1996, Tokyo



This two-week study mission, hosted by the EU-Japan Centre for Industrial Co-operation, is limited to the first 15 applicants on a 'first come, first served' basis. There are no tuition fees, although the participants must bear the expenses of travelling to and staying in Japan.

The programme includes ten visits to a wide range of innovative Japanese companies and laboratories, as well as twelve lectures on subjects such as:

- Japanese R&D and Industrial Policy;

- Industrial Design 'Japanese Style';
- Sources of Japan's Technological Edge;
- Intelligent Manufacturing System Programmes;
- Managing Product Development.

Further information and an application form can be obtained from both the EC and the EU-Japan Centre's WWW site.

Contact: Mrs Martin-Bletsas, DG III/A-2
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<http://www.iac.co.jp/~eujapan/>

●●●

International Workshop on Metallothioneins 30-31 October, Geel (Belgium)

The Institute for Reference Materials and Measurements (IRMM) - part of the EC's Joint Research Centre (JRC, see *edition 5/95*) - is organising a two-day workshop on the proteins known as metallothioneins or 'MTs'. Despite extensive research, the exact functions of MTs are as yet unknown. It is thought, however, that they could play a part in biological functions such as: metal storage, the detoxification of metal ions, cation transport, the immune response and the metabolism of essential elements.

In particular, essential trace elements such as zinc and copper, and toxic elements such as cadmium and mercury have been observed to pass into MTs. Hence it is believed that a greater understanding of MTs could help to elucidate the physiological mechanisms regulating the flow of metals through the organism. To this end, the workshop will focus on: analytical aspects; MT and the environment; and nutritional and biochemical issues.

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► PUBLICATIONS

■ RESEARCH AND TECHNOLOGY: THE FOURTH FRAMEWORK PROGRAMME (1994-1998)

EUR 16620, ISBN 92-827-49843, 7 ECU
 DG XII (Science, Research and Development) has published a guide to R&D under the Fourth Framework Programme. Available in all Community languages, the guide offers an introduction to the European Union's research programmes and guidance on how to gain access to them. It includes contact points for each specific programme, a list of Innovation Relay Centres (see page 14) and examples of EC-funded projects.

■ ELECTRONIC COMMERCE INVENTORY ON WWW

Via ESPRIT Home Page, <http://www.cordis.lu/>
 This new inventory has been compiled by ESPRIT, the EC's information technology RTD programme (see Dossier, *edition 6/95*). It covers the initiatives that were initially presented at a Commission workshop on electronic commerce which took place in Brussels in February, outlining their objectives and main fields of activity. ESPRIT's March call is supporting proposals for electronic commerce pilot projects as part of its 'Technologies for Business' area.

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■ GUIDE TO INNOVATIVE ACTIONS FOR REGIONAL DEVELOPMENT

ISBN 92-827-4870-7
 DG XVI (Regional Development) has published a Guide to Innovative Actions for Regional Development. Available in English and French, the publication covers the programmes financed by the Commission under Article 10 of the European Regional Development Fund. This supports innovative actions aimed primarily at exploring co-operation and exchange of experience between participants in local and regional development. The guide seeks to enable potential beneficiaries of ERDF grants to explore the range of activities covered between 1995-1999. It also outlines practical application details for future pilot projects in this area.

Contact: Mr. J.-P. Berg, DG XVI,
 Fax: +32 2 299 21 20

■ LET'S TALK RESEARCH

ISBN 92-827-5778-1
 The EC's Industrial Research and Development Advisory Committee (IRDAC) has published a booklet based on interviews with eight senior

NOTE

If specific contact information for obtaining a publication is not supplied, refer to the 'Quick Reference Guide' (1/96). Publications are free unless otherwise stated.

industrialists on the state of science and technology in Europe and the research programmes of the European Union. All the contributors agree that, while Europe is strong in its science, it has failed to transfer new scientific advances into industrial practices as quickly as the United States or Japan. What is more, entrepreneurship is not on the same scale as, for example, in the United States.

The industrialists see the major challenge facing Europe as being the achievement of a sound balance between the free market concept and constructive co-operation in R&D between competing companies. In this context, they consider that a better focusing of the Community's RTD programmes is necessary and see the creation of the new industry-research task forces (see *edition 5/95*) as a good step in this direction. The booklet is available in English only.

Contact: Mr Smits, IRDAC,
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