

Innovation & Technology Transfer

3/95

ISSN 0255-0806

Renewable Energies Future Business Opportunities

plus

- **Valorisation: New Alloys**
- **Technology Transfer:
Case Study and Conference**
- **Telematics Application Sites**
- **Software Best Practice**
- **Non-Destructive Testing**
- **and more**



C O N T E N T S



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Communicating EU Research

A key component of the 'Third Activity'

Encouraging greater public awareness of science and technology is an important concern everywhere. The European Commission contributes to this effort, for example by initiating the European Week for Scientific Culture.

Naturally, communication is a key part of the new Programme for dissemination and exploitation of research results, corresponding to the Third Activity of the Fourth Framework Programme. To give a taste of the research carried out under the Framework Programmes, a compilation of articles on the subject has recently been published ('Spotlight on European Research', see page 9). It is based on information communicated to European science journalists through a press service which is planned to continue under the Third Activity. The goal is to promote to the general public the benefits of adding a European dimension to the conduct of research.

In addition, the 'Third Activity' has another, more specific constituency - those who could directly benefit from the Programme's activities in promoting a better environment for innovation and the diffusion of technologies.

How best to reach this audience, comprising businesses of all sizes, research managers, technology advisers, financiers, academics and many others, is a continuing topic for discussion. This newsletter is one response; others include the Relay Centre network and the Community R&D Information Service (CORDIS).

Timely and effective communication with its partners will be a prime concern of the Third Activity. An opportunity for an in-depth debate with the Third Activity's constituency will be provided by the launching of a green paper on the promotion of innovation policies in the EU, foreseen for the end of the year.

Finally, eagle-eyed readers will have spotted a new CORDIS logo on this issue's cover. It has been introduced to underline the strides made by CORDIS since it was launched in December 1990. At that stage it was an experimental service comprising just three on-line databases. Today, CORDIS is a portfolio of easy-to-use products in the form of on-line services, a quarterly CD-ROM and printed publications. All offer unrivalled coverage of EU research and its exploitation potential.

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► **CASE STUDY: NETWORKS**

Multinational Teams for Transnational Networks

Cross-border personnel transfer is proving to be a very effective strategy for technology transfer networks. It played a crucial role last year when one network helped a British company displace American suppliers to the French aerospace market.

In 1990 SPRINT supported the start-up of a technology transfer network involving partners in France, Portugal, Spain and the UK. It has a regional approach and is characterised by private or semi-private technology transfer agencies. For example, Adour Compétitivité, the French partner,

is in nature - not specifically set up to focus on any one industrial sector. Nevertheless, the aerospace sector has provided the largest share of the almost 30 collaborations they have helped set up since 1990 through the SPRINT-supported network.

"We initially focused on the aero-

The Human Factor

Mr Delange is in a good position to understand the French and British regions of the network, as when the network was established he was working for Adour Compétitivité. He joined NIMTECH - originally for 18 months - to reinforce the linkages between the two companies.

"The human factor is absolutely essential to running technology transfer," he says. "When the technology transfer is also transnational in nature, then setting up international teams at each node of the network makes an enormous difference. It also makes a very significant difference in setting up first contacts".

The approach was so successful that it was expanded. Thierry Delange is still with NIMTECH, which has nationals from six different countries working in their office. In addition, when the Irish agency Forbairt joined the network last year one of their staff moved to Adour. "For local companies, this brings Europe right to their doorstep," Mr Delange continues. "Our clients here in the north west of England have Spaniards talking to potential Spanish partners, myself representing them in France, and so on. It makes a difference."

Judged by Merit

One of these clients is Bird Precision Bellows (BPB). A 100-strong company with a 5000m² factory in Cheshire (UK), BPB is an acknowledged high-quality supplier of process components to a wide ●●●



BPB's 'vibreaker' unit, being used by the Airbus consortium.

is a small, private company established by the French industrial giant ELF Aquitaine to support SMEs in the Pau and Toulouse region of south west France. The UK partner is The North West Regional Technology Centre (NIMTECH), originally established by twelve British industrial companies to focus on the English region north of Manchester.

According to Thierry Delange of NIMTECH, the network is general-

space sector because both the British and French regions have many subcontractors in this industry, so they are quite complementary areas," he notes. "The Spanish aerospace market has developed more slowly for us, particularly with the worldwide industry in its current state. We need to expand our operations, so more recently we have helped companies in fields ranging from plastics to surgical equipment. "

●●● range of manufacturing industries. Around 60% of their production is destined for export.

BPB have been supplying British and German aerospace manufacturers for many years. In the early 1990s they turned their sights to the French market. "What we were looking for was to expand our range of clients for one of our product families - a flexible joint used in aircraft ducting," explains Richard Mullings, Aerospace Sales Manager for Bird Precision Bellows. "This ducting, or pipework, is used throughout the plane for a variety of purposes, ranging from de-icing to cabin pressurisation. The French company we contacted were importing all of these joints from the USA, so, considering that we were already supplying both British Aerospace and Deutsche Aerospace, we thought we had a reasonable chance of success."

Breaking into a new market, however, is never easy. The French company were resistant to the idea

of introducing a new and, to them at least, unproven supplier. "It costs time and money to approve a new supplier, and with the aerospace market as it is they were not exactly enthusiastic," Mr Mullings recalls. "Eventually, however, we passed all of their quality audits, and so joined their list of approved suppliers. However, no contracts appeared."

The British company hired a French agent, who lobbied the aerospace company for 18 months without success. After several years' work, BPB were getting ready to admit defeat, but decided to make one last presentation to the company at the 1993 Paris Air Show.

At about the same time they contacted NIMTECH, who had already helped them investigate the Spanish market. At about the same time as BPB were making their final presentation in Paris, Thierry Delange was following up his own personal contacts in the aerospace company. He also capitalised on

the strong relationship existing between Adour Compétitivité and the aerospace company, which is a major force in the south west of France.

When Richard Mullings came back from the Paris Air Show he had the impression that BPB had been more favourably received. The company were then invited to resubmit a tender against revised requirements. Things began looking positive.

"There is no way that I or our partners in the network could have helped BPB if they were not able to prove that they could better the American suppliers," stresses Mr Delange. "What we were able to do was get the right people within the aerospace company to reconsider Bird's quality levels, which are outstanding."

The French company obviously agreed, awarding a five year contract worth £700,000 (840,000 ECU) to Bird Precision Bellows in 1993 and naming them as one of their

best suppliers. One of the two American competitors was dropped altogether, while another lost 60% of their business to the British SME.

"NIMTECH was very helpful in breaking down the extra barriers which often exist between companies in different countries in Europe," Mr Mullings concludes. "Once that was done, we stood or fell on the quality of our work. You can't ask for more than to be judged on your merits, after all. Fortunately for us, that was enough." □

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► CASE STUDY: VALORISATION

New Alloys: A Testing Environment

One of the largest valorisation projects, launched to test a new alloy developed under BRITE-EURAM, is producing promising results in a pilot power station co-funded by the THERMIE Programme.

The original BRITE-EURAM project was launched in early 1988 by the Grenoble-based Materials division of the Commissariat d'Énergie Atomique (CEA). The five other partners included the Belgian industrial research organisation CRM and research institutes and companies from France, Italy and the UK. Many of them met at the 1986 COST Conference in Liège⁽¹⁾ on high temperature materials.

"The project investigated the effects of adding various trace elements to an iron-aluminium alloy," recalls Dr Adrien Magnee, head of



The CRM played key roles in both the BRITE-EURAM and VALUE projects (pictured: scanning electron microscope and micro-analysis)

CRM's Metal Science Division. "Research into basic Fe-Al alloys

began in the 1960s because they had excellent oxidation and corro-

sion resistance. However they were abandoned because their ductility was basically nil, and could not be formed into useful products."

Small amounts of trace elements, however, can make a large difference. The BRITE-EURAM project focused on adding around 30ppm of boron, cerium, chrome and zirconium to the basic Fe-Al structure. Large samples and coatings of the new alloys were produced using several methods.

The results were promising. "The alloys have excellent ductility at high and room temperatures,"

Dr Magnee remarks. "They are more resistant to corrosion, wear and creep than stainless steel and are as good as nickel superalloys - but weigh and cost less. Our Italian research partner has already made pistons from these materials."

Waste Into Energy

It is therefore not surprising that Cockerill Mechanical Industries (CMI) showed interest in the results. An independent part of the Belgian Cockerill Sambre group, CMI focus on mechanical and energy engineering and export 85% of their products outside the EU.

"Energy production is a crucial industry to CMI - 60% of our turnover is in this sector," explains Etienne Offergeld, the project coordinator and a (now retired) deputy commercial director of CMI. "We are focusing more and more on environmentally responsible energy production methods, and are, for example, the world leaders in high-efficiency combined cycle production systems. For the same reason we believe strongly in the future of fluidised bed boilers."

Fluidised bed boilers (FBBs) were developed to create electricity by burning energy-poor wastes, particularly from the coal and other industries. CMI's interest is unsurprising - the company is located in the Liège province of Belgium, a classically depressed coal and steel industrial district.

"There are hills of mining waste throughout the region," Mr Offergeld continues. "Fluidised beds could help answer many pressing social and environmental needs around Europe, and CMI are well placed to develop them. However, it is still a highly experimental technology, not least because of the lack of suitable metals."

Coal residues are composed mainly of non-combustible ash, so FBBs burn them at very high temperatures. In an FBB, finely powdered waste is superheated by a set of burners. Strong blasts of air feed the reaction and keep the powder circulating fluidly. Energy is extracted from this inferno to a steam turbine by water-carrying pipes.

The turbulent powdered waste inside an FBB's boiler is highly erosive and reaches a temperature of 1,300°C. The tubes carry pressurised water at 600°C, creating a 700°C temperature gradient across their 5mm thick walls. Few metals can withstand this environment for long, which is a major limiting factor on the entire FBB technology.

Synergy with THERMIE

CMI were tackling this problem in depth because they, along with two other Belgian companies, had embarked on a major project in

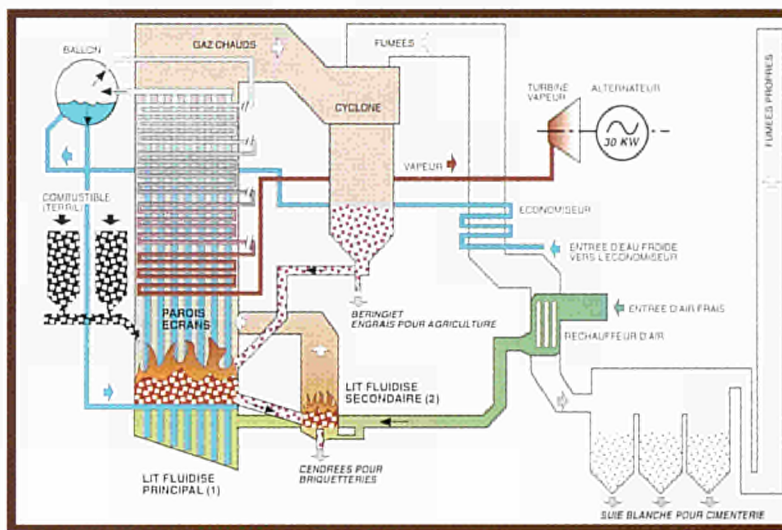
geld adds. "We had to get the project running, develop and test the coating technology in the laboratory, produce the tubes and install them in the new plant within 18 months."

Industrial Focus

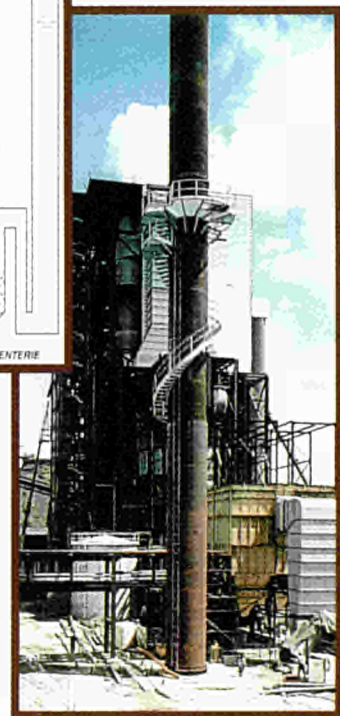
CMI therefore needed a coating technology specialist, and brought Ouest Coatings, a hi-tech French SME, into the consortium. Ouest Coatings' eight staff produced the coatings in their laboratories using the high velocity oxygen flame method, where the metals making

results-oriented structure," he explains. "The whole partnership worked so well because the EC's project framework enables companies as small as Ouest Coatings and as large as ourselves to work together effectively, without the complexities typical of private R&D agreements."

"We're optimistic about the results, and intend starting an economic study of the technology this year," he concludes. "We are also currently prioritising a list of other ideas we believe could be suitable for similar projects - we intend repeating this success." □



Schematic of a fluidised bed boiler (courtesy of CMI).



The tubes featuring the new coating were prepared in time to be installed in the 25MW demonstration fluidised bed boiler in Beringen.

1987 to build a 25MW demonstration FBB in Beringen, not far from Liège. The project has received more than 5 MECU from the EC's THERMIE Programme and its predecessor.

For CMI, therefore, the results of the BRITE-EURAM project offered a possible answer to the FBB water tube problem. However, they were interested primarily in coating the tubes with the new alloy. Although the BRITE-EURAM project had produced good preliminary results for alloy coatings, the coating technologies used were not appropriate for FBB applications.

The Valorisation project was launched in August 1993 both to develop coatings of the new alloys using the latest technologies and to test them in the Beringen FBB. "The overlap between Beringen and BRITE-EURAM presented us with a golden opportunity, but there wasn't much time," Mr Offer-

geld adds. "Whereas the BRITE-EURAM project was run by a research institute, this collaboration was run by CMI, a commercial company," Mr Offergeld notes. "The research organisations were like subcontractors, with CEA supplying Ouest Coating with the powdered metals and CRM testing the coatings in their laboratory."

The tubes were installed just eight months after the project launch. Initial results are positive. According to Mr Offergeld, the project's speed and success depended greatly on its structure. "We assembled all the elements we required in a vertically integrated,

(1) See issue 6/94 for a Dossier on COST and an article on the 1994 Liège conference on high-temperature materials.

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► CORDIS UPDATE



The new logo marks the strides CORDIS has made in providing easy access to authoritative, up-to-date and useful information on EU research and its exploitation potential.

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Usage Figures Soar

Recent figures confirm that more people are using the CORDIS databases than ever before.

There were 48% more individuals and companies using CORDIS in January this year than in the previous month - a surge doubtless due to the first Calls for Proposals being launched for the Fourth Framework Programme on December 15.

Unsurprisingly, the use of the RTD-Partners database rose particularly steeply. This database is an efficient and precise way for organisations to find potential partners across Europe to draw up research proposals. Last January saw an 87% increase in the use of this database.

CORDIS has also been quick to

exploit the latest communication technologies. Up until late last year, for example, CORDIS was registering 200-250 new users by mail every month. In November a simple-to-use on-line registration system was introduced. As a result there are now around 1,000 new users registered every month, 75% of them electronically.

CORDIS also launched its World Wide Web (WWW) Server in time for the December 15 Calls for Proposals. The server (located at <http://www.cordis.lu>), provides a wide range of CORDIS-related information, and is currently being accessed almost 3,000 times a week.

The WWW Server's electronic document delivery service has been particularly popular. This service allows users to download various RTD Programmes' Information Packs, Work Programmes and Calls for Proposals.

By February this year these documents were being downloaded at an average rate of 172 every day. In early March another 70 documents were made available through the electronic document delivery service for the March 15 Calls for Proposals. As *Innovation & Technology Transfer* went to press, the daily document download rate had climbed to almost 300. □

► MINT UPDATE

Satisfied Clients

A recent meeting of the national and regional organisations running MINT - 'Managing the Integration of New Technologies' - highlighted the success of this experimental scheme.

MINT was launched in earnest in 1994 to promote the absorption of new technologies by SMEs through the use of experienced consultants. In a typical MINT project, one of the scheme's recognised consultants spends a few days at the SME. The aim is to provide the company with an integrated management approach for acquiring and effectively using new technologies as part of an overall business strategy.

The results are already impressive - more than 400 experienced consultants are now involved, and over 600 SMEs are implementing the results of their work. Apart from helping these companies, MINT

also enables the various consultants to exchange good practice throughout Europe and stimulate SME use of innovation, advanced technologies and modern management techniques such as total quality management, industrial design, value analysis and so on.

It is a decentralised scheme. The European Commission has selected 21 regional and national Scheme Contractors from the Member States, Norway and Iceland. These select and train the business consultants, coordinate the process, organise workshops and establish links with other support schemes. The EC manages the European aspects of the pro-

gramme, has established a network to help the contractors exchange best practices, evaluates the results at a European level and ensures the comparability of methods and monitoring.

The experience exchange was highlighted by the Contractors as a significant asset when they met last February. The aim of the meeting was to review the initiative's results and discuss possible improvements for the future. Some conclusions included:

- firms have been very satisfied with the MINT consultancy. SMEs see it as a 'door opener' to strategic analysis and the successful introduction of innovation man-

agement techniques;

- MINT's flexibility and its international networking are very useful;

- the Contractors widened their know-how and range of activities as a result. □

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► CONFERENCE

Technology Transfer Projects

THE THIRD ACTIVITY

The Third of the four Activities of the Fourth Framework Programme (1994-1998) is devoted to disseminating and exploiting research results. It selectively builds upon the earlier VALUE and SPRINT programmes (see editions 1/94 and 2/94) and was profiled in edition 1/95. It is run by DG XIII/D.

"The role of technology transfer projects in the innovation process" attracted over 500 participants to Luxembourg last February to both analyse the experiences gained in technology transfer and improve processes and policies.

The conference attracted a wide range of people concerned with technology transfer and innovation, ranging from technology providers and brokers to policy-makers and planners. It was officially opened by Mr R. Goebbels, Luxembourg's Minister for energy, economy and public works, and was attended by Gordon Adams of the European Parliament.

Mr Parajon Collada, Deputy Director-General of DG XIII, underlined the Commission's commitment to developing a European culture of innovation. "The world of science and technology is changing so fast that it is becoming more and more difficult for enter-

prises of the first rank to maintain their position," he observed. "Europe must develop a culture of innovation which is not the preserve of a small circle of scientists and audacious entrepreneurs ... Innovation must be of prime importance to public decision makers at Community, national and regional level."

Themes and Sessions

The conference had several major themes for general discussion, ranging from the characteristics of technology transfer projects to improving management and dissemination strategies. The conference



Mr Parajon Collada speaking at the opening session of the conference.

success factors for one SPRINT technology transfer project were identified as:

- care taken during the definition phase;
- clarity concerning all financial aspects;
- effective coordination;
- flexible management;
- independent technical supervision;
- regular project meetings;
- personal enthusiasm.

High quality management is especially important in transnational technology transfer projects, as their added complexity gives the project managers greater responsibility, while denying them full control over the project resources.

Goal Oriented Project Planning (GOPP, de-

tailed in issue 5/94) is emerging as a powerful way to assist project planning and management. While GOPP is not the only such method available, its ability to help build and motivate a team through consensus is resulting in its increasing use by the EC and national agencies. Its advantages are that it:

- is a clear and simple method;
- exposes both common goals and disagreements in the team;
- leads to transparent plans and proposals;
- verifies plans by exploiting the experience of the entire team;
- creates 'ownership' of the project through encouraging participation.

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was dominated, however, by three specialised parallel sessions.

Within these sessions a total of 15 different discussions closely examined questions such as cultural barriers in transnational partnerships, working with SMEs, financing innovation and transferring technologies for the public good. Many featured presentations based on the experience gained in one of the many 'Specific Technology Transfer Projects' supported by the 1984-1994 SPRINT Programme.

Three sessions focused on good practice in project management, project planning techniques and the role of project managers. Key



Case Studies

Most sessions included a number of detailed testimonies from organisations involved in various technology transfer projects. A number of project participants from all stages in the technology transfer chain - technology providers, technology transfer intermediaries and technology users - assembled in one parallel session to show each other what their experiences were.

It soon became apparent that technology transfer is not the same for everybody. Participants enter projects with different aspirations, expectations and working methods. Conclusions included:

- there has to be a sound business reason for getting involved;
- success in another country requires a local presence familiar with the language, culture and so on, as well as commitment from senior management and a willingness to change production methods and working methods;
- technology transfer is 'almost impossible' if the partners have no prior knowledge of one another;
- the MINT programme (Managing the Integration of New Technologies, see page 6) offers a proven set of diagnostics in a short technical audit, and sounds attractive to SMEs;
- technology audits are useful tools for identifying SMEs' technology needs, but risk offering technology-led solutions and neglecting other business problems.

The Supply Chain

Changes in any one part of a technology supply chain will usually affect the rest. New demands from an important end-user, for example, will have important consequences for their suppliers. As the parallel sessions on the topic noted, this is increasingly the case, with systems integrators (e.g. vehicle and aircraft manufacturers) demanding subsystems, rather than unassembled components, from their suppliers.

This reduces the cost and risk for the systems builders and allows them to reduce the time to market by introducing simultaneous engineering. However it means that the

suppliers, often SMEs, require more sophisticated technologies.

One solution identified at the session is to network the supplier companies together. However the full solution to this change in industrial structure requires more. The suppliers need:

- greater systems engineering and design capabilities;
- a more responsive and innovation-oriented culture;
- better connections with the ongoing scientific and technological changes in their field.

■ need to navigate the diffusion of new technologies through the democratic process, which requires extensive and time-consuming discussion, consultation and negotiation.

Although municipalities can use new technologies to develop ageing urban infrastructure, additional efforts are usually required to get public bodies to accept the new technologies. Even when a new technology has been successfully implemented in one region, this does not guarantee its spread to other areas.

sure the spread of information on R&D. The use of this information must be assisted in the most effective and comprehensive way. It has to address all the changes necessary to bring about successful innovation in industry. We need to establish an environment that is conducive to innovation, creativity and risk taking. Therefore the Third Activity must be both multifaceted, addressing a multiplicity of components and factors, and holistic, capable of embracing all these factors at the same time." □



The Public Good

One overriding theme from many sessions was that a technology transfer project requires that all partners see a positive business reason to get involved.

Sometimes, however, it is in the public good to encourage innovation and technology transfer, even when barriers are high and markets are fragmented. One session looked at these cases, which usually fall into areas such as health, environment, resource management and so on. They are special cases because they usually involve municipalities, organisations which:

- are motivated more by quality of life issues than by business reasons;
- do not view each other as competitors, and therefore exchange know-how easily;

The conference heard how one project, which was functioning well with four partners, expanded its participant list to 14. "Each partner has a different level of technological ability and operates in a different regulatory climate and cultural conditions," a conference delegate recalled. "Integrating these additional parties and diffusing what is still an emerging technology has been hard work."

The Way Forward

The conference also covered the new Call for Proposals, launched under the Third Activity (see Box, page 7), for both Technology Validation and Technology Transfer projects.

As Dr Giulio Grata, Director of DG XIII/D, pointed out: "The new Programme's mission is not just to en-

Mr Parajon Collada, Mr R. Goebbels and Dr Giulio Grata (third, fourth and sixth from left, respectively) examining the results of a technology transfer project for clothing SMEs at the conference exhibition.

► PUBLICATIONS

Focusing on Results

'Spotlight on European Research' has recently been published in English and French. Apart from an Introduction to the EC's Research Programmes, it contains 50 two-page articles, each profiling the results of one or more successful research projects launched in the 1987-1994 period.

The articles, which were originally published as separate VIPS (VALUE Information Press Service) file sheets, are divided into seven sections:

- Electronics, Information Technologies and Communications (10 articles);
- Industrial and Materials Technologies (6);
- Medicine (6);
- Agro-industry and Food Technologies (7);
- Research and Technologies for Developing Countries (6);
- Environment (8);
- Energy (7).

Each article includes a brief summary of which countries and how many participants are involved in each project. Their scientific accuracy has been approved by the scientist interviewed.

Each section also summarises the European Commission's R&D activities in the sector, while contact information for each project coordinator is provided in a separate section, as is a keyword Index.

EuroAbstracts 1994 Index

Also published recently, the 190-page 1994 Annual Index of *EuroAbstracts* provides references to all of the EC's 1,561 RTD-oriented publications covered in *EuroAbstracts* last year. It allows a report to be located by its subject, title, EC Programme and author. This is achieved through four Indices:

- the Subject Index, ordered by research topic. Each entry provides the publication's title (translated into English where necessary),

bibliographic details, the issue of *EuroAbstracts* where an abstract of the publication can be found and a 'master accession number' - used by the other Indices;

- the Programme Index - the entry for each Programme provides a list of the titles, with master accession numbers, of the Programme's publications;
- the Titles Index - an alphabetical list of the publication titles, grouped by language, with each publication's master accession number;
- the Author Index.

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► EIMS UPDATE

Technology Demonstration Centres

Technology Demonstration and Application Centres, or TDACs, demonstrate new technologies and processes to both public and private organisations. 'TDACs in the EU', a report now available from the European Innovation Monitoring Service (EIMS), confirms that their number and impact has grown rapidly in the last decade. The survey and its policy implications are the subject of an EIMS workshop on 11-12 May.

The survey of over 200 TDACs, supplemented by interviews with almost 100 TDAC managers, clients and na-

tional policy makers, found that:

- most (70%) TDACs started since 1986, and, in most countries, are still developing their activities;
- TDACs are often (53%) part of a larger organisation;
- about half are sector-oriented, with most of the remainder either technology- or application-centred (20% each);
- they usually offer additional services (consulting, training, testing, etc.);
- 87% of TDAC clients are SMEs.

Their clients rated TDACs as quite useful. Advantages cited included

their objectivity regarding technology suppliers, the availability of free services (usually supported by public funds) and extra support such as training, technical assistance and help with integrating technology.

The report concludes that TDACs are one of several ways of diffusing practical technological change. They are well qualified to offer firms (particularly SMEs) technology monitoring services, and can help promote other services (market surveys, training, etc.).

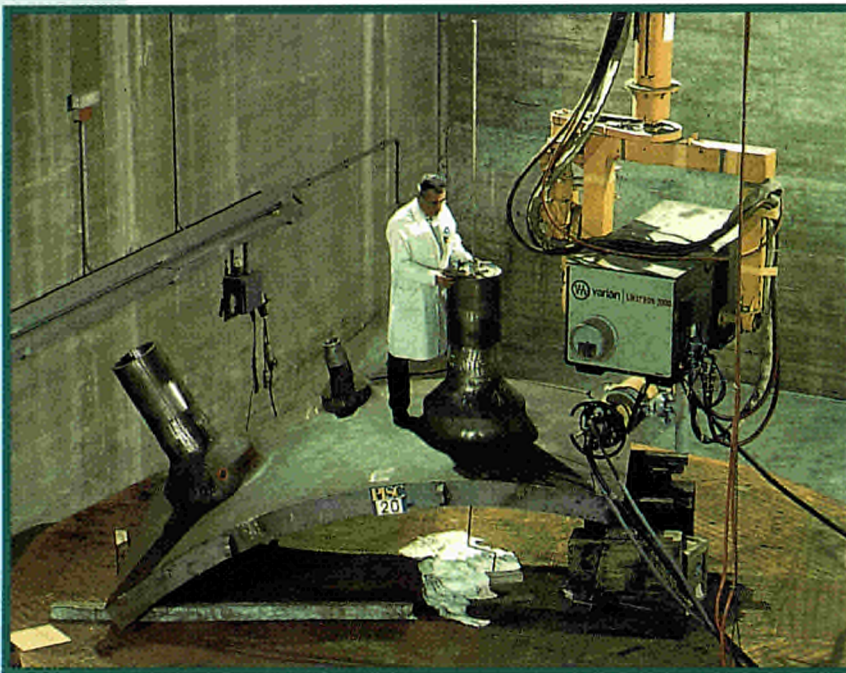
There is considerable demand for an exchange programme, both

between TDACs and policy makers. This would improve TDAC effectiveness, promote transnational technology transfer and integrate demonstration activities into technology transfer policy. TDAC evaluation criteria should also be developed.

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A Testing Network for Industry

After 20 years of coordinating Europe-wide R&D into non-destructive testing, the PISC Programme held its concluding conference in March. Three new research networks have been established to carry on the work and increase its scope to a wider range of industries.



PISC III: Testing NDE techniques on authentically shaped welded assemblies.

Steel pressure vessels and piping are critical components in the power generation, chemical processing and oil/gas industries. Defects are created in these components through a wide range of mechanisms, including corrosion, irradiation, thermal embrittlement and vibration.

These components therefore require regular inspection to ensure their structural integrity. Non-Destructive Examination (NDE) techniques, usually involving ultrasonics, have to be used for the In-Service Inspection (ISI) of these components, as they usually cannot be removed from their operating environments.

These NDE techniques, based on Section XI of the American Society of Mechanical Engineers' Boiler and Pressure Vessel Code (ASME XI), were first assessed in

1965 in the US. Some of the results, according to Serge Crutzen of the Joint Research Centre's Institute of Advance Materials (IAM), were inexplicably poor.

"Flaws were deliberately introduced into a series of 12 specimens and searched for using standard ASME XI techniques, which failed to find a significant proportion," he explains. "In the early 1970s, the Americans began a new series of tests. They also offered some of their specimens to Europe, and as a result PISC, the Programme for the Inspection of Steel Components, was born under the aegis of the OECD and the EC."

PISC I - Early Results

PISC I brought component manufacturers, power utilities, inspection companies, licensing author-

ities, technology developers and plant owners together for the first time. According to Mr Crutzen, "PISC I integrated the fragmented resources and R&D activities right across Europe - it was an early example of a truly European research effort."

As in the US, the PISC participants first used ASME techniques to examine large welded assemblies containing artificial flaws. It found that the Defect Detection Probability (DDP) - the chance that a given defect would be detected - was too low for vertical cracks as long as 25% of the wall thickness. The DDP for composite defects, moreover, was low no matter the defect size. In many cases the investigating teams undersized the size of the defects as they interpreted the data and the results were very inconsistent from one team to another.

Some of the teams, however, used non-ASME procedures, such as focusing probes and high sensitivity echo techniques. "These detected all of the composite defects - nearly perfect results," says Mr Crutzen. "These approaches are now routinely used throughout Europe for the ISI of reactor pressure vessels. They have also spread to other industries, particularly fossil fuel energy production and oil pipelines."

Further Investigations

These results led to modifications to official NDE procedures around 1980. PISC I also showed that many areas required further investigation, so PISC II was launched

by 15 countries in 1980.

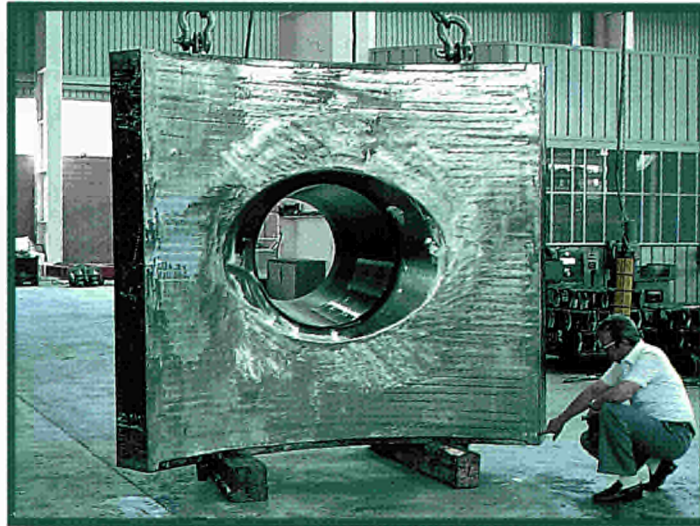
"National efforts were also launched in several European countries," Mr Crutzen points out. "For example, the UK began assessing the ISI techniques proposed for Sizewell B, their first pressurised water reactor. The results anticipated the results of the PISC II exercise, and gave several UK teams the incentive and chance to develop highly effective inspection procedures, which were tested in PISC II."

The major conclusion of PISC II, which finished in mid-1986, was that combinations of standard and advanced techniques could provide high quality fault detection. "The relationship between the detection of the fault and its size, position, orientation and nature was also further elaborated," Mr Crutzen notes. "Fatigue cracks, which are smooth and have sharp edges, for example, proved difficult to detect, no matter their size or the techniques used."

As a result, countries around Europe revised their in-site inspection practices and the US updated the ASME XI Code twice. "There was also a general change of attitude," Mr Crutzen observed. "Many teams reconsidered their techniques and improved their training and equipment. More R&D began into sophisticated ultrasonic tools and more attention was paid to reducing human error. All this, of course, benefited many industries."

PISC III was launched in 1987. It used authentically shaped test assemblies containing realistic defects, covered all major parts of the reactor's 'primary circuit' and featured a greater emphasis on human factors and validating mathematical models of fault detection. The Programme finished in 1994.

There were eight Actions, including studies on Real Contaminated Structures, Human Reliability, and Support to Code and Standard Organisations. The latter group is currently ensuring that the results, presently being analysed, are acted upon by the standardisation authorities. Results are expected to continue flowing from PISC III until the end of the century.



Three New Networks

The success of the PISC approach led to the creation of three new networks in 1994, all developed and operated by the IAM:

■ **European Network for Inspection Qualification (ENIQ):** Carried out by national centres, Inspection Qualification involves the verification of the effectiveness and performance of the inspection techniques and procedures used in nuclear plants. As validation centres can also work with other industries, however, the network is not geared

exclusively for the nuclear industry. ENIQ will develop expertise, material and hardware for its members and move towards a common European approach. A major inspection qualification methodology⁽¹⁾, endorsed by all of Europe's nuclear utilities, has already been published.

■ **Aged Materials Expertise and Studies (AMES):** More materials-oriented, AMES focuses on R&D into the degradation of reactor components due to heat and radiation. The qualification of repair work will receive particular attention.

■ **Network for Evaluating Steel Components (NESC):** This multi-disciplinary network explores international practices in the entire process of structural integrity assessment - NDE, material testing, stress and fracture analysis, and so on.

Like PISC, all three integrate the fragmented R&D work carried out throughout Europe. They will result in improved safety, better personnel training and lower costs for knowledge, services and materials.

Lastly, by harmonising European procedures they will stimulate a Europe-wide market, open to SMEs with high quality NDE and material testing skills for the first time. AMES and NESC are particularly open to new participants, who can join by contributing just one man-year of work.

(1) 'European Methodology for Qualification of Non-Destructive Testing', EUR 16139.

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Case study: NESC 1

In a Shocking Spin

The first NESC project is investigating Pressurised Thermal Shocks (PTS), where cold, emergency cooling water is injected into a hot pressurised reactor vessel (PRV). This poses a greater threat to PRV integrity than any other event.

According to the journal Nuclear Engineering International, "the project is unique in that it is the first large-scale exercise to include all the processes involved in assessing the structural integrity of a reactor pressure vessel, including prediction, inspection and testing."

The project thus reflects

NESC's integrated approach. It involves the inspection and analysis of an 8 tonne steel cylinder, currently being manufactured. The cylinder will be heat treated to simulate an aged PRV, and will feature several realistic cracks under its 4mm skin of stainless steel. It will start travelling around seven European countries and the US this September, where national teams will try to non-destructively detect and measure the cracks and predict their growth during a PTS.

The PTS will be simulated at British company AEA Technol-

ogy's Spinning Cylinder Test Facility in mid-1996. The cylinder will be heated to 320°C and spun at 2,500rpm. At this point cold water (5°C) will be injected onto the cylinder's inside wall, creating a thermal shock. The cylinder will then be re-examined by the national teams.

Destructive examination, scheduled for 1997, will then reveal how the cracks grew under the load of the PTS, how effective the NDE techniques were (both before and after the PTS), and the accuracy of the crack growth predictions.

Renewable Energy: A Business



The 150kW ECOTECHNIA 20/150 prototype was successfully tested on site in Andalucia (Spain) in a THERMIE project. As a result, 50 more are being installed and a further 16 are being manufactured.

"The Declaration of Madrid", signed in March 1994, set ambitious targets for the growth of renewable energies by 2010. New policies will create new markets for innovative energy technology suppliers. Many will have developed their technologies with the support of today's EC RTD Programmes.

At the 1992 UN Conference on the Environment and Development, the EU and many other industrialised countries committed themselves to stabilising their carbon dioxide (CO₂) emissions at 1990 levels by the year 2000. The follow-up conference, held in Berlin on March 28 - April 7 this year, delayed agreement on further reductions until 1997. However it did agree upon a major international clean energy technology transfer programme from industrialised to developing countries.

The emphasis on clean energy is unsurprising. About 80% of global CO₂ emissions, as well as significant proportions of sulphur and nitrogen oxide emissions, originate from energy production and use. Therefore these targets cannot be met without, among other initiatives, a major increase in the use of Renewable Energy (RE) sources. Other environmental and health factors, ranging from acid rain to nuclear waste disposal, add to the urgency.

There are also other reasons to promote RE technologies. The sector is already a significant employer in Europe, and is dominated by SMEs. As these technologies are usually implemented through local initiatives, adapted to regional needs, they will also help strengthen the economic and social cohesion of Europe.

In addition, European energy imports are expected to rise, making the diversification of Europe's energy supply a strategic necessity. A well developed RE sector will reduce Europe's vulnerability to geopolitical instability and improve Europe's balance of payments.

The worldwide market for RE technol-

gies has an estimated direct annual turnover of 40 billion ECU, a figure which will rise significantly as a result of the international technology transfer agreement.

However, the European RE industry is worth less than 2 billion ECU. Developing the European RE industry will thus open up enormous new markets for European technology around the world.

Political Will, Initial Targets

This explains the growing political will to promote REs. This will has been manifested in many ways at the European level over the past decade. EU funding into the RE sector has been increasing steadily since the mid-1980s, while the European Parliament has encouraged renewable energies at every opportunity.

These activities are not just technical in nature. In 1993, for example, the EU launched the 40 MECU ALTENER Programme to improve the market penetration of RE technologies, primarily through setting Europe-wide standards, legislation and other measures. Typical ALTENER projects deal with breaking down market barriers or establishing new legal, administrative, organisational, economic or managerial systems.

When adopting ALTENER, the European Council set three objectives for renewable energy sources in Europe by 2005:

- increase RE's market share from 4% to 8% of EU primary energy needs;
- triple the production of RE, excluding large hydro schemes;
- secure a 5% market share of total vehicle fuel consumption for biofuels.

A year later, many European countries and representatives of the European Commission and Parliament set an even

Opportunity

more ambitious target. At "An Action Plan for Renewable Energy Sources in Europe", a conference held in Madrid in March 1994, they signed the Madrid Declaration, which states:

"In the year 2010, renewable energy sources can, and with collaborative efforts between all actors should, substitute the equivalent of 15% of conventional energy sources demand in the European Union ... This could lead to the creation of 300-400,000 new jobs, increase the turnover of the renewable energy industry to 6 billion ECU and avoid the emission of 350 million tonnes of CO₂ each year."

This is not an official EU target. Even the ALTENER target is 'indicative' - agreed by the Council of Ministers, but non-binding. But they are crucial first steps along the road to a more sustain-

able energy supply, with the Madrid Declaration and associated Action Plan working as a 'framework document'.

The issue is also high on the international agenda. Apart from the 'Rio process' towards cutting CO₂ emissions, the United Nations Education, Science and Culture Organisation (UNESCO) aims to hold an international "World Solar Summit" next year, where a World Solar Decade (1996-2005) will be officially launched. The objectives of the Summit will be similar to the Madrid Conference, although there will be a larger focus on developing countries. Issues to be debated include new funds for RE sources, an International Solar Treaty, Priority RE Projects for each country and more.

Renewable Energy: Unrealised Potential

So what is the potential for renewable energy? In theory, RE sources could meet all the EC's energy requirements many times over. Practical reasons, from technical problems to economic, market and political factors, make this impossible.

The targets set by ALTENER and the Madrid Declaration are both underpinned by *The European Renewable Energy Study* (TERES), a major study commissioned by the EC in 1991 to assess the long-term prospects for RE technologies in the (then) twelve EU states, as well as Central and Eastern Europe .

TERES investigated the current technical performance and cost of various RE technologies. It surveyed their development prospects as well as the

The Conference and Action Plan

"An Action Plan for Renewable Energy Sources in Europe" was organised by the Fundación Cánovas del Castillo (a Spanish NGO), with the cooperation of the European Commission (Directorates General XII, XIII and XVII), the European Parliament (Scientific and Technological Options Assessment, or STOA) and the Spanish Ministry of Industry and Energy.

Its preparation involved the drafting of a major report on the current status of RE utilisation and the barriers to market penetration. Six Working Groups - five covering specific sectors (Biomass and Wastes, Hydro, Solar Thermal and Buildings, Photovoltaics and Wind), plus an Integration Group to oversee and coordinate the entire process - were established to propose a strategy for the Action Plan.

The Action Plan published with the



Declaration identifies the barriers renewable energies face and develops five detailed action lines to cope with them: Political, Legislative & Administrative; Financial & Fiscal; Technological; and Information, Education & Training. The Action Plan then outlines an initial package of specific measures under each of these actions.

Apart from the speeches of the opening and closing sessions, the Conference Proceedings includes all of the above Working Group papers, plus another on Geothermal energy. Each Sectorial Report summarises the field and the Group's main recommendations, covers the technological situation (R&D, demonstration and dissemination), the current market, the positive impacts of the technology and the barriers it faces.

Contact: EUFORES (see page 16)

●●● foreseeable cost reductions resulting from both technical progress and mass production. The possible market penetration of each RE technology was then analysed up to 2010, as were the constraints they face. Finally, recommendations for policy and other actions to overcome these constraints were made.

To begin with, TERES found that RE met 4.3% of the EU's 1990 primary energy needs (10% of electricity demand, 3.3% for heat). The most significant RE source was large-scale hydroelectricity,

resources are low;

- *technical development needed but will be cost competitive*: Producing electricity and heat from energy crops could be competitive with fossil fuels if crop yields can be increased and advanced conversion technologies proven;

- *technical development needed with fewer prospects for competitiveness*: Wave energy and solar-thermal-electric both require significant technical development, which is not expected before 2010.

ing measures to remove constraints are also implemented.

The results are clear:

- under present EU and national policies (Base Case and Existing Programmes), RE technologies would be limited to 6.5% of primary energy needs;

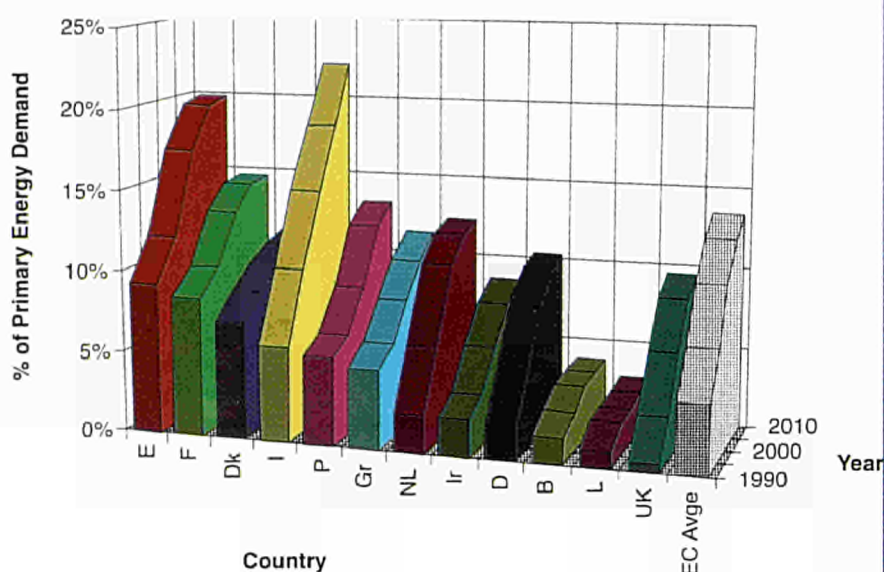
- the Proposed Policies would accelerate growth to a limited extent, resulting in a 9% RE contribution in 2010 and thus meeting most of the ALTENER targets;

- the Full Social Cost scenario would lead to a market penetration of 13% (see graph left). It would also meet the ALTENER target for transport biofuels and reduce CO₂ emissions by 5% of their 1990 level by 2000 and 12% by 2010.

TERES also finds that the results for the two more active scenarios cannot be met just with European-level measures - there must also be a wide range of policies and measures at the national and local level. This is tied up with the fact that all scenarios predict that around 60% of the total RE-derived energy will be from decentralised installations. Greater emphasis therefore needs to be placed on small systems.

While TERES makes clear that there are many obstacles in the way of the Full Cost Scenario, there is no doubt that the RE industry will grow in Europe to some extent. Companies wishing to prepare for future opportunities will need to be

Penetration of Renewable Energies under the Full Social Cost scenario



followed by biomass, notably forest residues, and energy-from-waste (for both heat and power). Today's RE industry provides some 110,000 jobs, and involves nearly 700 companies, mostly SMEs. Only six Member States have set RE targets.

TERES classified RE technologies into four types:

- *commercially mature and cost competitive with conventional energy*: Hydroelectric, geothermal, active/passive solar heating, landfill gas and energy from other wastes. In addition, solar photovoltaic is competitive for niche markets and for remote sites where grid connection and diesel generation are expensive, and both wind and solar thermal are competitive at sites with good resources (i.e., windy/hot locations);

- *commercially mature, but not yet cost competitive*: Solar photovoltaic, liquid biofuels and tidal. Wind and small hydro also fall into this category where these

Market Prospects and Policies

The future market penetration of RE technologies in the Twelve were forecast using four different policy scenarios:

- *Base Case*: the present policies of the individual Member States only;
- *Existing Programmes*: includes the effects of the EC's existing energy/environment Programmes (summarised below);
- *Proposed Policies*: proposed EC energy policy framework (ALTENER, internal energy market, carbon/energy tax) are successfully implemented, as are some supporting measures to remove constraints;
- *Full Social Cost*: the external costs (e.g., CO₂ emission, acid rain, decommissioning of nuclear reactors, social issues) associated with each energy source are accounted for in their prices, and all subsidies are abolished. This creates a 'level playing field' for RE technologies, most of which have higher start-up and production costs but much lower external costs than fossil and nuclear fuels. Full support-

Central and Eastern Europe

TERES also examined the situation in Bulgaria, the Czech and Slovak Republics, Hungary, Poland, Romania and the Republics of Former Yugoslavia. RE only contributes 3% of these countries' primary energy needs, and almost all of that is hydroelectric in nature. Only three countries - the Czech and Slovak Republics and Hungary - have made formal commitments to renewables.

TERES made market penetration forecasts based upon two scenarios, with the following results:

- *Base Case*: Existing national programmes will result in market penetration of only 5%;
- *Optimistic*: a rapid transition to market economies and the integration of the true social costs for energy will result in a 12% market penetration.

innovative in terms of technology, finance, customer service and more.

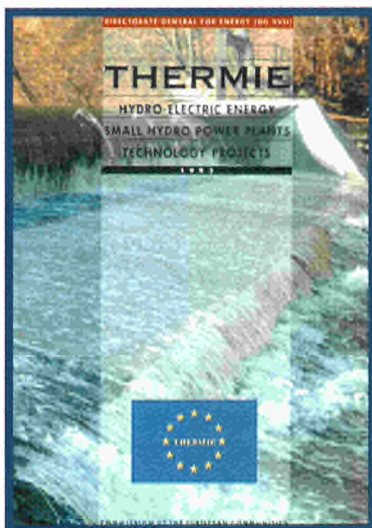
TERES will be updated to take into account all of the changes since 1991 in the RE sector, as well as the arrival of the three new EU Member States.

EC Programmes

The European Commission has been active in demonstrating RE technologies since 1978, when the first Community Energy Demonstration Programme was launched. Today's European RTD energy Programmes, however, trace their history back to the end of the last decade:

● **JOULE I:** Launched in 1989 by DG XII (Science, Research and Development), Joint Opportunities for Unconventional or Long-term Energy Supply aimed to develop new non-nuclear technologies and to promote the efficient and rational use of energy.

It was followed by **JOULE II** (1991-1994), which supported a wide range of projects within the renewable energy sector. Apart from the well-known RE sources, JOULE II also helped explore less well-known technologies such as heliothermodynamics, wave energy and hydrogen production from RE sources. It also encouraged greater collaboration between researchers and the potential users of renewable technologies and took steps to improve links with energy initiatives in Central and Eastern Europe and in developing countries.



One of nine major (200+ pages) reports describing THERMIE projects in one particular sector.

● **THERMIE (1990-1994):** The Promotion of European Energy Technologies Programme was launched by DG XVII (Energy) to demonstrate and disseminate innovative energy technologies, encourage their market penetration and coordinate EU

Case study: Biomass

The Return of Wood



An EC demonstration project in the Mediterranean produced biomass heat energy at below fuel oil prices using the 'Scorpion' harvesting machine.

In 1991, 2% of the EC's primary energy needs was produced from biomass and waste. This was 60% of all the RE produced. By 2005, according to ALTENER, this sector could produce over three times this amount, providing 70% of all Europe's renewable energy.

Because the CO₂ emitted is reabsorbed by growing trees and crops it is a 'greenhouse neutral' technology. It also avoids waste pollution, provides new outlets for set aside land and generates employment in the agricultural sector.

One promising biofuel is the world's oldest - wood. Whole forests are grown and harvested across Europe for the construction timber and paper industries. At final harvesting time the unused branches and top - anything up to 50% of the total tree mass - is usually left to rot, producing gases such as CO₂ and methane.

THERMIE has helped demonstrate the effectiveness of this energy source. In 1990, for example, a THERMIE project supported the establishment of a 1MW wood-fired heating system in Conches-en-Ouche (France). The 652,000 ECU installation uses forestry wastes to heat a block of 90 apartments, an indoor swimming pool, a school, a retirement home and a sports hall.

Backed up by a 200kW oil-fired boiler, it has reduced the community's energy

bill from 121,000 ECU to 38,000 ECU per year. Fossil fuel consumption has dropped by 85%, while the timber trade has benefited from the improved timber management system. The scheme, which should repay the investment within 8 years, has also created local employment.

Forestry waste, however, is restricted by the quantity of woodland cover. More than 10,000 hectares of coppice have now been established in north-west Europe to overcome this limit. Coppicing is an ancient woodland management system dating back thousands of years. The trees - willow and poplar are the most suitable - are planted at up to 10,000 cuttings per hectare. After one year of growth, up to 30 years of periodic harvesting begins, encouraging multi-stem growth and enhancing the yield of dry matter.

Coppice plantations are planned for three THERMIE projects recently selected following the 1994 Call for Tender. Submitted by power utilities in Denmark, Italy and the UK, they involve an initial 21 MECU of THERMIE funding between them. The planned installations will produce 6.5MW of electricity (or MWe) and 6.78MW of heating in Denmark, 11.9MWe in Italy and 8MWe in the UK, using more than 7,600 hectares of dedicated forestry.



A 1MW photovoltaic power plant in Toledo (Spain), established with THERMIE support.

●●● and national energy policies.

THERMIE's demonstration projects aimed to prove the technical and economic viability of the technology on a sufficiently large scale. Dissemination projects, on the other hand, encouraged the wider use of an innovative energy technology after the first successful project, usually in other countries or under new industrial or economic conditions.

One of THERMIE's significant achievements was the establishment of a network of Organisations for the Promotion of Energy Technology (OPETs). THERMIE was also unique in that it supported the dissemination of energy technologies which had been demonstrated in national as well as European schemes.

● **JOULE-THERMIE (1994-1998)**: THERMIE was run outside the Framework programme. However, as it also ended in 1994, this paved the way for an integrated programme under the Fourth Framework Programme (1994-1998). This is the 1,002 MECU Non-Nuclear Energy Programme, also known as JOULE-THERMIE.

Aligning the THERMIE Programme into the Fourth Framework Programme brings many advantages: Calls for Proposals are integrated, coordination is further enhanced between the R&D and the dissemination activities, and so on. There is much continuity between the old and new Programmes: the R&D element ('JOULE III') is still run by DG XII, while the demonstration element ('THERMIE II') is run by DG XVII.

● **APAS (1995-1996)**: As the JOULE-THERMIE projects will not actually get under way before early 1996, DG XII launched APAS to form a bridge between the Third and Fourth Framework Programmes in the field of renewable energies. The 25 MECU Programme is non-technical in nature, supporting market and feasibility studies, assessment of RE economics and so on.

The action lines of some DG XII non-energy RTD Programmes also support RE research. The previous Agriculture and Agro-Industry (AIR) Programme (1990-1994), for example, devoted over 35 MECU to the bioenergy sector, almost half of which was spent on a single bio-diesel demonstration project. The present Agriculture and Fisheries (FAIR) Programme expects to devote around 55 MECU to bioenergy.

There are also some Programmes run outside of the Framework Programme structure by DG XVII:

● **"THERMIE II-bis"**: As the Fourth Framework Programme does not permit dissemination projects, JOULE-THERMIE only covers R&D and demonstration projects. For this reason a new Programme, tentatively titled THERMIE II-bis, has been suggested. It is currently being deliberated by the Council of Ministers.

● **ALTENER (1993-1997)**: Described above (page 12).

● **SAVE (1991-1995)**: The Specific Action for Vigorous Energy Efficiency is basically a framework for EC legislation and standards for energy efficiency. SAVE II is expected to be submitted to the European Council this year. Budget: 35 MECU.

● **PERU**: The 4 MECU Energy Management in Regions and Cities Programme aims to support local and regional energy management agencies in improving energy efficiency and promoting RE technologies at the local level.

Lastly, other European Commission DGs also support some RE-oriented activities. DG XVI (Regional Policy), for example, launched the 392 MECU VALOREN Programme in 1987 to develop indigenous energy sources and more rational use of energy in Objective I regions. It finished in 1991. □

Major Contact Points

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■ **EUFORES**: Established by the Madrid Conference, the European Forum for Renewable Energy Sources brings all the involved actors together to achieve the Madrid Declaration's targets.

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A Global Consensus

Ministers from the G-7 countries, Members of the European Commission and business leaders met in Brussels in February to chart the way forward to a Global Information Society.



AG7 Ministerial Conference was not needed to ensure the introduction of the Information Society in some form. The phenomenal growth of the Internet and other, more commercially oriented services attests to the inevitability of the Information Age. What is required, however, is a global political vision and strategy to ensure that the Information Society benefits all, that the transition is a smooth one, and that nobody gets left behind.

The stakes are large. The Information Society could improve social integration, enhance the progress of democratic values and help share and preserve cultural creativity, traditions and entities. It could lead to a better quality of life, new jobs, economic growth and much more. As the Bangemann Report on Europe and the Global Information Society⁽¹⁾ states: "This revolution adds huge new capacities to human intelligence and constitutes a resource which changes the way we will work and live together."

While the Information Society may create jobs, however, it will destroy others. Moreover, the new jobs may appear in one part of the world at the expense of others, and there is no guarantee that Europe will be a net job creator. As the

Bangemann report points out, "we have to act to ensure that jobs are created here, and soon."

International Action

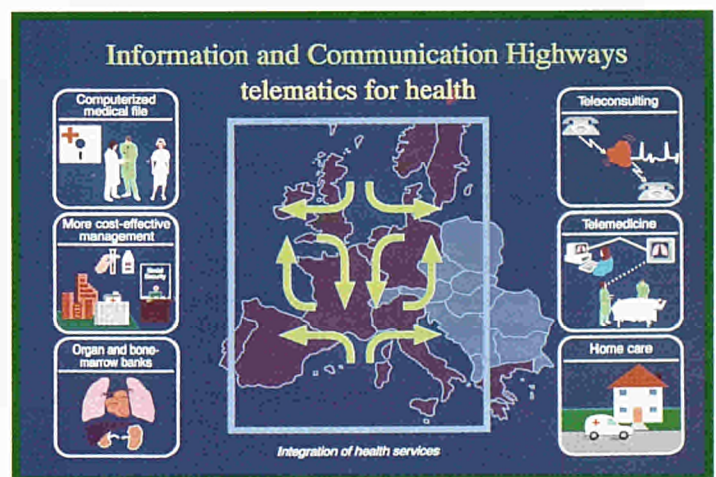
Like all societies, the global Information Society needs to be built on a set of common rules and a tolerance of diversity. Without collaboration at the highest levels there may emerge a society split between those with access to the Information Society, and those without. Other important issues include the protection of privacy, personal data and creative content, without which the Information Society will be mistrusted and misused.

Most importantly, the potential gains could be denied unless they are pursued together. Each coun-

Hence the G7 Ministerial Conference, held to define common principles and priority areas for international cooperation. The conference began on February 25 with a round table of 45 business leaders. This was followed by the Ministerial Conference, which examined the regulatory framework, competition policy, the development of the information infrastructure, the provision of access to it, applications and social and cultural aspects.

As a result, the G7 partners committed themselves to develop an Information Society where competition is fair, private investment is encouraged, the regulatory framework is adaptable and network access is open.

Mutually compatible regulatory frameworks will be developed so



Applying information and communication technologies to the healthcare industry is expected to bring many benefits.

try has its own vision - it will require unprecedented international cooperation to ensure that they can be connected together to create a truly global information infrastructure, reflecting the values of a democratic society.

that G7 members can pursue and achieve similar goals in different ways, according to national circumstances. And while constraints on private investment will be reduced, the G7 ministers agreed that a balance must be found ●●●

(1) Summarised in issue 5/94.

●●● between the free market and the concept of universal access. The universal provision of access and services must be ensured. The Information Society should promote equality of opportunity and cultural diversity, and recognise the necessity of worldwide cooperation, with particular attention to less developed countries.

The latter point was emphasised in the Chair's conclusions, which stated that "Countries in transition and developing countries must be provided with the chance to fully participate in this process, as it will open opportunities for them to leapfrog stages of technology development and to stimulate social and economic development."

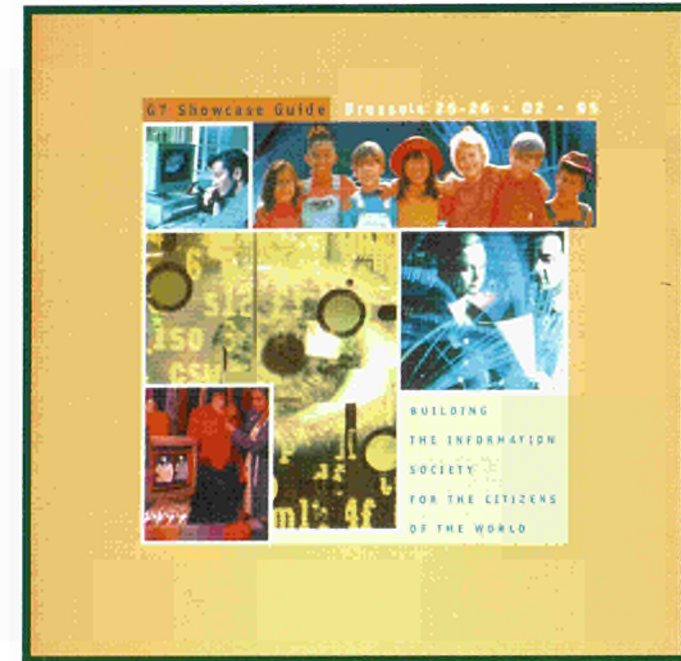
Pilot Projects

The Ministers gave concrete expression to their commitments by endorsing eleven pilot projects. Each relates to one of the eleven Theme Areas they identified as being where international cooperation should be pursued. The projects are:

1. **Global inventory:** a multimedia inventory of information regarding major national and international projects and studies relevant to the global information society, as well as an assessment of the social, economic and cultural factors relevant to its development.

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2. **Global interoperability for broadband networks:** to facilitate the establishment of international links between the various high-speed networks and testbeds.



The G7 Showcase Guide is a 94-page full-colour guide to the issues and technologies presented at the Information Society Showcase. Available from ISPO.

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3. **Cross-cultural education and training:** providing innovative approaches to language learning, in particular for students and SMEs.

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4. **Electronic libraries:** a large, distributed virtual collection of the knowledge of mankind, available to the public via networks.

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5. **Electronic museums and gal-**

leries: to accelerate the multimedia digitisation of art collections, to ensure their accessibility to the public, and provide learning sources for schools and universities.

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6. **Environment and natural resources management:** to increase the electronic linkage and integration of distributed databases of environmental information.

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7. **Global emergency management:** to encourage the development of a global management information network to enhance management of emergency response situations, risks and knowledge.

Contact: Mr. A. Simard
Tel: +1 819 99 71 107
Fax +1 819 99 43 389

E-mail: asimard@am.ncr.forestry.ca

8. **Global healthcare applications:** to demonstrate the potential of telematic technologies in fighting major scourges, and to promote joint approaches to issues such as the use of data cards and other enabling mechanisms.

Contact: Mr. M. Richonnier,
EC, DG XIII
Tel: +32 2 295 0973
Fax: +32 2 296 8362
E-mail: mri@dg13.cec.be

9. **Government on-line:** To exchange experience and best practice in the use of on-line information technology for conducting electronic administrative business between governments, companies and citizens.

Contact: Mr. R. Kerry
Tel: +44 1603 70 47 08
Fax: +44 1603 70 48 17
E-mail: r.kerry@ccta.gov.uk

10. **A global market place for SMEs:** to help develop an environment for open and non-discriminatory information exchange, and to demonstrate the interoperability of electronic and information cooperation and trading services on a global scale, for the benefit of SMEs.

Contact: Mr. Y. Sumi
Tel: +81 3 35 01 47 26
Fax +81 3 35 80 27 69
E-mail: sumi@trc.rwcp.or.jp

11. **Maritime information society:** to integrate and enhance environmental protection and industrial competitiveness for all maritime activities through in-

FURTHER READING

The following publications on the Information Society have been produced by the European Commission:

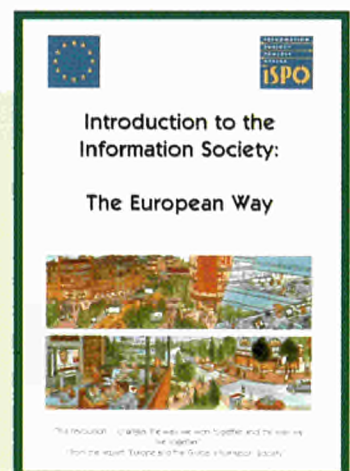
■ **G7 Showcase Guide:** a 94-page full-colour guide to the issues and technologies presented at the Information Society Showcase;

■ **Introduction to the Information Society - The European Way:** an introduction to the Information Society and the relevant EU policies;

■ **Europe's Way to the Information Society:** this 28-page CORDIS-focus Supplement contains articles, contact information and the

EC's Action Plan and other official texts.

The latter item is available from the RTD Help Desk (Fax: +352 4301 32084), while the former two are available from the Information Society Project Office.



formation and communication technologies.

Contact: Mr. H. Von Bose, EC,
DG III
Tel: +32 2 295 90 74
Fax: +32 2 295 68 51
E-mail: herbert.vonbose@dg3.
cec.be

Initial studies aimed at refining these proposals are currently under way. It is hoped that some will have begun their initial implementation phase by the time the G7 Summit is held in Halifax (Canada) this summer.

Exhibiting the Information Society

Held in parallel with the Conference, the Information Society Showcase exhibited over 100 Information Society applications from around 200 companies. The Showcase underlined the increasing potential of information and communications technologies to enhance the quality of life in areas as diverse as the environment and manufacturing.

Physically, it was divided into three main areas:

- the introductory Information Zone;
- 'Levers of Change', which showed the technological building blocks of the Information Society. One of the many technologies on show was the CD-i based Home Shopping System, realised by Philips through an ESPRIT-Multimedia project profiled in issue 4/94 of *Innovation & Technology Transfer*;
- 'Citizens of Change', which related the Information Society to all aspects of daily life: work, health-care, transport, learning, home, culture and entertainment. □

C o n t a c t
ISPO:
Information Society
Project Office (2)
Tel: +32 2 296 88 00/89 00
Fax: +32 2 299 41 70 / 80

(2) See issue 1/95 for a profile and a full list of freephone numbers and other contact information.

► SME'S

SME 'Info Pack'

Apart from the Information Packs published for each Specific RTD Programme, the European Commission has published an Information Pack specifically for SMEs.

The past few years have seen the growing recognition that Small and Medium-Sized Enterprises (SMEs) are extremely important to the European economy, both in terms of job growth and technological competitiveness. However, SMEs find it more difficult to benefit from the EC's initiatives than larger organisations.

As a result, the recently launched Fourth Framework Programme is the most 'SME-friendly' RTD Programme to date. Programmes and project formulae specifically established for SMEs, pioneered in pilot phases under the previous Industrial Technologies (BRITE-EURAM) Programme, have now been adopted by a wide range of Specific Programmes.

The Information Package for each Specific Programme details the SME-oriented initiatives relevant to that Programme. However, recognising that SMEs could benefit from a 'one stop shop' focusing exclusively on their needs, the 'Technology Stimulation Measures for SMEs' Information Pack was published.

Exploratory Awards and CRAFT

It details both types of SME-oriented initiative:

- Exploratory Awards, designed to help SMEs prepare complete research proposals. They are accessible to SMEs irrespective of their own R&D resources. The EC supplies up to 75% of the cost of the Award (maximum of 45,000 ECU). The exploratory award must not last longer than 1 year, and must include at least two non-affiliated SMEs from different Member States.

■ Cooperative Research Projects, also known as CRAFT projects after the original 1990-1994 Programme. These projects are for a number of SMEs (at least four) without R&D resources of their own. In a CRAFT project, these SMEs team up with a research institute or a large private company, which carries out an agreed R&D programme oriented towards their needs.

posals for both exploratory awards and cooperative research projects. It contains three booklets:

- Part I - Exploratory awards;
- Part II - Cooperative research (CRAFT);
- Part III - Information and assistance: Sources of information and assistance, plus information on each relevant Specific Programme.

While this Information Pack must be read in conjunction with the

Most Specific Programmes support both types of projects, as summarised in this table:

Specific Programme	Exploratory Awards	CRAFT Projects
Telematics Applications	✓	
Industrial & Materials Technologies	✓	✓
Standardisation, Measurement & Testing	✓	✓
Environment & Climate	✓	✓
Marine Sciences & Technologies	✓	✓
Biotechnologies	✓	
Biomedicine & Health	✓	✓
Agriculture & Fisheries	✓	✓
Non-nuclear Energy (R&D component)	✓	✓
Transport	✓	

Proposals for the new Industrial Technologies Programmes have been the most numerous - 56 proposals for Exploratory Awards and 25 for CRAFT projects were received in just one month. The high awareness levels in this sector is unsurprising, as both initiatives follow on from the previous Industrial Technologies Programmes.

Proposals 'Anytime'

Both initiatives have continuously open Calls for Proposals, so SMEs neither have to know of nor observe any specific deadlines. The new Information Package contains details for the preparation of pro-

main Information Package for the relevant Specific Programme, it provides an excellent overview of all the SME-oriented initiatives now up and running under the Fourth Framework Programme. □

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► ESPRIT

Promoting Best Practices

The European Software and Systems Initiative (ESSI) launched a Call for Proposals on March 15 to continue its activities in promoting Software Best Practice in Europe under the Fourth Framework Programme.

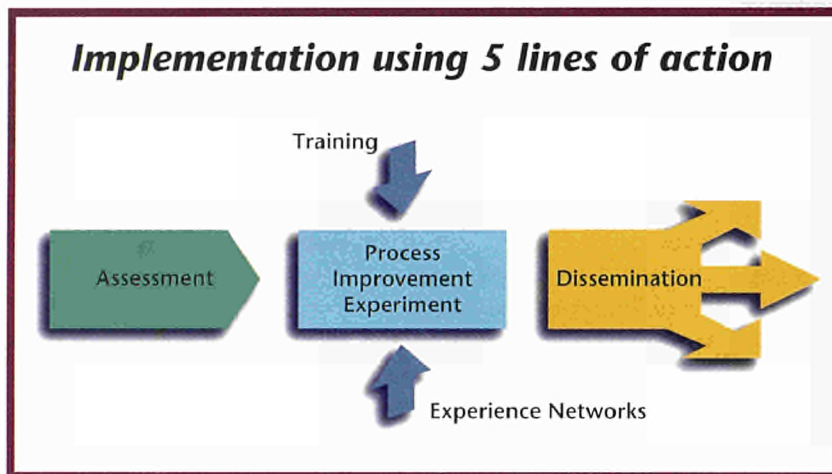
The European Software and Systems Initiative (ESSI) was launched in 1993 as an 'accompanying measure' of the Information Technologies Programme under the Third Framework Programme (ESPRIT II), with an initial budget of 25 MECU.

ESSI aims to promote improvements in the industrial software development process, leading to improved efficiency, quality and economy. It is aimed at all industrial sectors where the generation of quality software is an important factor.

It works by furthering the best use of productivity-enhancing methodologies and tools, especially by users of IT systems, and places a specific emphasis on the improvement of software quality. An ESSI proposal is an order of magnitude smaller than a conventional R&D proposal, and only requires a submission from the lead partner, rather than a consortium.

Under ESSI's pilot phase, activities are supported under two action lines:

- **Application experiments:** Involves introducing state-of-the-art software engineering supports (management practices, methodologies, tools, etc) into real production environments and assessing the results. The aim was to build up a comprehensive set of examples to show that the adoption of improved software development practices is possible in 'real life' and has clear industrial benefits. This sort of project does not involve developing a software application per se - instead, it supports the costs incurred in adopting the 'best practices'.



ESSI is now being implemented using five complementary action lines.

- **Dissemination actions:** These ensure that companies across Europe learn from the experiences gained within the application experiments, and of the opportunities more generally available to assist them in improving their software capabilities.

All actions emphasise the certification of software development processes according to widely-accepted international quality standards such as ISO 9001, BOOTSTRAP and others.

A Successful Pilot Phase

Although still in its pilot phase, ESSI has already clearly demonstrated both the need for the initiative and the effectiveness of its implementation:

- there were almost 1,000 proposals, mostly for Application Experiments;
- the proposals came from all major industrial and service sectors and were spread throughout Europe;
- the proposals mirrored exactly the profile of European software

development, with 77% of the proposals arising from industries outside the IT sector;

- almost half the proposals were lead by SMEs.

In total, 94 Application Experiments and 9 Dissemination Actions have already been launched. Many lessons were learnt from this pilot phase - while the original user-friendly proposal format worked well, for example, this made it easy to send in proposals only marginally related to ESSI's goals. It was therefore recommended to further tighten the definition of the scope of future activities.

New Actions Launched

New actions under ESSI - Software Best Practice - have now been launched, with the first Call for Proposals being published on March 15. It aims to provide support for software developing organisations at different stages of maturity through five complementary action lines:

- **Assessments** will provide a baseline for an organisation to decide on

the best way forward and to measure future progress. These stand-alone actions are aimed particularly at organisations just starting to improve their development process;

- **Process Improvement Experiments (PIEs)** will form the bulk of the Software Best Practice Initiative. They will demonstrate the benefits of software process improvement on a real project through a controlled, limited experiment. Proposers must demonstrate that the experiment being undertaken can later be replicated throughout the organisation. The emphasis will be on continuous improvement through small, stepped actions.

A successful PIE proposer will have already analysed its current situation and have an outline plan of the improvements necessary. It will define measurable goals for the experiment and undertake a final comparison of the situation before and after the changes to assess whether the goals have been achieved. The lessons learnt from the experiment will be used internally within the company to im-

prove the production process, and will be disseminated externally so that a wider community may also benefit from the experience.

A typical PIE will have a budget of 100,000-500,000 ECU and will last no more than 18 months. Funding will be available for the additional marginal costs incurred in carrying out the actions - no funding will be available for the underlying development costs.

■ **Dissemination Actions** will ensure that valuable and generally useful material, as well as the experiences gained in the Process Improvement Experiments, are disseminated across Europe, promoting further interest in the adoption of Software Best Practice.



■ **Experience Networks** will facilitate the exchange of experiences and provide an open forum for discussion between software devel-

opers. These groups of users will have the critical mass necessary to influence their suppliers through the formulation of clear requirements.

■ **Training Actions** will improve the skill levels of software developers in, for example, quality issues such as configuration management. They will act as a catalyst by concentrating on 'training the trainers', who will in turn train the users. The general level of awareness of the benefits of Software Best Practice will also be raised. In addition, there will be the opportunity for experts from experienced organisations to offer their services as mentors to other organisations to help them improve their software process.

The March 15 Call covered the first four action lines, and is detailed in Information Package for the Information Technologies Specific Programme (Part IIE), available from the ESSI Office. □

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 Mroh@dg13.cec.be

► **TELEMATICS APPLICATIONS**

Inter-Project Synergy

A conference held in Nice on February 15 brought together a wide range of potential partners to stimulate proposals for 'telematics application sites'.

The new Telematics Applications Programme emphasises user-oriented R&D. One of the Programme's central concepts is the 'telematics applications site'. Stemming both from recommendations in the Bangemann Report on the Information Society and the 'transport corridors' pioneered by the 1990-1994 Transport Telematics programme, the new concept aims to promote synergy between different telematics R&D projects.

The idea is that different projects use the same validation site. A validation site is where the vital fourth phase of any telematics project - the validation phase - is carried out. The Programme's strong user-orientation means that this validation phase, where the technology developed in the project is tested with users in real-life situations, should account for roughly 50% of the overall budget.

Therefore a telematics application site is where several different telematics projects, often from different sectors, validate their tech-

nologies and ideas. The possibilities for synergy between the various suppliers and users are clear. However, the creation of telematics applications sites requires close contact between a wide number of project proposers before their proposals are submitted to the EC.

Making Connections

That is why the "Telematics applications sites and cross-sectoral validation projects" conference was held last February in Nice. A kind of 'marriage brokerage service' between project proposers, it brought together the three types of organisations needed for a balanced proposal: public authorities, public and private R&D organisations and users.

While most of the roughly 300 people attending the conference were in an advanced stage of proposal preparation (the deadline for the first Call for Proposals was March 15), some attendees were interested simply in hosting tele-

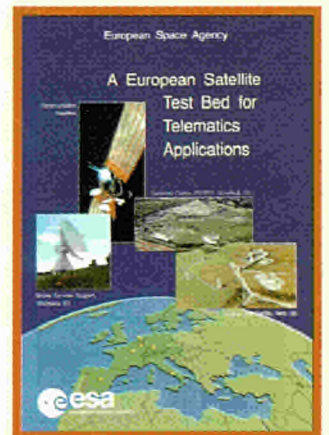
matics application sites on their premises. Apart from providing excellent opportunities for firming up existing contacts for the March Call, it also produced a large number of new contacts for the future.

The Telecities Network

Practically all of the cities represented at the conference belonged to the Telecities network, which had just finished a two-day internal seminar the day before. The Telecities network links together European cities, towns and regional authorities to focus efforts on using telematics for urban development.

It is in fact a spin-off from the much larger Eurocities network, which brings together European metropolitan cities with more than 250,000 inhabitants to focus on a wide range of urban issues. Telecities became a network in its own right simply because the demand of European cities for an initiative to focus attention on telematics was so strong. ●●●

SATELLITE TELEMATICS



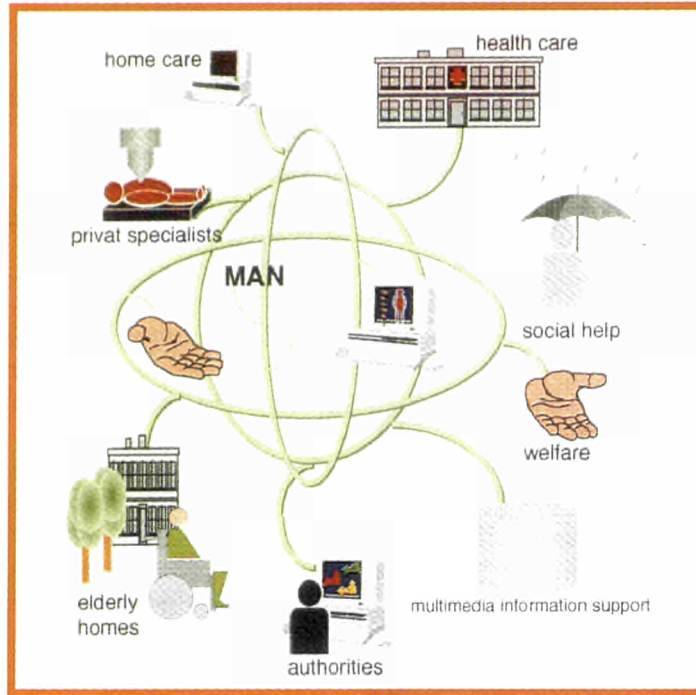
"A European satellite testbed for telematics applications" was recently published by the European Space Agency (ESA) to summarise the many ways the ESA's infrastructure and resources can be tapped by Telematics project participants.

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October last year saw the Telecities network gain funding from the EC. Today there are 50 members, including large cities like Berlin, medium-sized towns like Leeuwarden (90,000 inhabitants) in the Netherlands, and groups of small municipalities such as CIPAL, which represents the Belgian provinces of Limburg and Antwerp.

Their user-oriented perspective has provided valuable input into the definition of the new Telematics Programme. In addition, various consortia brought together through the Telecities network have made a total of eight project proposals for funding under this Specific Programme. All reflect one of the overriding concerns of both Telecities and the Specific Programme - that projects should be user-driven, which in this case means being led by city authorities.

Being user-driven, it is not surprising that six of their proposals are also 'cross-sector' in nature - they are relevant to a large number of the Programme's 14 Work Areas. This is part of a larger trend - around 65% of the outline proposals received for the Call are cross-sector, confirming the Pro-



Telecities' proposed CITYCARE environment brings together a city's welfare, social and health care information channels.

gramme's user focus.

Telecities' project proposals include a 'Creative City' concept where teleworking and teleservices support self-help initiatives, a trans-European network of World Wide Web pilot applications, an 'information and teleservices on de-

mand' system to offer users information and public services, and a multimedia, user-driven learning network for adult education. In the future the network will also submit Telematics proposals in the fields of Libraries and Disabled and Elderly People.

C o n t a c t

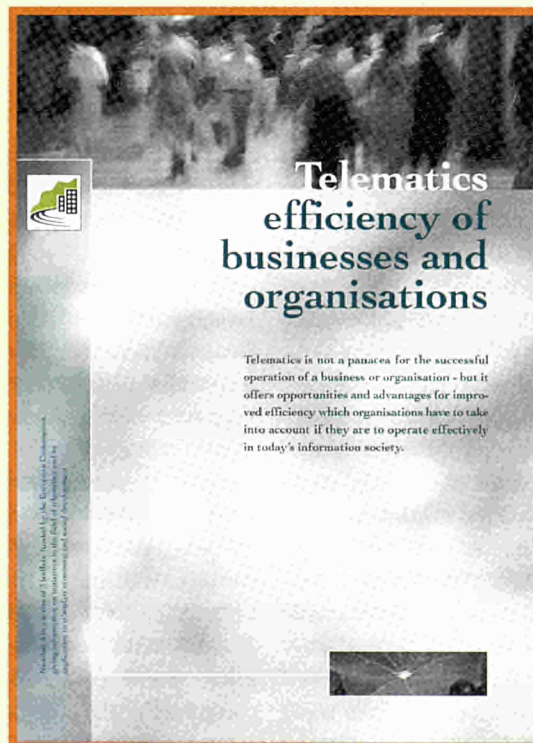
■ Mr C. Strack,
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■ Mr E. Mino, Ms. P. Keery,
Telecities
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P U B L I C A T I O N : R U R A L T E L E M A T I C S

Telecities gained EC funding last year after answering a Call for Exploratory Actions, in March 1994. There were four other projects resulting from this Call, three of which were strategic studies:

- producing guidelines for implementing telework;
- assessing the risk of job 'outflows' against job creation opportunities in urban areas due to telematics;
- analysing the current and foreseeable development of teleservices, the consequences for urban populations and developing public policies and recommendations.

The fifth action is currently producing printed, audiovisual and multimedia material to disseminate the results of ORA (Oppor-



tunities for Rural Areas), an initiative under the last Telematics Programme⁽¹⁾. The material is not simply a summary of the various ORA projects - each publication aims to make implementing telematics systems in rural areas as simple as possible, ensuring that the lessons learnt in ORA are understood by all.

(1) See issue 3/94 for a Case Study of a successful ORA project.

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► CONFERENCES

SIXTH JOINT EUROPEAN NETWORKING CONFERENCE

15-18 May, Tel Aviv (Israel)

The conference will address strategic aspects of open computer networking in five main themes:

- Networking technology and engineers: high-speed networking, desktop/WAN integration, etc;
- Support for cooperation work: teleconferencing, inter-application communication, etc;
- Security and privacy: authentication and integrity, firewalls, cryptographic mechanisms, etc;
- Providing and accessing information: tools, online services, etc;
- Policy-related issues: regional issues, funding models, global top-level interconnection and social implications.

Contact: RARE Secretariat

Tel: +31 20 639 1131; Fax: +31 20 639 3289

INTELLIGENT CONTROL AND INTEGRATED MANUFACTURING SYSTEMS

25-28 June, Lisbon (Portugal)

ASI '95 is being organised within the framework of an ESPRIT Network of Excellence in intelligent control and integrating manufacturing systems (ICIMS). The central theme of ASI '95 will be "Life-cycle approaches to production systems". There will be presentations, lectures, round-table discussions and demonstrations on developing integrated manufacturing systems and raising the automation level in production and manufacturing.

Contact: Mr. P. P. Groumpos, University of Patras

Tel: +30 61 99 72 95; Fax: +30 61 99 73 09; E-mail: lar@ee.upatras.gr

EUROPEAN QUALITY DYNAMICS

28-29 September, Luxembourg

Service quality is rapidly being recognised as the competitive differentiator for both manufacturing and service industries. This conference - 'Quality Management in Services and Manufacturing' - will emphasise the role of leadership in influencing people and processes to achieve total customer satisfaction. It is organised by the Luxembourg Ministry of Economic Affairs, with the support of the Third Activity.

Contact: ITOC

Tel: +352 45 66 80; Fax: +352 25 01 51

LANGUAGE ENGINEERING

CONVENTION 1995

16-18 October, London (UK)

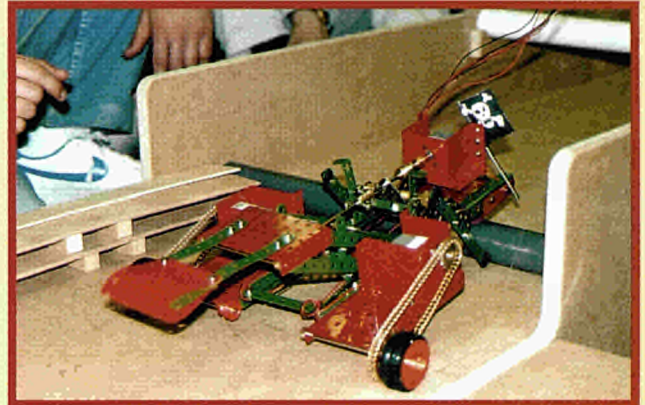
Organised by the UK Department of Trade and Industry in collaboration with the EC, the convention aims to promote the transfer of emerging and current technologies in speech and language and to integrate new language-processing tools.

The EC will present the Language Engineering area of the new Telematics Applications programme (1994-1998). Technical papers presented will cover office systems, translation, multilingual interfaces, language aids for the handicapped, language training, multimedia publishing, standards and much more. A final day session will discuss subjects as diverse as social policy and the relationship between theory and technology.

Contact: Mrs. Linda Prior, DTI

Tel: +44 171 215 1256; Fax: +44 171 215 1966

TELEMAN: TELEROBOTICS RESULTS



One of the student teams' robots lifts itself over an obstacle in last years' TELEMAN competition.

■ Telerobotics Research Conference 2-5 July, Noordwijkerhout (NL)

Organised by the TELEMAN Programme and the Delft University of Technology, the conference will allow industrial users, manufacturers, researchers and academics to present and discuss the results of five TELEMAN research projects on telerobotics and remote systems for hazardous and disordered nuclear environments.

While TELEMAN focused on the needs of the nuclear industry, the conference aims to disseminate the results to a broader range of potential users and manufacturers and to identify EU telerobotics research priorities. The projects (detailed in Programme Briefing, edition 4/94), range from a wall-climbing robot to a robust, multibodied intervention robot. Results from 16 earlier TELEMAN projects will also be presented in informal discussions and poster sessions.

There will also be a meeting of the European Robotics Network (EURET), which supports the exchange of researchers between collaborating laboratories to help strengthen EU research competence in the field of robotics.

■ The Undergraduate Students Telerobotics Congress

The same organisations, with the additional support of the Human Capital and Mobility Programme, are holding the Undergraduate Students Telerobotics Congress on July 1-5. It is intended for 50 European final year undergraduate engineering students who have been carrying out research projects on telerobotics as part of their university studies.

Apart from introducing the students to the European scene in telerobotics and allowing them to present their research to professional engineers and scientists, the Congress will also include the second annual TELEMAN EU Students Telerobotics Team Competition. International teams of five students each will compete against each other to design, build and race tele-robotic vehicles over an obstacle course representing a hazardous and disordered industrial environment. Technical visits to the telerobotics laboratory at the Delft University of Technology and the European Space Agency are also being organised.

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E-mail: barry.robertson@eurokom.ie

●●●

EVALUATION OF NEW TECHNOLOGY FOR INDUSTRIAL APPLICATIONS

17-21 October, Prague (Czech Republic)
 European Symposium Specialised in Evaluation of New Technology for Industrial Application, or ESSENTIA '95, is an international technology transfer conference covering 15 technological areas ranging from Agriculture to Electronics. The Programme includes:

- Technology Transfer Forum. Research centres from Eastern Europe will present the latest technologies, innovations, inventions and know-how;
- International Trade Fair. A large range of companies from developed countries will present their products and services to Eastern European visitors;
- Partnership Development Centre. SMEs will have the opportunity to present their activities and production programmes to potential partners seeking joint ventures, business contacts and opportunities for collaborations;
- International Conference. A conference on innovation and technology transfer will include lectures and will cover presentations on new technologies and new technology applications.

Contact: ESSENTIA '95 Conference secretariat
 Tel: +42 2 24511498; Fax +42 2 325630

SECOND WORLD CONGRESS ON INTELLIGENT TRANSPORT SYSTEMS '95

9-11 November, Yokohama (Japan)
 One of a series of annual Intelligent Transport Systems (ITS) World Congresses, the conference is co-sponsored by the European Road Transport Telematics Implementation Coordination Organisation (ERTICO).

The aim of the congress is the mutual exchange of research results and cooperation in order to promote the use of ITS. Executive sessions will consider recent developments, future visions, challenges and 'next steps' in realising ITS. Technical sessions will also be held on Generic and specific technology, Systems and applications and Architectural and institutional issues.

Contact:
 ERTICO S.C.
 Tel: +32 2 538 02 62
 Fax: +32 2 538 02 73

► PUBLICATIONS

● **FOURTH FRAMEWORK PROGRAMME**

■ Funding from the Fourth Framework Programme for RTD
 This free guide from the UK Department of Trade and Industry provides comprehensive information on participating in the RTD programmes under the Fourth Framework Programme. It contains an overview, advice on finding partners, methods of funding, applying for funding, further sources of information (including help for SMEs) and advice on preparing high-quality proposals.

Contact: DTI
 Tel: +44 171 215 1611/13
 Fax: +44 171 215 4127

■ **How to win EC contracts**
 Published by Coventry University Enterprises Ltd, this provides a step-by-step guide to the Fourth Framework Programme. It outlines the Specific Programmes and helps users identify partners (4,000 listed) and systematically initiate and maintain partnerships for submitting project proposals. National and EC contacts are also listed.

Contact: Coventry University Enterprises Ltd
 Tel: +44 1203 838 730/727/726;
 Fax: +44 1203 221 396

■ **EUROPEAN OBSERVATORY FOR SMEs**

100 ECU
 The Third Annual Report of the "European Observatory for

N O T E

If specific contact information for obtaining a publication is not supplied, refer to the 'Quick Reference Guide' (issue 1/95). Publications are free unless otherwise stated.

SMEs", prepared by the European Network for SME Research (ENSR), presents the latest developments and prospects for SMEs in the EU 15 plus Norway. It analyses the situation and perspective of SMEs in the European economy by monitoring their performance in various fields and examining the effects of the internal market on SMEs. It reveals that the recovery of the European economy is highly export-driven and larger enterprises have benefited more than SMEs.

Contact: EIM Small Business Research Consultancy
 Tel: +31 79 41 36 34
 Fax +31 79 42 57 86

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