

Innovation & Technology Transfer

6/98

Technologies *for the* Information Age

Plus

Annual Report on European Union research • Innovation in a low-margin industry • Helping young companies to license their technologies • Joint Research Centre and industrial partners speeding land-mines clearance

... and more

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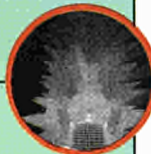
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Innovation & Technology Transfer



The European Commission's Innovation Programme is under the responsibility of Edith Cresson, Member of the Commission responsible for Research, Innovation, Education, Training and Youth.

Innovation & Technology Transfer is published six times a year in English, French, German, Italian and Spanish by the Innovation Programme. The Programme aims to strengthen Europe's innovation infrastructure and foster the application of research results to industry.

Editorial

Twenty-four per cent of all partners in EC-funded research projects launched in 1997 were small and medium-sized enterprises — a higher proportion than in any other national or international RTD programme. For two thirds of them, this was their first experience of publicly funded research of any kind.

The rapid growth of SME involvement in the final years of the Fourth Framework Programme is a testament to the success of the measures introduced to stimulate the sector's participation, and is welcome for a number of reasons.

- The SME sector is a key source of the new technologies needed to secure Europe's continued competitiveness.
- SME involvement helps to orient Europe's research effort towards the needs of the market. They constitute the channel through which many research results first find commercial application.
- Participation in research strengthens SMEs themselves, enabling them to penetrate developing markets in Europe and overseas, and to create new, high-quality employment.

This is why the measures in favour of SMEs are to be further strengthened in the Fifth Framework Programme. Each of the four Thematic Programmes will have its own Innovation Unit. These will be co-ordinated by the horizontal programme 'Promotion of innovation and encouragement of participation of SMEs', which will also provide a one-stop entry point to the research programmes, and a full range of services and tools designed to help SMEs to take part.

Edith Cresson

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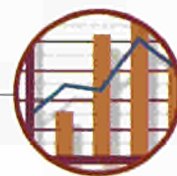
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European Research – Strength in Depth



Twelve and a half thousand SMEs have taken part in research projects under the European Union's Fourth Framework Programme. Two thirds of them had never before participated either in transnational collaborative research, or in publicly-funded research of any kind.

This is just one of the many insights offered by the European Commission's 1998 Annual Report on the research and technological development activities of the European Union⁽¹⁾, which examines research funded by the Commission, and research-related policy development, during 1997.

Implementation of the Fourth Framework Programme (FP4) continued in 1997 at a level similar to that of the previous year, with nearly 24,000 proposals received, 6,300 contracts signed, and ECU 3 billion of EC funds allocated to 24,000 participants. By the end of 1997 15,000 research projects, worth a total of ECU 8.2 billion in EC funding, had been launched under FP4 (see Figure 1).

The overall participation of SMEs⁽²⁾ grew strongly. They formed 24% of all participants in projects launched in 1997, compared to 18% in 1996, and received 16% of EC research funding for the year – up from 13% in 1996. This growth was largely due to the success of measures specifically designed to increase SME participation – co-operative research, exploratory awards, and (for information technologies) take-up actions.

In terms of research policy, 1997 was a turning-point, the report says:

- The modification of the legal base for research effected by the Amsterdam Treaty will streamline decision making.
- Agenda 2000 – the Commission's strategic response to an-

tipated geopolitical, demographic, environmental, technological and economic change – emphasises the key role of research, innovation, education and training in achieving sustainable growth and employment.

- The Commission's proposals for the Fifth Framework Programme (FP5) represent real progress towards a more strategic, focused and integrated set of research activities.

Innovation Action Plan

The report gives special attention to the progress made in 1997 towards the goals of the First Action Plan for Innovation – in particular, in relation to protection of intellectual property rights, innovation financing,

regulatory and administrative simplification, education and training, and the comprehensive orientation of EC-funded research towards innovation.

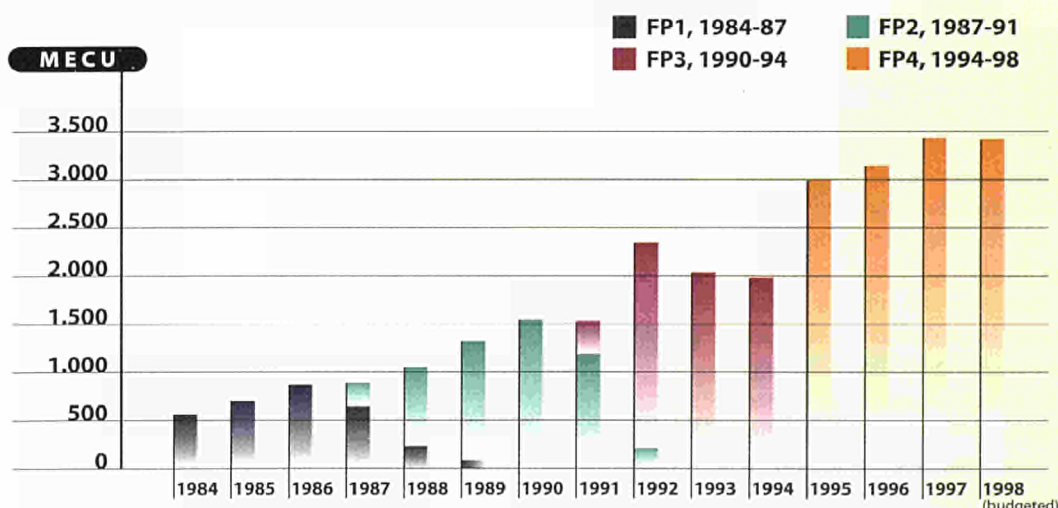
The forthcoming Fifth Framework Programme will, it says, be a major step towards achieving this last goal:

- FP5 is more focused, with just four thematic programmes and three horizontal programmes, and explicitly includes innovation among the objectives of all the programmes.
- The 'key actions' of each thematic programme aim to foster the emergence of targeted industrial applications, and to address socio-economic issues crucial for Europe.
- The Commission has taken steps to ensure that the know-how and expertise of its Joint Research Centre are better exploited.

Continued implementation of the Action Plan remains one of the Commission's priorities, in line with the conclusions of the November 1997 Employment Summit, which confirmed that research, innovation and the spirit of enterprise held the key to the reduction of unemployment in Europe.

FIGURE 1

Growth of EU RTD funding, 1984-98 (current prices)

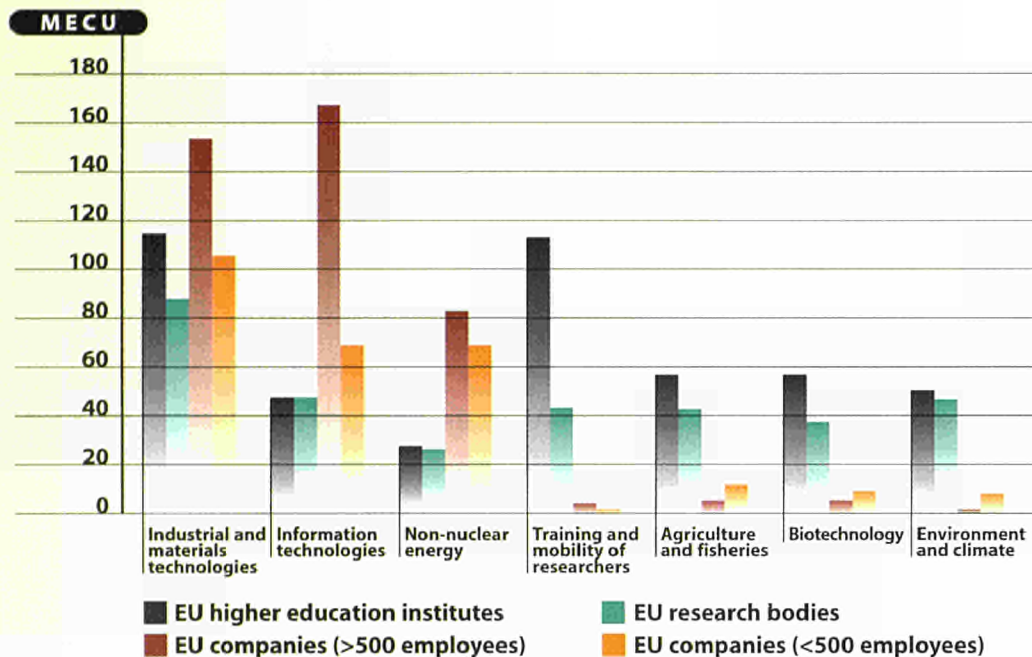


(1) *Research and Technological Development Activities of the European Union: 1998 Annual Report*; COM(98) 439

(2) *Defined throughout as enterprises with fewer than 500 employees, not more than a third of whose capital is controlled by a large enterprise and with a turnover not exceeding ECU 38 million (ECU 50 million for information technologies).*

FIGURE 2

1997 new shared-cost projects in selected research areas – Community contribution by participant type



Results and Impacts

In a brief review of the key achievements of Commission-funded research in 1997, the report highlights a number of important results:

- the sequencing of the genomes of several living organisms
- the development of a powerful climate-forecasting model for Europe
- the development of several innovative production technologies
- the launch of an international campaign to study the depletion of the ozone layer above Europe

Besides their scientific and technological successes, the research projects led to the establishment of hundreds of new research networks in 1997, and gave rise to large numbers of patents – strengthening Europe's scientific, technical and industrial fabric in a way which will benefit European industry as a whole.

The co-ordination made possible by the European research programmes is improving performance in fields such as environmental science, biotechnology and energy. A network formed under the Training and Mobility of Researchers programme (TMR) discovered the quantum

teleportation phenomenon, offering the prospect of new generations of computers, for example. The pooling of data and expertise has also helped to speed up the development of new medical treatments:

- Our understanding of certain forms of cancer has improved significantly as a result of studies carried out in parallel in several Member States, under the Biomedicine and Health Programme.
- An epidemiological monitoring network supported by the European Union detected the first ten atypical cases of Creutzfeldt-Jakob Disease, suspected of being linked to 'mad cow' disease.

The Union's major weakness remains its inability to fulfil the economic and commercial potential of this research – another reason, according to the report, why the establishment of a framework conducive to innovation will be so crucial.

Participation

The 6,300 projects for which contracts were signed in 1997 received an average of ECU 410,000 of EC funding, and had an average of 3.8 partners, drawn from 2.6 Member States. These figures include not just shared-cost actions (64% of projects)⁽³⁾, but also preparatory, accompanying and support measures (34%). Average project funding fell slightly from previous years, due to the growing success of the technology stimulation measures for SMEs.

Looking at shared-cost actions alone, 1997 saw over 4,000 project contracts signed, involving nearly 18,000 partners. Over the course of FP4 as a whole, shared-cost projects have each attracted an average ECU 730,000, with 4.8 partners from 3.2 Member States.

Industrial participation increased in 1997, mainly as a result of growing involvement by SMEs. In the first three years of FP4, enterprises accounted for 43% of EU participants in shared-cost actions (18% for large firms and 25% for SMEs), and for 44% of EC funding.

Industrial participation varies considerably from one specific programme to another. In 1997 FP4's two largest specific programmes, 'Information Technologies' and 'Industrial and Materials Technologies', were among those with industrial participation close to 50%, though large firms play the leading role (see Figure 2). SMEs play the most significant part in the Innovation programme (over 46% of project partners), and in the fields of transport and non-nuclear energy research. ●

(3) Shared-cost actions are projects co-financed by the European Commission, which normally provides up to 50% of total costs, and external research partners.

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• The full text of the report is available on-line at
<http://www.europa.eu.int/comm/dg12/report98.html>

Cleaning up a Traditional Process

Technological innovation can greatly improve competitiveness in established industries serving mature markets. But its introduction poses special challenges, quite different from those faced in emerging high-growth sectors.

The European drawn steel wire industry is shrinking, having to shake off over-capacity in the face of growing competition from the developing world. In a low-margin sector, it has focused on the higher added value products – plated wires, welding rods, and high-carbon steel springs and other automotive components. But if it is to hold on to this market, further cost reduction and quality improvement are needed.

"For the higher value products, thorough cleaning of the rod prior to drawing is critical," explains Alberto Rusconi of Otomec, an Italian manufacturer of specialised equipment for the industry. "The two tonne coils of wire rod supplied by steel mills are coated with a thin oxide scale. If this is not completely removed, it contaminates the drawing process."

For cheaper products like nails, the rod can be mechanically cleaned, removing about 80% of the oxide. But where total removal is required, batch pickling is used. The entire coil is dipped for 20 minutes into a 10,000 litre tank of hot sulphuric acid. The process is hazardous to workers and the environment – and expensive.

"Batch pickling is inherently inefficient," says Rusconi. "After about 250 tonnes have been treated, the action of the acid is

so weakened by the build-up of iron sulphate that the entire tankful must be disposed of. The additional costs of environmentally safe disposal make it uneconomic to process less than 50,000 tonnes per year. SMEs in the sector are forced to rely on specialised companies – pushing the cost up even further."

The Good News

Now an Innovation project⁽¹⁾ led by Otomec has developed a system which offers potential savings of around ECU 45 million per annum across Europe, and will particularly benefit the European sector's 500 SMEs.

The project's in-line pickling machine combines existing technologies in a completely new way. The unit is fully enclosed, and compact enough to fit into a small factory. Extensive testing of prototype machines by Otomec and end-user partners in Portugal and the United Kingdom have demonstrated wire production of consistently high quality with 70% reductions in cleaning costs.

"In our system, the wire rod is fed from the coil, through the cleaning machine and into the drawing apparatus in one continuous movement. That allows us to incorporate mechanical cleaning, which removes all but the finest oxide particles before the wire enters the acid, greatly extending the life of the solution."

The efficiency of the chemical action is further increased by low-voltage electrolysis, impossible in the traditional batch

process. Snaking back and forth between pulleys, as much as 200 tonnes of rod can be completely cleaned using a single tank of just 700 litres of acid. An ancillary device reduces the concentration of iron sulphate in the acid to a preset level. Continuously drawing off a tiny amount of the solution and evaporating it under vacuum, it produces a small volume of solid waste for safe and easy disposal, and recycles the acid for further use.

As well as reducing costs, innovation has transformed a process that was dangerous and dirty into one that is safe and non-polluting.

Heavy Duty

In high-growth, high-margin industries, manufacturers adopt major advances in process technology as early as they can, eager



Traditional batch pickling of a two tonne coil of steel wire rod

to gain competitive advantage. But although the Otomec technology has generated a lot of interest at steel industry trade fairs, Mr Rusconi is not expecting adoption to be rapid.

The Innovation Programme In Brief

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

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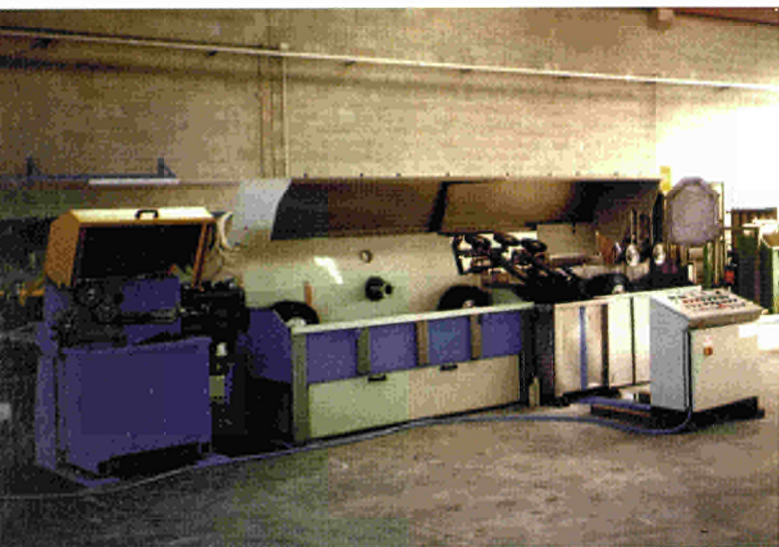
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The compact, enclosed, in-line electro-pickling unit developed by the Innovation project.

"The return on capital in this sector is very low," he explains. "There is natural reluctance to invest in new technology. That is why we have spent so much time monitoring and adapting the design at three pilot sites. If the machine broke down, the cost of lost production would very soon outweigh the savings, so it had to be 100% reliable before we introduced it to the market." Specially designed bearing and pulley assemblies, using stainless steel for key components, ensure both acid-resistance and a build quality robust enough for continuous, year-round operation.

Otomec has taken out a European Patent on the design – not

as an invention, but as an innovative system. The project ends in November 1998, after several months of successful end-user trials, and marketing will begin in early 1999. "Early reaction from potential users has been very positive," says Rusconi. "But we want them to understand the technology before they buy it. A company where pickling has always been outsourced will need to modify its factory layout, and to develop systems for the safe handling and disposal of residues." ●

UNIVERSITY-INDUSTRY LINKS

From Lay-Offs to Spin-Offs

Is the 'Silicon Valley effect' confined to buoyant regional economies with a strong research base? Two recent projects show that, with the right support, university research can also make an important contribution to the regeneration of less-favoured regions.

Reductions in the public funding of academic research are increasingly forcing universities across Europe to turn to industry as a source of research funding. Such funding takes many forms, including research contracts, the licensing of university-developed technologies, and the retention of shares in spin-off companies.

In less developed regions, and those undergoing industrial restructuring, local universities – and the new technologies emerging from their research departments – can be a key element in the success of econom-

ic regeneration strategies. The trend towards a clearer orientation to the needs of industry creates an opportunity to develop this role.

However, it is precisely in these regions that academic-industrial networks tend to be weakest, and the infrastructure necessary for dynamic technology transfer least well developed.

Transfer of Know-How

The Transfert project⁽¹⁾ brings together university-industry intermediaries from four Objective 1 and Objective 2 regions⁽²⁾. The

project's co-ordinator – Promotech in Nancy, France – and the R&D Liaison Unit of the Belgian University of Louvain la Neuve, both have over a decade of experience. In regions which have faced high levels of unemployment following the collapse of the steel industry, each has successfully supported the creation of new enterprises by university researchers.

Like Promotech, the other partners are Business and Innovation Centres (BICs), but are only beginning to explore the potential of research spin-offs. RIZ is based in the Neideröster-

reich Sud region of Austria, formerly an important textile and engineering area. BIC Zwickau serves a region affected by large-scale closures in the former East German car industry.

"The aim of Transfert is to give the two younger agencies detailed information about the structures and services which we have found to be most effective," says Jacques Cochard of Promotech, "and to show them concrete examples of our success, which they can use to support their efforts to win backing from their own regional authorities."

Critical Mass

The partners, together with other universities, business incubators, technology centres and intermediaries, have met to address these issues at two seminars – in Austria at the end of 1997, and in France in May this year.

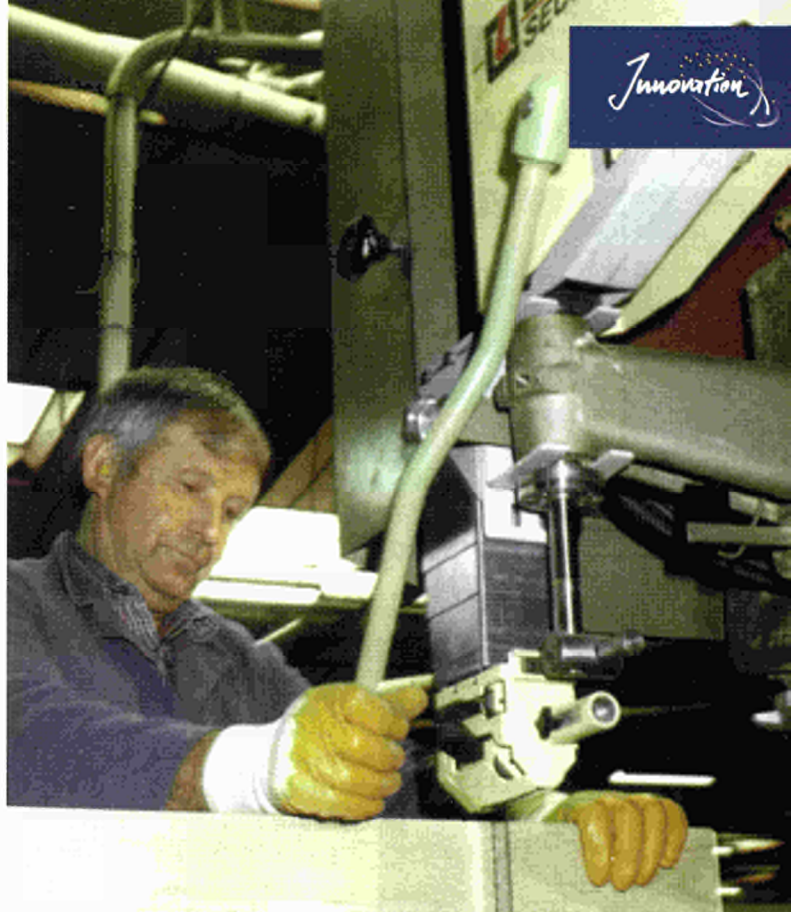
One of the key issues tackled was the need for close links between intermediaries and regional innovation funds. "Speed is important," Cochard explains. "Fund managers are naturally cautious, while entrepreneurs are trying to meet an immediate market need. If it takes too long to put together a financial package, a new enterprise may locate outside the region, or may never be created at all. If the university and the fund know one another well, things can happen much faster."

The University of Louvain generates enough spin-off projects to justify the existence of a dedicated fund, which has close links with the R&D Liaison Unit, although it is independently managed. The four universities served by Promotech are much smaller, and a single Saarlortlux Seed Capital Fund, which Promotech itself manages, has been established as a source of early-stage investment in spin-offs from all four.

"Where the academic base is relatively weak, it makes sense for universities to club together," says Cochard. "You need a certain critical mass before it is viable to establish a fund, or to offer project identification or patenting and licensing services. It can produce other benefits too, in terms of greater co-ordination between institutions which may see one another as competitors."

The project is now completed, but the partners are maintaining contact, in order to create opportunities for collaboration between companies in their four regions. Several staff exchanges have taken place, and BIC Zwickau recently led a delegation of policy-makers from its region to Nancy.

"The project showed them how to create the necessary tools for identifying suitable projects, for training and advice, and for project financing – and the results they could expect from them," Cochard says. "They have used that information to draw up their own plans, and are now seeking the support of their regional authorities. It is a promising sign that their local politicians wanted to come to Nancy to see for themselves what we have achieved."



A new band saw with advanced safety features was designed by the French National Institute for Safety Research (INRS) and commercialised by Lutrac, with technology transfer support from Promotech.

Good Practice Guide

The Transfert experience has also fed into a second Innovation programme project in which Promotech is involved. The Utrans⁽³⁾ partners, all experienced university-industry intermediaries, have developed a comprehensive guide to good practice in the field of academic spin-off support, aimed at innovation centres, science parks, universities, chambers of commerce and regional governments.

Designed as an aid to practical action, the guide outlines in concrete terms the operation of each of the key elements, from awareness raising to advice on intellectual property rights. It includes case studies describing the components, costs and results of 22 successful regional schemes. The Utrans partners hope to present the guide at the First European Forum for Innovative Companies in Vienna⁽⁴⁾. ●

- (1) Innovation programme project AM 03.
- (2) Objective 1 of the European Union's Structural Funds addresses the economic adjustment of regions whose development is lagging behind; Objective 2 focuses on the economic conversion of declining industrial areas.
- (3) Innovation programme project ENS022.
- (4) The Vienna Conference on Innovation and Employment; see edition 5/98.



IPR-HELPDESK

IPR Helpdesk – full contact details

The Innovation programme's new IPR Helpdesk, profiled in the previous issue of *Innovation & Technology Transfer*, provides a comprehensive central source of information and advice for research contractors on all issues relating to intellectual property rights. The Helpdesk's full co-ordinates are now available, and are given below.

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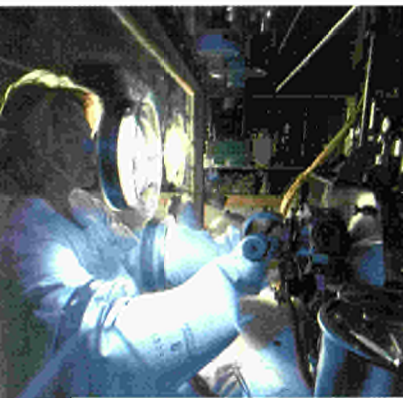
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A Drop of Oil in the Right Place

Europe's financial markets are currently awash with money looking for investment opportunities. At the same time, small high-tech companies are often prevented from exploiting research results by lack of commercial funding.



The Technology Transfer Fund will speed the exploitation of JRC research results.

A number of research centres and universities have recently established seed capital funds to bridge the gap between research and the commercialisation of products and processes based upon it. The funds, usually set up in partnership with financial institutions or other centres, have helped to create spin-off companies, to reduce time-to-market, and to promote an entrepreneurial culture.

In March, the Innovation programme and the European Commission's Joint Research Centre (JRC) invited fund managers and representatives of public research centres to participate in an exchange of information on best practices in this field, designed to inform policy development.

Funds appear to be most successful when they form part of a coherent set of schemes – entrepreneurs need access to training and mentorship, as well as to money. The fund should not be the only financing option available, and should itself be flexible enough to make quite small 'top-up' investments, in order to lever in funds from outside investors.

Analysis . . . Action!

In 1999, the JRC will establish a special fund to help technology-oriented entrepreneurs to attract suitable equity backing. Operated independently by a professional fund manager, under contract to the JRC, the Technology Transfer Fund (TTF) will serve to accelerate the commercialisation of JRC research results.

The fund is being developed in parallel with the Innovation programme's I-TEC scheme⁽¹⁾ and innovation finance helpdesk, LIFT – also to be launched early in 1999. It forms part of the European Technology Transfer Initiative (ETTI)⁽²⁾, which also includes a scheme to give companies access to JRC facilities, a European technology transfer network employing advanced information and communication technologies, a business incubator for start-up companies based on JRC research results, and entrepreneurship training for JRC scientists.

Market Opportunity

The JRC plans to select a management company by the end of 1998, which will then start to raise funds on the market.

"At least 50% of the fund's investments will be devoted to projects based on JRC results," explains Freddy Dezeure, who is co-ordinating the initiative. "It will be given preferential access to JRC research results, with three months to evaluate a project before it is offered to other investors. We expect it to play an active role in the search for investment opportunities and in

the development of the companies concerned, bringing in outside management expertise where this is needed. For the right fund manager, this will be a great opportunity.

"It will also allow the JRC to test new approaches to seed capital funding, as the basis for the definition and spread of best practice in support of European Union innovation policies." ●

⁽¹⁾ See most recently edition 3/98.

⁽²⁾ See edition 3/98.

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Innovation Relay Centre

Newsletter

L I C E N S I N G

Export Expertise

For Europe, technology transfer is a means to accelerate innovation. For high-tech companies, it can be a valuable source of development capital – but is often overlooked because of more urgent calls on managers' time. Innovation Relay Centres can help.

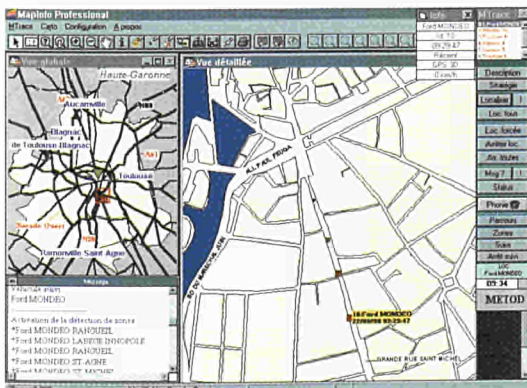
As well as protecting the technologies developed by Aerospatiale's aircraft division, its intellectual property department also licenses them. It is well equipped to handle the legal aspects of this work, but does not have the resources to disseminate its technology offers as widely as it would like.

Metod is a software company, specialising in cartographical applications. As a small enterprise it is closely focused on winning business in its domestic market — and, unlike Aerospatiale, lacks the legal expertise to negotiate cross-border technology transfer deals.

What the two companies share, besides their location in the south-west of France, is intense pressure on management time. "I know we could license our technologies in other countries, and the additional revenues would certainly be welcome," says Joel Hutin, Metod's managing director. "But my time is fully taken up with more immediate priorities."

Aerospace Spin-offs

Now, with the help of the IRC France Sud, Metod is starting to explore possible transnational technology transfer deals for the first time, while Aerospatiale has broadened the scope of its licensing activities.



"Through the IRC network, we can disseminate offers rapidly across the whole of Europe," says Jean-Philippe Mounier of the IRC's partner organisation CRCI Midi-Pyrénées — the regional Chamber of Commerce and Industry. "And by carefully filtering the responses, we are able to present clients with a pre-selected list of partners. They only need to spend time on those with real potential for concluding technology cooperation agreements."

Mounier first met Aerospatiale as a user of the CRCI's intellectual property rights survey service, ARIST, which scans 2,000 specialised databases to gather information about any technology specified by the client. "They had found the IPR surveys useful, and liked the way we worked," Mounier recalls. "When I suggested that they use the IRC's technology brokerage service, they were keen to try it."

Set up precisely to carry out technology transfers, and with all the necessary legal skills in-house, Mounier says the Aerospatiale unit is "the ideal IRC client. But their needs are specific — they have no interest in marketing agreements, for example. What they want is to license Aerospatiale technologies to other companies."

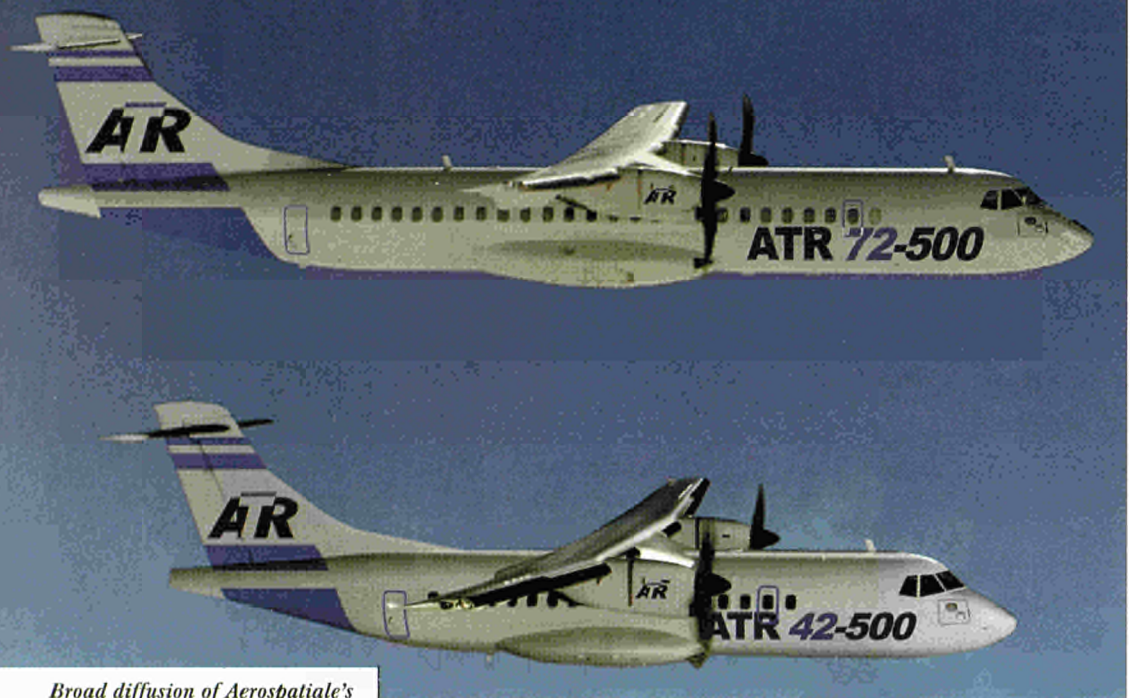
When they started looking for licencees for a composite-material technology developed for a new commuter plane, Mounier put two man-weeks into drafting the offer and sifting the responses.

With the help of IRC France Sud, Metod's GPS-based vehicle-tracking technology will soon find new markets in Spain and Greece through technology transfer agreements.

The IRC Network In Brief

The Innovation Programme's network of 53 Innovation Relay Centres (IRCs) spans the EU, Iceland, Israel and Norway (see map), with 'twinning' arrangements extending it to some Central and Eastern European countries (shaded in red).

Each IRC is its region's window on European innovation, helping companies and research organisations transfer technologies to and from the rest of Europe and access the EU's research programmes. Further information about the IRC network is available on the IRC homepage (<http://www.cordis.lu/irc/home.html>).



Broad diffusion of Aerospatiale's technology offers, mediated by the IRC network, serves to strengthen the European aeronautics industry and to improve the return on investment in research.

He interviewed more than 20 companies, in order to gauge their level of interest and their capacity to reach an agreement. Aerospatiale is now in negotiation with one of the SMEs which Mounier selected. Two other technology offers have met with similar success.

"In the past, we have worked with a small group of licensees — mainly existing suppliers," says Jean-Marc Brunel of Aerospatiale. "The IRC gives us access to a much wider group, and not only in the aeronautics sector. That serves to strengthen our European supply base, as well as increasing the return on our investment in R&D. But we certainly would not be able to handle all the responses on our own."

Inside Track

Metod has developed a range of software products for tracking vehicles using the Global Positioning System (GPS). "They needed more in-depth support than Aerospatiale," says Mounier. "We helped them to develop a technology transfer strategy, and to define the types of opportunity they were interested in. We have also provided a consultant,

already familiar with the technological area, to help them with the legal side of negotiations with foreign companies."

The service has proved highly effective. "In the past, we received a lot of approaches from people who only wanted to get technical information about our system," Hutin says. "When Jean-Philippe provides us with a contact, we know that they are ready to do serious business. We are proceeding cautiously, but a real prospect of transferring our technology to companies in other European countries has opened up for the first time. That could not have happened without his help."

During 1998, after trips to Spain and Greece, Hutin has

signed a distribution contract with a Spanish company, and has reached an agreement with a Greek radio manufacturer, allowing it to adapt Metod's software for its own hardware. In each case, he expects a full technology transfer deal to follow.

Intelligent Technology Transfer

"Innovative SMEs tend to adopt business strategies which concentrate on their own commercialisation of their technologies," Mounier concludes. "At least in the early years, they think principally in terms of marketing agreements and distribution contracts, and rarely consider the opportunities for licensing the technology to non-competing companies in other countries and sectors. We need to try and change this mindset. Intelligent technology transfer can often provide an ideal means of financing development. We have to show the directors of innovative companies that exploring the opportunities which exist at European level can be good for them, as well as good for Europe." ●

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Network Intelligence



The IRC website is far more than just a shop window on the network's activities. Behind the scenes, it performs the functions of filing clerk, personal assistant, and postman, freeing its human colleagues to spend more time with their clients.

The IRC homepage offers global access to the network. For first-time visitors, there is an overview of its mission and services. For companies and researchers wanting to make use of those services, there is comprehensive contact information — including clickable e-mail and web links — for each of the IRC and FEMIRC⁽¹⁾ co-ordinator and partner organisations, and a calendar of forthcoming IRC events. And for those who seek inspiration, the site offers a wide range of IRC success stories, as well as browsable back-issues of this Newsletter.

Intranet

But for the IRCs themselves, password-protected areas of the site operate as an intranet. As well as viewing the calendar of events, for example, network members can insert, edit, and delete items.

Similar functionality is available for the Technology Offer, Technology Request and Partner Search database — an indispensable tool for the network's core task of supporting European technology transfers. Sophisticated search facilities allow IRCs to find stored offers which meet particular criteria, or which match a current request.

Information may be posted to the publicly-accessible CORDIS databases. The system will even send new or amended records by e-mail to a user-defined mailing list of IRC contacts.

Finally, for the 12 Thematic Groups, the site provides comprehensive facilities for one-to-many communication, discussion and information exchange. ●

(1) The network of FEMIRCs (Fellow Members to the Innovation Relay Centres) consists of ten centres, many of them involving several local partners, in the Central and Eastern European countries.

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FINANCING INNOVATION

Technology-Specific Investment



Europe's high-tech companies are hungry for capital, while new, specialist venture capital funds are hungry for investment opportunities. The IRC network has the skills and contacts to help the two groups to satisfy one another.

"Small, technology-based companies find it particularly hard to finance innovation," says Wolfgang Gessner of IRC North Germany. "The returns on product development are too long-term and too uncertain for debt financing, and until recently equity capital was simply not available to them. Now, the Euro-

pean venture capital industry is developing rapidly. Funds are being established in most Member States, and many have a sectoral rather than a national focus — they will consider investments anywhere in Europe."

Problems remain. There is no easy way for specialist investors and specialist companies to

identify one another. And when they do meet, the gap between their expectations may be so wide that a deal is impossible. In particular, technology-oriented entrepreneurs often lack the skills to develop an attractive business plan, to present it convincingly, and to negotiate an appropriate deal.

Faster Finance

Gessner sees a real opportunity to speed up the flow of capital into European innovation by bringing well-prepared companies together with carefully matched investors, within a framework of professional support.

His confidence is based on

experience. VDI/VDE-IT, the IRC's host organisation, has already organised 15 investment forums, many in the area of information technology. "National or regional events have a success rate of 15-20%," he says. "If 20 companies attend, three or four will conclude deals with investors. An international forum, focusing on a specific technological area, produces twice as many signed contracts."

The IRC Innovation Financing initiative was conceived by IRC North Germany, but has already attracted wider interest. The consortium behind the first Biotechnology Investment Forum, to be held in spring 1999, includes a total of six IRCs.

"IRC's are well equipped to bring investors and companies together," says Gessner. "They use similar brokerage and negotiating skills to establish collaborative technology transfer and research projects, and many have already been involved in investment forums, so they understand the concerns of the investment community as well. The Thematic Groups also give the network unique transnational access to companies in specific technological areas — we are using the members of the Biotechnology Group, for example, to help us pick 35 companies for the forum. In the long term, the idea could be extended to

other fields, such as the environment and automotive sectors."

IRC's — Key Players

The forum will employ the proven methods developed by VDI/VDE-IT — companies will be selected with care, and will receive intensive coaching to prepare for their meetings with potential investors. Support will continue after the event, with assistance in the negotiation process available if required. The aim is to secure investment contracts for 14 innovative companies.

The consortium will run an advisory session for some of the selected companies at the First Eu-

ropean Forum for Innovative Companies in Vienna, on 12-13 November. This will serve two purposes, says Gessner. "It will give participants in the biotech event an additional opportunity to prepare. But it will also give the IRC network real visibility as a key player in the area of innovation financing." ●

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NEW NETWORK MEMBER



IRC Eastern England manager Alex Smeets (right) with colleague Robin Bligh.

IRC Eastern England

With a team of experienced innovation professionals, a new Relay Centre has been launched to serve England's eastern region, which has a significant concentration of firms and research facilities working in the areas of biotechnology, ICT and electronics.

"We are lucky," says manager Alex Smeets, formerly of IRC Netherlands. "The United Kingdom's leading science park is in Cambridge, as is the St John's Innovation Park run by the IRC's host organisation itself, with 70 early-stage knowledge-based companies. But the technology transfer potential is not confined to one city. There is, for example, a good deal of biotechnology activity throughout the region."

Smeets is joined by Robin Bligh, a former accountant, and Dorcas Doolan, who previously worked for another successful business incubator.

Adding a European Dimension

A number of well-established regional networks already serve the considerable regional market for innovation advice, information and support services. But the IRC has been welcomed, and is able to add a European dimension to their work, according to Smeets.

"We have forged close links with many of the existing networks," he says, "and they are al-

ready directing a steady flow of company enquiries to the Relay Centre. We have recently become the focal point for information and assistance about the Fifth Research Framework Programme to businesses in the region, and are now running an initiative to bring together all the information on relevant advisory services, as a way of streamlining the provision of advice and assistance." ●

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A Stronger Research Distribution Chain



Managers of European Commission research programmes and IRC technology transfer professionals are both looking forward to working together even more closely in the Fifth Research Framework Programme.

Although it is still too early to be sure how they will work, we know that there will be a new Innovation Team attached to each of FP5's four Thematic Programmes," says Gérard Comyn of Esprit. "I certainly expect that links between them and the Innovation and SMEs programme are going to be strengthened, in order to increase the impact of Commission-funded research, especially on the SME community. The IRCS are clearly going to play a bigger role."

Mr Comyn is responsible for the Prosoma service⁽¹⁾, which disseminates the results of Esprit projects as an aid to technology transfer. A survey of usage during the first 18 months of operation will be carried out later this year. But Comyn views the IRC network as a key user group. "The Prosoma web showcase is aimed at European technology brokers — the IRCS in particular," he says. "And each IRC receives a new version of the paper and CD-ROM products every six months." The Prosoma Helpdesk responds to requests from IRCS for results in specific technological areas, and Comyn's team often presents selected projects at IRC partner mediation events.

"The Commission does not have the means to establish direct contacts with SMEs," he explains. "We need intermediaries, and the IRC network provides an excellent interface with those who can make use of Esprit's re-

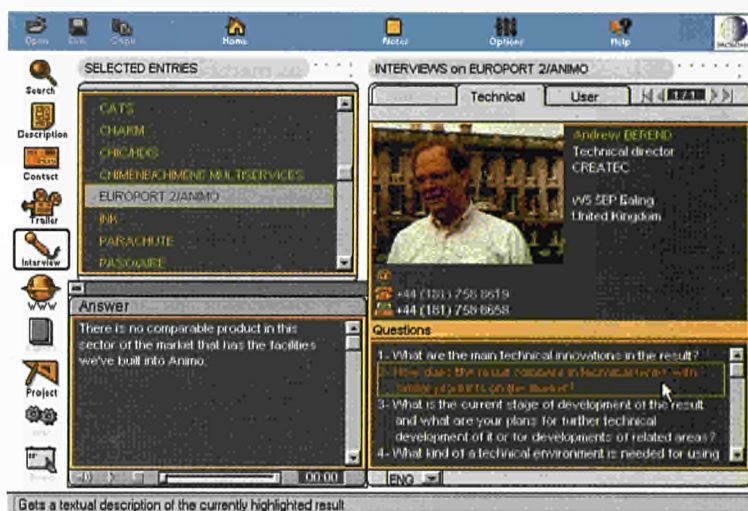
search results. Each IRC knows the best way to approach potential technology users in its own region. That is extremely valuable."

Big Opportunities

On the IRC side, expectations are also high. "FP5's increased emphasis on industrial application gives the network a great opportunity to play a bigger role," says Peter Wolfmeyer of IRC North Rhine-Westphalia, ZENIT.

During 1998, ZENIT has organised two major partner mediation events in collaboration with the current Environment and Climate programme — one on environmental technologies, and one in the field of cultural heritage conservation. And as co-ordinator of the Environment Thematic Group, Wolfmeyer has developed a close working relationship with senior officials in the forthcoming 'Preserving the Ecosystem' research programme.

"FP5 places a much greater emphasis on environmental research," he says. "Both the Commission and the IRCS are enthusiastic about the scope for closer collaboration in this area. All over Europe there are small, specialised companies which could make a real contribution to scientific progress. In Germany, where the water industry is still highly fragmented, we will be doing everything we can to ensure that North Rhine-Westphalian SMEs know about the research opportunities of-



Gets a textual description of the currently highlighted result

The Prosoma CD-ROM presents detailed information about the results of over 500 Esprit projects in a multimedia format.

ferred by FP5, particularly in the field of water treatment and management."

Greater SME involvement in research will be welcome, but Wolfmeyer also expects FP5's increased orientation towards the needs of the market to create more opportunities for technology transfer. "We still need to raise awareness of European research programmes as a source of new technologies, especially

among SMEs," he says. "Already, the Commission has started to recognise that the IRC network's strong regional contacts make it an ideal bridge to the industrial community. We will be working hard to develop that role." ●

⁽¹⁾ The Prosoma service is available online (<http://www.prosoma.lu/>).

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Basis of Trust

The personal chemistry between the staff of two IRCs has created a strong inter-regional bond. An exchange visit enabled them to respond swiftly when an opportunity for technology transfer arose as a result of unforeseen political events.



The Help Forward newsletter in which the highly topical French technology offer was announced.

"**N**ikos and I hit it off immediately," recalls Laurent Volle, manager of IRC France Centr' Est. "We had shared interests as members of the Environment Thematic Group, and felt comfortable working together. A visit seemed the obvious way to develop closer links between our two IRCs."

Before his trip, Volle exchanged technology offers and requests with Mr Melanitis and his colleagues at IRC Greece, Help Forward, who organised an appropriate programme of company visits. They also swapped information about their activities and host organisations, and each defined a list of specific questions he wanted to discuss.

"We are all busy," says Volle, "and a visitor cannot be expected to do the work of a normal staff member — in fact, both host and visitor are taken away from their normal work. But we found that with thorough preparation, we were able to do a lot in three days."

He and Melanitis divided the time between discussion of the Greek industrial and economic environment, and network issues — they produced a joint proposal concerning the IRC's system for the dissemination of offers and requests⁽¹⁾ — practical work on specific technology transfer projects, and site visits.

Breaking the Gridlock

One of the French offers concerned a parking payment system based on SMART card technology. By a bizarre coincidence, a market opportunity for this technology had been created in

Greece only weeks before Volle arrived.

"For years, Greek local authorities have controlled city parking, and generated considerable revenues, using parking meters managed by private operators," explains Melanitis. "A successful legal challenge to this system, on the grounds that it was unconstitutional to sub-contract police work, has thrown city traffic into chaos and is costing the municipalities huge amounts of money."

The French system, which does not require parking meters, seemed to offer a solution. Working together, the two managers presented the offer as 'technology of the month' in IRC Greece's newsletter, circulated to its 2,000 member companies and research organisations.

An Athens-based electronics manufacturer and a northern Greek municipality have both signed confidentiality agreements, and are examining detailed technical data. "A contract is under negotiation," says Melanitis. "Terms have not yet been discussed, but we think there is a good chance of a concrete technology transfer. Manufacturing costs will be the deciding factor."

Mutual Benefit

From a personal perspective, Volle highlights three main benefits of the visit. "First, insight into the way people do business in another country. Cross-border work can be frustrating and confusing if you do not understand these differences. Having a sense of the cultural and regulatory context really helps. Second, a visit strengthens the trust between two IRCs — essential if you are to deal effectively with sensitive information. Lastly, it allows you to share experience face to face, discussing favourite techniques and tricks."

For IRC Greece, too, the visit was worthwhile. "The companies Laurent visited were absolutely delighted that a technology transfer specialist from France should take an interest in their activities," says Melanitis. "When they found that he was willing to talk to them in Greek, they were really impressed." ●

(1) See this edition, page 11.

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Technology Audit for SMEs

An R&D or technology transfer project should never be undertaken without a comprehensive assessment of a firm's current technological capacity. The IRC Rhône-Alpes Auvergne has developed a method specially tailored to the needs of small companies.

Companies which fail to manage their human and financial resources properly do not survive. But in today's fast-moving and fiercely competitive markets, a company which relies on uncompetitive technology is as much at risk as one with a fragile cash-flow. Unfortunately, many businesses still do not consider the management of their technological assets to be a priority.

Over the past three years, the IRC Rhône-Alpes Auvergne and its host organisation have helped over 50 SME clients to develop effective technology strategies using a step-by-step self-diagnostic technique⁽¹⁾. It has also provided training for staff at the Brussels and Paris IRCs, where the technique is now in regular use.

Solid Foundation

The methodology enables an SME to assess its own technology needs in relation to the strength or weakness of its market offerings and its technological position vis-à-vis its competitors.

"For the IRC, the technology audit provides a solid basis for on-going work with a company," says manager Claude Sabatin. "It allows us to prioritise the technology transfer and R&D options. We recommend the method when we meet a new client, and around six companies each year request the training and support needed to use it for the first time."

The initial six-hour training session can be delivered to a group of companies or at an in-

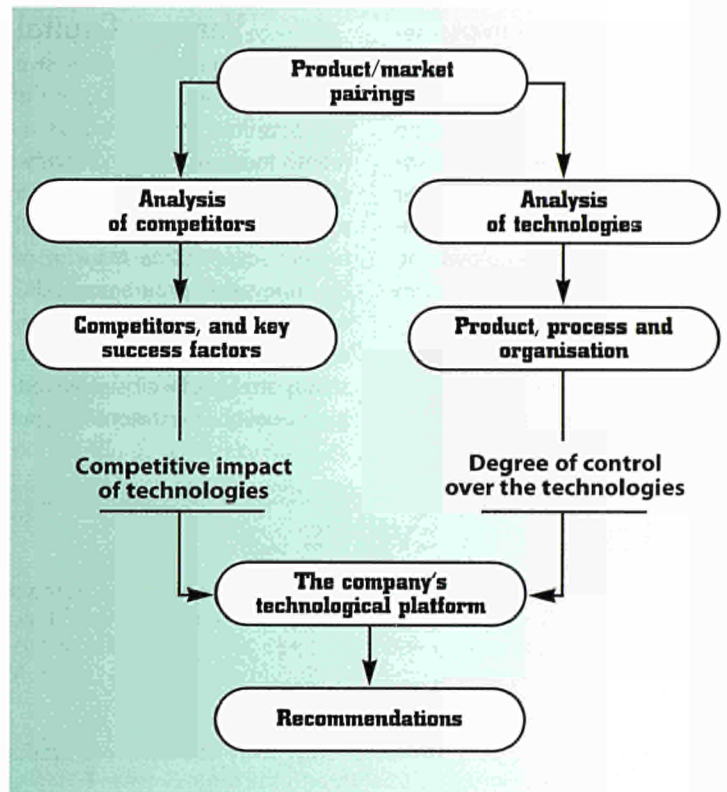
dividual client's premises. IRC staff then spend a full day on-site. For its part, the company typically spends half a day gathering information, and up to two days carrying out the audit. The IRC provides another full day of support to check and discuss the first results.

After that, the company can re-use the method as often as it needs, and in any area of its operations, without further help. "To remain competitive, you have to monitor technological developments in your industry continuously," Sabatin explains. "Although the tools generate practical recommendations of real value, they are relatively simple. We knew that if the method was too complex or time-consuming, small companies would never make regular use of it."

Steps to Success

The first step is to prepare a matrix of product-market pairings, and to pick one requiring urgent attention — others can be tackled later. For the selected pairing, the company identifies key factors for competitive success, and assesses its own position. Each relevant product, process or organisational technology, both current and future, is then scored — first for its impact on the success factors, and second for the extent to which it is controlled by the company itself, rather than by its suppliers or partners.

Recommendations are derived from these scores — for example, to extend the application



of current technology resources, to acquire a new technology through licensing or R&D, or to sub-contract a process to an outside specialist.

"The audit frequently reveals a promising option which had been overlooked," says Sabatin. "One automotive component manufacturer we worked with was on the point of launching an expensive in-house R&D project. After the audit, he realised that he

could secure the same competitive advantage more quickly, and with lower risk, through a transnational technology transfer." ●

(1) INITEC-ARIST, adapted from a methodology developed at the École Supérieure de Commerce, Grenoble.

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The Promised Land?

As a nursery for innovative companies, Israel has it all – highly qualified scientists and engineers, an entrepreneurial culture, plentiful venture capital, and well-designed ‘incubator’ and spin-off schemes.

To the December 1997 Round Table on Innovation, Entrepreneurship and Jobs⁽¹⁾, it was clear that the Israeli experience could not to be overlooked. Since the start of the 1990s, a series of government initiatives have led to the creation and rapid growth of large numbers of new high-tech companies. If the European Union was to make better use of science as a source of competitiveness and employment, lessons could surely be drawn from this extraordinary success.

In May, 14 members of the Round Table's three working groups visited Israel on a trip or-

ganised by Matimop, the Israeli Industry Centre for R&D and host organisation of IRC Israel⁽²⁾.

Abundant Venture Capital

“One of the most impressive features of the Israeli system is the close links which the government's incubator and company-cluster programmes have with private sector venture capital funds,” says Andrea Mancini of the Innovation programme's IRC team. “In less than ten years, government pump-priming and a steady stream of well-supported, high-quality investment oppor-

tunities have built a dynamic venture capital industry. For good projects, lack of access to finance is no longer an obstacle, even in the very early stages.”

Mancini expects the launch of IRC Israel to lead to greater Israeli participation in EU research, and

to increase the rate of technology transfer between Israeli and EU companies. “Especially in high-tech fields, Israel has a huge amount to offer,” he says. ●

(1) See edition 2/98.

(2) *ibid.*

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Calendar of Events

3/12/98
 Nancy
 (FR)

Exhibition, Conference and Brokerage Event: Medical Technologies
 Transnational marketing of technology offers and requests in the fields of hospital diagnosis, devices and training, technical aids to rehabilitation and health care, and image processing, hospital logistics and telemedicine.

IRC Luxembourg-Trier-Saarland / Dr H. Wittig
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 Fx. +49 681 9520 478
 E-m. hanno_wittig@compuserve.com
<http://www.saarland.ihk.de/zpt>

10/12/98
 Erfurt
 (DE)

Europe Information Day: The Fifth Research Framework Programme
 Supported by DGXII/E and the three German Focal Points for the Thematic Programmes.

IRC South Germany / E. Römhild
 Tl. +49 361 348 4130
 Fx. +49 361 348 4288
 E-m. thati-ef@t-online.de

11/12/98
 Brussels
 (BE)

Brokerage Event: Environmental Technologies
 Presentation of four completed projects with results ready for exploitation, followed by prearranged face-to-face meetings between the project partners and potential buyers and end-users.

IRC Brussels / C. Tombeux
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25-26/2/99
 Bilbao
 (ES)

PROMA'99 — Brokerage Event: Environmental Technologies
 In the framework of the International Environmental Fair PROMA'99, the presentation of selected projects and a partner mediation event for SMEs involved in production or services in the fields of industrial and municipal water, recycling and reuse, waste treatment, contaminated soils, air pollution and acoustic pollution.

IRC Basque Country / A. Antón
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 Fx. +34 94 479 7022
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<http://www.spr.es>

18-19/3/99
 Berlin
 (DE)

Conference: Advanced Microsystems for Automotive Applications
 An international platform for the discussion of microsystems for safety applications, driver support, vision systems, comfort systems, the intelligent power train, passenger information and entertainment, on board diagnosis and communication, and car to car and car to road communication.

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 Fx. +49 332 845 3256
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<http://vdivde-it.de/amaa>

28-29/4/99
 Limoges
 (FR)

Brokerage Event: Ceramics
 This mediation event is designed as a marketplace for companies to establish technology transfer and research and development partnerships. It takes place within the larger Ceramic Network convention, which includes exhibitions, workshops and conferences.

IRC South Western France / L. Tassone
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ECHO No Longer Heard

After 18 years as a pioneering demonstration of the value of electronic information, the European Commission Host Organisation (ECHO) server was retired on 1 October.

ECHO was launched in 1980 as an awareness-raising exercise, to encourage the development of electronic information services in Europe. Since then, the technology has developed with astonishing speed, and the growth of the World-Wide Web has led to an explosion in the number and range of electronic information services. The European Commission believes that ECHO has served its purpose, and will now concentrate its efforts on services offered through the I*M Europe Web server.

ECHO created the opportunity for early users to establish pan-European, and often multilingual, services on a non-commercial basis. In recent years, it formed part of the INFO2000 programme, which supports the development of multimedia content in Europe.

From 1 October 1998, services previously on ECHO will be accessible as follows:

- **TED (Tenders Electronic Daily)**, which provides electronic access to invitations to tender contained in the Official Journal 'S' series, is now available in all EU languages (<http://ted.eur-op.eu.int>).

- **Eurodicautom**, the Commission Translation Service's electronic terminology database, will be available under the Multilingual Information Society (MLIS) programme on the I*M Europe server (<http://www.echo.lu/edic>).

- **I*M Guide** and **I*M Forum** are respectively directories of electronic information services, and of experts and organisations. These services are maintained by the INFO2000 programme and will be accessible via the I*M Europe homepage (<http://www.echo.lu/>) at least

until the end of the INFO2000 programme in December 1999.

- All other ECHO services were discontinued on 1 October.

A Winning Innovation Project

Renewed efforts by the European Commission's Joint Research Centre (JRC) to promote innovation based on technologies developed in the course of its research activities has achieved an early success.

The JRC's Institute for Transuranium Elements in Karlsruhe, Germany, is one of six main partners in the KEIM project, which was among the winning entries in the German 'Entrepreneurs from Higher Education' competition. KEIM was one of five winners chosen in August by the German Ministry for Education, Science, Research and Technology, from 100 regional proposals.

The Karlsruhe project will bring together over 80 institutions. They will develop initiatives to stimulate the creation of new spin-off companies to commercialise the results of work carried out in public research centres and universities. These will include entrepreneurship training, mentoring schemes, support for the development of both prototypes and business plans, and innovation financing.

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E-m. freddy.dezeure@cec.be

Europe's Young Scientists Are All Winners

Prizes worth a total of ECU 33,000 were awarded to twelve winning projects in Porto, Portugal, at the end of the week-long 10th European Union Contest for Young

Scientists, on 26 September.

But the 88 finalists who attended the event, and the 30,000 European students aged 15-20 who participated in the national heats, are all winners. The annual contest, organised as part of the Training and Mobility of Researchers (TMR) programme, raises the profile of science and technology among Europe's young citizens, and draws public attention to its next generation of innovators.

It also allows young scientists to forge transnational links, both between themselves and with established scientists and researchers. "Europe cannot be just a consumer of technology," said Edith Cresson, Commissioner for Research, Innovation, Education, Training and Youth, who has been actively encouraging young people to choose careers in science and technology. "The youth of today will be the driving force to take our continent into the next millennium."

This year's contest drew participants from all 15 Member States, the four associated countries, and 12 central and eastern European countries. The finalists' work, on display to public and press during the week, ranged from academic studies to practical technologies. The three first prizes were awarded to a 15 year-old from Hungary, for a 3D Scanner which uses a simple digital camera to capture three-dimensional images on computer; two Austrian students for an ultrasonic sensor which gives blind people 'virtual vision'; and a pair of 18 year-olds from the United Kingdom, for a ground-breaking analysis of the yellowing of alkyd-based paints.

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<http://www.cordis.lu/tmr/home.html>

Innovation Projects Get Their Own Homepage

Access to information about the Innovation programme's technology validation and technology transfer projects (TVP/TTP) is now more user-friendly. A new Internet homepage, launched on 1 October, offers details of more than 170 projects — including Accompanying Measures projects — from the three calls of 1995, 1996, 1997, and of all the partners involved in them.

The new site gives access to project information by call, by type of project and by theme. This allows users to identify and focus on the information they require — for example, projects involving SMEs, or projects with a social dimension. A useful new feature is the inclusion of clickable links to projects' own web sites and e-mail addresses, allowing interested users to contact project co-ordinators directly.

The site also contains information on a number of project management related publications, videos and guides published by the Innovation Programme.

<http://www.cordis.lu/tvp/home.html>

Technologies for the Information Age

The integrated structure of the European Commission's new Information Society Technologies research programme reflects the increasing orientation of the digital industries towards the needs of customers, rather than conventionally defined sectors or disciplines.

"I think there is a world market for maybe five computers," said Thomas Watson, chairman of IBM, in 1943. The prediction fascinates us because we still have no idea what the ultimate impact of computer-based technologies will be. Is it possible that even today's leaders of the information technology industry underestimate the scale of the social changes which the digital revolution will eventually bring about?

The technologies involved are so far from maturity that advances are not confined to the incremental improvement of existing applications. Entirely new uses of digital technologies – often in areas in which they have previously played no part – are regularly envisaged and implemented. We are still at the dawn of the information age.

I. Towards the Information Society

As information and communication technologies (ICT) spread further into the fabric of society, it is at the interface between the technological and the social that the most challenging and rewarding innovations occur.

Our three case studies – chosen from the huge number of successful ICT projects supported under the Fourth Research Framework Programme – demonstrate the steadily unfolding potential of digital technologies, not just to improve business processes, home entertainment, and mobile communications, but to effect step changes in these fields, as in many others.

It is essential that technological development delivers benefits to all Europe's citizens, and to all its industries, as well as to its electronics and information technology sector. Recognising this, the European Commission has, over the past decade, steadily increased the orientation of its support for ICT research and development towards the realisation of an 'Information Society'.

As long ago as 1994, the Commission's Action Plan 'Europe's Way to the Information Society'⁽¹⁾, was based on the conviction that ICT had the potential to transform European society in a positive way.

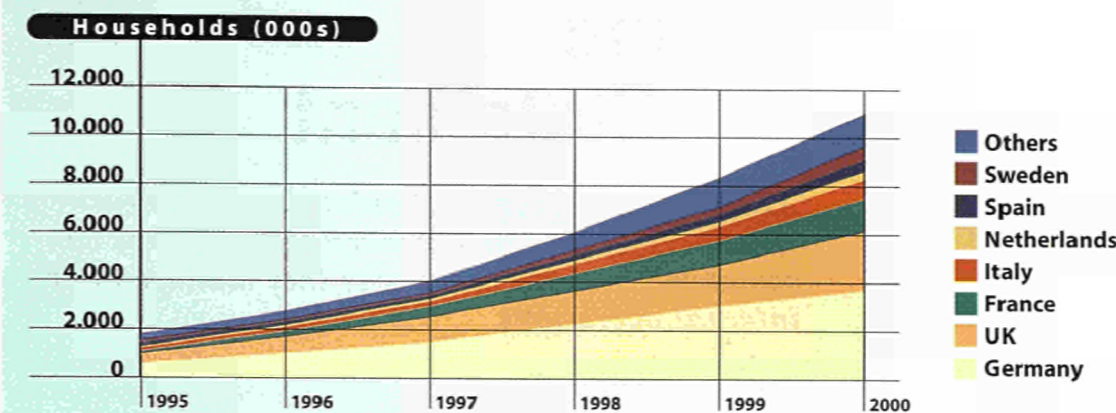
Affordability

Today, as the new Fifth Research Framework Programme (FP5) is finalised, ready for launch at the start of 1999, the social orientation of European ICT research priorities is stronger than ever. In the new Information Society Technologies (IST) programme, the Commission has proposed that every funded project should be directed towards achieving the central goals of "usability, dependability, interoperability and, above all, affordability."⁽²⁾

In the field of mobile communications, for example, the rapid miniaturisation of compo-

FIGURE 1 source: Datamonitor (1996), *Multimedia in Europe*

European households with PC and modem, 1995-2000



nents, advances in battery technology, and the advent of the third generation mobile standard – UMTS (Universal Mobile Telecommunications System) – promise new levels of usability. At the same time, liberalisation will attract new providers to enter the market, driving down the cost to consumers.

"Mobile communication is again at a leap-off point," says a source in the Commission's Directorate-General for Industry. "There is an opportunity to establish a virtuous circle of increasing utility and falling prices, which will lead to a seamless European network, in which wireless multimedia communications will be accessible to anyone, from anywhere, at any time."

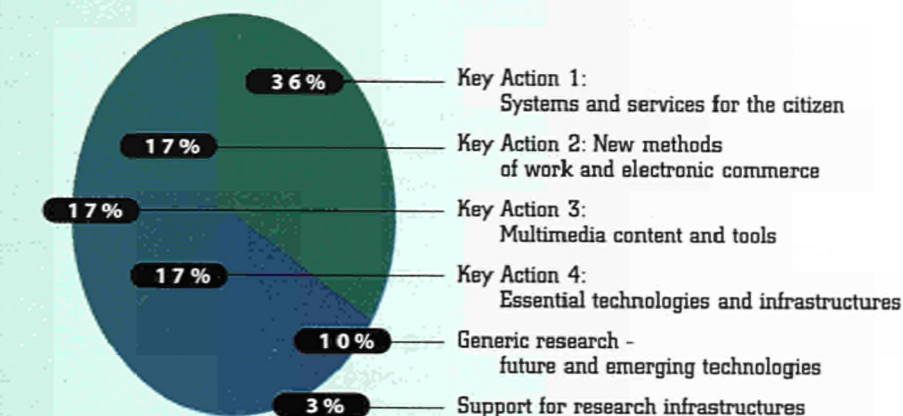
The IST programme hopes to help establish such virtuous circles, in order to accelerate the broad deployment of all information society technologies.

Convergence

From a technological perspective, the new programme is informed by the convergence of digital technologies – also clearly illustrated by our case studies. Under four key actions (see Figure 2), it will encompass most of the areas of work covered by the three precursor programmes. "Specific research priorities will of course reflect the progress that has been made," says the Commission source. "There

FIGURE 2 source: Commission Proposals, COM(1998) 305 final

Indicative Breakdown of the Proposed IST Programme Budget⁽¹⁾



⁽¹⁾ A final decision on the budget will not be made before late November. For the period 1998-2002, the Commission has proposed a figure of ECU 3,925 million for the IST programme.

will be a greater emphasis on convergence between technologies, especially in Key Action 4, which will include work on concurrent systems and network integration."

Convergence is also changing the way that the ICT industry is structured. Many of the most exciting breakthroughs are now occurring at the boundaries between what were until recently viewed as distinct technologi-

cal or industrial areas. Mergers and cross-ownership deals between companies in the computer, television, publishing and telecom sectors are proliferating.

Each of FP4's three ICT programmes embraced a very wide range of technical fields, leading to some overlap between them. But there was also some arbitrary allocation of research domains, according to the Commis-



⁽¹⁾ COM(94) 347 final, browsable at <http://www.ispo.cec.be/infosoc/backg/action.html>.

⁽²⁾ Proposals for Council Decisions Concerning the Specific Programmes Implementing the Fifth Framework Programme of the European Community for Research, Technological Development and Demonstration Activities (1998-2002), COM(1998) 305 final, browsable at <http://www.cordis.lu/fifth/sr/305-en.htm>.

sion source. "We noticed a widening gap between the way in which research tasks were divided among the units and teams of the FP4 programmes and the increasingly integrated structures in which these tasks were managed in industry," he says. "The fully integrated structure of the new IST programme reflects our desire to match industry's orien-

tation towards applications."

IST will use a rolling work programme, updated annually in the light of feedback from industrial and research experts – a system which has enabled Esprit⁽³⁾ to track rapid market developments with considerable success. The work programme itself has not yet been finalised, but a draft will be presented at

IST 98 in Vienna (see box, page 21). The final programme, setting out the research priorities for 1999, is expected to be published by early January.

(3) *The information technologies (IT) programme of the Fourth Framework Programme.*



The benefits of ELEGANT's business information system extend right through to the point of sale – in selected outlets, CAL has installed multimedia 'kiosks' to help customers select the right garment.

CASE STUDY

Fashion Statement

As well as bringing companies closer to their customers, electronic commerce applications can completely transform the way they manage their internal operations.

Established in 1974 as a specialist clothing wholesaler, since the early 1980s CAL has expanded rapidly into design and manufacture, and is now a leader in the high-quality sports and functional leisurewear markets. Based in Lecco, northern Italy, it has four eastern European production plants and a world-wide distribution network serving 1,200 independent specialist stores, mainly in Europe and Asia.

Paper Chase

"By 1996, our paper-based information system had become completely inadequate for such a complex operation," recalls Angelo Riva, managing director of the family-run firm. "The clothing business is driven by rapidly-changing fashions. Like its competitors, CAL launches two new collections every year. Each is designed, tested and refined over an 18 month period before it reaches the shops. The speed and richness of the flow of information between the designers and the fabric suppliers, production managers, distributors, and retail stores has a direct impact on competitiveness."

Getting early feedback on its new designs would help CAL to match its offering to the needs of the market. Giving distributors and

stores immediate access to accurate information about the technical specifications, price and availability of each garment would enable them to market the clothes more effectively. "We experimented with a printed catalogue," Riva says. "But it could not show all the different combinations of style, colour and size – and anyway, it was always out of date."

Establishing a company website convinced Riva that a multimedia communications and data management application was not only feasible, but essential. "The technology we wanted did not really exist at the time," he remembers. "But support from the Esprit programme enabled us to build the system ourselves – probably two years earlier than we could have done without it."

No Turning Back

Funded as a best practice pilot within Esprit's 'Technologies for Business Processes' domain, an 18-month project⁽¹⁾ was launched at the beginning of 1997 with CAL's Internet Service Provider, Onion, as technology supplier, and its Austrian distributor, Sportfreizeit, as end-user.

"The technical challenge was to incorporate highly structured information like product and sales data, and unstructured information such as distributors' requests and suggestions, in a single easy-to-use application," says Enrico Fagnoni of Onion. "A multimedia format was needed to show garments in full

colour. And it had to be Web-based, so that design changes would be available immediately, anywhere in the world. What has been really exciting is the impact of communications technology on the process of business re-engineering."

"Everything in our company has changed," says Riva. "Around 70% of our information flow now uses electronic mail and web technologies, and the proportion is still growing. Not everyone has found it easy to adjust to the change, but we have passed the point of no return."

CAL now gives its distributors a detailed preview of each forthcoming collection four months earlier than in the past. Sales are up, and stock levels have been reduced. Micaela Gironi of Sportfreizeit is enthusiastic about the benefits to CAL's customers. "The Internet tools enable us to offer a much higher level of customer service," she says.

(1) *ELEGANT, Esprit project 24047.*

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II. Releasing the Brakes on IST

Small and medium-sized enterprises, and in particular spin-off and start-up companies, are vital for the take-up and deployment of IST.

The Commission is keenly aware of the need not just to encourage SME participation in research, but to maximise the contribution of SMEs to the spread of new technologies. "Particular attention will be paid to ensuring that the 'innovation dimension' is actively addressed, and to stimulating and supporting the participation of SMEs, so as to contribute to the effective take-up of research results for economic and societal benefit."⁽²⁾

Until very recently, the difficulty of attracting capital constituted a serious barrier to the growth of new ICT companies. "Europe has little or no tradition of equity financing for young companies and dynamic entrepreneurs," says Marco Cecchini of the Esprit programme, who is responsible for the Investment Conference and Forum at IST 98 (see box).

In the last few years, the picture has changed dramatically. "The EASDAQ and Euro NM markets have made a real difference," says William Stevens of specialist researchers Europe Unlimited. "Venture capital funds have had a lot of recent successes, with the flotation or acquisition of companies in which they have invested. Funds and their institutional backers now realise that it is possible to make a lot of money on early-stage investments. The European market for such investments is in a phase of explosive growth."

Exploitation Plans

Stevens believes that this success has also had a positive effect on innovators, and will start to create the dynamic, growth-oriented entrepreneurial culture which Europe has so far lacked. "Three out of every ten investments of this kind fail," he explains. "To offset the very high level of risk, investors are looking for significant returns. Projected annual growth of 10% is not sufficiently ambitious to attract them."

The quality of a company's management team is even more important to investors than its technology or its market, he says. "Someone who has already raised finance for a successful project has relatively easy access to capital. Occasionally, researchers and technologists do make it on their own. But they succeed more quickly, and find it much easier to secure financial backing, when they team up with an experienced business manager."

Cecchini agrees, and sees the IST 98 Investment Forum as a contribution to the

process of awareness-building. "Many entrepreneurs still do not really understand the implications of working with outside investors, and are reluctant to sacrifice control of their vision," he says.

Both view FP5's requirement for research proposals to include exploitation plans as significant. It will encourage participants to adopt a more pro-active attitude towards commercialisation and financing, making it much easier for publicly-funded ICT research projects to attract the private sector funding they need, if they are to fulfil their potential as world leaders in emerging niche markets.

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VIENNA, 30 NOVEMBER - 2 DECEMBER 1998

IST 98: Living and Working in the Information Society



Reflecting the broad scope of the integrated Information Society Technologies programme, the IST 98 conference and exhibition addresses a much wider technological field than the annual Esprit events of previous years. It presents those who have participated in ACTS, Esprit and Telematics Applications programmes with their first opportunity to meet and exchange ideas as a single community of research partners. Technologies and products arising from completed projects in each of these programmes will be displayed and demonstrated at the exhibition.

A series of 15 parallel workshops, organised in strands which address the central theme of the conference, will focus on some of the new programme's key areas. A one-day Investment Conference will consider issues related to the financing of early-stage projects, and will be followed by an invitation-only Investment Forum,

at which 50 selected European companies will present their business plans to an audience of potential investors. On the final day, the IST programme will be launched, with the presentation of an advanced draft of the 1999 work programme.

Jointly hosted in Vienna by the European Commission and the Austrian Ministry of Science and Transport, the event will have a strong Central and Eastern European component.

The conference will be preceded, on 29 November, by the INFO2000 Multimedia Content Conference and EuroPrix Multimedia Art Gala.

Full details of all aspects of the event are available on-line (<http://www.cordis.lu/ist98>).

ACTS Atlantic



Prototype MOLE coders and decoders being demonstrated on the Atlantic stand at IBC 98.

CASE STUDY

Maintaining Digital Quality

Digital television will be the vehicle for many of the high-quality information and entertainment services central to the Information Society.

As yet, only a tiny number of European homes receive TV programmes in digital form. But a great deal of content is already created, manipulated and stored digitally. The penetration of digital technologies, all the way from camera to living-room, is likely to be rapid. They promise viewers improved picture and sound quality, and a much wider choice of programming.

The speed with which the industry can adopt these technologies – and so offer their full benefits to the public – is limited by the cost of the hardware. The ACTS⁽¹⁾ project, Atlantic⁽²⁾, has achieved a breakthrough which will greatly reduce the initial costs, enabling broadcasters to handle a much larger proportion of digital programming with only minor modification of existing networks and equipment.

It's a MOLE!

"Our aim was to enable TV companies to use compressed video and audio right through the production and broadcast chain," says Peter Brightwell of the BBC's research and development department, which has led the project.

Highly efficient MPEG-2 compression is already widely used, to reduce demand on costly bandwidth and server storage capacity. But MPEG bitstreams are incompatible with existing equipment such as editing suites and continuity desks. At each stage, signals must be decoded for processing, and then recoded – and every recoding causes a loss of quality. To compensate for this progressive degradation, the signal's original quality has to be much higher than is needed for broadcast. The resulting bit-rate overhead consumes much of the saving offered by compression.

"Equipment manufacturers have implemented MPEG-2 in different ways," Brightwell explains. "So that it can be decoded, a compressed signal contains information about the decisions used to encode it. Normally, this information is discarded. When the signal is recoded, quite different coding decisions may be taken. This is what causes loss of quality."

Atlantic's MOLE decoding system retains the information, hiding it in the non-compressed video and audio signal. A compatible coder can recode the signal using the original decisions, avoiding a loss of quality.

Industry Standard

MOLE technology will allow the seamless and transparent switching and editing of compressed signals. It is close to gaining approval as a world-wide industry standard⁽³⁾, and Brightwell is confident that it will be very widely taken up once this process is completed. In the short term, special decoder and recoder units will give existing equipment the ability to handle MPEG bitstreams without restriction or loss of quality.

"This will offer significant savings for a relatively small outlay," Brightwell promises. "Equipment manufacturers certainly anticipate a large demand – we have already received many requests to licence the technology." Prototype hardware developed by the BBC's project partners generated a huge amount of interest when it was demonstrated at the International Broadcasting Convention (IBC 98) in September.

Among the most exciting applications on display was a journalist's workstation, permitting near-real-time editing of MPEG-2 video on a low-cost machine. "This is critical as a means of reducing post-production costs," says Brightwell, "leaving TV stations more to spend on programmes."

(1) Advanced Communications Technologies and Services.

(2) Advanced Television at Low bitrates And Networked Transmission over Integrated Communication systems, project AC078.

(3) From SMPTE, the Society for Motion Picture and TV Engineers.

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After eight generations of conventional MPEG-2 coding and decoding, a video signal becomes seriously degraded (top). Using MOLE technology, the loss of picture quality is imperceptible (above).



Information in Your Pocket

Easy access to the travel information you need, when you need it, wherever you are – the future has almost arrived.

As her car approaches the city centre, the driver checks the time – only ten minutes to the start of the meeting. She has her mobile phone and Personal Digital Assistant (PDA) with her. But neither can give her the information she really needs – the location of the closest car-park with free spaces, or the timetable of the bus which could speed her through the city-centre traffic jam.

Yet the convergence of digital technologies has brought mobile access to such information very close. Manufacturers are combining the functionality of the mobile phone and the PDA in a single unit, which can also act as a hand-held internet terminal. At the same time, more and more information about timetables, weather and road conditions is available on-line, via the World-Wide Web.

Citizen on the Move

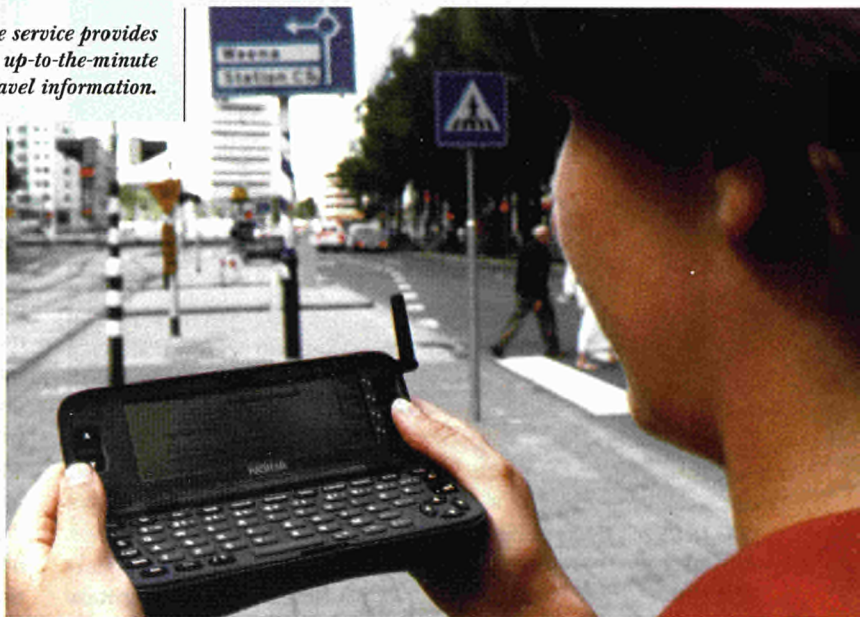
Using a hand-held terminal, the Promise project⁽¹⁾ has developed and demonstrated such services at test-sites in six European countries, as a first step towards the realisation of a pan-European travel information service.

"Our aim was to offer travellers up-to-date, personalised travel and traffic information not just at the planning stage, but at any point on their journey," says Tommi Ojala of Nokia Mobile Phones, which co-ordinates the PROMISE project.

The benefits to the citizen on the move are clear – direct access to real-time traffic information will, for instance, enable drivers to avoid congested areas by choosing alternative routes. But wider advantages are also anticipated. The ability of individuals to optimise their journeys is expected to improve the overall efficiency with which transport infrastructures are used – reducing traffic congestion and increasing the use of public transport.

The prospect of substantial economic and environmental savings has encouraged six municipal authorities to participate, alongside some of Europe's industrial leaders in the

The Promise service provides mobile access to up-to-the-minute travel information.



fields of telecommunications, car manufacture and geographical information systems. Validation tests, followed by full demonstrations, have taken place in Finland, Sweden, the United Kingdom, the Netherlands, France and Germany.

Commercial Services

"Using the hand-held terminal as a browser, you can access all the available information from a single web site," Ojala explains. "Both Nokia and Renault have also prepared early prototypes of in-car terminals."

Content providers such as airlines, bus and train companies, road-users' associations and city authorities make frequently updated information available to a value-added service provider. The service provider presents this data via a simple menu on the Promise homepage – and, as the service develops in the future, will be responsible for integrating it, and for adding interactive and multilingual functionality. Finally, a telecoms company provides internet access. Currently, Promise uses the GSM cellular network, but will be able to make use of faster systems without modification, as these become available.

Early feedback from test users has been encouraging. "They wanted the service to be faster and more accurate. But they said that they would be willing to pay for it," says Aki Lumiaho of the Technical Research Centre of Finland, VTT, which has managed the Finnish test site.

"At least some of the national partnerships will certainly launch commercial services in the near future," Ojala adds.

⁽¹⁾ Personal Mobile traveller and traffic Information Service – Telematics Applications Programme project TR1043.

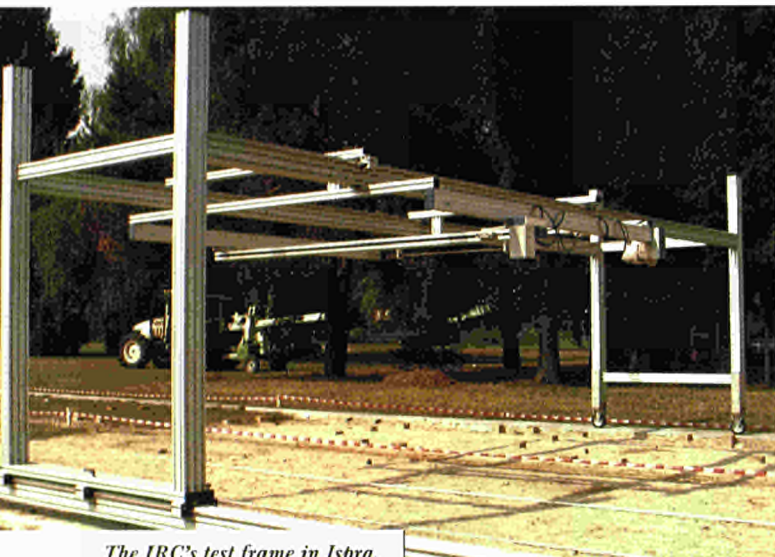
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A Clearer View of Land Mines

Mine clearing is an agonisingly slow process, and the labour costs constitute a major barrier to comprehensive clearance programmes. Now, a European initiative is bringing advanced sensor technologies to bear on the problem.



The JRC's test frame in Ispra, where innovative mine-detecting technologies can be evaluated.

Political efforts to limit or ban the production of land mines have rightly received much recent publicity. But more than 60 million deadly anti-personnel and anti-tank mines already litter former theatres of war, killing thousands each year, and preventing the resumption of normal agricultural activity.

The European Union has led international efforts to improve de-mining technologies, in order to speed the clean-up. A year ago, with the support of the European Parliament, Commissioner for research Edith Cresson launched an ECU 15 million research programme, under the technical supervision of the European Commission's Joint Research Centre (JRC). The programme, and the global research network which is forming around it, was the focus of the recent 'De-Mining Technologies' conference at the JRC's site in Ispra, Italy, at the end of September.

The JRC – a Catalyst

"We must bring down the rate of false alarms," explains Dr Alois Sieber of the JRC, who leads the programme. "In Afghanistan, demining teams report 1,000 false alarms for each mine identified. On average, it takes 20 minutes to investigate each. Intelligent, multi-sensor devices will be more expensive than the present detectors, but because they give far fewer false alarms, they will greatly reduce the cost per square metre."

The second, urgent problem is that many modern anti-personnel mines are made almost entirely of plastic, and are undetectable by today's hand-held metal detectors.

In 1995 the JRC, widely acknowledged as an authoritative and neutral centre of expertise on industrial sensors, carried out an assessment of the available technology. It concluded that the fastest way to improve performance would be to use sensors of three different types in combination with sophisticated software for on-site analysis of image data.

"We do not rule out the use of other sensor types," Sieber says, "but at present we are working on the integration of these three. Improved metal detection will allow the device to image any metal object on or below the surface. Ground-penetrating

radar will image non-metallic objects. An infra-red sensor will map any disturbance of soil or vegetation – inevitable when a mine is laid."

Contracts were awarded in early 1998 to three industrial consortia, and five more were announced at the Ispra conference. Each team is working on one complementary component of the overall strategy. The JRC itself is using its advanced measurement and test facilities to develop a database of mine 'fingerprints' – the unique signatures by which known mines reveal themselves to one or more of the sensors. Sieber expects the new technology to be demonstrated by the end of 1999, with the first device in the field in 2000.

Global Effort

Mme Cresson, who has taken an active interest in the development of improved de-mining technologies, is keen for the JRC's co-ordinating role to be strengthened under the Fifth Research Framework Programme.

"Our evaluation facilities are already available for use by equipment developers and manufacturers from anywhere in the world," Sieber says. "Now we are seeking international approval as a certification centre for de-mining technologies." ●

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Think Big!



Entrepreneurial researchers need financial backing, but venture capital funds are only interested when business ideas are turned into robust business plans. Training innovators to found market-oriented companies is one way to fill the gap.

TRAIN-IT⁽¹⁾ hopes to jump-start over 30 spin-off and start-up information technology companies in a 24-month period. It aims to speed the commercialisation of Esprit research results by giving 300 high-tech entrepreneurs the business skills to convert technological wizardry into successful companies with marketable products.

By the end of 1999 the project's partners – technology centres in Germany, France, Denmark and Finland – will run a total of thirty week-long courses. Demand from information technology innovators already exceeds the ten places per course, and priority will be given to those with Esprit experience. They will undergo intensive training designed to help each of them develop a winning business plan.

A Flying Start

The first course took place in September in Itzehoe, Germany, home of the project's co-ordinator, the IZET innovation centre. It was an immediate hit. "The participants were looking for answers from the moment they arrived," says Dr Ingo Hussla of IZET. "They were refreshingly open with one another, and handled the constructive criticism of the tutors with great maturity. They really wanted to learn."

Coming from Germany, Spain, Belgium and the United Kingdom, most had already taken the legal step of founding a company. But few had yet prepared the business plans needed to define their commercial goals – and to win the confidence of investors.

"We encouraged them to think big," says Hussla. "If you really believe in your technology, you should set yourself an ambitious five-year growth target – and then map out the route very carefully." As well as business planning, the course addressed market research and the analysis of customer benefits, marketing and sales strategy, collaboration with venture capitalists, and intellectual property rights issues.

The entrepreneurs' greatest weakness turned out to be customer research and sales forecasting, which Dr Hussla says will receive even more attention in future. "A technologist often finds it hard to focus on what his customers want, rather than on what he thinks they need," he says. "It is vital to change that mindset."

Technologists into Business People

Participants found the one-on-one discussions with the tutors – experts chosen for their hands-on experience – particularly useful. "Dirk Kanngiesser of Baring Private Equity Partners really pushed them to justify their ideas in business terms," says Hussla. "That can be painful, but they all knew that the next time they presented their plans it would be to a real investor. One abandoned his entire strategy in favour of a radically different marketing approach."

The course mixes lectures and counselling with self-directed and group learning. Specially developed software gives participants access to on-line business information, as well as to their



IT entrepreneurs used TRAIN-IT's specially-developed software environment to polish their business plans.

own company data – and to one another – via e-mail. Interaction between the participants is important not only during the course itself, but in the follow-up phase. The partners hope to build a network of mutual support, with start-up veterans returning to pass on their experience to new trainees.

Two participants in the pilot course were so impressed that they elected to locate their new companies in IZET's business incubator – compelling evidence that TRAIN-IT itself has succeeded in meeting the needs of its target market.

The project will be running a 'start-up surgery' at the IST 98 conference⁽²⁾. ●

(1) Esprit accompanying measure 'Training of IT Innovators', project 25756.

(2) See this edition, page 21.

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Digital Technologies Go Paper

The World-Wide Web has revolutionised the dissemination of information – not least, information about the application and impact of information and communication technologies themselves.

Reviewed below is a selection of recent European Commission publications related to the take-up of these technologies.

Business Transformation through Technology ISBN 92-828-3426-3

"Remaining competitive in the increasingly global and interconnected marketplace of today means developing new ways of doing business. Communication and information technologies are . . . key factors." This book presents 21 case studies from the Esprit programme's Technologies for Business Processes domain, showing how success was achieved.

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<http://www.ispo.cec.be/ecommerce/tbpbook.html>

Accelerating Electronic Commerce in Europe ISBN 92-828-0376-7

Under the slogan "global business interaction at the touch of a button", this guide describes nearly 250 EU-funded projects in the field of electronic commerce. Some are sectoral (retail, tourism), some deal with business process management, some with 'components' such as confidence and IPR, and some with quality, awareness, and techno-legal issues.

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anne.sinnaeve@dg3.cec.be
<http://www.ispo.cec.be/ecommerce/ecbook.html>

Multimedia Broadcast

A huge potential market for real-time interactive multimedia services to the home and small business is beginning to be addressed by telecom and cable TV operators, as well as satellite and terrestrial broadcasters. This overview describes the work of Advanced Communications Technologies and Services (ACTS) projects in interactive distribution and transmission.

Contact:
aco@bxl.dg13.cec.be
<http://www.uk.infowin.org/acts/analysys/products/thematic/mmb/>

The Handbook on Communication Services

This manual offers recommendations to help European research project participants to use electronic communications most efficiently. It provides a guide to the evolving information infrastructure and networks, suitable for inexperienced users.

Contact:
aco@bxl.dg13.cec.be
<http://www.uk.infowin.org/acts/analysys/products/handbook/handbook.html>

Prosoma CD-ROM showcase, 2nd Edition

The results of almost 500 successful Esprit projects are presented here, in a format designed to give users easy access to essential business and technical information on project results.

Contact:
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Electronic publishing and the multimedia content industry

Information Engineering:
ISBN 92-828-3602-9
Interactive digital media services:
ISBN 92-828-3738-6
The future of content:
ISBN 92-828-3258-9
The content challenge:
ISBN 92-828-3603-7
Electronic publishing in Europe:
ISBN 92-828-3421-2

This series presents work carried out in the information engineering sector of the Telematics Applications programme, focusing on electronic publishing, information dissemination and information retrieval.

Contact:
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<http://www.echo.lu/ie/en/iehome.html>

Information Brokerage

This summarises selected ACTS projects in the area of electronic commerce and information brokerage. Each summary includes both business and computational perspectives, and a description of trial results. Interviews with project managers and experts focus on future development paths.

Contact:
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<http://www.uk.infowin.org/acts/analysys/products/thematic/brokerage/>

Statistics in focus: EU patent applications

**Patent activities in the EU,
Edition No. 2, 1998
CA-NS-98-002-EN-C; ECU 6**

A new EUROSTAT report examines the development of EU patent applications filed between 1989 and 1996. This serves as a useful indicator of innovative activity and technology development, and allows international comparisons of technology growth.

Around 34,000 patent applications were filed by EU Member States in 1996 – an increase of 16% from 1989. Germany, France and the UK accounted for 70% of the total applications. The statistics reveal something of the specialisations of different countries – that of Belgium, for example, in chemistry and metallurgy. Patent activity is also examined on a regional basis, with comparisons of the growth, patent activity and emerging specialisations of different regions.

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Earth observation customer segment studies

ISBN 92-828-3351-8; ECU 70

The CEO programme of the European Commission's Joint Research Centre (see the Dossier: Feedback from a Small Planet, edition 5/98) seeks to build relationships between customers and service providers to encourage the wider use of Earth observation information generated by satellites.

The CEO has examined a number of sectors, in order to identify customer requirements, evaluate market potential, and provide a basis for matching Earth observation products to specific tasks. Final reports of these studies are available for:

- water companies
- the shipping industry
- land navigation and the digital mapping industry
- agribusiness
- insurance companies
- the travel and tourism industry
- environmental protection organisations for land resources
- town and city local government departments
- civil engineering companies

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JRC 1997 Annual Report

COM(1998) 483; ISBN 92-78-38694-4

The annual report of the European Commission's Joint Research Centre (JRC) provides a general overview of activities during 1997 in each of the JRC's seven Institutes, and highlights their most significant achievements.

Of particular importance was the European Technology Transfer Initiative (ETTI), which will improve access to the Centre's installations, provide a technology transfer capital fund and a virtual technology park, and support training and education initiatives. 1997 also saw changes in the overall approach to the services provided by the JRC – in particular the adoption of a more customer-driven approach.

Highlighted scientific work, illustrating the diversity of the JRC's research activities, include:

- Boron Neutron Capture Therapy (BCNT) (see edition 1/98)
- anti-personnel mine detection systems and strategies (see this edition, page 24)
- the European Integrated Pollution Prevention and Control Bureau (EIPPC)

The JRC also contributed to the preparation of FP5 with an analysis of demand for scientific and technological assistance from the Commission, which has led to a greater emphasis on socio-economic activities such as consumer protection, prospective technological studies, sustainable growth and the environment.

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Progress with Environment and Climate research projects

**1997 Workshop on environmental
technologies**

ISBN 972-676-165-4

The proceedings of this workshop document progress made in 35 Environment and Climate research projects, covering life-cycle assessment, recycling technologies, treatment of hazardous waste and remediation of contaminated sites.

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Towards industrial sustainability – biotechnology

ISBN 92-64-16102-3

Partly financed by the Biotech programme, the latest in an OECD series examining the environmental applications of biotechnology argues that life cycle assessment (LCA) offers the best available method for defining clean technology.

It provides an overview of industrial use of biotechnology, with examples of new procedures, and evaluates the economic importance of applications in the chemicals, pulp and paper, textiles and leather, food and feed processing, metals and mineral extraction, and energy sectors.

Both industry and the environment can benefit from biotechnology, the study shows, but concludes that without significant economic incentives, biotechnology penetrates industry very slowly. The ability to manipulate biological processes will have a significant impact on manufacturing industries, but encouragement is needed, notably from government, during the early stages of adoption.

Research policy is viewed as critical, particularly in building bridges from basic research to final implementation, and for supporting demonstration projects.

Contact:
**Further information and details of sales
outlets are available on the OECD website
(<http://www.oecd.org/>).**

Setting the standard: 25 years of quality measurement

ISBN 92-828-0831-9; ECU 7

Measurement was one of the first fields of research supported by the European Communities. This publication documents developments in measurement and standards activities from the early days of the Community Bureau of Reference (BCR) to today's Standards, Measurements and Testing programme (SMT). It examines the development of the programme as a response to European needs and discusses key future actions in this subject area, in the context of FP5.

SME Technology Days

3-4 December, Vienna (Austria)

The annual SME Technology Days will bring together European and national policy-makers dealing with SMEs in the context of EU research, intermediaries providing information and advice for SMEs, industrial associations, venture capitalists and intellectual property specialists.

The conference will focus on SME involvement in the Fifth Research Framework Programme (FP5), and will present results and experiences from FP4 – in particular, the Technology Stimulation Measures. The aim is to stimulate an exchange of experience on different support and advisory services for SMEs between policy actors and operational intermediaries at national and EU level.

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Public perceptions of biotechnology

15-16 December, Brussels (Belgium)

Topical issues in biotechnology include the environmental impact of genetically modified crops and the consumer acceptability of genetically modified foods. There is also controversy relating to the patenting of human genome sequences and the ethics of genetic testing.

These issues will be discussed by key participants from science, industry, consumer

and environmental organisations, government and the media. The forum will seek constructive ways to resolve them, with input from social scientists who have been tracking public attitudes to the various aspects of biotechnology.

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Financing Entrepreneurship and Innovation in Science-Based Industries

22-23 January 1999, Mannheim (Germany)

There are wide institutional differences between the financial systems of different countries. With the growing importance of innovation in the science-based industries as a source of economic growth, the impact of financial systems on R&D and innovation is becoming critical to economic performance. The conference will address issues related to the financing and taxation of new technology-based firms in the EU.

Funding is available from the TMR programme for EU researchers under 35, and from the INCO programme for those from Central and Eastern Europe.

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Note

Publications are free unless otherwise stated. If specific contact information for obtaining a publication is not supplied, and there is a price listed in ECU, then the publication can be purchased from the sales and subscription office in your country of the Office for Official Publications of the European Communities (Eur-OP). Addresses can be found in most EC publications, on the WWW (<http://eur-op.eu.int/en/general/s-ad.htm>) and by contacting Eur-Op (fax: +352 2929 42759).

Implementing the White Paper 'Renewable Energy and the Changing European Society'

25-26 May 1999, Amsterdam (The Netherlands)

As part of the Sustain '99 World Sustainable Energy Fair, the Altener programme is supporting a 'kick-off' conference for the EU White Paper.

The conference will examine the social implications of the growing use of sustainable energy sources, as well as the new market opportunities it will create.

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