

Microsystems: Driving *the* Car Industry?

Progress of the Innovation Action Plan

Gathering Momentum

- Call for proposals now open – support for the creation of innovative companies

Plus

- Reducing the cost of managing urban traffic flows
- Novelty searches – a means to improve the efficiency of research
- Environmental technologies – the IRC network makes the connections
- Using sunshine to drive office air-conditioning

... and more

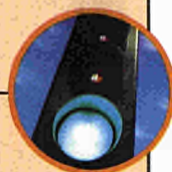




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Innovation & Technology Transfer



Innovation & Technology Transfer is published six times a year in English, French, German, Italian and Spanish by the 'Innovation and participation of SMEs' programme, part of the European Commission's Fifth Research Framework Programme. The Innovation and SMEs programme promotes innovation and encourages the participation of small and medium-sized enterprises (SMEs) in the framework programme.

Innovation in Europe

Innovation – the creation of economic and social value through the development of new products and processes – is deeply embedded in the Research Framework Programme for the period 1999-2002. Research will in future be directed towards the market – towards the needs of Europe's companies, and of its citizens.

Innovation demands speed, for the windows of opportunity for new technologies are narrow. But an invention, even when it meets a clear need, must overcome many obstacles before it can be successfully brought to market. The company which is to commercialise it must tackle the interlocking issues of intellectual property rights and access to finance. It must find a path through the administrative and regulatory paperwork. And it needs well-trained, well-motivated and creative managers and staff, willing to tackle problems and take risks.

The First Action Plan for Innovation in Europe recognised that innovation involved not just scientific and technological issues, but educational, institutional and cultural ones as well. Since its launch, much has already been done to dismantle the barriers to innovation, speeding the flow of new European technologies to the global market place.

Over the coming four years, the Innovation and SMEs programme will play a central role in pushing forward the Action Plan's agenda for change – within the Commission, among the research community, and among policy-makers and practitioners at national and regional levels.

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Dismantling Barriers to Innovation

In the past, Innovation projects dealt purely with the transfer and pilot testing of new technologies. Increasingly, they will focus on non-technical obstacles to technology transfer. How will this contribute to innovation in Europe, and what are the implications for the projects themselves?

The first call for Innovation projects under the Fifth Research Framework Programme closed on 24 June. The projects selected will carry out transfers of technology between sectors and regions, and from universities and research centres to industry. But they have also been chosen for their ability to address non-technical issues encountered in the innovation process.

"We asked people to indicate in their proposals the social, institutional or organisational problems which they expected to encounter in carrying out the technology transfer," says Guido Haesen of the Innovation and SMEs programme.

Clusters

The Commission is working with the projects to define these problems more precisely, and in the first half of next year will launch accompanying measures to support clusters of projects grouped around particular types of issue. "We will not create arbitrary clusters," Haesen explains. "But we do expect to identify issues in which a number of projects have a shared interest, and will support additional joint work on these aspects with 100% funding."

Haesen is confident that the sharing of experience within the clusters will benefit projects directly. But he also expects to draw out lessons and methodologies of wider relevance to companies and researchers en-



In Europe alone, 60,000 tonnes of concrete mould-release agents are used every year. Sumovera promoted the use of a non-polluting alternative to the conventional product.

gaged in the transfer of technology. "In the second call, we intend to select projects primarily on the basis of their potential contribution to clusters addressing non-technical issues," he says.

The role of universities

As an example of this kind of work, he cites a previous Innovation project⁽¹⁾ which developed approaches that could be applied in areas unrelated to its own technological focus.

"Sumovera dealt specifically with the introduction of a new material in the construction industry, as a substitute for a 'traditional' product with serious environmental and health risks," says the project's co-ordinator,

Pieter van Broekhuizen of the University of Amsterdam. "But the critical role of the four academic institutions involved was as national animators."

By maintaining their independence from the manufacturers of the new products, they gave the substitution campaign scientific legitimacy. By focusing on the environmental and occupational health arguments, they also won the support of trade unions, employers' associations and governmental bodies, which was crucial in overcoming resistance to change among construction companies and their workers.

Conventionally, universities contribute to innovation solely through research. Van Broekhuizen believes that they can perform a much broader function, hastening market acceptance of new technology by making costs and benefits transparent, and by revealing the social dimensions of choice. ●

⁽¹⁾ IN10110I - Sumovera. See also 'Technology - the Healthy Alternative', edition 2/98.



The Innovation/SMEs Programme In Brief

Part of the EU's Fifth Research Framework Programme, the 'Innovation and participation of SMEs' programme promotes innovation and encourages the participation of small and medium-sized enterprises (SMEs) in the framework programme. The Programme Director is Mr G.C. Grata.

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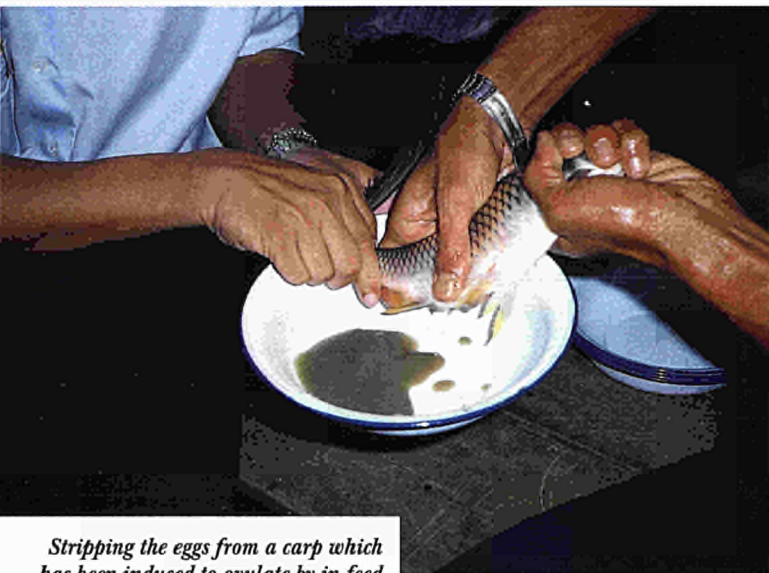
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Baby Boom

With natural fish stocks already close to exhaustion in many regions, and demand for seafood expected to rise by 25% over the next ten years, a simple and effective means to control the timing of reproduction in farmed fish will bring significant advantages to Europe's aquaculture industry.



Stripping the eggs from a carp which has been induced to ovulate by in-feed delivery of oral peptides.

"**M**any commercial fish species, such as trout, spawn over a period of as much as two months, during which time each breeding fish must be visually inspected at least once a week," explains Olivier Lescroart of the Laboratory of Aquatic Ecology at the Catholic University of Leuven (KUL). "The ability to induce spawning allows much more efficient use to be made of hatchery facilities, as well as greatly reducing labour costs."

Spawning can be induced by administration of a small peptide, gonadotrophin-releasing hormone (GnRH). But at present this involves the capture and injection of individual fish. The procedure is both labour intensive and stressful for the fish, requiring the use of an anaesthetic. Therefore, trout farmers employ it only for specific breed-

ing programmes, or when the price of eggs is especially high – though in the salmon industry its use is becoming more widespread.

In-feed delivery

Now KUL and its partners have succeeded in developing an innovative system which allows GnRH to be delivered orally, in specially formulated pellets.

The Innovation project⁽¹⁾, in which KUL is working closely with the Netherlands-based animal health company Intervet International, builds on the work of earlier European Union research under the former FAR (Fisheries and Aquaculture Research) programme. This led to the development of a basic oral delivery mechanism, for which KUL and its partners submitted a patent application. The challenge tackled in the present project by KUL, Intervet and their two French partners – the fish and poultry farmers' cooperative SYSAAF, and the fish physiology laboratory of INRA at Rennes – is to develop a commercial product.

"The system consists of micro-capsules, approximately 500 microns in size, produced by granulation," says Lescroart. "They contain both the peptide, supplied by Intervet, and an absorption enhancer. This combines a surfactant with an oily substance, and is designed to improve the peptide's uptake in the intestine of the fish by increasing the permeability of

the intestine wall. To be acceptable to the fish, the micro-capsules must be incorporated into food-like pellets with a diameter of around half a centimetre. But their stability is highly sensitive to heat and moisture, both of which are involved in normal feed production processes."

Back to square one

The two initial hurdles were overcome early in the project. Using appropriate binders, KUL devised a method of incorporating the micro-capsules into pellets which fish would accept voluntarily, in such a way that both peptide and absorption enhancer remained viable.

But at this stage they encountered an unexpected problem. "Like mammals, most fish have acid stomachs," Lescroart explains. "We designed the micro-capsules to prevent the peptide from being released in the stomach. But in fish, food passes through the stomach very slowly. The problem was that the release of the peptide in the intestine was spread over such a long period that the amount in the bloodstream never reached the threshold level needed to trigger spawning."

To solve the problem, a complete reformulation was required. "It was a big setback," Lescroart admits. "But we have now managed to produce pellets which work perfectly in catfish. You force-feed them with the pellets, and next day they spawn."

Large-scale tests

In itself, this result is of little commercial interest, since catfish are naturally highly fertile – just a few fish are needed to stock an entire farm. But the new formulation has also performed very well on trout in laboratory experiments conducted by INRA, and SYSAF has recently started a large-scale testing programme at one of its trout farms.

"Initially, the main market will be for trout," Lescroart believes. "But it will be some time before a commercial product will be available to the industry. Intervet already has an option to license the technology, but further

product development is still needed."

In the longer term, Lescroart expects oral peptides to be adopted in the even larger salmon industry – of particular economic importance in Norway and Chile, but also significant in the United Kingdom and Ireland. However, their use will require fish farmers to make changes to their present stock management methods, so adoption is likely to be a gradual process.

For Europe's trout farmers, though, it should be no more complicated than giving the special spawning pellets instead of the regular feed, approximately a week before spawning

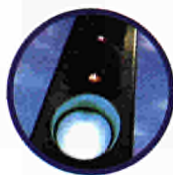
is required. They can look forward to improved efficiency at a time of growing demand for their product, helping them to provide European households with plentiful fresh fish at attractive prices. ●

(1) IN10062I – Oral spawning induction in fish.

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TRAFFIC MANAGEMENT



Watching the Traffic Flow

The car offers individual drivers autonomy and flexibility. But to keep their vehicles moving on Europe's increasingly crowded roads, traffic must be carefully managed. The widespread deployment of intelligent automatic monitoring devices is becoming ever more necessary.

Every day, millions of journeys are delayed by traffic congestion. At an individual level this is merely frustrating. But cumulatively, the economic and environmental impacts are colossal. Lost time, delayed deliveries, wasted fuel and avoidable pollution cost Europe billions of euros each year.

Belgian company Traficon is a world-wide market leader in the field of video-based traffic detection systems. Building on a technology first demonstrated in 1982 by the Catholic University of Leuven, Traficon designs

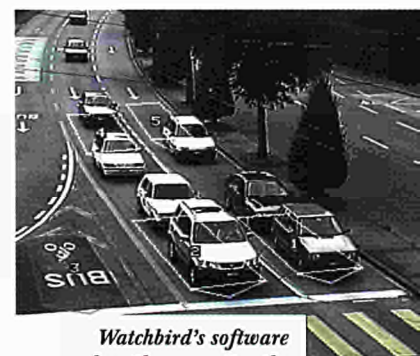
and develops products for a wide range of traffic management applications. Video signals from roadside cameras are first digitised and then analysed in real time using powerful detection algorithms, with outputs to traffic signal controllers, census systems, or emergency service alarms.

Down to the crossroads

The Watchbird project⁽¹⁾ focuses on road intersections. "Reducing the average waiting

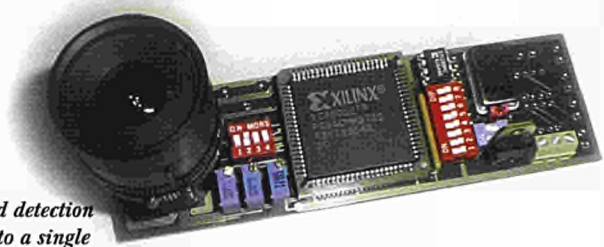
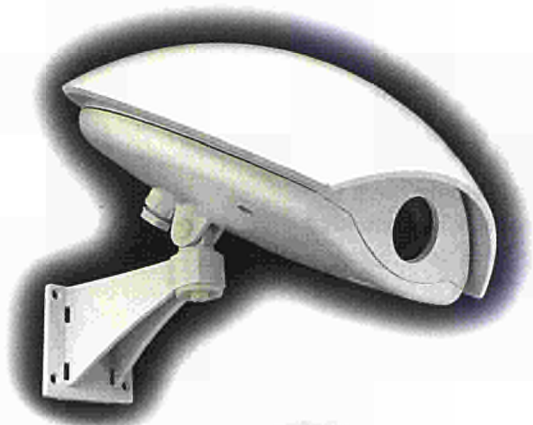
time at traffic lights can really speed up urban traffic flows," explains Bart Boucké of Traficon. "The ability to adjust the cycle of light changes in response to the presence of waiting vehicles is important. For many years, the standard technology has been the inductive loop – metal strips buried beneath the road surface, which register the passage of vehicles above them."

But the strips, which are also widely used on motorways, are vulnerable to wear and tear – and in order to repair them the



Watchbird's software algorithms monitor the presence of vehicles in one or more 'detection zones' superimposed on a digital image of the intersection.

(1) Innovation project IN104091-Watchbird.



With Watchbird, the use of a CMOS image sensor (right) allows camera and detection system to be integrated into a single compact and easily installed unit.

●●●
road must be dug up, creating additional congestion. In Belgium, where a high percentage of motorway loops no longer function, the road authorities have started to replace them with video-based detection systems.

"Our current product for the intersection market also sells well in the United States and Germany," says Boucké. "A camera is attached to the traffic-light cluster, connected by power and video cables to a detector unit connected to the traffic-light controller." The aim of the Watchbird project is to integrate the detector and a very small 'camera on a chip' within a single unit. Traficon hopes that miniaturisation will make the system easier to install and maintain, reducing its life-time costs.

Belgian chips

"The Belgian microelectronics research centre IMEC is a leading developer of silicon image sensor technology," Boucké says. "Teaming up with them allowed us to design a more compact and more powerful system. Instead of digitising video images, it uses IMEC's CMOS sensor chip to capture digital images directly – a separate camera is no longer needed."

The initial aim was simply to reproduce the functionality of Traficon's existing system, in order to provide the same data outputs to the traffic-light controller. But since the signal produced by a CMOS camera is quite unlike conventional video, this required a complete re-engineering of the detection algorithm. For this part of the project, Traficon was joined by a third Belgian organisation, the national metalworking industry's research centre, WTCM, which has extensive experience in the area of automated visual surveillance.

As users and end-users of the technology, the project also involves manufacturers of traffic-light controllers from the United Kingdom and Germany – Monitron and Weiss Electronics – and the Flemish Ministry of Transport. "Monitron and Weiss are potential purchasers of the system," Boucké explains. "They will run tests at several sites in their own countries, providing valuable technical feedback and, in due course, helping us to publicise the technology in their national markets."

The first test site, probably in Antwerp, will be managed and monitored by the Flemish Ministry of Transport, which will evaluate the new system from the point of view of the end-user. "From their perspective," Boucké says "the first consideration will be the overall cost savings –

reflecting not just the installed price, but the mean time between failure (MTBF). We expect the integrated design to be very robust."

Testing should begin in Antwerp by the end of 1999, with pilots at British and German sites, as well as at two locations in the US, running during 2000.

No stopping

In the longer term, Boucké is confident that the use of digital image sensor technology will allow the system's functionality to be extended, making it even more attractive to potential users.

"We are already planning to add some new features before the project finishes at the end of 2000," he says. "In response to growing demand, we will offer the option of connecting the unit to an office-based PC. This will enable the user to view images of the intersection, and to change system parameters remotely."

The partners will also adapt Watchbird for use as a motorway data collection system. Inductive loops are even more widely used on motorways than at urban intersections, but suffer from the same problems. Traficon envisages a data collector capable of detecting the size, speed and occupancy of each vehicle, as well as the overall density of the traffic flow. ●

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Look Before You Leap



Patent databases contain state-of-the-art technical knowledge, 80% of which cannot be found anywhere else. A professional novelty search, before the start of a research project, avoids the danger of conflict with current patents, and may save costs by revealing an available existing technology.

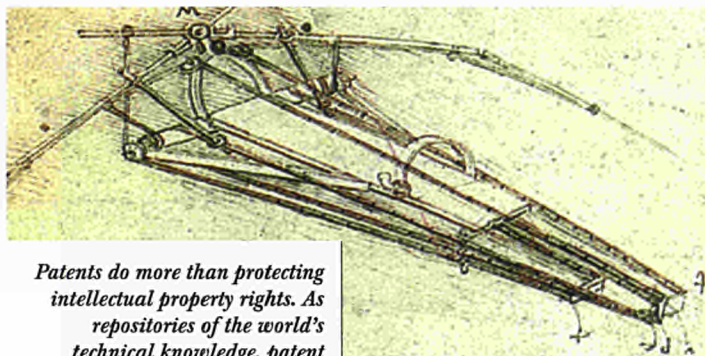
A primary function of the Innovation and SMEs programme is to serve as a test bed for tools and methods with the potential to support or facilitate innovation. The approach is well illustrated by the Quick Scan service, successfully piloted in the Fourth Research Framework Programme (FP4) and soon to be rolled out across the whole of FP5.

Cost savings

Between 1995 and 1998, the service was applied in the definition phase of 187 Innovation projects. Experienced examiners at the European Patent Office (EPO) conducted searches of patent and technical databases, comparing each proposal's technical outline with the current state of the art in the area concerned.

Although many of the projects had claimed to be innovative, only 25% were shown to offer real technological breakthroughs. In these cases the research teams were advised to secure adequate protection of their intellectual property.

As many as 60% of the searches discovered existing patents or other relevant documents – though in some cases, rights belonged to a member of the research consortium itself. Where other current patents existed, and might have prevented future commercialisation of the proposed technology, partners were advised to purchase a licence to



Patents do more than protecting intellectual property rights. As repositories of the world's technical knowledge, patent databases are a priceless resource for innovators.

the patent, or to redirect their work. Where lapsed or abandoned patents were found, they were encouraged to adopt or build on the technologies described, saving the costs of new research and reducing time to market.

Only in 15% of cases could a novelty search not be completed – generally because they dealt with software, which is protected by copyright rather than by patent. Overall, the service proved its value both to the projects and to the expert panel which reviewed the results of their definition phases, and decided whether the implementation phase should be funded.

Win-win

Now, every SME which receives an exploratory award contract⁽¹⁾ under FP5 is being explicitly encouraged to undertake a full novelty search.

"We use the results of the Quick Scan pilot to demonstrate

the value of a proper search," says Waldemar Kütt of Directorate-General XII (research). "We give them contact details for the EPO and their own national patent office, where a professional novelty search might cost around €1,000 – of which the Exploratory Award contract will cover 75%."

Kütt was himself involved in the early stages of the Quick Scan project, and took his enthusiasm for the service with him when he moved to DG XII, where he initiated a small-scale pilot within the Biotech programme, which produced equally positive results.

For the projects, he sees it as a

win-win proposition. "If novelty is demonstrated, they can proceed with confidence, and with a strengthened case for public funding," he says. "If it is not, they can save themselves time and money by using an existing solution for their problem. At the very least, a thorough trawl of the relevant scientific and patent databases is an excellent way of identifying both competitors and research partners."

Now a deal with the EPO is in the pipeline, to offer the Quick Scan service to EU research contractors across the full range of FP5's thematic programmes. ●

⁽¹⁾ See 'Opportunities for SMEs', edition 3/99.

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Exploration Pays Off for SMEs

Between 1994 and 1998, exploratory awards helped 2,700 small and medium-sized enterprises to prepare proposals for full research projects. The findings of a recent study have been used to fine-tune the scheme, making it even more useful for small companies.

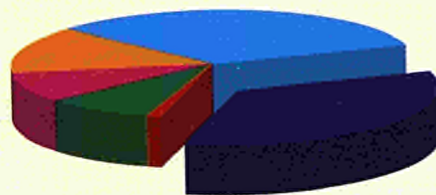
Of the 3,000 applications for exploratory awards submitted in the Fourth Research Framework Programme, 1,252 were selected, leading to 78 collaborative and 451 cooperative (CRAFT) research projects⁽¹⁾.

The scheme played a unique role in helping SMEs to participate in FP4, according to the study⁽²⁾ – and especially very small companies and newcomers to transnational research. Among the SMEs which went on to take part in full research projects, 54% viewed their exploratory award as essential to the selection of their second stage proposal. A further 33% felt that it had made a significant contribution. Nearly three-quarters of all those who benefited from exploratory awards had had no previous involvement in EU-funded research, while 70% had fewer than 50 employees.

Improved chance of selection

Overall, it was also clear that an SME's chance of success in applying for a full research project was improved by an exploratory award – from 43% to 48% in the case of CRAFT projects. Selection rates varied between programmes, from nearly 80% for CRAFT proposals to the Joule programme to less than 20% for those to the Standards, Measurements and Testing programme.

The use of exploratory award funds under FP4



- 34% - Technical feasibility study
- 33% - Preparation of stage 2 proposal
- 14% - Partner search
- 9% - Market study
- 9% - Novelty search
- 1% - Other

Feasibility studies absorbed one-third of FP4 exploratory award funding. Under FP5, support has been concentrated on the other elements.

Over one-third of the total funding was applied by SMEs to studies of the technical feasibility of their projects, and the study report suggests that support for this element should be reduced, with greater emphasis placed on other means of strengthening proposals – such as market studies, novelty searches and the recruitment of additional partners.

The consultants also recommended greater flexibility in the choice of research topic, and further simplification of the application procedure.

Overwhelming response

The recommendations have informed the design of the new Exploratory Awards scheme

under FP5, whose first batch of applications was evaluated during May.

SMEs may now submit research proposals on any topic, via a single entry point in the Commission. The application forms have been greatly simplified, now covering only ten pages, and the Commission has committed itself to giving all applicants a clear, written response within 13 weeks of the start of the evaluation. Funding remains at 75% of eligible costs, but the maximum has been reduced from €30,000 to €22,500, since technical feasibility studies are no longer covered.

These changes may in part explain the overwhelming response to the open call for exploratory award proposals launched on 1 April. "In those two weeks we received 329 pro-

posals," says Giorgio Clarotti of Directorate-General XII (research). "That is six times more than the number submitted in the first month after the call was opened in FP4." Forty per cent of applicants had used interactive forms downloaded from the CORDIS FP5 web site to prepare their proposals.

The cut-off date for the next batch of proposals to be evaluated is 15 September. ●

(1) For further information on the SME specific measures under FP5, see 'Opportunities for SMEs', edition 3/99.

(2) 'Efficiency and outcomes of the Exploratory Awards scheme in the 4th Framework Programme for Research and Technological Development', prepared for the European Commission by Segal Quince Wickstead.

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Fertile Imagination



Traditional methods for the disposal of sludge residues from municipal waste-water treatment are environmentally unsustainable. A newly opened pilot plant in Luxembourg turns the sludge into a hygienic compost with commercial applications in agriculture and land reclamation.

"At present, more than half the sludge is buried, but that route will soon be closed off," explains Denis Godeaux of the small Luxembourg company Soil Concept. "The timing of the introduction of new regulations will vary, but we expect disposal of untreated sewage in landfill sites to be outlawed in every European Union country by 2010 at the latest."

Now, in the course of a three-year Innovation project⁽¹⁾, working with two public water authorities in the Saar-Lux region, and with academic and marketing partners from France, Belgium and Germany, the company has demonstrated a new composting technology. Sludge is thoroughly mixed with leafy waste, tree bark and sand, composted at high temperature under forced ventilation, and matured – producing a clean, odourless compost in 12-16 weeks. This can form the basis for fertilisers and soil conditioners, for use on agricultural land or in landscaping and reclamation schemes.

Industrial-scale

The culmination of the project will be the opening of the first industrial-scale pilot plant at Diekirch, in Luxembourg, in October this year. Construction of the 12,000 tonne/year capacity facility was completed at the start of July, and Soil Concept is currently installing and commissioning the mixing and ventilation equip-

ment, and the control system.

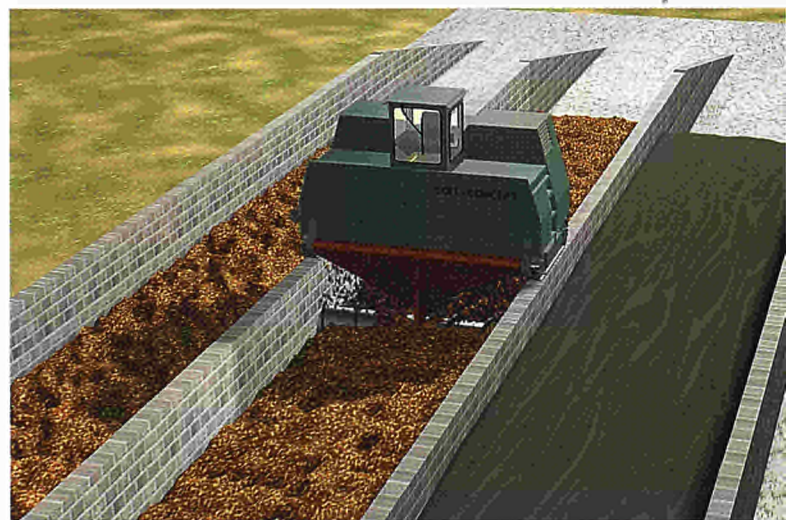
The technology can be applied on a smaller scale. Earlier in the project, a 3,000 tonne/year installation was built at Überherrn, Germany, and a temporary composting site in Luxembourg was in operation between April 1997 to 1998. But Godeaux believes that the system's full commercial potential requires the efficiency and economies of scale of the new large-scale plant, in which purpose-built mixing machines will ride over the compost, using the silo walls as rails.

"Our partner Siden (Syndicat Intercommunal de Depollution des Eaux Residuaire du Nord), for whom we are building the plant, expects a payback on its investment within four years," he says.

Returns will come in part from savings on alternative methods of treatment and disposal. But the plant will also generate income, through the sale of compost-based products. The Innovation project has developed a range of ready-to-use mixes, formulated for different applications, for which it is now establishing markets and distribution chains.

Attracting interest

Soil Concept is also managing a parallel Accompanying Measure project⁽²⁾, to disseminate the results of the development work to water authorities and potential distributors and end-users of compost products throughout Europe.



Composting takes places in silos covered by special membranes, over which the specially-designed mixing machine is able to ride.

Godeaux says that earlier publicity has already generated substantial interest from SMEs and universities as well as from municipalities. "The opening of the Diekirch plant gives us a real story to tell," he says. "Now, we need to use it to sell the economic and environmental advantages of the technology."

As new legislation threatens to push the cost of conventional disposal to unprecedented levels, the Soil-Concept solution is looking increasingly attractive. ●

(1) IN10424I – Soil-Concept. See also 'Turning Problems into Profits', edition 5/98.

(2) INAMI0635 – Soil-Information.

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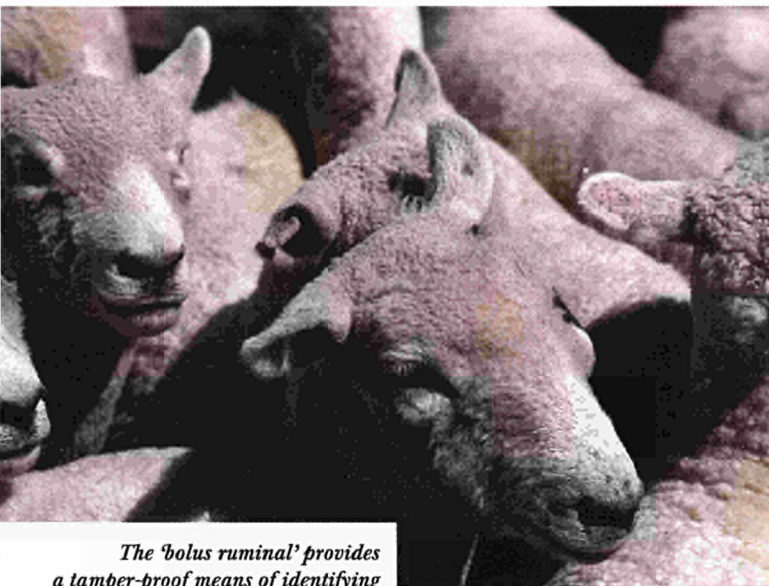
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• A Real Player film explaining the Soil-Concept technology (in French) is available at
<http://www.soil-concept.lu/media/soilc.rm>



Leading by Example

With the Joint Research Centre committed to making its scientific results more accessible to industry, the little-known Community Patent Portfolio is assuming growing importance.



The 'bolus ruminal' provides a tamper-proof means of identifying individual sheep or cattle.

The Innovation and SMEs programme works hard to promote the use of patents among technology-based small and medium-sized enterprises (SMEs), as a means of protecting their intellectual property and at the same time generating additional income through licence fees. But the programme also manages a substantial patent portfolio itself.

Return on investment

The portfolio dates back to the first projects carried out by the Community's research centres during the early 1950s, mainly in the field of nuclear energy. As both the scale and scope of the work undertaken by the European Commission's Joint Research Centre (JRC) expanded during the 1970s to embrace environmental and transport

technologies, the portfolio grew.

"More recently, it has expanded further into areas of industrially oriented research such as electronics, information technology, advanced materials, and biotechnology," says Luis Ferrão, who leads the specialised team which manages the portfolio. "The portfolio now includes over 1,000 patents and patent applications filed throughout the world, covering a very wide range of technologies. At present, we receive a flow of around 20 patent proposals each year. But we expect the number to grow."

Each year, over €1 million is spent on patent attorney and patent office fees in order to protect Community intellectual property. These resources are focused on technologies with potential for commercial exploitation within the 20-year lifetime of a patent – and the resulting

national and international patents are producing an increasing return on the investment, according to Ferrão. "Seven new licence contracts were signed in 1998, and others are under negotiation," he says. Licensing activities are carried out in close co-operation with the JRC's technology transfer department.

Counting sheep

He cites the example of an innovative method for identifying individual cows and sheep, which was developed in a collaborative project by the Autonomous University of Barcelona, the Spanish company Gesimpex, and the JRC's Institute for Systems, Informatics and Safety (ISIS) in Ispra, under a research contract with Directorate-General VI (agriculture).

The patented 'bolus ruminal' is a ceramic cylinder which houses a conventional passive transponder of the kind used in modern

car keys. "The bolus is inserted into the second stomach of the animal – from which it cannot be removed," explains Christophe Korn of ISIS. "The identification codes of a large number of animals can be rapidly collected by driving them through a reading corridor equipped with a suitable antenna and reader."

To date, licences have been granted to a number of different companies for the commercialisation of the technology in Europe, the United States, Canada, Japan, Australia, New Zealand, Mexico and Brazil.

The renewed emphasis on technology transfer in the JRC's work programme under the Fifth Research Framework Programme is likely to produce an even greater volume and diversity of patent proposals, says Ferrão. His team will be looking in particular for new ways of protecting software-related inventions – since at present software as such is not patentable in Europe. ●

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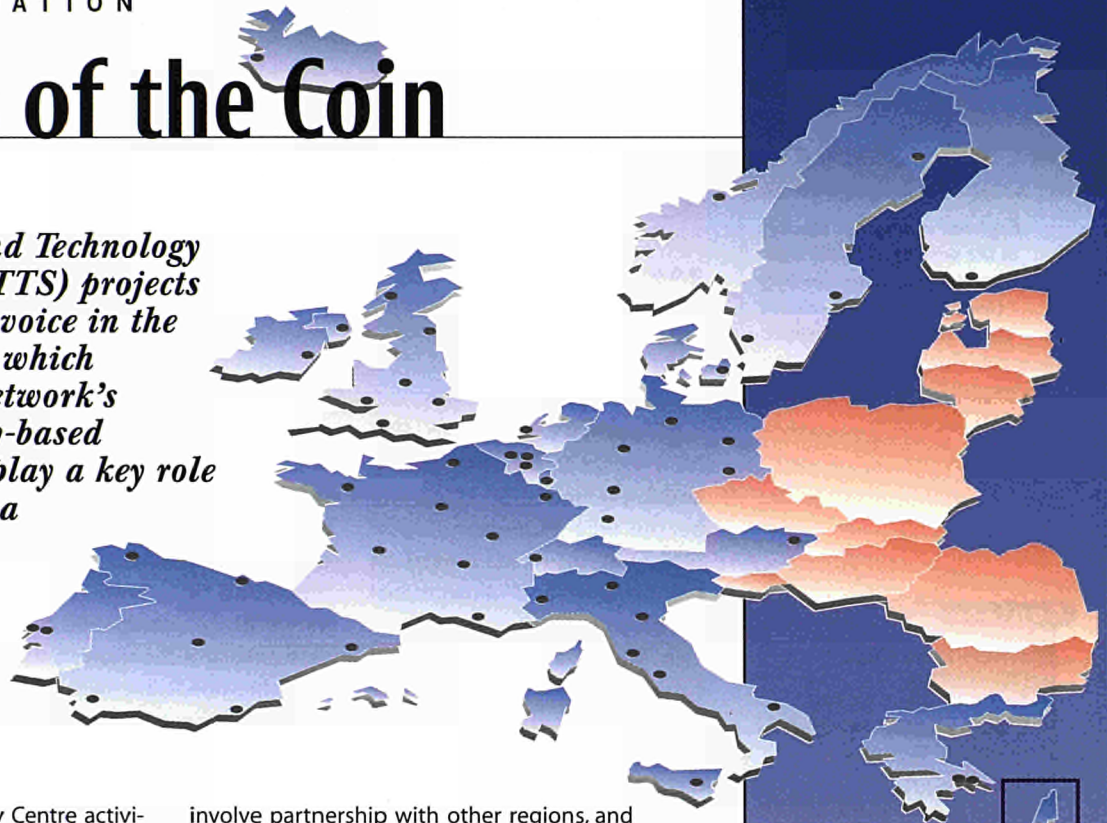
Innovation Relay Centre

N e w s l e t t e r

REGIONAL INNOVATION

Two Sides of the Coin

Regional Innovation and Technology Transfer Strategies (RITTS) projects give European SMEs a voice in the development of policies which affect them. The IRC network's close links to technology-based companies enable it to play a key role in the RITTS plans, as a catalyst for technology partnerships between SMEs across borders.



The RITTS and Innovation Relay Centre activities are strongly complementary, according to Javier Hernández-Ros, whose unit is now responsible for both. RITTS are strategic projects, preparing the way for investment in innovation as a cornerstone of regional economic development policy. IRCs, meanwhile, have developed, tested, exchanged and optimised a range of practical tools and techniques for the support of transnational technology transfer.

Now, as part of the European Commission's new approach to innovation under the Fifth Research Framework Programme, the two networks are to be managed in parallel in order to improve efficiency and to secure maximum synergy between them.

"In both cases the projects are rooted in the regions, but co-operate at European level," says Mr Hernández-Ros. "One is engaged in the planning of regional innovation support services for SMEs, and the other in their delivery. Frequently, the agency responsible for developing the region's innovation and technology plan is also involved in its IRC, either as host organisation or as a partner. But even where this is not the case, the opportunities for synergy are substantial."

Window on the world

Innovation strategies must, of course, reflect the distinct technological capacities and needs of each region. But any successful strategy must also

involve partnership with other regions, and the IRCs form an ideal vehicle for such transnational linkages. For example, transnational partnering events like ECOpartners⁽¹⁾, already organised by the IRC network, could well be supported by RIS/RITTS plans in the future⁽²⁾.

"In the planning phase, we want the strategists to take account of the IRCs' experience," says Hernández-Ros, "and in the implementation phase to build on their practical, hands-on work. We expect to see the IRCs part-funded at regional level as flagship projects within regional innovation plans – in some cases using Community Structural Funds." IRCs themselves would benefit from integration into coherent regional innovation policies as primary providers of support for transnational technology co-operation. But he believes that they also have a great deal to contribute, and cites the case of the Welsh Development Agency's technology and innovation group, which is already responsible for the Wales Regional Technology plan, as well as running IRC Wales.

"They have developed a well-structured plan," he says. "The 66 component projects include a Welsh venture capital fund, and university technology transfer centres. A third major priority in the strategy is technological co-operation between Welsh companies and partners in other European regions, and here the prime mover will be the IRC." ●●●

The IRC Network in Brief

The Innovation and SMEs Programme's network of 53 Innovation Relay Centres (IRCs) spans the EU, Iceland, Norway, Switzerland⁽¹⁾ and Israel (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. Further information about the IRC network is available on the IRC homepage (<http://www.cordis.lu/irc/home.html>).

(1) Associate Member

(1) See this edition, page 13.

(2) RITTS and RIS (Regional Innovation Strategies, managed by DG XVI) were covered in detail in 'Reinforcing Europe's Regional Innovation Fabric', edition 5/97.



Regional innovation strategy in the making - RITTS team meetings in (from the left) Germany, The Netherlands and Spain.

•••

Learning to learn from SMEs

Of particular value to RIS/RITTS projects, at both planning and implementation stage, will be the IRCs' understanding of SMEs' support needs in relation to innovation and transnational co-operation.

In March, a seminar on the subject was held in Brussels for representatives of the 30 regions which launched new RITTS projects during 1998. The RITTS planning process, oriented towards consensus among a region's key actors, has always rested on a thorough initial study of the particular needs of its companies,

especially its SMEs. The seminar offered the new RITTS teams an overview of the available methods – such as surveys and technology audits – and of the issues to be considered in selecting the most appropriate and most cost-effective option.

Building links with regional networks of companies, and assessing and monitoring their changing needs, are skills which have been developed both by IRCs and by the longer-established RITTS projects. Although there was no direct IRC input into the March seminar, the potential for inter-network exchange of best practice is clear. A presentation of the RIS/RITTS network will

be made at the IRC Annual Meeting in Prague in June, and the IRCs will similarly be introduced at the RIS/RITTS plenary meeting in the autumn.

As the two networks draw closer together, European SMEs can look forward to further improvement in the quality of innovation support in their regions. ●

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New IRC Call

A call was launched on 15 June for proposals from organisations wishing to operate regional Innovation Relay Centres between April 2000 and the end of the Fifth Research Framework Programme (FP5).

Building on the achievements of the current IRC network, the period covered by the call will see greater emphasis placed on co-ordination with existing regional structures – in particular, the National Contact Points for the thematic programmes of FP5. It is expected to cover a total of 31 countries – not just all European Union Member States,

but also associated countries such as Norway, Cyprus, Iceland, Israel, Liechtenstein, Switzerland and the Central and Eastern European Countries, although in some cases this association is still under negotiation.

Work will focus on the transnational transfer of technologies, from whatever source, and on the dissemination and exploitation of the results of Community research. The development of SME capacity for transnational partnership, tailored to the needs of companies in each region, will also be a priority.

In the first two years, the Innovation and SMEs programme will fund up to 50% of the costs of running each IRC. Contracts will be reviewed following a mid-term assessment of performance.

The call for proposals will close in September.



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Growth Industry



Excellent contacts with innovative companies, and established expertise in the support of transnational business collaboration, make IRCs well-suited to act as intermediaries between research-based firms and private investors, as well as between technology partners.

The BioTech Investment Forum, held in Lyon in March in conjunction with Bio Vision and the 2nd Conference on Biotechnology and Finance, was organised by a consortium of IRCs led by IRC North Germany.

Focusing exclusively on the biotechnology sector, the event attracted 34 investors, many from specialist funds. The organisers had carefully selected 32 companies offering high-quality investment opportunities, drawn from 11 EU Member States, Israel and Lithuania. They also gave them extensive support in devel-

oping their business plans, and in preparing for negotiations with investors.

"Some of the companies are recent university or research centre spin-offs," says Hildegard Schaumann of IRC North Germany. "Others are well-established firms, one step away from stock market flotation. Often, new companies expect investors to fall in love with their technology, and resist any restriction of their freedom of action. We wanted them all to realise that in order to secure development capital, they needed to offer a

commercially attractive deal."

The presentations were followed by a series of formal and informal bilateral meetings, which Schaumann expects to lead eventually to a number of signed contracts. "It is still too early to judge the success of the forum," she says. "But we have already received positive feed-

back from companies and investors. We think it will prove to be a winning formula." ●

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ENVIRONMENTAL TECHNOLOGIES

Emission Impossible



As post-Kyoto regulations start to bite, and fuel and water shortages threaten corporate profitability, the global market for advanced environmental technologies will grow rapidly in the decades ahead. The Innovation Relay Centre network is helping European SMEs to become leading players.

Throughout Europe, stricter environmental regulation is creating huge opportunities for small companies with innovative technological solutions.

In the Netherlands, whose prosperity has always depended on active environmental management, recent governments have tackled air and water pollution with determination and pragmatism, in close collabora-

tion with industry. The approach has been successful in combating pollution, and has given rise to a dynamic environmental technology sector. Supported by a strong regional network of research centres, Dutch equipment suppliers and consultancies have gained a substantial lead in key technical areas.

The Innovation Relay Centre Netherlands, which organised

the first ECOpartners in Utrecht in 1997⁽¹⁾, staged the event there again this April. Timed to coincide with the Ecotech fair, it has proved highly effective as a platform for small and medium-sized enterprises to find the partners they need to capitalise on current market opportunities – speeding the spread of the latest environmental technologies to every region and sector.

Compliance or competitiveness?

"Many core technologies are now proven," says the IRC's Wim van Althuis, "and Dutch SMEs are looking for growth in export markets. Among plant and equipment suppliers, 50% of sales are already made ●●●

(1) See 'Thorough Preparation Gives Results', edition 4/98.



Simon Blakley, ESN

During the two-day ECOpartners event, 272 scheduled meetings took place between potential technology partners.



outside the Netherlands. As the technology becomes more sophisticated, it is increasingly being tailored to the needs of specific industrial sectors, creating additional pressure to search for customers at European level."

Five years ago, van Althuis says, the state of the art was 'end of pipe' solutions, designed to ensure that factories met emission regulations. But business has rapidly integrated responsibility for environmental performance into the process and product design functions. Today, the motivation for investment in clean technology is not so much compliance as profit. Resource efficiency, and the reuse of energy and water, have become important weapons in industry's fight to reduce costs.

Triangle & Partners is a small Dutch consultancy which specialises in solving the waste-water treatment problems of medium-sized textile producers. "Many currently use purification systems which rely on chemicals that actually add to the net environmental burden," says Dr Coby Pellenbrink-Blom. "Although this is permitted now, we can expect regulation to be much tighter in future. Disposing of the residual sludges produced by these systems also has a high cost, while water itself is becoming more and more expensive."

Sludgeless

"What smaller producers need is a non-chemical purification technology which enables them to recycle their water," explains her colleague Gezinus Bonkestoor. "This will ensure that they can meet any foreseeable emission standards, and in two-thirds of cases will start to save them money immediately."

At ECOpartners '97, Triangle met German waste-water treatment plant manufacturer Heuser Apparatebau⁽²⁾, which already had textile industry experience, and adopted it as a preferred supplier for its own purification systems. Triangle has since developed a system based around

an anaerobic reactor, which removes pollutants from waste water biologically, allowing it to be reused within the textile plant. The system requires no chemical inputs and leaves almost no solid sludge, producing methane and other easily managed organic gases. Prototypes have successfully handled up to 200 litres per hour, and the system is to be progressively scaled up in several pilot factories during 1999, to a maximum capacity of 2,500 litres per hour.

Both companies returned to Utrecht this year to look for further development and marketing partners – but also to meet one another. "The fit between us is excellent," Birger Heuser confirms. "Triangle's solution is economically attractive to smaller textile companies, which regulation is now forcing to tackle waste-water treatment. Heuser is looking forward to carrying out the first technical realisation of these ideas on an industrial scale."

Cradle to grave

Finnish environmental technology centre Neopoli and another Dutch consultancy, Rotterdam-based BECO, also came to ECOpartners to discuss an ongoing collaboration, as well as to

make new contacts.

"Neopoli is a regional partner of IRC Finland, which I met at a time when it was looking for a Dutch partner to supply technical expertise in the area of eco-design," explains André Roos of IRC Netherlands. He put them in touch with BECO, who are leaders in the field, and he has supported the developing partnership during visits to Finland on IRC business.

"Eco-design is a methodology for minimising the environmental impacts of a product over its entire life cycle, from raw materials to final disposal," explains BECO's Stephan Versteeg. "Neopoli wanted a qualified provider of know-how on this relatively new topic. We were keen to take on more work outside the Netherlands, but had little experience of transnational work. The IRC has helped us to put together a concrete project in which we will deliver training both to Neopoli itself and to a group of SMEs from the Finnish wooden furniture sector."

Roos sees the project as an excellent model for the transfer of technical expertise. "The participating SMEs will benefit directly," he says. "But Neopoli itself will also be equipped to spread eco-design more widely in Finland. And BECO has gained valuable transnational experience, which has already encouraged it to look for new business in Germany and Spain."



Cambridge-based technology developers Sentec, clients of IRC Eastern England, showed their innovative biogas sensor to potential users at ECOpartners. Based on a simple acoustic resonator, it offers the sewage treatment industry a small, robust and cost-effective means to monitor the methane-CO₂ ratio of output gases in real time. A new spin-out company, Biogas UK, has recently been launched to market the device.

(2) See 'Joint IRC Initiative at ENTSORGA', edition 4/98.

A winning formula

It is too soon to tell how many new partnerships will emerge from ECOpartners '99, but Roos, who co-organised the event, is well pleased.

"More companies were involved than in 1997, and from more different regions," he says. "Of the 144 which registered, 60% were from outside the Netherlands. Some were represented by their local IRCs, but 104 attended in person, and 272 scheduled meetings took place." A dozen other IRCs were also involved, and were so impressed with the efficient and relaxed ECOpartners format that the

possibility of staging a similar event for the Agro-food Thematic Group was raised.

On the following day, the IRC representatives attended a meeting of the Environment Thematic Group, whose 20 core members have recently restructured themselves into 'task forces' to deal with strategy, corporate identity and improved techniques for technology transfer.

In response to a proposal made by Roos on behalf of the strategy group, which he leads, it was agreed to develop information tools covering four areas – company competence profiles, market intelligence, legislation and legal issues, and cultural

barriers to technology transfer, including tips on doing business in different Member States. The purpose of these tools is clear – they will enable the network to provide an even better service to European SMEs. ●

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IRC WEST SWITZERLAND

The Swiss Connection

At the beginning of February, a new member joined the Innovation Relay Centre network, opening a channel for the development of commercial and research partnerships between French-speaking Switzerland and the rest of Europe.



IRC West Switzerland's Associate status allows it to participate fully in all the network's activities, and to use all of its resources. West Switzerland itself, and the regions served by the current IRCs, both stand to benefit from the arrangement.

"The French-speaking part of the country is strong in machine tools, industrial automation and robotics, in electronics and microtechnology, and in biotechnology and biomedical devices," says Roland Luthier, Director of the Centre for Scientific and Technological Support (CAST),

based at the Swiss Federal Institute of Technology Lausanne (EPFL), which hosts the IRC. "It also has a strong tradition of openness to the rest of Europe. The region's companies and research groups took part in 400 projects in the Fourth Research Framework Programme."

CAST leads a large consortium, made up of two existing regional networks – economic development agencies with strong ties to about 500 technology-based companies, and university-based teams whose previous role was to advise on

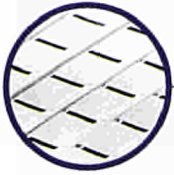
participation in European Union research programmes.

Now the consortium will take on a new role, promoting the transfer of technology from universities to European industry. "EPFL has some technology transfer experience, but it is mostly local," says Luthier. "We need to develop new approaches and working practices, and expect to learn rapidly through our contacts with other IRCs."

The IRC was formally launched on 26 May, before an audience of Swiss entrepreneurs and academics. ●

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Microsystems - Driving the Car Industry?

Car buyers now take performance and reliability for granted. Digital and micromechanical technologies promise sophisticated new safety, communication and engine management functions. But manufacturers must be certain that these will deliver features that customers want, at prices they can afford.



All 27 papers presented at AMAA 99 are available in 'Advanced Microsystems for Automotive Applications 99', ISBN 3 540 65183 7, 319pp, Springer.

The competition between European car makers is intense, but increasingly it is being fought at the frontiers of technological feasibility. The new battlefields are safety, environmental performance, in-car entertainment and information services, and interaction with traffic management systems.

"There are fewer and fewer major functional differences between the leading car brands," says Paul Mulvanny of Jaguar Cars. "Our products all have four wheels, and all start and stop reliably. Technologies developed outside the industry, and digital technologies in particular, create opportunities to incorporate entirely new features into the basic design."

Innovation and reality

Mulvanny is a member of the steering committee of Advanced Microsystems for Automotive Applications (AMAA). At its annual conference, organised in Berlin by the Innovation Relay Centre North Germany, promising new technologies are presented to an audience of European car manufacturers – sometimes sceptical, and always cost-conscious – by their first- and second-level suppliers.

The successful introduction of new functionality requires not just inputs of new technology but close collaboration between car makers and their suppliers,

the companies which package the technology in 'black boxes'. These components must be reliable, cheap, and easy to assimilate into the assembly process – compatibility with other systems is critical. Above all, they must deliver value to the customer.

In the case of untried, 'blue sky' technologies, there is a strong argument for co-operation between car makers themselves. To reduce risk and secure economies of scale, the industry needs to pick winning technologies together, rather than developing rival proprietary solutions.

"Researchers produce the most incredible results in the laboratory," says Mulvanny. "But we have to ask how they can contribute to the creation of products which the market will really want in ten years time. The winners will be those who can match their technologies to the needs and opinions of our customers. AMAA gives us the chance to put innovators in touch with the realities of the market place."

Sensor wars

At AMAA 99, nearly 30 new technological solutions were presented, in sessions devoted to traffic management and communication, media control and engine management, and safety. A fourth session dealt with micromachined components, in which mechanical parts are constructed on silicon wafers – in

some cases providing a complete device on a single chip.

The technologies on view included a highly accurate piezo-electrically driven fuel injection jet from Renault's Technocentre, and an electrostatic actuator from the Fiat Research Centre in Turin, where a prototype rotary motor of 30mm diameter and 2mm thickness has been demonstrated. But the great majority were based around sensors of various kinds, and the signal processing circuits and communication networks through which their data outputs are made available to the driver or to automatic control systems.

Sensors designed to gather data from within the vehicle ranged from a pad for detecting and classifying a seat's occupant, to two- and three-axis silicon accelerometers with applications in ABS braking, air-bag deployment, roll-over detection and active suspension. Pressure and ion current sensors, for use in advanced engine management systems, were also examined.

Distance detection

Applications relying on external sensors – such as adaptive cruise control, collision warning and motorway exit alert – will be important not just as safety features but as components of new strategies for the management of Europe's increasingly dense traffic flows. Obstacle and distance



CSEM's laser scanning range sensor is accurate, robust and compact. A prototype (below) was built into the left headlamp of a Fiat Brava (left and inset). CSEM; Centro Ricerche Fiat SpA

detection is therefore a field that is being contested with particular ferocity, and the relative merits of four technologies – optical, infra-red, radar and pulsed laser – were discussed at AMAA.

One laser device, developed in a recently completed Esprit project⁽¹⁾, was presented by Max Monti of the Swiss Center for Electronics and Microtechnology (CSEM), which is now looking for manufacturing partners to develop it as a commercial product.

OLMO's range sensor combines existing technologies in a robust, low-cost, high-performance unit, easily manufactured by injection moulding, and compact enough to be positioned anywhere on the car. The sensor consists of a commercially available low-power laser source in a counterbalanced scanning head, which resonates in a 20-degree horizontal arc around a virtual pivot. "The pivot is a frictionless, elastic structure," explains Monti. "It is based on a technology CSEM has used in space applications, where it fulfils the same requirement for compactness, long lifetime, and low power consumption."

Signal-processing employs a random modulation time of flight algorithm. Laser light is modulated with a binary code, and object distance calculated by comparing this code with that of the reflected signal. "With some technologies, crosstalk is a serious danger," says Monti.

"Generating the code randomly in real time ensures that there is no interference between units on different cars, even when sensing the same target object."

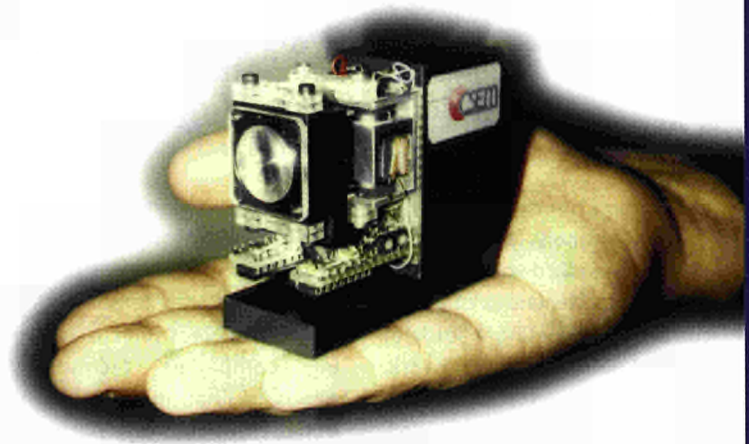
A necessary platform

AMAA is the only industrial platform of its kind in Europe, and possibly in the world. Mulvanny calls its creation in 1995 "incredibly far-sighted".

Wolfgang Gessner of IRC North Germany prefers to give the credit to the car industry itself. "This kind of co-operation requires a competent but neutral convenor," he says. "Ideas could not be exchanged so freely if the event was organised by a single car maker or supplier. The IRC can perform that co-ordinating role. But AMAA has been shaped in response to the demands of its participants. It is successful because it meets a real need among a large group of motor manufacturers and suppliers."

AMAA's format is that of a market place for competing technologies rather than a conventional conference, and provides an excellent basis for technology transfer.

"The assumption that technology will make steady progress from academic to applied research, and then to industry, does not always match reality," Gessner says. "Especially in the car industry, the process is often less linear than that, and may take a



long time. With AMAA, the IRC has established a platform for the exchange of new ideas – building and interlinking networks, and connecting the different cultures of technologists and marketers. This is useful in itself, but in time it also generates specific technology transfer projects. In fact, it provides the best possible focus for the IRC's technology transfer work."

AMAA 2000 will take place in Berlin on 6-7 April next year. A call for papers has already been announced, and abstracts should be submitted to the IRC by 13 August.

(1) Project 22889 - On-vehicle laser microsystem for obstacle detection (OLMO).

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Learning from Experience

Innovation Relay Centres' wide transnational contacts make them primary regional sources of technology transfer support. The exchange of good practice with other network members also provides the basis for continuing development of their technical and professional capacity.

"The Commission has deliberately avoided imposing standard procedures," says Arturo Menendez of Idetra, currently conducting a study of good practice in the network. "Different IRCs are structured in different ways, and serve widely differing regional economies. To be sustainable, they must be allowed to evolve independently. However, they should also be encouraged to adopt approaches and methods which have worked

well in other regions."

Idetra's year-long study aims to identify 40 examples of successful and transferable good practice, in areas such as assessing companies' technology needs, facilitating negotiations between technology partners, and managing large flows of technology transfer data.

The selected cases will be made available to network members on-line by the end of this year, but IRCs are already

being given the chance to learn from some of them in a series of six workshops, between May and October.

"Each event will focus on six common technology transfer or network management issues, introduced by experienced IRC managers," Menendez explains. "To stimulate the exchange of ideas, delegates have been chosen from as many different IRCs as possible, and the day will also include small group work, in

which we hope they will initiate new joint projects. Close, on-going collaboration is the best way of building the mutual trust necessary for efficient technology transfer."

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Calendar of Events

For comprehensive and up-to-date information, see <http://www.cordis.lu/irc/src/events.htm>

- | | | |
|---|--|---|
| <p>1-2/9/99
 Erfurt
 (DE)</p> | <p>Brokerage Event: Sustainable Natural Resources
 The event will cover the properties, applications and commercial potential of fibres and colourings, starch, sugar and fat. Presentations, forum discussions, individual meetings and a trade exhibition event will stimulate cooperation between companies, universities and institutes.</p> | <p>IRC South Germany
 E. Roemhild
 Tl. +49 361 348 4130
 Fx. +49 361 348 4288
 E-m. thati-ef@t-online.de
 http://www.thati.de</p> |
| <p>6-9/9/99
 Haifa
 (IL)</p> | <p>Trade Fair: Agritech 99
 Israel's sole official international agricultural exhibition is the showplace for new developments in agrotechnologies, and is expected to attract leading agricultural experts from all over the world.</p> | <p>IRC Israel
 A. Rosenstein
 Tl. +97 23 510 0155
 Fx. +97 23 510 6724
 E-m. arosenst@matimop.org.il
 http://www.agritech.org.il</p> |
| <p>30/9/99
 Mülheim an der Ruhr
 (DE)</p> | <p>Information day: LIFE programme
 An information day about the EU LIFE programme.</p> | <p>IRC North Rhine-Westphalia
 H. Rath
 Tl. +49 208 30004 23
 Fx. +49 208 30004 29
 E-m. hr@zenit.de
 http://www.hlt.de</p> |
| <p>11-14/10/99
 Rouen
 (FR)</p> | <p>Conference: Harmonisation of Atmospheric Dispersion Modelling for Regulatory Purposes
 This event will focus on practical models which can be used for local scale modelling. An area of primary interest is the quality assurance of models, in particular through evaluation. Organisations wishing to advertise commercially available software, hardware or other products are invited to exhibit.</p> | <p>IRC Northern France
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Proposals for an EU Patent

Following wide-ranging consultation with all interested groups and the European Parliament, at the end of March the European Commission adopted a Communication presenting a series of measures which will eventually make it easier and cheaper to obtain patent protection covering the whole of the European Union. The Communication⁽¹⁾ forms part of the Commission's First Action Plan for Innovation in Europe.

Users of the present patent system want legally defensible protection to be available at a reasonable cost, making the introduction of a unitary patent, valid throughout the Single Market, a priority for the Commission. The new measures lay the foundations for cost-effective pan-EU patent protection, which is expected to promote investment in innovation, boosting employment, growth and competitiveness in the EU. They will especially benefit innovative European businesses.

The measures outlined include:

- a Regulation creating an EU Patent which would be valid, with immediate effect, throughout the EU on the basis of a single application
- a Directive to harmonise conditions for the patentability of inventions related to computer programs
- clarification by the Commission of how patent agents can benefit from rules on freedom of establishment and freedom to provide services throughout the EU
- pilot action to be launched by the Innovation and SMEs programme to support the efforts of national patent offices in promoting innovation.

(1) The full text of the Communication is available at <http://europa.eu.int/comm/dg15/en/intprop/indprop/99.htm>

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New Networks of Business Angels

Business angels are wealthy entrepreneurs willing to invest money and time to support the creation and development of start-up companies. They provide a vital source of finance and management experience for young businesses not yet sufficiently well established to attract venture capital. Indeed, the involvement of a business angel often makes risk capital more accessible, by convincing investors that the project is in competent hands.

However, matching angels to projects is often a matter of luck – few formal channels exist to help either party find suitable partners, although a number of semi-public initiatives in the United Kingdom have proved highly successful. Now Directorate-General XXIII (enterprise policy) has launched a new programme to promote networks of business angels. The programme will fund up to 50% of the cost of one-year feasibility studies relating to the creation of national or regional networks, and of three-year pilot projects aimed at establishing them.

Applications from those wishing to take part in the programme must be submitted before 30 September.

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Easier Computer Dating

It is not always easy to find suitable partners for your research project – especially across national borders. By mid-April, over 3,000 potential participants in the Fifth Research Framework Programme (FP5) had registered with the CORDIS partner search web service.

To make matching easier for the user, a special new 'Expression of Interest' (Eoi) section has been launched. Accessible directly from the FP5 home page, the new service allows users to update their own request profiles on-line, using a password provided by the system. Those who are already registered with CORDIS' automatic information delivery service, Rapidus, may use the same password and login name to gain access to the Eoi database in order to update their record.

The Eoi service is available from the FP5 web service at <http://www.cordis.lu/fp5>
The Information Society Technologies programme has its own Eoi service at <http://www.cordis.lu/ist/eoi.htm>

JRC Heads into the 21st Century

The new work programme for the European Commission's Joint Research Centre, covering the period 1999-2002, groups projects around four main themes:

- serving the citizen
- enhancing sustainability
- underpinning European competitiveness
- safety and security of nuclear energy

The work programme summarises the scientific and technical objectives of 100 projects which form the basis of the JRC's activities. It reflects the JRC's role as intermediary between European policy-makers and the industrial and scientific communities, and its mission "to provide customer-driven scientific and technical support for the conception, development, implementation and monitoring of Community policies".

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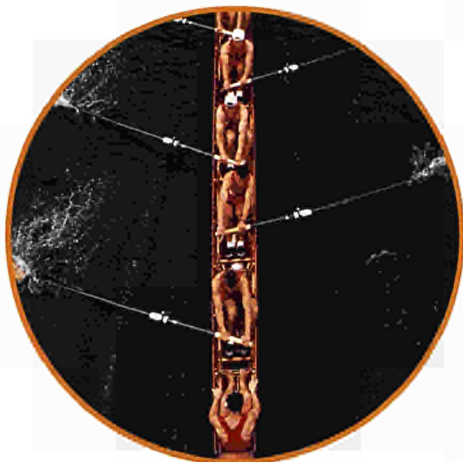
Israel Joins FP5

A scientific and technical co-operation agreement between the European Union and Israel was signed at the beginning of March. The agreement associates Israel with all the non-nuclear activities of the Fifth Research Framework Programme (FP5), and gives European researchers access to Israeli research programmes in similar fields. Under the terms of the agreement, Israel becomes an Associated State, which means that Israeli project participants can receive EU funding.

FP4 produced 350 joint European-Israeli projects, many of which have already produced concrete results. The new agreement signals both parties' commitment to strengthening their co-operation, extending its benefits to a wider group of individuals and institutions. Each has a great deal to gain from the other, not least in pooling their expertise to develop solutions to shared problems – for example in the management of water resources.

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Gathering Momentum for Innovation



Many of the measures set out in the First Action Plan for Innovation in Europe have been implemented in the two years since its launch - a significant first step towards lowering the barriers to technological progress. The promotion of innovation has been integrated across the whole Research Framework Programme, and is increasingly accepted as a cornerstone of policy not only for research, but in other areas as well.

In the Fifth Research Framework Programme, the job of converting Community research into concrete social and economic benefits is not confined to a special Innovation programme," says Jean-Noël Durvy, Head of the Innovation Policy Unit in

Directorate-General XIII/D (Innovation). "Instead, a 'technology implementation plan' covering the dissemination, demonstration and commercialisation of its results will be built into every research project - while each thematic programme has its own Innovation

Unit, responsible for stimulating and facilitating the realisation of these plans. As envisaged in the Innovation Action Plan⁽¹⁾, research will in future be oriented towards industrial needs from the outset, rather than as an afterthought."

1. A Provider of Innovation Services

The role of the new Innovation and SMEs programme itself has changed.

As the promotion of innovation has spread out across FP5, the programme's own focus has shifted correspondingly, Durvy says. Much greater emphasis will in future be placed on the provision of specialist innovation services - services to researchers, to regional and national innovation policy-makers, and to FP5's thematic programmes.

For EU research contractors, the LIFT and IPR Helpdesk services⁽²⁾, both already in place, offer easily accessible, expert advice on the financing and patenting issues involved in bringing new technologies to market, especially for new or smaller companies.

For the wider community of academic, entrepreneurial and corporate innovators, CORDIS and other central information services, and distributed structures such as the network of Innovation Relay Centres, speed the transnational flow of information, ideas, technologies and innovation management techniques. "And we will use the new generation of pilot and demonstration projects to

find solutions to generic barriers to innovation⁽³⁾," Durvy says, "encouraging and helping them to experiment with new approaches to innovation and technology transfer."

Tip of the iceberg

For innovation policy-makers and practitioners - within universities and technology centres, and at regional, nation and Community levels - the programme will gather, analyse and disseminate data on Europe's innovative performance, and will provide a test bed for new approaches, structures and ways of working. New pilot activities are soon to be launched, related to three of the key priorities of the Innovation Action Plan - intellectual property rights, the financing of innovation, and the creation and development of innovative companies.

"In the last of these areas, the evidence that action is needed is clear," says Durvy. "The European economy is not fully exploiting the

potential of high-tech start-ups to create new jobs. We will be launching a pilot action⁽⁴⁾ to promote regional initiatives supporting the creation and development of new high-tech companies - linking existing schemes, and spreading good practice to other regions."

Finally, the Innovation and SMEs programme will design, develop and test tools and support measures for use by the Innovation Units in FP5's own thematic programmes. "Its intended impact is disproportionate to its modest budget," Durvy emphasises. "What you see is just the tip of FP5's innovation iceberg."

(1) See Special Editions of December 1996 and February 1998. The Action Plan can also be downloaded from <http://www.cordis.lu/innovation/src/action.htm>

(2) See 'Need a LIFT?', and 'A Personal Service', both in edition 3/99.

(3) See this edition, page 3.

(4) See 'A Virtuous Circle', page 23.

mentum - in Europe

2. Measuring the Rate of Change

The making of effective innovation policy depends on reliable and timely data about current innovative performance at company level.

In its role as 'innovation observatory', the Innovation and SMEs programme has recently launched the Trend Chart on Innovation as a European platform for policy-makers to analyse and benchmark innovation performances and policies⁽⁵⁾. The Trend Chart will draw on, among other sources, the ongoing work of the Community Innovation Survey (CIS), carried out by Member States and co-ordinated on the programme's behalf by the Commission's statistical office, Eurostat. The first pilot survey, CIS1, was carried out in 1992/93⁽⁶⁾. Now, the first preliminary results of CIS2 have been published in a recent issue of *Statistics in Focus*⁽⁷⁾.

Are SMEs less innovative?

In 1994-96, the period covered by CIS2, 53% of all EU manufacturing enterprises were innovators, the report says. That is, they introduced new processes, or launched new or improved products or services. However, this was the case for only 44% of companies with fewer than 50 employees, compared to 81% of those with more than 250. Among all small manufacturing companies, new or improved products introduced in the previous three years accounted for only 15% of turnover, while among the largest they accounted for 35%.

But these averages conceal a sharp distinction between a large group of non-innovating SMEs, and a smaller group of dynamic innovators. Among innovating companies, SMEs derived nearly as high a proportion of sales from new or improved products as did large companies.

The survey defined innovation expenditure as spending on research and development, new machinery and equipment, and

design, training and marketing activities linked to new products, services or processes. On average, this accounted for just under 4% of manufacturing sector turnover, though the gap between Sweden, where the 'innovation intensity' was highest, and Spain, where it was lowest, is marked.

Innovators' objectives were also examined, as were the obstacles they encountered. Financial problems were prominent among the factors which most commonly held up innovation, or prevented it altogether. More

surprisingly, organisational rigidity and lack of qualified staff also turned out to be significant, especially among service companies (see Figure 1).

(5) See 'Benchmarking Innovation in Europe', edition 3/99.

(6) See 'Mapping the Innovation Universe in Europe', edition 2/98.

(7) Community Innovation Survey 1997/1998, *Statistics in Focus*, Theme 9 - 04/99, ISSN 1024-7971, Catalogue number CA-NS-99-002-EN-C.

Factors preventing or delaying the introduction of innovation (percentage of innovating enterprises citing each factor, per sector)

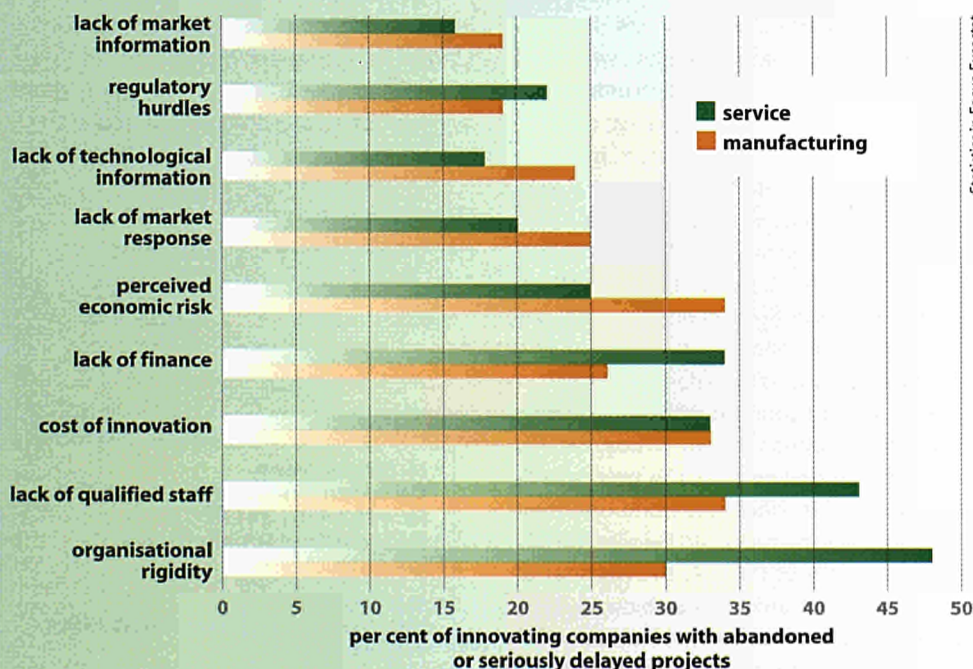


Figure 1: Barriers to innovation - surprisingly, internal factors appear to be as important as external, especially in the service sector.

3. Learning to Innovate

The human dimension of innovation is as important as the technological one.

Technological innovation is increasingly recognised as the key not only to Europe's industrial competitiveness, but to its wider prosperity, through the creation of new companies and new, high-quality employment.

Realising this potential requires not just a plentiful supply of new technologies, and a legal, financial and regulatory environment which supports the development of new market players to exploit them. European industry must also have access to an adequate pool of entrepreneurial talent – per-

sonnel with advanced technical and managerial skills, a 'can-do' approach to problem-solving, and a willingness to handle risk.

Creative destruction

The central role of human factors is clearly recognised in the Innovation Action Plan. It places the issue of 'Fostering an innovation culture' – addressing education and training measures, the mobility of scientific and technical personnel, and innovation manage-

ment at company level – first, ahead of the other two key priorities of 'Creating an environment conducive to innovation' and 'Gearing research to innovation'.

"The emergence and diffusion of new ideas, products and production techniques entails a continuous process of 'creative destruction'," says José-Ramón Tíscar of the Innovation Policy Unit. "New technologies inevitably destroy jobs in some industries, especially among low-skilled employees. But in the long term, innovation creates jobs by fostering the development of new products, services and market opportunities, allowing rising productivity to go hand in hand with employment growth."

Accelerating technological change places a premium in the labour market on up-to-date technical skills, and on the knowledge and attitudes necessary for high levels of participation and responsibility.

"The trend is towards multi-skilling, with a new emphasis on communication skills and customer focus," says Tíscar. "This poses a major challenge to education and training policies. The Action Plan for Innovation stipulates the adjustment of course content and teaching methods at all levels of the educational system, in order to foster a culture of enterprise and innovation. The Commission's contribution in this field is growing – in FP5's Innovation and SMEs programme and Human Potential programmes, and through the programmes of DG XXII (education)."

As recently as April, the European Council of Ministers called on Europe "to develop further human capital and enterprise culture, in particular to encourage the spirit of enterprise in young people", as a central element of its industrial policy. The role of the First Action Plan for Innovation in Europe remains pivotal. ●

INTELLECTUAL PROPERTY RIGHTS

IPR – We're Getting There



The European Commission is acting as a catalyst for the overhaul of Europe's patent system, in order to give researchers and innovators streamlined access to cost-effective, Europe-wide patent information and patent protection.

Reducing the cost and complexity of protecting intellectual property is a key priority of the First Action Plan for Innovation in Europe. In March, the Commission proposed a regulatory framework for the issue of patents valid throughout the EU, which will not only simplify the application process but will make it easier to enforce patent rights.

Awareness of the patent system, both as a means of protection and as a source of technical information, also needs to be improved, especially among small and medium-sized enterprises (SMEs). Commission initiatives, such as the Quick Scan service⁽¹⁾ and the creation of a single entry-point IPR Helpdesk⁽²⁾ have contributed to this effort.

Now, in collaboration with the Commission, the European Patent Office (EPO) is offering free on-line access to over 30 million patents throughout the world. Launched last July, the esp@cenet service is accessible either centrally or through the websites of national patent offices. Searching by date, technical field or keyword, users receive full bibliographic details of all matching records and, in many cases, an English abstract.

The Commission and the EPO are joining forces again for a major promotional event later this year. The annual Patinnova and Epidos conferences are to be combined in Halkidiki (Greece) on 18-22 October, creating the largest gathering of its kind ever held in Europe.

The conference, which will examine recent and forthcoming technical and policy developments, will draw IPR experts, innovators and intermediaries from all over Europe. Delegates will also be able to take part in specialised training courses, as well as hands-on demonstrations staged at the parallel exhibition.

(1) See this edition, page 7.

(2) See 'A Personal Service', edition 3/99.

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A Virtuous Circle

There is no need to look beyond the Atlantic for successful schemes supporting the creation of new technology-based companies.

"Europe has its own centres of excellence," says Paul Bradstock of the Oxford Trust. And, as the Trust's own experience in the United Kingdom shows, a small initial impetus can establish a self-sustaining virtuous circle of innovation.

Positive feedback

"The Trust was founded by Sir Martin Wood in 1985, when his company Oxford Instruments⁽¹⁾, itself a university spin-out of the late 1950s, was floated on the stock exchange," says Chief Executive Paul Bradstock. "He decided to recycle a small part of that wealth to help create more spin-outs in the region."

With seed-funding of around €3 million, the Trust's mission was 'to encourage the study and application of science and technology'. "Sir Martin realised that sustainable innovation was not just about starting new companies," Bradstock explains. "A change of culture and attitude was also needed, and the Trust's education programme – its scheme of student placements in local science-based firms, for example – is still as important as its work with the business sector."

The Trust now operates four incubation centres, where over 140 companies, employing more than 1,500 people, have begun their lives. "Our first premises were small and shabby," Bradstock recalls. "Yet one of the companies started there is now capitalised at over €150 million."

Regional partners

Oxford Trust's work is funded in roughly equal proportions by its own charitable Foundation, by lease income from its innovation centres, and by public grant funding for projects which fit its mission.

Bradstock sees the Trust as a regional catalyst. "We work in close partnership with the universities, local authorities, and business support agencies," he says. "The Trust acts as a convenor, linking a number of networks, but does not try to retain control. It is important not to be over-prescriptive. Innovation depends on creativity – you need to unite

creative people around a common goal, and then just try to remove any barriers in their way."

Business incubation is backed by parallel financing and network schemes. "Banks and venture capital funds are unsuitable as sources of early-stage finance," Bradstock says. "The Oxfordshire Investment Opportunity Network mobilises the skills and reputations of wealthy entrepreneurs, as well as their money, in support of young high-tech firms. And established spin-outs are themselves a valuable resource, acting as mentors to new start-ups, and creating sectoral clusters capable of making their own input into regional innovation policy."

(1) See 'Scientists Make Good Managers', edition 1/99.

Call Now Open

The Innovation Action Plan envisages measures at both European and national levels to speed the formation of high-tech spin-out companies, and to nurture their early growth. In mid-June, the Commission launched a call for proposals under a pilot action to facilitate the start-up and development of innovative companies. This will support the exchange of expertise between existing regional structures, and the testing of new approaches to business incubation, financing, mentoring and training by transnational pilot schemes. The call closes in mid-September.

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A launch-pad for high-tech spin-outs - the Milton Park Innovation Centre, which is run by the Oxford Trust's commercial subsidiary, Oxford Innovation Ltd.



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Export Potential Gets Inflated

As the case of one Spanish company shows, innovation management can accelerate change, delivering real competitive advantage.



The Innovation Action Plan identified an urgent need among Europe's small and medium-sized enterprises for better tools for planning and managing technological and organisational change. Between 1995 and 1998, the Innovation programme's Innovation Management Techniques action line⁽¹⁾ supported the development and testing of a variety of tools and methods⁽²⁾, at the same time helping to build regional capacity among the consultants and agencies which assist SMEs to use them.

The TIPPS project⁽³⁾ adapted a 'continuous innovation' methodology, originally developed by Enterprise Ireland, for use in Spain, Greece and the United Kingdom, where it was piloted in 60 SMEs. TIPPS is a straight forward six-stage process of innovation audit, capability audit, product analysis, diagnostic report, technology watch and action plan. Designed to be carried out with the support of an external consultant, it involves company staff at each stage, leaving them with an action plan which they understand and want to implement.

Strategic thinking

Volumen International, founded in 1982, has a core workforce of just 40. It manufactures and distributes inflatables for advertising campaigns and children's playgrounds, as well as other large canvas structures – marquees, and shades for car parks, swimming pools and exhibitions. When TIPPS' Spanish partner, Institut Catalá de Tecnologia (ICT), offered Volumen the chance to test the new methodology, it grabbed it with both hands.

"It is always hard for us to find the time for strategic thinking," says Managing Director Tomás Feliu. "The project gave us a clear, efficient structure for doing this. I had already begun to think about exporting. But by the time ICT finished, we were 100% certain that this was the top priority for the company. That clarity has enabled us to go ahead and do it."

Working closely with Feliu and his colleagues, ICT's consultants identified a series of problem areas. "They needed software to speed up the translation of three-dimen-

sional designs into two-dimensional canvas pieces," says Angel Guàrdia. "The influx of up to 25 temporary workers during the busy summer season made it hard to maintain staff skill levels. And the company was responding too slowly to technical and market developments – we encouraged them to monitor the competition more actively."

Altered vision

Feliu says that it is still too early to say what the long-term impact of the TIPPS consultancy will be. But he is in no doubt that it was worthwhile.

"It fundamentally altered our perspective," he says. "And it encouraged us to adopt a number of concrete new measures immediately. We have already recruited an export manager, and have made one director responsible for the on-going monitoring of new technology in our sector."

Volumen is now preparing to launch its tent and playground product ranges in markets in the southern hemisphere, which should help to smooth out its workload – allowing for a more stable workforce, and a better return on investment in training.

(1) See 'Managing to Fulfil Europe's Technological Potential', edition 1/99.

(2) An overview of published innovation management studies supported by the Innovation programme is available at <http://www.cordis.lu/imt/src/p-study.htm>

(3) PRO 025 - Transnational Innovation Pilot Programme in SMEs, see edition 1/99, *ibid.*



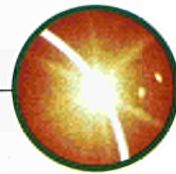
Demand for Volumen's inflatables and tents is highly seasonal. The company hopes that export markets in the southern hemisphere will help to smooth the flow of orders.

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Sunshine Cooler



Conventional air-conditioning consumes a lot of energy, and its use is spreading rapidly in the European Union, hampering efforts to reduce Europe's greenhouse gas emissions. But an alternative technology, powered by the sun itself, is on the way.

The energy consumed by buildings – primarily for heating, lighting and ventilation – accounts for more than 40% of the EU total, and for 30% of its CO₂ emissions. As standards of living rise, growing use of electrical air-conditioning offsets much of the energy saving achieved through more efficient heating technology and building design⁽¹⁾.

Solar energy can fairly easily be employed to reduce the load on conventionally-powered heating systems. Solar cooling requires more complex technologies. But it enjoys one great advantage over solar heating – energy is most readily available just when the demand for cooling is highest. Solar energy can therefore be used immediately, making bulky and costly systems for storage unnecessary.

Competitive Technology

Germany's Fraunhofer Institute of Solar Energy Systems (ISE) has developed an air-conditioning unit which, though more expensive to install than a standard, electrically driven system of the same capacity, will consume only half as much electricity.

"All ventilation systems use electricity to push air through the building," explains Dr Hans-Martin Henning of ISE. "Our design also incorporates a thermal heat source as a back-up. Our objective was to design a system which would be attractive to real customers – in terms both of comfort and of cost. As yet, the solar-driven desiccant cooling

technology cannot compete with small domestic window units, but for large non-residential buildings such as hospitals, hotels and offices, we are confident that it is commercially viable."

ISE has already tested its concept in a small-scale application in Germany. Now, in a Thermie project, it is installing a much larger demonstration system in the offices of Atecnic, a Portuguese manufacturer of air-conditioning equipment, in Sintra, near Lisbon. Henning hopes to commission the system, which will serve the whole of the building's 350m² first floor, in time to monitor its performance throughout the 1999 summer season.

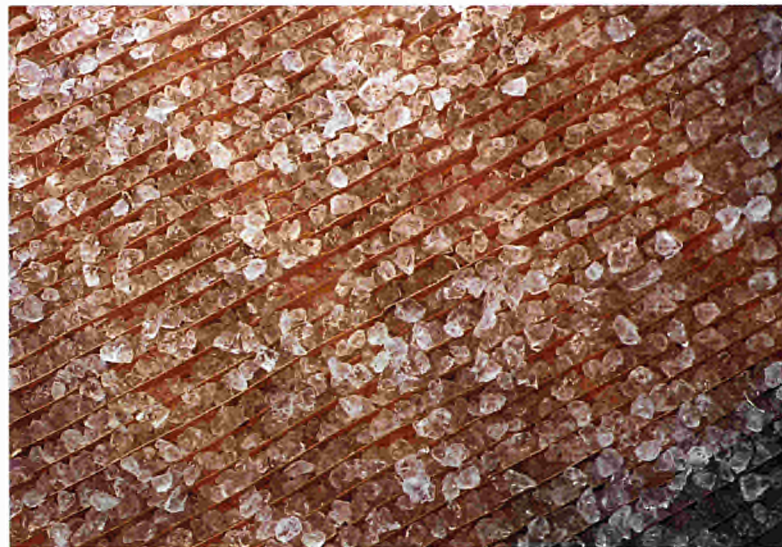
"Atecnic is an ideal end-user," he says. "Air-conditioning is their business, so they understand exactly how the system needs to perform in order to win acceptance in the market place. If the company is happy with its own installation, it will be in an excellent position to recommend the system to its customers."

A second Portuguese partner, the research institute INETI, will be responsible for analysing performance data as the basis for an assessment of the overall energy savings achieved in practice.

Temperature and Humidity

How can the same sunlight which beats against the windows of an office be used to cool the air which passes through it?

In fact, temperature reduction is achieved through evaporative



Water vapour is adsorbed from ambient air by silica gel in a rotary dehumidifier.

cooling. As air is drawn into the building it is humidified, and its temperature falls. "But where the humidity of the outside air is already high, there is very little potential for evaporative cooling," Henning explains. "Besides, the building's occupants want less humidity, not more. Our system dries the air first. Humidification can then bring its temperature down to a comfortable 18-19°C, without creating unacceptable levels of humidity."

Water vapour is adsorbed from the inlet air by silica gel, packed into a dehumidification 'wheel'. Hot water from a solar collector heats the outlet air to around 65°C. As the wheel turns, it passes through the stream of hot air, which drives off the water, desorbing the gel for the next cycle. A second wheel – a rotary heat exchanger – pre-cools the inlet air, pre-heating the outlet air at the same time. ●●●

(1) As noted in the first report of the External Advisory Group on cleaner energy systems and economic and efficient energy use, December 1998. The report is available on-line at <http://europa.eu.int/comm/dg12/jfp5/eag-energy1.html>



"The wheels create two feedback loops between the inlet and outlet flows, making it very hard to control both temperature and humidity," says Henning. "The biggest technical challenge is to maintain conditions indoors within the desired limits, despite changing inputs from the solar collector. We think we have succeeded, but we will monitor the system closely during the first summer to ensure that it meets the end-user's requirements."

Retrofit

The take-up of all renewable energy technologies has been

slowed by the depressed prices of conventional forms of energy, now at their lowest since the 1960s. The financial savings offered by new, energy-efficient technologies are often too small to justify the initial investment – except as part of large capital projects, where only the additional cost needs to be justified.

However, only 2% of Europe's building stock is replaced each year. Technologies which can be installed in existing structures, as Atecnic's system has been, can spread faster. "The retrofit market may turn out to be very important," Henning confirms. "Of course, you need space on the

roof for the solar collectors, and a site for the air-conditioning unit, which is larger than a conventional system."

Optimal configuration of the system depends upon local climate. In the warm and humid conditions at Trapani, in Sicily, ISE found that the lowest overall air-conditioning costs can be achieved by using solar energy

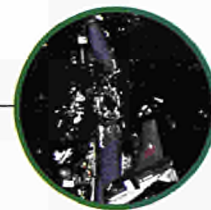
only for dehumidification, relying on conventional electrically powered air-chilling systems for temperature reduction. ●

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JOINT RESEARCH CENTRE

Air Safety – the Human Factor



The Joint Research Centre's lesser-known units also help to fulfil its mission to place the results of its advanced research at the disposal of European industry⁽¹⁾.



Alitalia's computer-based Crew Resource Management course introduces pilots to the issues raised by stressful in-flight situations, using reconstructions of real crashes.

It's the le ... It's the right one." "Okay, throttle it back." In January 1989, after this hurried cockpit exchange, flight G-OBME crashed on the M1 motorway near Kegworth, in the United Kingdom, killing 47 passengers. Instead of shutting down the damaged left engine, the crew shut had down the right one, causing a disastrous loss of power.

A detailed reconstruction of the crash forms the basis of an interactive, multimedia tutorial for pilots – part of a three-day crew resource management (CRM) course developed for Alitalia by the Human Factors Laboratory of the Institute for Systems, Informatics and Safety (ISIS) at the Ispra site of the European Commission's Joint Research Centre.

"Our work on the human aspects of safety began after the nuclear accidents at Three-Mile Island and Chernobyl," says Carlo Cacciabue, who heads the laboratory. "We developed an understanding of human behaviour and communication under stress, which has been used in the design of control interfaces and procedures, safety assessment, training and accident investigation."

It has since been applied in the fields of aviation transport and, more recently, de-mining and disability at work. "The JRC's primary institutional task is to serve the European Commission," Cacciabue explains. "But we also take part in collaborative research projects, as well as working for industrial clients on a con-

sultancy basis. Alitalia asked us to produce a course based on a thorough analysis of the company's safety culture." ●

(1) See also this edition, page 10 and page 19.

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Biotechnology R&D in Europe

EUR 17459 EN; ISBN 92-827-9491-1

With the aim of avoiding unnecessary duplication of work and facilities, this report gives a brief summary of the key areas of academic and industrial research in 16 European countries. It provides a basis for the planning of future activities, identifying areas of research where the co-ordination of national efforts would be most useful. The principal national research institutions are listed, and there is an overview of industrial biotechnology research and development activities – major companies, spending figures, numbers of researchers, and representative associations. The report also lists the key publications on each country's biotechnology strategies and activities.

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Advancing the Information Society: 101 Telematics Applications Success Stories

ISBN 92-828-5193-1; CXD-13-98-734-EN-C

This guide presents an overview of the 1997-1998 projects of the Telematics Applications Programme on research topics which include language engineering, healthcare, education, and training and transport.

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Tl. +32 2 299 9399
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<http://www2.echo.lu/telematics>

Towards a sustainable information society

This 1998 status report, the first of its kind, focuses on opportunities and challenges presented by research activities, their political impact and economic and social implications. Europe's industrial competitiveness, employment, quality of life and sustainable growth depend on the EU being at the leading edge of the development and take up of the information society. But the new information society must be sustainable in ways that our industrial society is not, the report says. New status reports will be issued annually.

A digital version of the report can be downloaded from:

<http://www.uk.infowin.org/ACTS/ANALYSIS/GENERAL/ACTS98>

Technology Stimulation Measures for SMEs 1994-96 – Project synopses

EUR 17481; ISBN 92-828-2116-1; €53

FP4's Technology Stimulation Measures for SMEs (TSME) have supported projects on topics ranging from intelligent tools for micro-drilling to leather ash reuse. This report includes synopses of projects which received exploratory awards or funding under the co-operative research (CRAFT) scheme, where groups of low- or medium-tech SMEs out-source research work. TSME projects from the Esprit and Transport programmes are not included.

Technoeconomic Analysis Report: A baseline report on selected policy-relevant technoeconomic developments

The report assesses the economic impact of new technologies in the EU, and highlights three key developments as being of particular importance for policy-makers – the Kyoto Protocol, which signals a qualitative shift in approaches to climate change; cloning, which signals a new era for life sciences and health; and the global scale of policy intervention in the market place. The report aims to establish a baseline against which future technoeconomic developments can be measured.

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Job Creation and Competitiveness through Innovation

This report from the European Round Table of Industrialists (ERT) includes the recommendation for a 'Single Market' in research. It analyses the interaction between innovation, competitiveness and employment, and outlines the obstacles to be overcome by governments, industry, administrations and academia. Six priorities are identified:

- to promote a more entrepreneurial attitude, with greater openness to innovation
- to create new businesses by rewarding risk-taking and removing obstacles to initiative
- to apply the Single Market concept to our research and academic communities
- to improve Europe's knowledge and skills by rekindling enthusiasm for innovation and entrepreneurship in the educational world
- to free up finance and risk capital to fund businesses

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 euros, 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).

- to modernise government and legislation, introducing a lighter approach to business legislation.

Contact:

ERT
Tl. +32 2 534 3100
Fx. +32 2 534 7348
E-m. contact@ert.be
<http://www.ert.be>

The European Guide to Science, Technology, and Innovation Studies

Science, technology, and innovation (STI) studies examine the development of scientific knowledge, the process of technology creation, and the way these interact to effect change in the economy and society as a whole. This is the first European guide to the subject, linking three intellectual traditions – the sociology of science, the history of technology, and evolutionary economics. It is designed to facilitate public access to these relatively young specialities of academic and strategic research.

Contact:

European Commission, DG XII-G/4
Fx. +32 2 296 2137
E-m. tser.secr@dg12.cec.be
<http://www.chem.uva.nl/sts/guide/>

Industrial Technologies: Impact Predicted, Impact Delivered

ISBN 92-828-4859-0

The brochure synthesises the findings of three studies of Brite-Euram projects, and addresses the questions:

Do the projects generate economic activity and return on investments?

What effects do the projects have on SMEs?

Is the Standards, Measurements and Testing programme a scientific and technological success?

How are projects used in practice?

Contact:

RTD Helpdesk
Tl. +352 4301 32084
E-m. rtd-helpdesk@lux.dg13.cec.be

Building national and large-scale Internet information gateways

14-15 September,
The Hague (Netherlands)

This workshop will consider the implications of building gateways using web and library standards. Subjects to be addressed will include Internet cataloguing, metadata and web standards, Internet resource and discovery, and tools and methods for building large-scale Internet information gateways.

Contact:
<http://www.desire.org/html/subjectgateways/workshops/workshop1.html>

Exchange of Technology and Know-how conference (ETK'99)

13-15 October,
Prague (Czech Republic)

Organised by Eurostat and the JRC's Institute for Systems, Informatics and Safety, this seminar is for those who produce statistics or use them as input to their production process. It addresses transfer of know-how and best practice, and will be organised as a series of demonstrations of new tools and methods for the production and processing of statistics.

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E-m. etk-99@eurogramme.lu
<http://europa.eu.int/en/comm/eurostat/research/conferences/etk-99/>

Patinnova/Epidos

18-22 October, Halkidiki (Greece)

Patinnova '99 will focus on developments in patent information, awareness-raising, and European patent litigation⁽¹⁾. The Epidos Annual Conference will focus on the retrieval of patent information, the Internet and other tools available on the market.

The joint conference will be of interest to decision-makers in industry and government, patent professionals, innovators, consultants, universities, chambers of commerce and all those involved in the innovation process.

Contact:
T. Jones,
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Tel. +352 4301 33461
E-m. trevor.jones@lux.dg13.cec.be
<http://www.cordis.lu/patinnova99/home.html>

(1) See also this edition, page 22.

European software process improvement conference

25-27 October, Pori (Finland)

The second EuroSPI conference, entitled 'Learn from the Past - Experience the Future', will present practical results from improvement projects in industry, focusing on benefits gained and criteria for success. It will be of interest to those concerned with the management and improvement of organisational processes, innovation and effective use of information systems and software processes, or interested in developing efficient and profitable work processes to increase the competitiveness of their organisation in the market.

Contact:
Conference Secretariat EuroSPI 1999
Tel. +353 1 286 1583
Fax. +353 1 286 5078
E-m. europsi@bigfoot.com
<http://www.bigfoot.com/~EuroSPI>

IST 99 - Information Society Technologies conference and exhibition

22-24 November, Helsinki (Finland)

The theme of this year's annual EU conference and exhibition on Information Society Technologies is 'Exploring the Information Society', and will give special attention to Central and Eastern European Countries (CEECs). It will cover the themes of the Information Society Technologies programme of FP5, and will include presentation of the results of earlier programmes. Participants from CEECs will have the opportunity to present their IT expertise to potential EU partners. The event will also include the presentation of the European IT Prize, and the Investment Forum will again provide the opportunity for Europe's leading companies to present themselves to financial and industrial investors and intermediaries.

Contact:
IST 99 Conference Secretariat
Fax. +32 2 296 8388
E-m. ist99@cec.be
<http://www.ist99.fi/>

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