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Research Results for SMEs – VI

*Success Stories from FP6
Co-operative Research projects*

Turning knowledge into profit

PROJECT SYNOPSES

EUR 23479

Introduction

‘Small and medium-sized enterprises (SMEs) are the DNA of the European economy. They are the basis of our future growth and prosperity. Why? Because, in Europe, that growth and prosperity must be based on knowledge and it is SMEs that are most capable of turning knowledge into growth, of turning bright ideas into commercial success, of turning research into rewards. That is why they are the essential catalyst in what we call the Lisbon agenda.’

Commissioner Potočník

The European single market has opened up new markets for all firms, which means that competition is becoming increasingly stiff. In a globalising world, innovation has become the fastest way to conquer new markets, and to maintain existing ones. As a result, SMEs increasingly need to acquire new knowledge, to innovate and to internationalise their network of business partners.

Yet in today's world, these activities are becoming increasingly specialised and costly.

That is why the European Union is encouraging SMEs to participate in its Framework Programme for Research and Technological Development (RTD), which is an excellent instrument to realise all these objectives at the same time.

The Seventh Framework Programme (FP7) provides financial support for transnational research for and by SMEs wishing to innovate and improve their competitiveness, by enhancing their investment in research activities to acquire new knowledge for growth in Europe's knowledge-based economy.

To encourage more SMEs to take part in the EU's RTD Programmes, special instruments have been developed for SMEs.

For a practical guide see the SME Techweb (<http://ec.europa.eu/research/sme-techweb>) which will take you through the possibilities step by step.

Under the current FP7 (2007-2013) there are two dedicated initiatives to strengthen the innovation capacities of SMEs by providing the support they need to outsource research which is critical to their core business:

- Research for SMEs (formally Co-operative research)
- Research for SME Associations (formally Collective research).

Research for SMEs supports small groups of innovative SMEs in solving technological problems and acquiring technological know-how. Projects must fit into the overall business and innovation needs of the SMEs, which are given the opportunity to subcontract research to RTD performers in order to acquire the necessary technological knowledge. Projects must render clear exploitation potential and economic benefits for the SMEs involved.

This publication presents the achievements of 20 Co-operative research (now Research for SMEs) projects completed under the Sixth Framework Programme (2002-2006). In total, these projects involve more than 200 SMEs. They illustrate the richness and diversity of the results that SMEs can obtain from EU research projects and show how SMEs with little or no research capacity can benefit from the Research for SMEs scheme.

Besides the SME specific instruments, research-performing SMEs with their own research capacity can benefit from support in three major ways:

- Cooperation Programme
- People Programme - Marie Curie Industry Academia Partnerships and Pathways (IAPP)
- Eurostars.

Further information on FP7 can be found on the following dedicated sites:

- SME Techweb (<http://ec.europa.eu/research/sme-techweb>)
- www.ec.europa.eu/research/fp7
- www.cordis.europa.eu/fp7.

SME Unit, European Commission, Research DG

Research Results for SMEs – VI

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AGRONETS brings net benefits for SMEs, farmers, consumers and the environment



Nets have long been used in agriculture to protect crops from pests such as insects and birds, and shield them from hail, wind and frosts. Now the AGRONETS project has given agricultural nets and the structures that support them a modern makeover.

The result is a series of new products which are more effective at protecting crops from pests and the elements. The products are not only good news for the small and medium-sized enterprises (SMEs) producing the nets and frames. Because they offer better protection than the structures that are currently used, the AGRONETS solutions are beneficial to the farmers who will see the damage to their crops fall. The nets also help farmers to keep their crops pest free without resorting to pesticides. This is also good for consumers, who are increasingly keen to purchase food that has been produced in an environmentally sensitive manner.

Finally, the new products are designed to blend into the landscape. In contrast, many older nets stand out from the surrounding countryside, marring the beauty of many of Europe's otherwise attractive landscapes.

The benefits of nets

Europe's fruit, vegetable and flower growers regularly use specially designed nets to protect their crops from a wide range of natural hazards. The right net can shield a crop from winds, rain, sun and hail, and protect it from the unwanted attention of birds and insects. Nets can also help to limit weed growth, and the microclimates they create can help to promote early flowering or fruiting. Some climbing plants, such as vines, strawberries, blueberries and peas, even use nets as a support.

Because they form a physical barrier to keep pests off the crops, nets also help farmers to cut down on pesticide use. They therefore have an important role to play in 'high quality-input' food production systems.

A wide variety of netting materials is readily available on the market. However, structures which combine the netting and the frame to support it are harder to come by. As a result, many nets are simply placed over modified greenhouse frames or over simple structures put together by farmers.

In addition to this, until now there has been little research into how the performance of these structures could be improved, for example by using different kinds of netting or altering the shape of the structure.

The aim of the AGRONETS project was to investigate which kinds of netting are

Thanks to the project, manufacturers of netting and greenhouses are now able to produce structures that are tailored to protect crops from specific threats.

best suited to different needs and design structures to support them. Research also focused on reducing the 'aesthetic pollution' caused by these large, often unattractive structures.

The project brought together three research institutes and three SMEs in Greece, Italy and the Netherlands. The SMEs are all active in the greenhouse and net production sector.

Together, the partners carried out a wide range of tests to see how different kinds of materials and structures would perform in different situations. Among other things, they looked at the strength of materials and their resistance to tearing, as well as their ability to let through air, water and light. On the aesthetics front, it quickly became clear that dark-coloured nets blend into the surrounding countryside much better than the white materials that are often used nowadays.

<http://www.agronets.aua.gr>

The partners also developed a design methodology for net-covered structures which took into account the farmers' requirements while keeping costs to a minimum.

The AGRONETS team designed and constructed four model structures: a shading house, an anti-hail canopy roof, an anti-insect house and a windbreak.

The shading house offers protection against wind and snow and has a lifetime of 15 years, which is the standard lifetime of a greenhouse. The anti-hail roof uses a specially designed net which incorporates reinforcing cables to ensure that the fruit trees it covers are protected from the elements. The structure is easy to put together, and is designed to be erected for just a few months during spring and summer.

The anti-insect house, as its name suggests, ensures that pest insects are kept out, while useful insects such as pollinators are kept in. Finally, the windbreak was designed to be effective regardless of the type of netting used. This makes the structure easier to construct with whatever netting materials are at hand.

Everyone's a winner!

By designing structures which integrate nets and a supporting frame, and are customised to address specific crop protection issues, the project partners have responded to a previously unmet need in the agricultural sector.

Thanks to the project, manufacturers of netting and greenhouses are now able to produce structures that are tailored to protect crops from specific threats. Consumers are increasingly interested in crops produced without pesticides, meaning demand for such structures is likely to rise.

Farmers are also set to benefit from the new, low-cost structures, which offer enhanced protection for their crops and enable them to slash their use of pesticides and other agrochemicals. For their part, consumers gain access to high-quality fruit and vegetables that are largely or even entirely pesticide free.

The plus points for the environment are manifold; in addition to a reduction in pesticide use, the nets also help farmers cut down on energy and water use. And of course, using darker materials prevents these important structures from becoming an eyesore.



Acronym:	AGRONETS
Full Title:	Development of Protective Structures Covered with Permeable Materials for Agricultural Use
Contract number:	507865
Call:	FP6-2002-SME-1
Starting Date:	20/09/2004
Duration (months):	27
Total cost:	€ 1 247 336
EC Contribution:	€ 824 710

Contact Person:	Antonis Mistriotis
	Agricultural University of Athens
E-mail:	amistr@aua.gr
Tel.	+30 2105294022

Partners:

- 1 Howitec Trading B.V. (NL)
- 2 Arrigoni SpA (IT)
- 3 Agrek C. Samantouros S.A. (EL)
- 4 Agricultural University of Athens (EL)
- 5 Plant Research International B.V. (NL)
- 6 Università Degli Studi di Bari (IT)

Recto: Pictures © Shutterstock, 2009
Verso: Model anti insect house

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ALADDIN – Destination anywhere

An innovative management system enables small and medium-sized enterprises (SMEs) in the tourist industry to provide travellers with a range of information and services before, during and after their trip. The same system is also designed to help tourists access information about their journeys and their destination. As far as the project partners are aware, there is currently no other mobile system on the market that combines business-to-business and business-to-consumer applications.

The prototype system was successfully tested in a range of scenarios in three European locations. Meanwhile, the SMEs involved in ALADDIN are already benefitting from the knowledge generated by the project on the tourist industry and the needs of travellers, and the technology developed puts them at the forefront of their respective sectors.

Tourism: vital for Europe, vital for many SMEs

Tourism brings in around EUR 3 billion to the European economy every year, and it generates some 20 million jobs directly and indirectly.

Many of the companies operating in the tourism and travel sector are SMEs, including incoming tour operators, tourist offices, restaurants, museums and other tourist attractions as well as conference organisers. Between them, these businesses need to provide a diverse array of services to a single customer, the traveller, in a cost-effective yet attractive way.

Incoming tourist agencies in particular have to carry out a wide range of tasks, including optimising tour transfer set-ups, designing tailored trips and handling changes to flights and hotels. These jobs are made all the more difficult by the growing trend towards last-minute bookings and changes. For these SMEs, it is becoming ever more difficult to compete with large international companies that simply have more resources at the destination.

Meanwhile, the widespread use of smartphones and handheld computers is opening up an as yet untapped market for mobile leisure and business services. However, the wide range of device types on the market means that few SMEs can afford to break into this new mobile market.

The SMEs involved in ALADDIN are already benefiting from the knowledge generated by the project on the tourist industry and the needs of travellers, and the technology developed puts them at the forefront of their respective sectors.

The ALADDIN project set out to develop a mobile destination system that would provide incoming tour operators with both a mobile workspace and a mobile content and service management system, and create a platform for SMEs at the destination to advertise their services to tourists with ease.

The project brought together 11 partners in 6 countries, including travel agencies, specialists in software for the travel industry, a provider of online advertising services, a specialist in multilingual content and a regional tourist association as well as research organisations.



A modern system for the modern traveller

The project partners successfully developed a prototype system, at the heart of which is the Professional Mobile Workspace (PMW). Through this, tour guides at the destination can provide a range of services to travellers, interact electronically with their back office and access information on arrivals, flights and accommodation, for example.

Meanwhile, SMEs at the destination, such as restaurants, event organisers and tourist attractions can use the platform as a marketing channel to offer services and provide information to travellers in an attractive and accessible manner.

Twinned with the professional workspace is the 'Mobile Travel Environment' (MTE), which is designed for travellers. In the MTE, travellers can set up a profile so that they receive information of interest about their destination. The application, which can be accessed via the Internet and mobile phones, also allows the traveller to search for points of interest in the destination and check out any special offers. In addition to this, the system has a map facility; if the phone also has a global positioning system (GPS) function, automatic positioning can be triggered.

The prototype system underwent extensive testing in three locations: Wildschönau (Austria), Budapest (Hungary) and Stockholm (Sweden). During these trials, participants acting as tourists were asked to set up a profile, find and book a place on a guided tour, find a tourist attraction, navigate their way to certain locations, find and reserve a table in a restaurant and check details of a return flight.

Meanwhile, people working in the tourist industry checked out the professional workspace of the system. Among other things, they were asked to check the data of an arriving group of travellers, manage an ad hoc change, obtain information on a tourist attraction and find out about travel options for getting there, send a text message to group members telling them when and where to meet, and make a complaint about a hotel room.

The testers rated the performance of the system highly, and described the functions offered as desirable and helpful. According to the testers, the most important points concerning the information provided by the system are its overall quality and whether or not it is up to date.

Business benefits

Even though the ALADDIN system is still in the prototype stage, the project has brought about a number of benefits for the partners. For the technological SMEs in the project, the tools and software developed by ALADDIN will help them to stay at the forefront of new developments in their areas (mobile business, tour operator software, etc.)

For the SMEs that plan to use the service once it is commercialised, the system will help them to offer a better, more personalised service to customers and make life easier for tour guides.

All SMEs have benefited from an increased understanding of the potential of mobile devices as a tool for both tour guide and traveller.



Saint Stephen's Basilica in Budapest.

Acronym:	ALADDIN
Full Title:	Mobile Destination-Management for SMEs
Contract number:	17566
Call:	FP6-2003-SME-1
Starting Date:	01/08/2005
Duration (months):	24
Total cost:	€ 1 800 768
EC Contribution:	€ 1 299 200

Contact Person:	Frank Schröder
	ISO Software Systeme GmbH
E-mail:	frank.schroeder@isoGmbH.de
Tel.	+49 698007100

Partners:

- 1 ISO Software Systeme GmbH (DE)
- 2 Yellowmap AG (DE)
- 3 Language Technology Centre Ltd (UK)
- 4 Universitaet Stuttgart (DE)
- 5 University of St Gallen (CH)
- 6 Incoming Tourism Scandinavia ITS AB (SE)
- 7 University of Pannonia (HU)
- 8 Atlasz World Travel Idegfoglalmi Kft (HU)
- 9 Tourismusverband Wildschoenau (AT)
- 10 FHS Kufsteintiroel Bildungs GmbH (AT)

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From biogas to BIO-HYDROGEN

Hydrogen is set to play a key role in Europe's energy mix in the future; the only exhaust gas it produces is water vapour, making it ideally suited to a low carbon economy. Now the BIO-HYDROGEN project has come up with a prototype system to convert biogas from farms, landfills and water treatment plants into hydrogen that could be used to power vehicles, for example.

The technologies developed by the project have been patented and proven effective in tests carried out under realistic conditions.

Demand for hydrogen is currently low. However, Europe is investing large amounts of money in hydrogen and fuel cells research and development activities. When the results of this research hit the market, the demand for hydrogen will inevitably rise, and companies which are able to produce hydrogen from readily available, renewable sources like biogas could make large profits.

Meanwhile, the project partners have benefited from the knowledge of these innovative technologies generated and the contacts made during the project. Some of the technologies developed by BIO-HYDROGEN are now being refined and tested on larger scales in further projects.

Seeking cleaner fuels

The transport sector pumps out a lot of pollution into the atmosphere, including the greenhouse gas carbon dioxide (CO₂) and other pollutants that significantly reduce air quality in many urban areas. This fact, along with rising petrol prices, is driving the search for a cleaner alternative fuel, and hydrogen produced from renewable sources fits the bill perfectly. In short, the only gas that comes out of a hydrogen-powered vehicle is water vapour.

Biogas is a clean, renewable energy source which is produced when biological materials such as agricultural waste are broken down. The aim of the BIO-HYDROGEN project was to develop a cost-effective system which could convert biogas into hydrogen.

The project brought together 10 partners, including research institutions and small and medium-sized enterprises (SMEs) in 4 countries. Between them, they brought to the project expertise in gas reforming, biogas production, and cleaning and fuel cell technologies. There was also a slaughterhouse in Spain which already houses a small biogas plant that digests its waste.

The project partners' first task was to develop a system to clean the biogas. Biogas often contains impurities, such as hydrogen sulphide (H₂S) and siloxane, which can damage the reformer (the device which actually converts the biogas into hydrogen).

'We have developed the technology, we have the results, and we are optimistic!'

In the first stage of the process, the biogas is pumped through a biological filter, in which a specially developed mix of microorganisms removes almost all the damaging hydrogen sulphide and siloxane. The remaining gas then passes through an activated carbon filter and a nickel filter, which effectively remove any remaining traces of hydrogen sulphide or siloxane in the biogas.

Once all impurities have been removed, the remaining methane (CH₄) gas passes on into the reformer itself. Here, the methane is converted into hydrogen and carbon dioxide as well as small amounts of water vapour and carbon monoxide. The hydrogen can easily be isolated from the mix using commercially available technologies that can be 'plugged in' to the reformer.

Following successful tests in the lab, the prototype system was put through its paces



at the Spanish slaughterhouse, using gas produced by the slaughterhouse's own biogas plant. The results were good.

'The whole chain works and we demonstrated this in Spain,' said Project Coordinator Johann Bergmair of Austrian research institute Profactor Produktionsforschung.

The costs of producing hydrogen in this way have been estimated at between EUR 0.12 and EUR 0.18 per kilowatt hour of hydrogen for a small reformer (5 kilowatts to 15 kilowatts). This is in line with other production processes. Furthermore, market studies reveal high levels of biogas availability right across Europe.

The project partners have since patented some of the technologies developed in the framework of the BIO-HYDROGEN initiative. For example, there is a European patent protecting the biological system for removing hydrogen sulphide and siloxanes from the biogas.

This system is now undergoing further development in a new project involving partners from the land fill sector and has already been successfully scaled up to deal with larger volumes of biogas. A number of companies are watching the project with interest; if the results are positive, the companies involved should be able to commercialise the system successfully.

Similarly, there are a number of companies that are interested in the biogas reformer itself; there is little call for hydrogen at the moment, but that will undoubtedly change as hydrogen-powered vehicles appear on our roads.

'We have developed the technology, we have the results, and we are optimistic!' concluded Mr Bergmair.

Juan de Blas, CEO of Spanish SME Besel, credits the project with increasing his company's knowledge of these technologies. 'For two years we worked with the leaders and we learnt about the new technologies,' he explained. Besel will continue working on these technologies on a low level, so that it is ready to leap into action when the hydrogen economy takes off. 'We are positioning ourselves for the future,' said Mr de Blas.



Hydrogen fueling station

Acronym: **BIO-HYDROGEN**
Full Title: **Development of a Biogas Reformer for Production of Hydrogen for PEM Fuel Cells**
Contract number: **17819**
Call: **FP6-2003-SME-1**
Starting Date: **01/07/2005**
Duration (months): **24**
Total cost: **€ 1 370 237**
EC Contribution: **€ 846 236**
Contact Person: **Dr Werner Ahrer**
Head of Department
Profactor GmbH
E-mail: **werner.ahrer@profactor.at**
Tel. **+43 7252885400**

Partners:

- 1 Profactor Produktionsforschungs GmbH (AT)
- 2 Besel S.A. (ES)
- 3 Schmack Biogas AG (DE)
- 4 Udomi Competence in Fuel Cells (DE)
- 5 Matadero Frigorífico del Nalón S.L. (ES)
- 6 Proton Motor Fuel Cell GmbH (DE)
- 7 Bitter GmbH (AT)
- 8 Fronius International GmbH (AT)
- 9 Universität Duisburg-Essen (DE)
- 10 Slovenska Polnohospodarska Universita v Nitra (Slovak Agricultural University In Nitra) (SK)

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BIOMON – Boosting biolubricants

As interest in environmentally friendly biolubricants grows, the BIOMON project has come up with a range of biolubricants suitable for a number of applications, as well as an online monitoring system to provide advice on how best to maintain machines and components.

With additional funding, the biolubricants and biogreases developed by the project partners could be brought to the market. Meanwhile, the monitoring system is currently undergoing further development and will be launched for commercial use in the near future.

According to the small and medium-sized enterprises (SMEs) involved in BIOMON, participating in the project has helped them to enhance their reputations in their respective markets, opening up new business opportunities, boosting sales and generating new jobs.

Towards a greener future

Awareness of the environmental impacts of oil extraction and use is now widespread, and there is a growing body of legislation designed to minimise these impacts. Lubricants and greases based on vegetable oils have the potential to mitigate the effects of machine lubrication on the environment, and the use of these 'greener' products has grown significantly in certain niche applications such as hydraulic systems.

However, the wider uptake of biolubricants and biogreases by the industry at large remains low. One of the reasons for this is the relatively poor performance of these products in the lubrication of key components such as bearings, gears and ball screws.

The BIOMON project aimed to tackle this problem and so promote the uptake of biolubricants via a four-pronged, strategic approach. Their first aim was to develop two product groups designed for operations involving ball screws, rolling bearings and gears, namely long-life biolubricants and high-temperature and oxidation-resistant biodegradable greases.

The partners also set out to develop procedures to analyse the degradability of oils and greases, both during and after use. In addition to this, the project aimed to evaluate the performance of mechanical components in real and simulated situations.

Mike Burrows, Monition's Managing Director, credits the BIOMON project with enhancing the company's standing in the oil analysis sector. 'It has set Monition apart from the rest of the market. We are at the cutting edge,' he explained.

The final aim of the project was to design an online condition-monitoring system to advise on the best maintenance procedures for machines and mechanical components lubricated with biolubricants and biogreases.

The project brought together seven partners, five of them SMEs in four countries. The participating SMEs included end users of applications (involving roller bearings, gear boxes and ball screws), a biolubricant developer and a supplier of condition-monitoring solutions and services. For their part, the two research organisations in the project provided expertise in the analysis, monitoring and development of biodegradable oils and greases.

Good greases

The project partners produced a number of biolubricants during the course of the project, all of which met the target biodegradability and toxicity requirements. Furthermore, most of them performed as well as or better than ordinary, mineral-based lubricants.

The gear oils showed the most impressive results. In addition to their biodegradability and low toxicity, they offered a competitive price/performance ratio and had better gear-wear performance and load-carrying capacity than already commercialised adequate mineral oil-based products.

Good results were also obtained for biogreases for use in ball screws. Here, the high biodegradability of the biogreases is a major advantage, as most of the grease applied to these components ends up in the environment.

Finally, the biolubricants designed for use in bearings turned out to behave in a similar way to the conventionally used mineral oils. In terms of seal and lacquer compatibilities, this is important in meeting customer needs.

With further funding, the company that makes the biolubricants could commercialise these innovative products and start to sell them.

The other main outcome of the project was a prototype online condition-monitoring system. Those responsible for the maintenance of machinery need to know how often they should analyse the lubricants in their machines, and must be able to interpret the results of these analyses correctly.

The system developed by the BIOMON team greatly facilitates these tasks. As the tool is online, it can be accessed by people from all over the world. Users simply enter information on their machine, the industry involved and its environment, as well as data from oil analysis samples. The programme processes this information and delivers a tailor-made maintenance strategy to the client.

Since the end of the project, Monition, the UK-based SME that runs the system, has obtained funding to develop the product further and add new features, including a training module, to it.

Mike Burrows, Monition's Managing Director, credits the BIOMON project with enhancing the company's standing in the oil analysis sector. 'It has set Monition apart from the rest of the market. We are at the cutting edge,' he explained.

The project has already generated new business opportunities for Monition, which has had to hire more staff to cope with the increased workload. The increased income has also made it possible for the company to invest in more sophisticated machinery, enhancing the services it offers still further. Job security at the company has improved, as employees are no longer reliant on a small number of clients. All in all, the company is now in a much stronger position to seize opportunities as soon as they arise.



Acronym:	BIOMON
Full Title:	Towards Long-Life Bio-Lubricants Using Advanced Design and Monitoring Tools
Contract number:	508208
Call:	FP6-2002-SME-1
Starting Date:	01/10/2004
Duration (months):	27
Total cost:	€ 1 740 000
EC Contribution:	€ 870 000

Contact Person:	Harald Bock
	ROWE MINERALÖLWERK GmbH
E-mail:	h.bock@rowe-mineraloel.com
Tel.	+49 635595410

Partners:

- 1 Rowe Mineralölwerk GmbH (DE)
- 2 Instituto de Engenharia Mecânica e Gestao Industrial (PT)
- 3 Rodamientos Europeos Sal - FERSA S.A. (ES)
- 4 Shuton S.A. (ES)
- 5 A. Brito - Industria Portuguesa Engrenagens Lda (PT)
- 6 Fundacion Tekniker (ES)
- 7 Monition Ltd (INTERNATIONAL) (UK)



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BULK SUBSTRATES – Mushroom magic for mycelium manufacturers

Mushrooms and related mycelium products are needed for the production of a wide array of products, including bread, coffee, tea, beer, cheese and meat substitutes. Yet all too often, the substrate on which these moulds and mushrooms are grown is contaminated. Now the small and medium-sized enterprises (SMEs) that produce this substrate are set to see their profits grow as fast as their mushrooms, thanks to the BULK SUBSTRATES project.

The project partners have developed a new machine which produces a high-quality, contamination-free substrate. What's more, the novel production method is faster than the old one and requires less energy, water and manpower. As a result, the many SMEs involved in the production of substrates for the mould and mushroom industries are set to cut their production costs drastically.

A prototype of the machine has already proven successful in trials, and following fine tuning by the project coordinator, it will be put to use on an industrial scale by the project partners. Eventually, the BULK SUBSTRATES consortium plans to sell the machine to other producers from outside the project.

The art of growing mould

Mushrooms and related fungi are grown on substrates made of a mixture of grain or wood chips and additives such as nutrients or chalk.

The way this substrate is produced has not changed in a long time. First, the grains are cooked, before being emptied into bags along with the required additives. These bags are then heated, to sterilise their contents.

Once cooled, the bags are opened, and the desired strain of fungus is added, a process known as inoculation. Once resealed, mixed and cooled, the bags are ready for sale to mushroom and mould growers.

The causes of contamination

Unfortunately, if production is not carried out under 100% sterile conditions, the bags are liable to become contaminated with the wrong kinds of mould. In this respect, the weakest link in the production chain is the inoculation stage. When the bags are opened to add the desired strain of fungus, it is all too easy for other, less desirable micro-organisms to sneak in as well.

Usually the substrate manufacturers are able to spot the contamination before the bag is sold to a mushroom grower, as the contaminant moulds are often a different colour from the desired moulds.

Thanks to the BULK SUBSTRATES project, the many SMEs involved in the production of substrates for the mould and mushroom industries are set to cut their production costs drastically.

However, if the contamination is not detected and the bag is sold, the results at harvest time are disastrous. In short, the mushroom grower will find his or her crop overrun with the wrong kinds of mould.

As many as 10% of all bags are contaminated, and as contaminated bags have to be thrown away, this represents a major loss of income for substrate producers. Furthermore, if the contamination goes undetected and the substrate is sold, the result is an irate customer.

The high risk of contamination is not the only problem with the old substrate production system; it is also time consuming, extremely labour intensive and uses a lot of energy and water.



Joining forces to solve a common problem

The aim of the BULK SUBSTRATES project was to develop a method of producing substrates which would eliminate the risk of contamination, reduce energy and water usage and require less labour.

The project brought together 10 SMEs and 2 research organisations in 8 European countries (including 6 EU Member States). The project partners included mushroom growers as well as representatives of the breweries industry, and companies which produce moulds for pest control purposes in organic agriculture.

By joining forces, and with the help of EU research funds, this diverse group of companies was able to set about developing a better way of producing substrates.

Many of the partners had been thinking about how best to tackle the contamination issue for a long time. 'We had it in mind for many years, but we are only a small company so we couldn't afford it,' commented project coordinator Magda Verfaillie of Belgian SME Mycelia.

Between them, the project partners brought a lot of ideas to the table. With the help of the research organisations, they were soon able to turn these into a reality.

Cleaner and greener – the new BULK SUBSTRATES machine!

The result of the project is a prototype BULK SUBSTRATES machine, which permits the sterile production of mycelium substrate. The new production method entails filling the machine with the substrate ingredients and sterilising them with steam. The mixture is then cooled and humidified with sterile water. The mycelium is added and mixed in once the substrate has cooled. Finally, the inoculated substrate is placed in bags.

The entire process takes place under aseptic conditions within the machine and, crucially, the risky step of re-opening the bags by hand to add the fungal strain has been eliminated.

'Everything is handled in the bulk machine,' explained Mrs Verfaillie. 'You also have a more homogeneous product because it is mixed in bulk, so the final product is more beautiful.'

The reduced contamination risk and improved product quality are not the only advantages of the new machine. While the production of a batch of substrate took 72 hours using the old method, the new machine delivers a batch of filled, inoculated, sealed, contamination-free bags in just five hours – a dramatic improvement.

In addition to this, the new machine uses much less water and energy than the older production methods. Finally, the whole process is far less labour intensive, allowing users to save around a third on personnel costs.

The machine is almost ready for industrial use, and the project partners are keen to commercialise it and make it available to other businesses in the mushroom and mycelium industries.



Acronym:	BULK SUBSTRATES
Full Title:	Development of an Energy-Efficient Bulk Sterilisation Technique for the Production of Mycelium
Contract number:	508645
Call:	FP6-2002-SME-1
Starting Date:	15/01/2004
Duration (months):	30
Total cost:	€ 1 945 520
EC Contribution:	€ 1 008 040
Contact Person:	Magda Verfaillie Mycelia BVBA
E-mail:	magda@mycelia.be
Tel.	+32 92287090

Partners:

- 1 Catholic University College Ghent, Chemical and Biochemical Research Centre KaHo / Chemisch en Biochemisch Onderzoekscentrum Kaho Sint-Lieven (BE)
- 2 Wam SpA (IT)
- 3 SACo₂ NV (BE)
- 4 Agrifutur Srl (IT)
- 5 Dingemans Mout NV (BE)
- 6 Tekoa Mushroom Farm Ltd (IL)
- 7 Myo AS (NO)
- 8 Fungi 2000 The Mushroommakers (NL)
- 9 Forest Mushrooms (IE)
- 10 Carlos Díaz Tarrago (ES)
- 11 Pilzgarten GmbH (DE)
- 12 Mycelia BVBA (BE)

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CADPIPE speeds up design pipeline



Computer Aided Design (CAD) can turn flat, two-dimensional drawings (2D) into animated, three-dimensional (3D) objects. It is used by architects, engineers and computer game designers, among others. Now, a system developed by the CADPIPE project is set to make it easier to convert CAD designs into high-quality, real-time animations.

The project partners have developed a prototype system and are now keen to develop it further. If successful, they will be able to tap into the valuable virtual reality market, which is worth tens of millions of euros and is growing fast. The project has also provided the partners with useful technical know-how and contacts in companies and research institutes across Europe.

Bringing objects to life

Not long ago, many industries that involved design presented their ideas in 2D technical drawings and plans; these could often only be understood by people with specialist knowledge. Recent years have seen a rapid rise in 3D CAD which enables designers to breathe life into their concepts and present them to clients.

For example, an architect can walk a client through a building and show him or her alternative ideas. Airlines use CAD in simulators to train their pilots, and the National Aeronautics and Space Administration (NASA) and the European Space Agency (ESA) use it to train their astronauts. Back on Earth, it is widely used by the computer game industry and in the film and television industry to create special effects.

However, turning the CAD file into a truly high-quality animation is an extremely time-consuming process, especially when photo-realistic visualisation is needed, as in virtual reality environments or animated computer game content.

Doing this entails vast amounts of detailed, expensive manual work as designers turn countless tiny details into moving, lifelike objects with texture and lighting and shade. Even manipulating simple shapes such as a circle or sphere is far from easy.

The task is made all the more difficult by the fact that over the years, a multitude of

'We gained a serious amount of technology expertise, new partners and contacts, as well as knowledge to work successfully in international consortiums,' explained Krum Hadjigeorgiev of Bulgarian SME and project partner Melon Technologies. 'The project did help us a lot to increase our sales and profits, although indirectly.'

CAD software packages and file formats has sprung up, and many of these formats cannot easily be converted for use by 3D visualisation software. The entire process is extremely slow and expensive.

The aim of the CADPIPE project was to speed up this laborious process, by developing software capable of converting a wide range of CAD file formats into a form where the data can be easily manipulated by 3D visualisation tools.

The 14 project partners came from 9 countries and included companies with

<http://cadpipe.vtt.fi/>

expertise in 3D software, interfaces, geometrical modelling and virtual reality, as well as television and 3D specialists and research centres.

Unblocking the CAD pipeline

The result of the project partners' efforts is a prototype CADPIPE system which was successfully demonstrated at the end of the project. A users' manual accompanies the system. Users access the CADPIPE system through a single interface, giving them control over the whole production pipeline. Its modular design means that it will be relatively simple to add further tools and features in the future. The CADPIPE storage system also separates materials, models and scenes to different databases. In practical terms, this means that each parameter can be changed from external applications without disturbing the work of the CADPIPE system.

Thanks to the system's innovative import/export tool, users will be able to dramatically slash the time taken to convert CAD files so that they are ready for use in 3D visualisation tools such as those used in computer game development.

The system also comprises tools that allow the user to alter the object's properties. Among other things, it will allow users to add a range of realistic textures to the object's surface and alter its glossiness or make it more transparent or opaque. Scene editing features permit users to open a door in a virtual room, combine objects from different sources, and scale, position and orient them relative to one another.

The CADPIPE system is relatively easy to use; for example, the shading parameters are manipulated via an interface that can be easily grasped by someone who is unfamiliar with shader technologies.

At the end of the project, the partners signed an exploitation agreement. They are now actively looking for funding to iron out the bugs in their prototype software and develop it further. At stake is access to the rapidly growing virtual reality market.

The CADPIPE team is keen to emphasise the unique nature of their system. 'There are other tools to convert CAD files into a virtual reality format, but this is a full-blown system,' comments Seppo Laukkanen of SenseTrix, a Finnish SME, adding that once refined, the CADPIPE system would not only speed up the conversion process, but significantly improve the quality of the end product.

Meanwhile some of the project partners are using some of the source code underlying the system in their work. The project also brought other benefits for the SMEs that participated in the project.

'We gained a serious amount of technology expertise, new partners and contacts, as well as knowledge to work successfully in international consortiums,' explained Krum Hadjigeorgiev of Bulgarian SME and project partner Melon Technologies. 'The project did help us a lot to increase our sales and profits, although indirectly.'

Recto: The Technical manager of the CADPIPE project, Timo Tossavainen from VTT, is working with the 'CadChain' (the actual name of the final product) software. CadChain works in different views and with different types of integrated editors simultaneously. Here, Timo is editing surface properties of a selected group of objects at one time. This scene includes tens of chairs which can inherit these edited properties; the properties can also be assigned to an individual object or part of an object when needed.

Verso: Here, Timo has imported one CAD object into CadChain and has started editing. The object was imported in native STEP format. CadChain import supports several of the most commonly used CAD formats.



Acronym:	CADPIPE
Full Title:	CAD Production Pipeline
Contract number:	512897
Call:	FP6-2002-SME-1
Starting Date:	2004-10-01
Duration (months):	24
Total cost:	€ 1 615 496
EC Contribution:	€ 980 390
Contact Person:	Hannu Kuukkanen
	VTT Technical Research Centre of Finland
E-mail:	hannu.kuukkanen@vtt.fi
Tel.	+358 207225948

Partners:

- 1 VTT Technical Research Centre of Finland (FI)
- 2 Nemetschek Ood (BG)
- 3 Melon Technologies Inc. (BG)
- 4 Brainstorm Multimedia S.L. (ES)
- 5 Ingenieria Y Soluciones Informaticas Del Sur S.L. (ES)
- 6 Deltacad (FR)
- 7 Fractal Graphics S.L (ES)
- 8 Fraunhofer Gesellschaft zur Förderung der Angewandten Forschung E.V. (DE)
- 9 Ege University, International Computer Institute (Uluslararası Bilgisayar Enstitüsü) (TR)
- 10 Miralab, University of Geneva (CH)
- 11 Deskartes Oy (FI)
- 12 M-Bis Mobile Business and Innovative Solutions GmbH (DE)
- 13 Vebco Venture Business Consult GmbH (DE)
- 14 Sense Trix Ltd (FI)

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Fistula Catheter lightens dialysis burden

Thanks to dialysis, many patients with kidney failure are now living longer than ever. However, over time, dialysis can seriously damage the patient's blood vessels at the point where blood leaves and re-enters the body. Now the Fistula Catheter project has developed a device designed to prevent this damage from taking place.

Worldwide, almost two million people suffer from kidney failure, and in Europe alone, over a quarter of a million people regularly undergo dialysis. The FistulaCath device has the potential to dramatically alleviate the pain often associated with dialysis, reduce the risk of infection and save money for healthcare systems.

The device will be tested on the first patients shortly before being launched at major medical trade fairs in the US and Europe. Once on sale, the SMEs (small and medium-sized enterprises) in the project hope to tap into the EUR 500 million market for such devices.

The kidneys: keeping blood clean

Our kidneys' primary role is to remove waste products and excess liquids from our blood; these end up in our urine. Our kidneys also regulate our body's salt, ion and water levels, control blood pressure and stimulate the production of red blood cells in our bone marrow. It is possible to survive with one kidney, but if both kidneys fail, a transplant or dialysis is essential.

A dialysis machine is effectively an artificial kidney. During dialysis, the patient's blood is removed via a stainless steel needle inserted into a blood vessel in the arm and fed through the dialysis machine before being returned to the body through another needle in the arm. Patients with kidney failure usually need to undergo dialysis three times a week, and each session lasts around four hours.

The good news is that medical advances mean that, dialysis patients now have a better life expectancy than in the past. The problem is that over time, spending 12 hours a week hooked up to hard, stainless steel needles damages the blood vessels in the arm. When this happens, surgery is required to restore access to the blood vessels.

As a consequence, the question of how to protect these blood vessels is a hot topic among dialysis specialists. The aim of the Fistula Catheter project was to develop a solution to this problem. The nine project partners included medical device makers, plastic component manufacturers, university hospitals and research centres in five countries.


Asked what he thinks the device's impact will be on Nordic Medcom's bottom line, Mr Puhasmägi replies: 'Enormous! We are a relatively small company and this is a big thing!'

Replacing hard with soft

'It's actually a very simple thing, and sometimes the simple things are the most important,' explains Project Coordinator Arne Puhasmägi of Swedish SME Nordic Medcom. The project team took the conventional stainless steel needle and covered it in a thin, plastic sheath. The needle is inserted into the arm, taking the soft material with it. The needle is then removed, leaving the soft part of the device behind.

In other words, the needle is only in the patient's arm for a few seconds per week, down from 12 hours a week normally. The soft structure left behind when the needle is taken out does no damage to the blood vessels and is able to cope with the large flows of blood involved in dialysis.

The project partners came up with 15 different designs for their device and asked



nurses in Sweden, Holland, Finland and Italy for their opinions on the ideas. Based on their feedback, the researchers put together a prototype device and went back to the nurses. This time, the nurses gave the new product, now dubbed the FistulaCath, the thumbs up.

There are other products on the market that are based on the same principle as the FistulaCath, i.e. replacing the hard needle with a softer material. However, sales of these products remain low because they entail changes in the dialysis process, are unpopular with nurses and often hurt the patients.

In contrast, the FistulaCath product has proved popular among nurses and because it works in a similar way to the systems they currently use, they will not require extensive retraining to use it.

Seal of approval

Once the device has official approval from the relevant authorities, the project partners will launch a small-scale trial involving around 200 patients. If all goes well, a further, larger trial will be organised involving patients in a number of centres.

The project partners hope to launch the FistulaCath in the not too distant future at major medical trade fairs and conferences in Europe and the US.

Once on the market, the devices will be sold for around EUR 2 each. Given that most dialysis patients receive treatment three times a week, and each session requires the use of two devices, Mr Puhasmägi estimates that the world market for the FistulaCath could reach 384 million products annually. A number of hospitals and clinics are already eagerly awaiting the launch of the device.

Nordic Medcom owns the intellectual property rights for the FistulaCath, and will draw on its existing market channels to promote the device. 'Since we are selling dialysis products today, we will sell it in our area and we can use our suppliers to sell in their respective countries,' says Mr Puhasmägi. Meanwhile the other SMEs involved in the project will have selling rights for the device in their own countries.

Asked what he thinks the device's impact will be on Nordic Medcom's bottom line, Mr Puhasmägi replies: 'Enormous! We are a relatively small company and this is a big thing!'

Healthcare systems will also benefit from the device; currently, hospitals spend around EUR 16 000 per patient per year on maintaining access to the blood vessels in the arm, and the new device will reduce these costs significantly.

Finally, dialysis patients can look forward to less painful treatments and fewer operations on their arms.



Acronym:	Fistula Catheter
Full Title:	New Technology for Haemodialysis
Contract number:	16909
Call:	FP6-2003-SME-1
Starting Date:	01/09/2005
Duration (months):	30
Total cost:	€ 1 115 000
EC Contribution:	€ 577 500

Contact Person:	Arne Puhasmägi
	Nordic Medcom AB
E-mail:	ap@nordicmedcom.se
Tel.	+46 33228858

Partners:

- 1 Nordic Medcom AB (SE)
- 2 Berco SpA (IT)
- 3 Dirinco B.V. (NL)
- 4 Oy Carbonex AB (FI)
- 5 Västra Götalands Läns Landsting Sahlgrenska Universitetssjukhuset (SE)
- 6 IFP Research AB (SE)
- 7 Innovation Team Sweden AB (SE)
- 8 Institutet for Produktudvikling (DK)
- 9 Stiftelsen Chalmers Industriteknik (SE)

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ION speeds up drug development



A new system to speed up the development of drugs for certain neurological disorders is the result of the ION project. The new knowledge generated during the project has already helped the SMEs (small and medium-sized enterprises) involved to improve their products and services and identify potential new drug candidates.

The project team is now planning to develop the system further so that it can be commercialised, allowing the partners to tap into the valuable global market for such systems.

In the longer term, the project could significantly boost the competitiveness of Europe's pharmaceutical industry. Finally, patients worldwide will benefit if the drug discovery process can be accelerated.

Ion channels – portals to the cell

Ion channels are special pores in cell membranes that allow charged particles called ions in and out of the cell. Defects in ion channels cause a range of health problems, including common neurological and psychiatric disorders such as depression, Parkinson's disease, epilepsy, migraine and pain.

Developing drugs to treat these conditions is a long, slow, expensive process. The first step of drug development entails screening hundreds of candidate molecules to see if any of them interact with ion channels and so could be used therapeutically.

The aim of the ION project was to develop an innovative, integrated system to speed up this process by improving the electrophysiology equipment used to test the drugs and linking it up with intelligent software designed to provide a rapid analysis of the screening test results and guidance for the next round of testing.

The project brought together nine research organisations and SMEs in five countries. The SMEs brought to the table expertise in drug research and development, chemistry, the production of screening equipment and software development. The research organisations specialise in medicine, pharmacology, brain diseases and neurology, as well as artificial intelligence.

'The ION project achievements may represent a European solution capable of increasing European competitiveness in this important but highly specialised field.'

The result is a prototype system that offers significant advantages over other systems. Firstly, ION's system draws on a carefully designed library of molecular structures and has easy access to a large set of drug targets. Secondly, experimental data is analysed by sophisticated software that aids in the planning of subsequent experiments in the drug screening process.

At the system's core is an electrophysiological platform that measures the activity of ion channels in cells to see if they are affected by the molecules being screened. Previously, the technology used two electrodes to measure changes in the current across the membrane. A major innovation of the ION project was to simplify the process so that it now uses just one electrode. The German SME that makes the IONEP platform has

<http://www.ion-project.net>

already incorporated this improvement into its products, making it one of the most competitive electrophysiological platforms available on the market.

The ION project also developed a Target Library, which provides detailed information on the ion channels which could be targeted by drugs to treat conditions such as Parkinson's, depression and pain. Among other things, the library contains information on how the channels behave both in the laboratory and in the body (*in vivo*).

Another project outcome is the Chemical Library. This is a collection of chemical structures which are known to interact pharmacologically with the ion channels featured in the target library. These libraries are already being used by the pharmaceutical companies involved in the project in their quest to find and patent molecules that could one day form the basis of new medicines.

The project partners also designed the 'ION Sequential Screening Software', a computer programme that is able to estimate how a given chemical structure could interact with a specified ion channel target. In this way, it helps pharmaceutical companies set their priorities for the synthesis of new potential drug compounds and plan their experiments accordingly.

The Romanian SME that developed the software has the relevant intellectual property rights, an asset which is likely to be extremely valuable when the ION system is fully commercialised.

All of these components are integrated into the ION Sequential Screening System. The

prototype system uses data interchange software modules which can be operated through a common interface. 'Usually the machine just sends out numbers, but we wanted to create some software that takes the data, interprets it and generates a dose response curve,' explains Project Manager Carla Caccia of Italian SME Newron. 'It is not just an analysis of data but a kind of artificial intelligence that interprets the information and gives guidelines and suggestions for the next round of screening.'

The different components of the system can all be commercialised separately, and in some cases this has already happened. Meanwhile, the project partners are looking for funding to refine and commercialise the entire system. According to the ION team, the global value of the electrophysiology platform market is worth some EUR 268.75 million. The ION partners hope that once commercialised, the improved IONEP platform and the fully integrated ION Sequential Screening System could capture just 8% of this market, worth EUR 21.5 million.

'The ION project achievements may represent a European solution capable of increasing European competitiveness in this important but highly specialised field, if further developed,' commented Newron's Patricia Salvati, the ION Project Coordinator.

'The ION project shares the objectives of a number of EU policies, and in particular to speed up the discovery of new drugs in neurological and psychiatric disorders that affect millions of EU citizens,' added Dr Caccia. 'Faster drug screening processes will contribute to both public health and social policy.'



Acronym: **ION**
Full Title: **A Sequential High-Throughput Ion Channel Screening System for Drug Discovery in Neurological and Psychiatric Disorders**
Contract number: **513190**
Call: **FP6-2002-SME-1**
Starting Date: **16/09/2004**
Duration (months): **24**
Total cost: **€ 1 744 920**
EC Contribution: **€ 1 280 000**

Contact Person: **Carla Caccia**
Newron Pharmaceuticals SpA
E-mail: **carla.caccia@newron.com**
Tel. **+39 0261034663**

Partners:

- 1 Newron Pharmaceuticals SpA (IT)
- 2 Multi Channel Systems MCS GmbH (DE)
- 3 SC IT Romania ITR Srl (RO)
- 4 Nikem Research Srl (IT)
- 5 University of Debrecen (HU)
- 6 Università Degli Studi Di Firenze (IT)
- 7 Institute of Pharmacology,
Polish Academy of Sciences (PL)
- 8 Istituto Di Recerche Farmacologiche
'Mario Negri' (IT)
- 9 Politecnico Di Milano (IT)

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ISSEA puts car manufacturers on the road to success



SMEs (small and medium-sized enterprises) play an important role in the car industry by putting together the steering and suspension sub-modules that make up our vehicles.

The ISSEA project helped European SMEs working in this competitive sector to develop cheaper and better products, giving them a significant advantage over companies elsewhere in the world.

One of the world's leading car manufacturers is already using the sub-module designed by the project. Thanks to ISSEA, the project partners have seen their costs fall and turnover and sales increase dramatically.

The Project Coordinator, Sergio Deike of Spanish SME Plásticos Dúrex is extremely happy with the outcomes of the project. 'It is more than we hoped,' he said simply.

Keeping Europe ahead of the rest

Europe has a long and proud history of producing and assembling top quality sub-modules for the car industry. However, increasing competition from the rest of the world, especially China and south Asia, means that European companies must develop new technologies and more efficient ways of working if they are to maintain their status as world leaders in the fast changing, competitive car industry.

Before ISSEA came along, producing the steering and suspension sub-modules involved many steps. First, the separate components of the module were produced. These were then treated separately to prevent corrosion before being joined together with traditional methods such as screws and adhesives. The entire process involves many steps and the end product often has 'corrosion hotspots' which shorten its lifetime.

The ISSEA project aimed to tackle the problems in the production process, and give a boost to European SMEs. The project partners included six SMEs specialised in fields as diverse as the production of the components of a car chassis, the use of lasers in manufacturing, the development of corrosion protection treatments and the development of press tools and moulds.

The four research institutes involved in the project brought expertise in metals

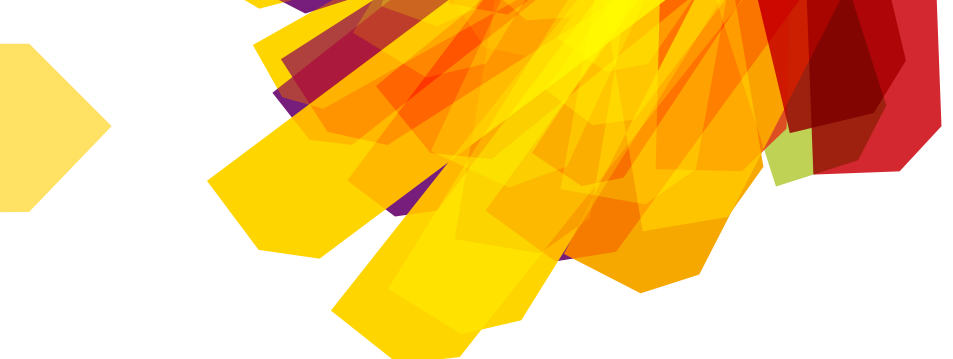
The techniques developed in the project have already helped the project partners to save money and significantly boost their turnover.

and ceramics, automotive research, microelectronics, advanced materials and laser welding techniques.

Faster, cheaper, lighter, stronger

Together, the ISSEA team members succeeded in reducing the number of steps involved in the production of the sub-module and improving the quality of the end product. The project partners used modern materials such as high-strength low-alloy steel to produce the components of the sub-module. This provides the end product with increased strength while reducing both weight and costs.

To join the components together, the project partners turned to laser welding techniques. Laser welding allows parts to



be joined together extremely accurately and contributes to the strength of the end product. Finally, the entire sub-module undergoes a specially developed anti-corrosion treatment that is compatible with the different materials (steel, rubber and thermoplastics) that make up the sub-module.

This method also has the advantage of requiring lower temperatures (under 100°C) than other anti-corrosion techniques and being environmentally friendly, as it does not involve volatile organic chemicals or heavy metals like chromium, zinc or nickel.

The prototype device developed by the ISSEA partners is of a higher quality than alternatives on the market and is also both cheaper and lighter.

Early successes

Car manufacturers are notoriously cautious about incorporating new processes into their vehicles. Nevertheless, one leading auto maker is already trialling the new sub-module on a small scale to see how it performs. According to Mr Deike, so far everything is going OK and 'they are very happy with it'. The rest of the vehicle industry is following the trial's progress with interest.

The next step for the ISSEA project partners is to set up a legal structure and obtain the funding necessary to really speed up production of the sub-module so that it can be commercialised on a bigger scale.

'Now it is time to push it commercially,' commented Mr Deike. 'I am confident that we will get it.'

Big benefits for the project partners

The techniques developed in the project have already helped the project partners to save money and significantly boost their turnover. For example, the new technique for coating metal parts is saving Plásticos Dúrex EUR 165 000 per year. This includes EUR 75 000 saved because the new technique does not require parts to be cleaned before treatment.

Furthermore, sales are up by over 10%, and the company's turnover is expected to rise by EUR 3 million in just 3 years – not bad for a company whose total turnover is just EUR 10 million.

Other companies in the consortium have also made significant savings and seen their turnover increase thanks to the technologies developed by the project.

Another benefit for the SMEs is the close relationship they now have with each other and the research institutes involved in the project. These new partnerships will help the companies involved to share new ideas and expertise, and investigate new technologies that could be used to develop their products further.



Acronym:	ISSEA
Full Title:	Integration of the Security Sub-Modules Elements in the Automotive Industry
Contract number:	508097
Call:	FP6-2002-SME-1
Starting Date:	01/11/2004
Duration (months):	18
Total cost:	€ 1 493 189
EC Contribution:	€ 746 494
Contact Person:	Sergio Deike Plásticos Dúrex S.A.
E-mail:	sergio.deike@plasticosdurex.com
Tel.	+34 923190360

Partners:

- 1 Plásticos Dúrex S.A. (ES)
- 2 Teknia Dej (ES)
- 3 Tecni Sata Industria Metalomecanica Lda (PT)
- 4 Autoforese, Protecão Anti -Corosiva Lda (PT)
- 5 Poeton Industries Ltd (UK)
- 6 Micrometric Techniques Ltd (UK)
- 7 Fundación para la Investigación y Desarrollo en Automoción (ES)
- 8 Lulea Tekniska Universitet (SE)
- 9 Centro Sviluppo Materiali SpA (IT)
- 10 Instituto Superior Tecnico (PT)

© Pictures ISSEA
Recto: Headquarters of Plásticos Dúrex
Verso: Various rubber and plastic products

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MULTIWAVE: One laser – lots of channels



High bandwidth communication via optical fibres is set to get easier thanks to a new device developed by the MULTIWAVE project. Currently, sending multiple channels down a single fibre requires multiple lasers. The MULTIWAVE device achieves the same result with just one laser.

The prototype device has been presented at trade fairs and conferences around the world, and aroused the interest of telecommunications companies as well as researchers whose work involves lasers. The project partners are optimistic that the device will be available on the market in just a few years time.

Meanwhile, working on MULTIWAVE has helped the SMEs (small and medium-sized enterprises) involved in the project to improve their products and so increase their sales. The project also gave them the opportunity to strengthen their links with both commercial and research partners across Europe.

Shine a light!

The growth in communications means there is an urgent need for new and more efficient ways of transmitting data. In fibre-optic communications, it is possible to send signals from lots of different laser diodes down one single fibre. 'The basic idea is that you take the light of the different colours and put it into one fibre,' explains project coordinator Thomas Südmeyer of the Swiss Federal Institute of Technology. 'Because it takes quite a lot of money to have a fibre link from Europe to the US, for example, you want to transmit as much data as you can through it.'

Setting up and maintaining such a system is extremely expensive. They comprise large banks of lasers, with each individual laser source emitting a different wavelength; each wavelength corresponds to a channel. Each diode requires its own drive electronics and current and temperature controls. If additional channels are needed, more diodes must be added to the system. Furthermore, backup diodes are needed to replace those that stop working.

'The idea for the MULTIWAVE system is to get rid of all these different individual lasers and replace them with one laser system that generates all the different wavelengths at the same time,' says Dr Südmeyer.

The project brought together four SMEs and two research institutes from five European countries. Between them, the SMEs supply

Working on MULTIWAVE has helped the SMEs involved in the project to improve their products and so increase their sales.

most of the components needed for the MULTIWAVE device, including the pulsed laser, special photonic crystal fibres, specialised mirrors and a complex device that filters out unwanted wavelengths. For their part, the research institutions contributed expertise in pulsed laser technology development and telecommunications systems testing and development.

Over the course of the project, the partners improved the various components of the device and added new features to them before putting them together to create the MULTIWAVE device.

So how does it work?

'We start off with a pulsed laser,' explains Kurt Weingarten of Swiss SME Time-Bandwidth. 'If you have pulses coming out of a laser at a certain repetition rate, say 25GHz, it turns out that 25GHz pulses correspond to a bunch of individual channels in the wavelength space.'

Normally, the pulsed laser would only generate a limited number of channels in this way. However, sending the pulsed laser down photonic crystal fibres that have unusual optical properties creates far more channels. 'If we do it right, we can basically create enough channels to fill the whole communications range,' adds Dr Weingarten.

Tests revealed that the MULTIWAVE device can transmit data as efficiently and accurately as other systems used today for data transmission and testing applications.

Looking to the future

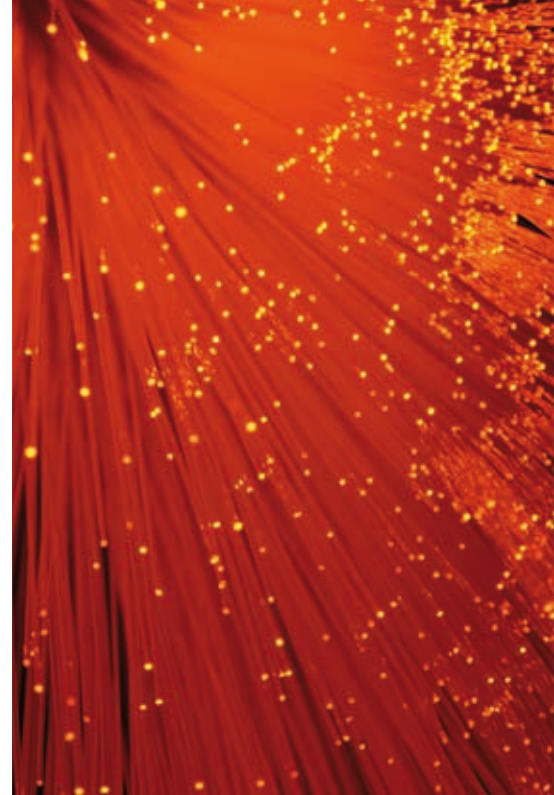
The various components that make up the device and are made by the project partners are protected with a range of patents. The device itself requires some further refinements before it can be fully commercialised, but the project partners are optimistic that it will be ready for sale in the next few years. If successful, the market for the device could be quite large.

Meanwhile the project team has been busy presenting the new device at trade fairs and conferences around the world. It has generated high levels of interest, mostly from the manufacturers of telecommunications equipment and people in engineering departments.

Even though the MULTIWAVE device is not on sale, the companies that created it are already benefitting from their involvement in the project. For example, Time-Bandwidth has improved the performance of its pulsed laser. The upgraded device is proving a hit with the researchers who have bought it. 'We're getting feedback that it's the best pulsed laser system they've ever worked with!' exclaims Dr Weingarten.

Elsewhere in the project, new features were added to the crystal fibres and the miniaturised mirrors and special filters were perfected through the project.

Dr Weingarten also highlighted know-how transfer and networking as additional benefits of working on the project. 'It was a good project and we're happy to have been involved in it. We got to know some really good leading groups and companies,' he comments. 'It helped pull us into the EU scene and get us more networked with other companies and institutes around the EU.'



Acronym:	MULTIWAVE
Full Title:	Cost-Effective Multi-Wavelength Laser System
Contract number:	18074
Call:	FP6-2003-SME-1
Starting Date:	01/11/2005
Duration (months):	24
Total cost:	€ 2 087 499
EC Contribution:	€ 1 490 608

Contact Person: **Thomas Südmeyer**
Eidgenössische Technische Hochschule Zürich
E-mail: **sudmeyer@phys.ethz.ch**
Tel. **+41 446336825**

Partners:

- 1 Eidgenössische Technische Hochschule Zürich (CH)
- 2 Institute of Communication and Computer Systems of the National Technical University of Athens (EL)
- 3 Time-Bandwidth Products Inc. (CH)
- 4 Photon Laseroptik GmbH (DE)
- 5 Crystal Fibre A/S (DK)
- 6 SLS Optics Ltd (UK)



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NAGINELS marks a revolution in laser engraving technology



An innovative laser marking system developed by the NAGINELS ('Non aggressive internal engraving laser system') project is set to strengthen efforts to enhance traceability and tackle counterfeiting in the pharmaceutical, perfume and luxury goods sectors.

The NAGINELS technology uses lasers to embed marks or codes inside glass and other transparent materials. Because the mark is inside the glass, it cannot be removed or altered. Large, easily visible designs could help a customer determine whether a bottle of perfume is the genuine article or a fake, for example. Smaller designs, invisible to the naked eye, could be viewed with a special reader for traceability purposes.

The six small and medium-sized enterprises (SMEs) involved in the project have set up a new company, called Trackinside, to develop and commercialise the patented technology. Interest in the NAGINELS system is high, and products marked with the exciting new technology should be on sale soon.

At the same time, the SMEs are working on a further project with the aim of speeding up the process, so that it can be integrated into production lines more easily.

A new weapon to combat counterfeiters

Counterfeiting is a major problem across a wide range of sectors. In 2007, 79 million counterfeit products, including clothes, jewellery and watches, cosmetics, medicines, toys and foods were seized at EU borders. Naturally, the manufacturers of the genuine versions of these items are keen to exploit novel methods to help both consumers and customs officials spot the difference between genuine products and copies.

At the same time, many sectors, including the pharmaceutical sector, are under growing pressure to improve the traceability of their products, from the start of the production line to the moment of purchase.

NAGINELS offers a solution to both of these problems. The idea of using lasers to mark the interior of a piece of glass is not new; however, until NAGINELS came along, it was impossible to mark thinner pieces of glass such as syringes or perfume bottles. This is because the lasers generated microcracks in the glass that quickly led to breakages.

The NAGINELS project brought together six SMEs and two research institutes in four countries. The SMEs include companies that make lasers and optical devices as well as businesses involved in traceability and anti-counterfeiting work in the pharmaceutical, perfume and luxury goods sectors.

The NAGINELS team has patented the unique technology and set up a new company called Trackinside, which is devoted to developing and commercialising the new technology

Together, they developed a laser marking system that uses femtosecond lasers.

These emit much briefer pulses of light than traditional lasers; the pulse lasts long enough to mark the material, but not long enough to heat it up and create damaging cracks. In this way, the laser creates marks which, when backlit, look like holograms.

The NAGINELS system can create tiny data matrices just 0.1mm by 0.1mm; these are invisible to the naked eye but can be read with special scanners. These marks act like barcodes and can be used to track an item through the production process.

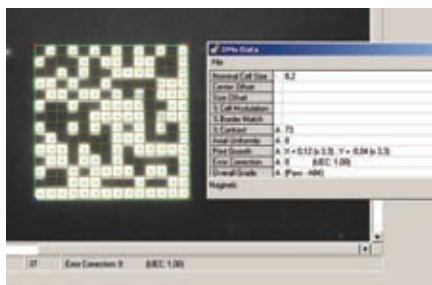


These marks could also be used to tell customs officials that an item is genuine. As they are too small to be seen with the naked eye, they do not detract from the product's attractiveness.

The system is extremely versatile, and can also be programmed to draw logos in the glass. These marks in a perfume bottle or the glass of a watch face could indicate to a customer that the product they are looking at is genuine.

Ready for the off!

The NAGINELS team has patented the unique technology and the SMEs have clubbed together to set up a new company called Trackinside, which is devoted to developing and commercialising the new technology. As shareholders, the SMEs will be the first to benefit when the NAGINELS device starts rolling off the production line. They are also closely involved in the production process.



The device can either be sold on its own or integrated into a production line. The project has generated a lot of interest from the three target sectors, with syringe manufacturers, perfume makers and designer watch makers all keen to see how the system can help them.

The first sales of the system are imminent, and the first products marked with the NAGINELS technology are likely to be on sale in the not too distant future.

However, the NAGINELS team is not resting on its laurels; even as the first version of the device enters the market, they are carrying out further research with the aim of speeding up the engraving process by a factor of 10. The project partners expect the development of this upgraded version of the system to be ready in a couple of years.

Counterfeiting costs European businesses a lot of money; with the NAGINELS system, all industries that package their goods in glass have at their disposal a tool to differentiate their products from fakes. Similarly, European consumers will be in a better position to ensure that when they decide to treat themselves to a new bottle of perfume or an expensive new watch, they're getting the real McCoy, and not a poor imitation.



Acronym:	NAGINELS
Full Title:	Non Aggressive Internal Engraving Laser System
Contract number:	512931
Call:	FP6-2002-SME-1
Starting Date:	01/10/2004
Duration (months):	25
Total cost:	€ 1 359 965
EC Contribution:	€ 735 345

Contact Person:	Axel Kupisiewicz Trackinside S.A.
E-mail:	info@naginel.com
Tel.	+32 43650243

The Naginels® technology is now presented at
<http://www.trackinside.com>

Partners:

- 1 KST - KS Techniques S.A. (BE)
- 2 TBS - Total Brand Security Ltd (UK)
- 3 COSTET S.A. (FR)
- 4 SOLOS - Solos Identificazione e Protezione S.R.L (IT)
- 5 Amplitude Systèmes S.A. (FR)
- 6 LASEA - Laser Engineering Applications (BE)
- 7 Université Bordeaux I - PALA (BE)
- 8 Université de Liège - Centre Spatial de Liege (BE)

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Recto: Datamatrix written in a syringe
Verso: Readed code with grade A quality

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French PARADOX pumps up profits for SMEs



France is famous for its rich food, yet rates of heart disease in the country are among the lowest in Europe. The key to this 'French Paradox' is red wine. Red wine contains high levels of antioxidants, which help to stave off an array of diseases, including heart disease and cancer.

Now the PARADOX project has turned the essence of the French Paradox into a stable food additive that can be easily added to a wide range of foods and drinks without affecting their flavour or texture in any way. The technology used to create the red wine extract has also been adapted to produce fish oil extracts and iron salt supplements.

PARADOX has been a major success for GAT Microencapsulation, which coordinated the project. Its sales are up by over 50%, and the number of employees at the Austrian SME (small and medium-sized enterprise) tripled in just three years. The other project partners have also benefited from their involvement in PARADOX in a number of ways.

Why is wine good for you?

Red wine owes its reputation as a health drink to the fact that it is packed with powerful antioxidants such as polyphenols. These amazing molecules help to prevent heart disease and stroke by keeping blood pressure and cholesterol levels down.

They also destroy DNA-damaging free radicals, boost the immune system and help to prevent a range of cancers as well as neurodegenerative diseases such as Alzheimer's.

So why not confer the health-giving properties of red wine on other foods and drinks by simply adding red wine extracts to them? Unfortunately, production processes and time both take their toll on antioxidants, so the final product would probably contain very low levels of active antioxidant.

The aim of the PARADOX project was to develop a novel, stable food additive that captures the health-giving properties of red wine and survives the rigours of production processes and lengthy periods of shelf life to deliver health-giving, active antioxidants to the consumer.


The project brought together 16 partners in 9 EU Member States, including grape farmers, research organisations, food manufacturers and companies involved in the distribution of functional foods.

PARADOX has been a major success for GAT Microencapsulation, which coordinated the project. Its sales are up by over 50%, and the number of employees at the Austrian SME (small and medium-sized enterprise) tripled in just three years. The other project partners have also benefited from their involvement in PARADOX in a number of ways.

A new twist on an old technology

The project coordinators at GAT Microencapsulation had already developed a special microencapsulation technique for agricultural products. With the help of their partners in the PARADOX project, they succeeded in transferring this technology to the functional food sector.

First the red grape extract is obtained from grape pomace, a waste product of the wine



industry. The extract is then enclosed by a patented process in tiny capsules just a fraction of a millimetre in diameter. A shell of natural polymers protects the precious extract from heat, light, pressure and oxygen both during the production process and throughout the product's shelf life.

In fact the capsule stays intact until it is consumed, when the acids in the consumer's stomach dissolve the outer layer of the microcapsule to release the powerful antioxidant products within.

The Paradox capsules are delivered in liquid form, meaning they can be added to any product that involves liquid ingredients, such as yoghurts, breads, biscuits and pâtés. It can even be added to the brines used to cure meats such as hams. Crucially, they do not affect the flavour or texture of the final product in any way.

During the project, clinical trials were carried out in which volunteers drank orange juice containing PARADOX microcapsules every day for two weeks. By the end of the period, the volunteers were found to have higher levels of antioxidants in their blood.

The PARADOX microcapsules are now available commercially and have been added to a wide range of products on sale across Europe and beyond. Meanwhile the project partners have adapted the technology to encapsulate fish oils and iron salts. The health benefits of fish oils are well known; among other things, the omega 3 fatty acids they contain help to lower cholesterol and reduce the risk of heart disease. Like antioxidants, these products quickly break down inside the food without the protection offered by the microencapsulation technology.

Minerals such as iron are a vital part of a healthy diet, yet adding minerals directly to foods often affects the food's colour, taste and texture. Microencapsulation neatly gets round this problem.

Selling these products has given GAT Microencapsulation's profits a major boost, and helped it to triple its workforce. For the moment, they are concentrating their efforts on increasing sales of the three existing products, but in the longer term, there is no limit to the kinds of health-giving molecules and compounds that could be encapsulated in this way and added to ordinary foods and drinks.

Meanwhile the other project partners have also benefited from their involvement in PARADOX. For example, the grape farmers are now able to sell the grape pomace, albeit for a relatively low price, to the companies that make the extract; before the project, this substance was simply thrown away.

The partners from the functional foods distribution industry gained useful contacts while visiting companies to sell Paradox.

Looking to the future, the functional foods market is predicted to grow steadily over the coming years, and is expected to be worth over EUR 400 million by 2014. With technology that guarantees delivery of an active, stable product to the consumer, the Paradox partners can expect to capture a good share of this growing market.



Acronym:	PARADOX
Full Title:	French PARADOX – Red Wine Extract Food Additives
Contract number:	508649
Call:	FP6-2002-SME-1
Starting Date:	15/02/2004
Duration (months):	24
Total cost:	€ 1 373 038
EC Contribution:	€ 200 911
Contact Person:	Barbara Gimeno GAT Microencapsulation AG
E-mail:	bg@microencapsulation.at
Tel.	+43 262453922/0

Partners:

- 1 GAT Microencapsulation AG (AT)
- 2 Bodgas Roda S.A. (ES)
- 3 M. Chapoutier (FR)
- 4 Heinrich Johan U Mitges (AT)
- 5 Matjaz Lemut (SI)
- 6 Vinceller Mnps Kkt (HU)
- 7 Cins Center za Izolacijo Naravnih Substanc d.o.o. (SI)
- 8 Natex Prozestechnologie GmbH (AT)
- 9 Chiroblock (DE)
- 10 Barentz Campi y Jové S.L. (ES)
- 11 Valmar S.A. (FR)
- 12 Kuk -Handelsgesellschaft M.B.H. (AT)
- 13 Atys -Austria GmbH (AT)
- 14 Queen Mary and Westfield College -
University of London (UK)
- 15 Experimental and Clinical Pathology and
Medicine, University of Udine (IT)
- 16 University of Crete, School of Medicine (EL)

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PIPESCAN – Pipe inspections just got easier!



Millions of kilometres of pipeline criss-cross Europe. Many of these pipes carry hazardous substances such as oil and certain chemicals, and checking them for cracks and corrosion is both difficult and extremely expensive. Now, a range of new technologies developed by the PIPESCAN project is helping to make inspections more effective while significantly bringing down costs.

The project has been immensely successful. The PIPESCAN technologies are now widely used commercially, and other, unforeseen applications of the technologies are helping to boost profits for the organisations involved still further. Meanwhile, new pipelines are continuously being laid, and the fines for companies whose pipelines leak are getting higher, so the demand for low cost, reliable pipe inspection techniques is set to remain high for years to come.

What's more, the small and medium-sized enterprises (SMEs) and research organisations in the consortium are now doing a lot of business with each other in a range of areas, to the mutual benefit of all involved. On the research front, the partners have continued to work closely together and are actively involved in a number of other EU-funded projects.

An expensive problem

Millions of kilometres of pipeline transport oil, gas and other hazardous substances such as solvents and acids, sometimes at high temperatures and pressures, across Europe. These pipes are prone to cracks and corrosion.

To prevent this, the pipes are often coated with substances such as concrete. However, if the coating is not applied properly, water can still get in and cause corrosion.

'So now you've got a double problem – you've got corrosion but you can't see it because it's under insulation,' explained Project Coordinator Aamir Khalid of industrial research organisation TWI in the UK.

The stakes are high. Left undetected, cracks and corrosion permit hazardous substances to leak out into the environment, where they could endanger the health of wildlife and humans alike. If leaks occur, the companies in charge of the pipeline face huge fines.

Before PIPESCAN came along, inspecting the pipes for corrosion entailed removing the insulating coating, checking the pipe for damage and replacing the coating.

Doing this along the entire length of the pipeline is prohibitively expensive, so small sections were checked and the results were extrapolated to the rest of the pipe. However, even testing small sections of the pipe was expensive, and the system did not pick up on damage in unchecked sections of pipe.

The PIPESCAN technologies are now widely used commercially, and other, unforeseen applications of the technologies are helping to boost profits for the organisations involved still further.

The aim of the PIPESCAN project was to develop novel, more effective inspection techniques that would work through the coating, as removing and then replacing the coating is the most expensive part of the operation.

The project brought together 12 partners in 4 countries. They include SMEs that manufacture inspection systems, research organisations, companies which own pipelines and a national public authority responsible for the safety of industrial plants.

One problem – lots of solutions

The PIPESCAN project worked on a number of systems for inspecting pipes. One system uses a guided wave system. This involves removing a small section of insulation and

sending a low frequency ultrasonic wave 50 metres down the pipe in both directions. This system therefore permits inspectors to test 100 metres of pipe while removing insulation from just 1 metre. The guided wave system is now commercially available and sales for the company that supplies it are up.

Another system developed by the project is called Alternating Current Field Measurement (ACFM). If you create a magnetic field near a sample, they interact with one another in a certain way, and cracks interfere with the magnetic field. ACFM detects this interference and enables the inspector to gauge the size and location of the damage.

The PIPESCAN project increased the range of ACFM devices so that they could detect corrosion through 10mm to 20mm of insulation (previously their range was barely 2mm). This means that pipes can be inspected without removing the coating at all, thereby dramatically saving on inspection costs.

Although ACFM has been successfully applied to detect damage to insulated pipelines on land, it is now mainly used in the offshore market to aid in the inspection of underwater pipes. Over time, these pipes quickly become covered in a layer of marine life consisting of algae, barnacles and other creatures.

Inspectors used to have to clean the pipes before checking them for damage. Just as the upgraded ACFM can detect damage through a layer of insulation, so it can also be used to inspect pipes through a layer of marine fouling. This unforeseen application has proved to be extremely profitable for the company that makes the ACFM devices.

A third technology developed by PIPESCAN involves the use of a so-called 'low frequency pulse eddy system'. 'This is a very specialised technique,' said Diego Florez, CEO of project partner TecniTest in Spain. 'We now know much more about it and how to use it.' In addition to inspecting pipes, the technology has also proven effective at inspecting ships' hulls.

Side benefits

PIPESCAN has clearly brought direct benefits to the SMEs involved through the sale of the novel inspection technologies developed through the project.

For example, many of the partners are now selling products and services to the other companies involved in the project. The experience has also inspired the SMEs to embark on further collaborative research projects, both at European and national level. Finally, many friendships were forged through the project.

'Anything to do with pipes is going to be a major subject now,' Dr Khalid stated confidently. 'New pipes are being laid and more fines are being levied on oil companies that allow pollution to occur, so I think the whole area of the inspection of pipelines is only going to increase and some of these companies are doing very well out of this.'



Fig. 1



Fig. 2

Acronym:	PIPESCAN
Full Title:	Development of Systems for the Inspection of Metal Pipelines Buried Underground, in Concrete, in Water or Covered with Coatings
Contract number:	508614
Call:	FP6-2002-SME-1
Starting Date:	01/04/2004
Duration (months):	30
Total cost:	€ 1 999 024
EC Contribution:	€ 1 035 722
Contact Person:	Aamir Khalid TWI Ltd
E-mail:	aamir.khalid@twi.co.uk
Tel.	+44 (0)1223899000

Partners:

- 1 Coaxial Power Systems Ltd (UK)
- 2 TecniTest Ingenieros SL (ES)
- 3 Innospexion APS (DK)
- 4 Technical Software Consultants Ltd (UK)
- 5 Zenon S.A. Robotics And Informatics (EL)
- 6 Spree Engineering Ltd (UK)
- 7 Total E&P UK Ltd (UK)
- 8 Ideasis EPE (EL)
- 9 Health and Safety Executive (UK)
- 10 TWI Ltd (UK)
- 11 Kingston Computer Consultancy Ltd (UK)
- 12 Miltech Hellas S.A. (EL)
- 13 Kaneb Terminals Ltd (UK)

Pictures

Recto: © Shutterstock, 2009

Verso: © Fig. 1. Dr John Rudlin with a representative of the End User on field trials installing the radiography system, and Fig. 2. New Type of easily deployable probe mount for Guided Waves

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RASPED – Safer hip replacements

Thousands of Europeans undergo hip replacement surgery every year. Now a new surgical device developed by the RASPED project ('Reverberating Abrasive Single-use Piezo Electric Driven Device') is set to reduce the risks of infections and other complications linked to surgery. This is good news for the SMEs (small and medium-sized enterprises) who make the device, and for the patients who will avoid the pain associated with complications.

Since the end of the project, the prototype device has undergone numerous tests to prove its safety and to demonstrate that, in addition to reducing the complication rate, it performs as well as, if not better than, the tools which are currently in use. The project partners hope to begin selling the device commercially within a few years. In the long term, the tool could potentially be adapted for use in operations which require similar function.

Meanwhile, the project partners are already benefiting from their participation in RASPED; they are now working together on further projects, and the contacts made during the RASPED project have opened up new business opportunities.

A common operation

The hip is simply a ball and socket joint, with the head of the femur (the thigh bone) fitting neatly into the cup-shaped acetabulum in the pelvis. In a healthy hip, a cartilage coating ensures that the joint moves smoothly and without pain. Over time, arthritis can cause this layer of cartilage to wear away, leading to painful and restricted movement.

Approximately 700 000 people have hip replacements in Europe every year. During the operation, the surgeon removes the damaged head of the femur and hollows out the top section of the shaft of the bone; this creates a space for the stem which supports the replacement 'ball' of the joint. Next, the damaged tissue is reamed from the surface of the acetabulum, so that the hemispherical replacement socket can be implanted.

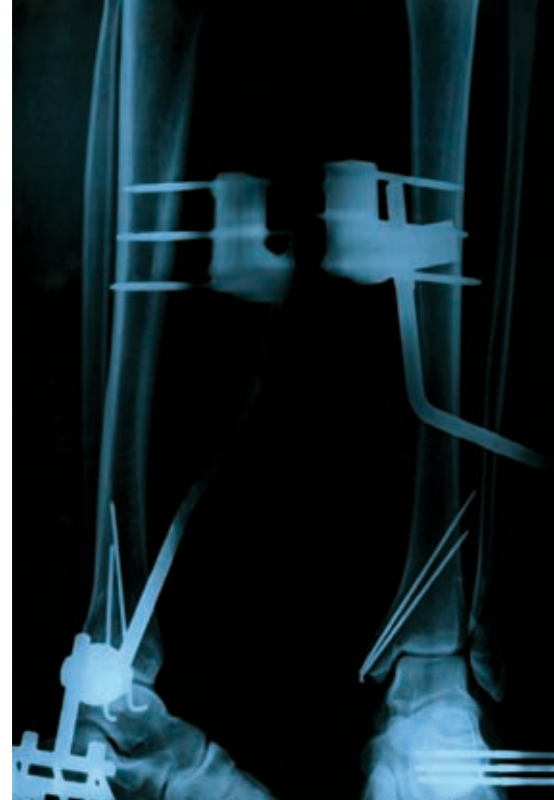
The hollow in the femur is created by repeatedly impacting a solid rasp against the bone. While effective, this procedure carries a number of risks. Firstly, the repetitive impacts can occasionally cause stress fractures in the femur. Although this is relatively uncommon, it can lead to lengthened recovery times, resulting in greater discomfort for the patient and a higher bill for the healthcare system.

As the rasps age they become less sharp, meaning that more impacts are needed and bone stress could be increased. Blunting can also cause considerable heating to the bone which may cause 'necrosis'; the killing of bone cells which are relied upon for fixation of the prosthesis.

Once on sale, it will no doubt increase sales for the companies involved in the RASPED project that will manufacture and distribute the product.

Additionally, re-usable devices can pose a serious contamination risk; certain pathogens are not always destroyed with conventional sterilisation techniques – although this type of cross-contamination is extremely rare, it does provide further argument for the use of disposable rasps.

The aim of the RASPED project was to develop a set of single-use devices which would avoid these problems. The project brought together 10 partners in 6 countries, including orthopaedic implant manufacturers, metal tooling experts, medical instrument makers, packagers and research organisations. These partners also worked closely with a panel of orthopaedic surgeons, who provided valuable advice throughout the project.



Safer surgery

The result of this project is a set of hollow rasps and reamers which, according to project coordinator, Dr Andy Taylor of British SME, Finsbury Orthopaedics, 'look like sophisticated cheese graters'. The devices are pressed from thin sheets of stainless steel. This not only saves costs compared to current devices, but pre-clinical tests suggest that the devices will work considerably better than the traditional devices currently used.

Crucially, while traditionally used worn rasps usually require 10 impacts to hollow out the top of the femur, the new rasp requires only 4. Measurements also showed that the new device's improved flexibility generated significantly lower strain in the bone. Both improvements mean that the risk of fractures is much lower with the RASPED device.

The rasp has received positive feedback from the panel of surgeons and it is hoped that the device could be on the market in a few years. Once on sale, it will no doubt increase sales for the companies involved in the RASPED project that will manufacture and distribute the product. The project partners aim to keep manufacturing costs down so that use of the disposable device will cost less than maintaining and sterilising traditional devices.

The RASPED device has the potential to save health systems considerable amounts of money. Healthcare systems are under growing pressure to keep costs down while continuing to improve patient outcomes. By eliminating the risks of infection from cross-contamination and reducing the incidence of complications such as stress fractures, the RASPED device will substantially reduce the costs of caring for patients who suffer complications and infections following hip replacement surgery, and will not compromise the quality of care given.

Finally, many patients will avoid the pain and suffering associated with complications and infections, greatly improving their quality of life. 'When this product comes to market, it will hold tremendous benefits for the patient,' stated Dr Taylor.

Acronym:	RASPED
Full Title:	Reverberating Abrasive Single-Use Piezo-Electric-Driven Device
Contract number:	513134
Call:	FP6-2002-SME-1
Starting Date:	01/11/2004
Duration (months):	27
Total cost:	€ 1 420 000
EC Contribution:	€ 734 479
Contact Person:	Andy Taylor Finsbury Instruments Ltd
E-mail:	andy.taylor@finsbury.org
Tel.	+44 (0) 1372360830

Partners:

- 1 Finsbury Instruments Ltd (UK)
- 2 Nisaform S.R.O. (CZ)
- 3 Incerplast S.A. (RO)
- 4 Hunt Developments Ltd (UK)
- 5 Cedrat Technologies S.A. (FR)
- 6 Bester Medical System Sp. z o.o. (PL)
- 7 Molnycke Health Care AB (SE)
- 8 Pera Innovation Ltd (UK)
- 9 Biomatech (FR)
- 10 University of Southampton (UK)

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STANLUB – One process, two green products

An economically viable process that turns a single plant-based oil into a lubricant and a solvent has been developed by the STANLUB project.

Most of the lubricants and solvents used today are based on petroleum products, whose extraction and use can be damaging to both human health and the environment. The process developed by STANLUB could help the SMEs (small and medium-sized enterprises) involved to tap into the growing demand for more environmentally friendly alternatives.

Many of the project partners are now working on a new project to further strengthen the position of European SMEs in the fledgling biolubricant market. Meanwhile the STANLUB SMEs are continuing to work together on new products, to the mutual benefit of all involved.

The SMEs will not be the only ones to benefit from the rise of biolubricants and solvents; farmers could benefit either by selling the plants to the SMEs or by becoming part owners of a company manufacturing these value added products.

From black oil to green oil

Lubricants are vital to the smooth running of machinery in a broad range of industrial sectors and applications. Currently, some 40 million tonnes of lubricant are used every year worldwide, and over 90% of this is produced from mineral oils. Extracting these oils from the earth causes serious damage to the local environment. Furthermore, around 30% of lubricants used by industry ends up in the environment, where it causes serious harm to wildlife and ecosystems.

Europe gets through around 5 million tonnes of solvents per year; like lubricants, most of these products come from the petrochemical industry. Solvents such as white spirit are widely used in the production of paints, for example. A major problem with solvents produced from mineral oils is the high levels of volatile organic compounds (VOCs) they emit. VOCs are damaging to human health and contribute to both the greenhouse effect and the destruction of the ozone layer.

Several pieces of EU legislation have been passed with the aim of reducing the impacts of lubricants and solvents on the environment, so companies that use these products are on the lookout for less damaging alternatives.

Lubricants and solvents based on vegetable oils offer a number of advantages over products produced using mineral oils.

‘Economically it is very interesting because in the same process you get two products which are valuable in different markets.’

Because they are made from plants, the environmental damage and pollution associated with oil extraction is avoided. In addition to this, plant-based oils are less toxic and contain lower levels of VOCs, rendering them less harmful to both humans and the environment. Finally, plant-based lubricants and solvents are highly biodegradable.

Yet despite their many advantages, ‘biolubricants’ make up just a tiny proportion (less than 5%) of the lubricant market. The aim of STANLUB was to develop an environmentally friendly, low-cost production process that could be used by SMEs to turn plant-based oils into lubricants and solvents.

The project brought together nine partners in four EU Member States. They included SMEs that make and use lubricants, paint manufacturers and research centres with expertise in developing and testing oils and oil-based products.



A new process...

The raw materials for the STANLUB process are polymerised oils based on linseed and rapeseed oils that are produced by Belgian SME and STANLUB project partner Vandeputte.

'We developed a new process leading to two co-products, one for the biosolvent market which is mainly for paint formulation, and the other for the biolubricant market,' explains Project Coordinator Carine Alfos of the French Institute for Fats and Oils (ITERG). 'Economically it is very interesting because in the same process you get two products which are valuable in different markets.'

The innovative process was refined and tested at the pilot scale. Technical tests covering a wide range of lubricant applications revealed that some of the STANLUB biolubricant formulations were particularly well suited to metalworking. Metalworking fluid is poured over the cutting edges of machines such as lathes and saws to keep them cool and to lubricate them. In fact, the STANLUB product performed better than some commercially available products on wear and friction tests. The STANLUB biolubricants could also be used in railway switches.

From the environmental point of view, the new biolubricants are not ecotoxic. However, they did not prove to be as biodegradable as the project partners had hoped.

On the biosolvent side, the products of the STANLUB process were formulated into aluminium pastes and decorative paints. Although these products were found to be similar to other 'green' solvents on the market, some problems remain (in particular regarding yellowing and the hardness of the coatings). Nevertheless, these results have helped the project partners to deepen their understanding of the production and drying processes involved.

...for a greener, cleaner future

Many of the STANLUB project partners are now working on a further EU-funded project which aims, among other things, to further improve the performance of biolubricants, decrease the costs of their production and promote their uptake in a range of applications.

Meanwhile, the contacts made during the project have helped to forge new business partnerships, thereby boosting the bottom line of the SMEs in the project.

Acronym: **STANLUB**
Full Title: **Development of New Bio-Lubricants and Coatings Using Stand Oils from Linseed, Castor and Tung Oils**
Contract number: **508753**
Call: **FP6-2002-SME-1**
Starting Date: **01/07/2004**
Duration (months): **27**
Total cost: **€ 648 796**
EC Contribution: **€ 335 573**

Contact Person: **Carine Alfos**
Institut des Corps Gras
E-mail: **c.alfos@iterg.com**
iterg@iterg.com
Website: **http://www.iterg.com**
Tel. **+33 556360044**

Partners:

- 1 Institut des Corps Gras (FR)
- 2 Motul (FR)
- 3 Baraldi Lubrificanti S.R.L. (IT)
- 4 Zerowaste (FR)
- 5 Vandeputte Oleochemicals S.A. (BE)
- 6 Pewas s.r.o. (SK)
- 7 Toyal Europe S.A. (FR)
- 8 BFB Oil Research S.A. (BE)
- 9 Societe des Colorants du Sud Ouest (FR)

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How science restored the TrueSound of baroque pipe organs



Europe's baroque pipe organs, and the small and medium-sized enterprises (SMEs) that maintain and restore them, are being given a new lease of life thanks to the TrueSound project.

TrueSound applied the latest in analytical techniques from materials science to reveal how the master organ builders of the 17th and 18th centuries made their reed pipes. Reed pipes dating from this period have a very distinctive tone, and until the TrueSound project came along, modern organ manufacturers were unable to make pipes which sounded the same.

The SMEs involved in TrueSound are already using the techniques learnt through the project to great effect, both in the restoration of old organs and the construction of new ones.

The business opportunities in the organ building and repair business are immense; Europe is home to some 10 000 pipe organs, all of which need regular maintenance and repair. Further afield, there are many organisations and institutions outside Europe that would dearly love to own a pipe organ that produces a genuine Baroque sound. With organ prices often exceeding the EUR 1 million mark, the advantages for any organ builder who can construct an authentic-sounding instrument are clear.

The 'king of instruments'

Pipe organs are orchestra in themselves; by operating the stops, organists can conjure up the sound of a flute, a stringed instrument, a trumpet, or even the human voice. Most of the pipes in an organ are so-called 'flue pipes'. These work in a similar way to a whistle or recorder; producing a sound when air blown through the pipe hits a horizontal tongue which causes the air to vibrate.

Many pipe organs also have a smaller number of reed pipes, which contain a brass reed or tongue that vibrates when air passes over it. They tend to mimic brass instruments such as the trombone and French horn. Reed pipes have a more complex tone than flue pipes, and so add greatly to the overall quality of the sounds produced by the instrument.

A lost art

The art of building pipe organs reached its peak in the Baroque period when organs were made by hand by masters of the craft. However, with the onset of the Industrial Revolution, organ building became an increasingly industrial affair, with instruments put together in factories. Over time, much of the detailed knowledge and skills of the master organ makers were lost.

Modern organ restorers and builders do their best to adhere to the techniques of the Baroque masters. However, despite their best efforts, they were unable to make reed pipes which sounded as beautiful as those

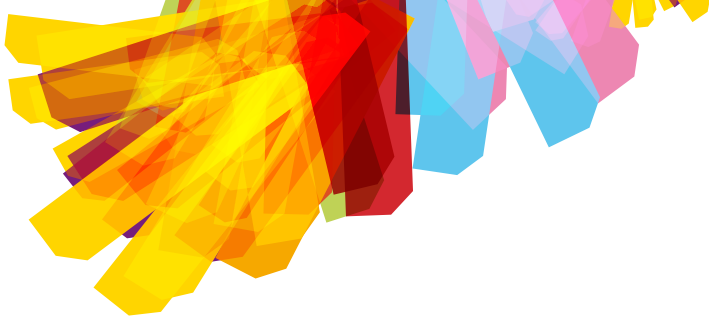
With organ prices often exceeding the EUR 1 million mark, the advantages for any organ builder who can construct an authentic sounding instrument are clear.

produced in the Baroque era. In a bid to unravel the secrets of their Baroque ancestors, the organ makers turned to science, and the TrueSound project was born.

Applying modern science to ancient instruments

TrueSound brought together four research institutes and five organ builders in six European countries. The partners' aim was to work out precisely what materials and techniques the ancient organ builders used to make the brass reeds that give the Baroque reed pipes their unique sound.

Over the course of the project, the scientists examined reed pipes from around 30 historic organs dating from the 17th to 19th centuries from across Europe. The pipes were subjected to a barrage of tests, including X-ray diffraction, electron probe microscopy



and secondary ion mass spectrometry. Throughout the tests, great care was taken to avoid damaging the samples.

The project team's analyses revealed that it is the proportions of zinc, copper and lead in the brass that are key to the special baroque reed pipe tone. The levels of these metals in the mix changed over time. The zinc concentration remained at 26% until 1740, when it increased suddenly to 32% due to changes in the way brass was produced. Meanwhile, the lead concentration fell gradually from around 7% in the 1620s to barely 2% in the middle of the 1700s, before disappearing from the alloy completely by around 1820.

On the basis of this information, the project partners produced two alloy mixes. The first, which is 25% zinc and 2% lead, is designed for use in the restoration of organs dating from the 17th and early 18th centuries. The second has a higher zinc content of 30% and is lead free, making it more suited for use in organs dating from the late 18th and 19th centuries. These two alloys enable modern organ builders to match the sound of new reed pipes to older ones when restoring historical organs.

The project partners also investigated the manufacturing process, and determined the casting, forming, hammering, rolling, filing and annealing process required to turn the molten alloy into a finely tuned reed.

An authentic Baroque sound in the 21st century

The new-found alloys and techniques were quickly put to the test in the restoration of the magnificent Casparini organ in the Church of the Holy Spirit in Vilnius, Lithuania. The organ, which dates from 1776, is widely considered to be a shining example of the baroque organ-building art. Thanks to the TrueSound project, the organ's Vox Humana stop, which recreates the sound of the human voice, has been brought back to life.

Elsewhere in Europe, the TrueSound results have been applied in the construction of a new organ, built in the baroque style, in Gothenburg, Sweden.

Music to the ears!

The project has opened up new horizons for the SMEs involved. With the new alloys and techniques uncovered by the project, they are now able to restore organs of different ages, confident that the sound produced by new reed pipes will match that produced by the original baroque pipes. They can even build new organs that sound as though they were constructed by the baroque masters themselves.

Recto: Oergryte Organ (Photo: Max-Planck-Institut für Metallforschung)

Verso: B.B. and R.G. with Flue Pipe Casparini Organ (Photo: Stefan Geier/Max-Planck-Institut für Metallforschung-Scientist and organ builder: Brigitte Baretzky from Max-Planck-Institut für Metallforschung and Rimantas Gucas from UAB Vilniaus Vargonu Dirbtuvė with a flue pipe from the Casparini organ.)



Acronym: **TrueSound**

Full Title: **A Challenge for Materials Science: Bringing True Baroque and Medieval Sound Back to Life in Historic and New Pipe Organs**

Contract number: **5876**

Call: **FP6-2002-SME-1**

Starting Date: **01/11/2004**

Duration (months): **27**

Total cost: **€ 1 225 000**

EC Contribution: **€ 700 000**

Contact Person: **Brigitte Baretzky
Max-Planck-Institut
für Metallforschung**

E-mail: **baretzky@mf.mpg.de**

Tel. **+49 71 1689 1890**

Partners:

- 1 Max-Planck-Gesellschaft zur Förderung der Wissenschaften e.V. represented by Max-Planck-Institut für Metallforschung (DE)
- 2 Göteborg University, Göteborg Organ Art Center (SE)
- 3 Chalmers University of Technology (SE)
- 4 Università Politecnica delle Marche, Sezione di Scienze Fisiche (IT)
- 5 Henk Van Eeken Orgelmaker (NL)
- 6 Mats Arvidson Orgel & Cembalobyggare AB (SE)
- 7 Società Marco Frati S.a.S. di Frati & Co. (IT)
- 8 UAB Vilniaus Vargonu Dirbtuvė (LT)
- 9 Ugale Organbuilding Workshop (LV)



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TURPRO – Lower costs to streamline turbot production



Aquaculture is the farming of marine products, both plants and seafood. It is taking off in a big way and nearly 50% of the world's fish is now being produced by this method.

The development of aquaculture is a pressing necessity because with the projected increases in population over the coming decades, millions more tonnes of fish will need to be produced to feed people.

With the rise in demand for fish due to increased recognition of its health benefits and the concomitant rise in population, traditional capture fishing methods cannot keep pace with demand. Scarcity of certain species caused by overfishing means that some species are now endangered. Aquaculture can rectify both the problem of growing consumer demand and the endangering of certain species by using controlled conditions to breed fish sustainably.

Diversification is the goal

Aquaculture can also help the economy by producing jobs in regions where other sources of income are scarce. The aquaculture industry provides over 80 000 full and part-time jobs throughout the EU and produces 1.3 million tonnes of fish products a year.

Currently, 90% of aquaculture production is taking place in Asia, so EU aquaculture needs to optimise production yields to ensure a competitive advantage for European SMEs. The most popular fish in EU farmed-fish production at the moment are salmon, mussels, trout and oysters, but heavy demand on these has meant that fish farmers are being encouraged to diversify and produce more exotic fish such as sea bream, halibut and turbot.

Diversifying into other species will keep the EC aquaculture industry competitive rather than just producing already heavily overfished and popular products such as salmon. For example, the TURPRO project focused attention on the aquaculture production of turbot, an expensive marine flat fish traditionally regarded as a delicacy.

Turbot from farm to fork

Turbot is an ideal fish for aquaculture producers. It is becoming more popular with northern European consumers, although it has always been eaten in the southern Mediterranean. Turbot has a slightly 'exotic'

'Lower costs and higher yields will enable SMEs to expand production and ensure that Europe remains a world leader in turbot farming.'

appeal, is difficult to catch with traditional fishing methods, has a high market value and is native to European waters.

Production costs, however, are high and there is increasing competition from turbot farmers in Asia. Improvements need to be made in EU production methods to enhance its yields and reduce production costs. With this aim in mind, TURPRO carried out a series of experiments including slowing down the maturation rate of farmed turbot to test potential improvement in growth, and making a series of changes in water temperature and quality to discover what differences in quality this achieved. The project also carried out experiments in processing methods.

The aim was to identify what needs to be done to create new, sustainable production systems to improve the quality of farmed turbot along the whole production chain from farm to fork. Specifically, this included

investigating the end quality effects of environmental manipulation on turbot growth, including exposure to light, and different water temperature and quality.

Important results to cut production costs

TURPRO consisted of eight partners from Germany, Iceland, the Netherlands, Norway, Portugal and the UK. They included fishing research institutes, aquaculture SMEs and universities. The team set about systematically investigating the most important factors in rearing farmed turbot. For example, one temperature experiment involved rearing young turbot at two different temperatures for two months, resulting in a significant weight gain for the fish raised this way. Turbot of the same age reared at the same temperature showed no such weight gain. This is a very important finding that will help maximise farmed turbot yield for SMEs and first analysis figures show a possible 20% to 30% production gain if this method is used.

In a series of water quality experiments, turbot growth was found to increase when water renewal rates were stepped up; a positive indicator that poor water quality in fish farms inhibit growth. Tests were also carried out to ascertain if constant exposure to light delayed sexual maturity in turbot, which is important to increase growth. Results were not conclusive here, but further tests will be undertaken in this area.

Slaughter methods were also investigated including both time of year of slaughter and method. It was found that stunning the fish with an electric shock lowered the quality and texture of the flesh, and also that flesh quality fluctuated according to the time of year of slaughter.

One of TURPRO's most important findings was that farmed turbot can have a shelf life of seven days longer than wild turbot: this will help SMEs in their transportation and market opportunities.

Isidro Blanquet, manager of Portuguese aquaculture SME A Coelho E Castro says, 'The TURPRO project gave us a lot of useful information about how to produce quality turbot. That means we can give our clients correct information and improve our customer relations based on trust and quality. We have also improved many of our techniques of fish management and that has resulted in better production. Participating in the project has definitely improved our production and our sales.'

Ultimately, TURPRO achieved its objective of making production more efficient and cheaper. Its results will help EU SMEs to reduce their costs and increase their efficiency, making turbot easier to farm and more available to consumers. TURPRO has produced a handbook for aquaculture SMEs for this purpose.

Professor Albert Imsland, of Akvaplan-NIVA AS Polar Environment Centre in Norway, who coordinated the TURPRO project, says, 'Lower costs and higher yields will enable SMEs to expand production and ensure that Europe remains a world leader in turbot farming.'



Acronym:	TURPRO
Full Title:	Biological Optimisation and Development of Processing Methods for Turbot Farming
Contract number:	508070
Call:	SME-1 Co-operative Research (all areas of science and technology)
Starting Date:	01/08/2004
Duration (months):	24
Total cost:	€ 1 500 000
EC Contribution:	€ 750 000
Contact Person:	Prof. Albert Imsland Akvaplan-Niva AS
E-mail:	ai@akvaplan.niva.no
Tel.	+354 5625800

Partners:

- 1 Netherlands Institute for Fisheries Research (NL)
- 2 Llyn Aquaculture Ltd (UK)
- 3 A Coelho E Castro Lda (PT)
- 4 Ecomares GmbH & Co. KG (DE)
- 5 Saebyli HF (IS)
- 6 University of Bergen Department of Fisheries and Marine Biology (NO)
- 7 Zeeland VIS B.V. (NL)

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WashControl spins its way to success

Helping small to medium-sized enterprises (SMEs) to become more productive, competitive and cost efficient is what EU-funded research programmes are all about.

Modest savings in one SME can add up to millions of euros across a particular sector.

EU-funded projects can also help SMEs form collaborations with universities and research institutes to bring them up to date with new knowledge and technologies that they can adapt and use to make savings or develop new products.

The WashControl project that ran from 2005 to 2007 is a good example of this. The aim of WashControl was to help thousands of laundries and dyeing houses across the EU to cost-effectively streamline their production methods and maximise their profits.

Waste not, want not

Dyeing houses and laundries have always used the traditional method of a long washing and rinsing procedure to establish a good quality result either for dye fastness or cleanness. The washing and rinsing stages are carried out with no controls to establish when fabrics and garments are ready, and consequently washing and rinsing usually takes far too long, wasting a lot of water and electricity.

Wastage from laundries would represent an enormous sum of resources thrown away if EU-wide figures were compiled.

A simple controlling and monitoring process to indicate when stains are removed from fabrics or when dyes are fast will vastly reduce the amount of wash and rinse cycles laundries and dyeing houses currently have to carry out.

Enter the WashControl consortium, which stepped in to develop a system to reduce the waste by monitoring and controlling washing and rinsing procedures. WashControl was led by the Institute for Textile Chemistry and Chemical Fibers in Germany and involved eight other partners from five countries, Denmark, Germany, Italy, Slovenia and Sweden.

The team's main aim was to develop a monitoring and controlling system that would reduce water and energy wastage by

'Due to the benefits of water savings and reduced energy consumption we have increased our productivity by more than 28%.'

(Beti Tekstilna Industria)

a significant amount and enable recycling of laundry and dyeing house washing water.

Another important aim was to reduce pollution from laundries. Water polluted with chemicals, detergents and dyes from both commercial and private washing machines significantly contributes to river pollution.

Multi-sensor monitoring system

The WashControl software consists of several components. The first is a multi-sensor used to monitor washing cycles and identify when washing and dyeing procedures have achieved their intended effect, i.e. either the correct level of colour fastness or cleanness of a product. The sensor does this by identifying when stains have been removed or when colour is fast to avoid further washing and rinsing.



The multi-sensor system can identify all the necessary factors for optimum washing cycles, including pH balance, temperature, oxygen content measurement and UV sensors to measure levels of detergents and bleaching agents. There is also an optional colour measurement sensor.

The second component is a control technique that ends the washing cycle when the effect has been achieved. The third is a recycling technique to reuse laundry washing water.

WashControl was tested in laundries and dyeing houses which then gave their feedback on how easy the software is to use and how useful it is. The project partners also carried out some tests with laundry employees of different skills and abilities to test its user friendliness on a wide range of SME employees, and it was found to be both easy and efficient.

Positive results fuel more productivity

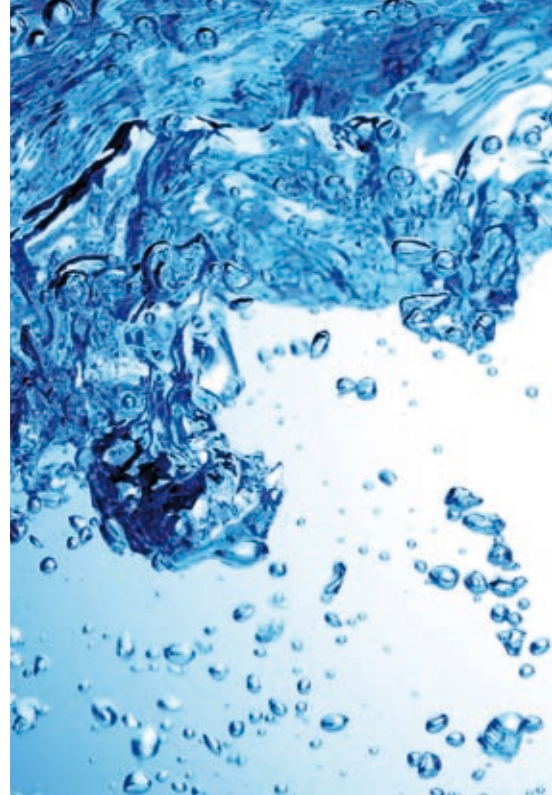
The software was used every day over a number of months to test its effectiveness in reducing dyeing and rinsing times, and it was found to reduce rinsing time by 20 minutes per load. There was also a 15 minute reduction in dyeing time, leading to increased productivity of 10% to 20%. When the WashControl system is installed in thousands of laundries and dyeing houses it will lead to both a substantial increase in productivity and a substantial reduction in wasted water and electricity. Water recycling experiments were also carried out in labs and pilot plants, which involved using recycled water from laundries and dyeing houses. Experiments were carried out to see

if recycled water could be used again using ultrafiltration (a process that uses reverse osmosis membrane technology which exerts pressure to separate a solution).

The results were positive – it was found that using recycled water even on dyed materials didn't affect the colour of the fabric. This will mean much more economical production methods for laundries in the future as well as increased profits.

Romana Petrovic from Slovenian SME Beti Tekstilna Industrija, which participated in WashControl, says, 'Multisensor provides the complete controlling dyeing process and it is able to reduce a lot of energy and time. We had a lot of benefits in this research project, we made a lot of progress and we got excellent results. We were also able to make our older machines much more advanced, which will be good for the future.'

Overall, WashControl achieved highly positive results. It was found that a 30% saving in water can be achieved by laundries and dyeing houses using the WashControl software, which will be an excellent way of keeping EU textile and laundry SMEs competitive. This is great boost for a sector of the economy that is particularly vulnerable to competition from countries where production is very cheap.



Acronym: **WashControl**
Full Title: **Development of an Online Sensor-Based Wash Control System and Water Recycling for Use in Textile Dyeing Houses and Laundries**
Project ref: **COOP-CT-2004-005864**
Call: **SME horizontal research activities involving SMEs**
Starting Date: **01/04/2005**
Duration (months): **24**
Total cost: **€ 1.45 million**
EC Contribution: **€ 1.03 million**

Contact Person: **Dr Reinhold Schneider**
Institute for Textile Chemistry and Chemical Fibers
E-mail: **reinhold.schneider@itcf-denkendorf.de**
Tel. **+49 7119340103**

Partners:

- 1 University of Maribor Institute of Textile Chemistry Ecology and Coloristic (SL)
- 2 Institute for Product Development (DA)
- 3 Beti Tekstilna Industrija D.D. (SL)
- 4 F.O.V. Fabrics AB (SV)
- 5 Pralnica Lucija d.o.o. (SL)
- 6 Punto Bianco S.R.L. (IT)
- 7 MDS-Prozesstechnik GmbH (DE)
- 8 Thies GmbH & Co. KG (DE)

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WaveShift – Raising the alarm on burglaries

Crime rates, particularly house burglaries, have soared over the past few decades, making the manufacture and sale of burglar alarms a thriving business. Unfortunately, the business has now reached a kind of saturation point, where people tend to ignore burglar alarms when they hear them, because they go off so often and most of them are false alarms. In fact, in the EU, more than 90% of all burglar alarm activations are false, either triggered by faulty equipment or by user error.

These false alarms cost EU police forces and thousands of crime prevention small to medium-sized enterprises (SMEs) around EUR 3.3 billion annually. Improving the efficiency and accuracy of burglar alarm systems will save money and help to improve the current crime statistics in the EU – now at more than 2 million house burglaries each year.

There is no doubt that having a visible burglar alarm fitted to your home or your business deters most potential thieves. But some burglars may choose to take the risk of burgling a house or commercial premises if they think no one will take action over the familiar sound of a ringing alarm.

Burglar alarms have a wide variety of price ranges and many people cannot afford to spend thousands on buying expensive models. Currently, most burglar alarms operate on motion detection, and it is the cheaper ones that set off most false alarms. Raising standards, but not prices, was an important motivating factor for the WaveShift project.

The burglar alarm market is still growing and involves thousands of SMEs in manufacturing, installation and maintenance. The problem is that high-quality, high-tech alarms with low error levels are needed, but these are expensive.

Changing the frequency

The frequency currently used for burglar alarms in the EU is 10GHz. The EU wants to encourage burglar alarm manufacturers to change this to the higher frequency of 24GHz to improve performance quality and reliability. This would also free up the 10GHz frequency for other uses.

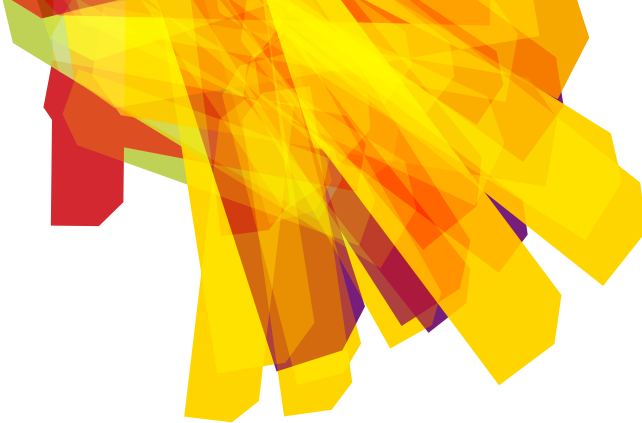
The WaveShift project was therefore created to develop efficient sensors for burglar alarms operating at the 24GHz frequency. WaveShift consisted of nine partners from six EU countries – Belgium, the Czech Republic, Germany, Poland, Sweden and the UK. The project was coordinated by the UK's Microwave Solutions Ltd, based in Sheffield, England. With half a million euros in funding, the consortium were able to investigate ways of developing better-quality burglar

The WaveShift super high frequency sensor alarm system has received its first commercial orders within the last month and several others are expected before the end of 2008.

alarm systems operating at the 24GHz frequency than can be produced at low cost under mass manufacturing conditions.

John Hallatt, managing director of the SME Microwave Solutions, and coordinator of WaveShift, says, 'All countries have an approved frequency of operations for applications such as burglar alarms, but many countries have different allocations. Therefore many countries have to make and get approved different versions for these different countries. Despite many years of effort, no progress has been made to achieve a harmonised frequency of allocation in the 10GHz frequency.'

This situation means added costs and it limits the free movement of goods within the EU. The 24GHz frequency, which WaveShift operates on, is already a harmonised band through most of the world, so creating low-cost sensors at this frequency will provide the opportunity to create a single product that can be sold throughout the EU and beyond,



without different versions having to be made and approved for different countries. This will cut costs and open up the market.

Up to now, 24GHz sensors have been too large and expensive to be manufactured for the burglar alarm industry and have been limited to professional equipment. WaveShift has helped change this situation by developing a universal microwave detector unit in the 24GHz frequency that meets harmonisation needs and can be manufactured in mass market conditions.

From concept to production

John Hallatt says, 'The outcome of the WaveShift project is a technique for applying modern mass manufacturing techniques in an area that has previously relied on high-cost manual assembly. The techniques we have developed will enable the development of products that will operate efficiently in the 24GHz frequency but which can be manufactured using standard mass production techniques. This will lead to improved profitability in the future.'

The WaveShift consortium is now actively developing the concept into a range of commercially available products called WaveShift, which has been trademarked in Europe. The WaveShift super high frequency sensor alarm system has received its first commercial orders within the last month and several others are expected before the end of 2008.

The consortium is also continuing to actively promote its product by attending conferences and exhibitions and proceeding with their own funding. John Hallatt says, 'Since the conclusion of the project we have continued to develop the concept using our own internal funding to reach the current stage. Further investment is required before we can claim to be fully in production, but I am confident that the other partners are making good use of the experience they obtained from the project in their own fields of business.'

Microwave Solutions had been actively seeking ways to fund this type of research for several years before joining an EU-funded project. John Hallatt says, 'I doubt if we would have been able to fund the project ourselves within the timescales we achieved, so the EU funding certainly speeded up the development and may well have facilitated it.'

'We are working actively with three of the project partners at the moment, who we would have been unlikely to have selected if they had not been consortium members. We are also talking to two others whom we may well work with in the future. The project has certainly extended our relationships positively with other European SMEs.'

Acronym: **WaveShift**
Full Title: **The Development of a Novel Integrated Super High Frequency (SHF) Non-Contact Detector Unit for Mobility Detection and Speed Measurement**
Project ref: **16927**
Call: **SME 1 Co-operative Research**
Starting Date: **01/09/2005**
Duration (months): **27**
Total cost: **€ 1.12 million**
EC Contribution: **€ 580 000**

Contact Person: **John Hallatt**
Microwave Solutions Ltd
E-mail: **johnh@microwave-solutions.com**
Tel. **+44 (0)8701223346**

Partners:

- 1 Microwave Solutions Ltd (UK)
- 2 Cube CZ S.R.O. (CZ)
- 3 Schaal Oberflächen & Systeme GmbH & Co. KG (DE)
- 4 Linwave Technology Ltd (UK)
- 5 RCD Radiokomunikace SPOL, S.R.O. (CZ)
- 6 System Monitorowania Alarmow Sp. z o.o. (PL)
- 7 Besam Production AB (SV)
- 8 Innowacja Polska Sp. z o.o. (PL)
- 9 Crif-Wallonie (BE)

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WEATHER – Protecting life by monitoring the forces of nature



Much discussion is currently taking place in the media on the proliferation of hurricanes, storms, floods and other extreme weather conditions in many parts of the world. Tragic events such as hurricane Katrina, which destroyed parts of New Orleans in 2005, are causing unprecedented disruption and damage to infrastructure and property, and devastating people's lives.

It is believed that up to a third of traffic accidents on roads which are especially exposed to strong winds, such as bridges and embankments, are either caused by the winds or have high winds as a contributing factor. At particular risk in these areas are trains and high-sided lorries and cars.

Wind alarm systems are currently in use, and some bridges do have height restrictions to avoid wind-induced accidents, but these are not part of a coordinated strategy.

The weather is one area of nature that human ingenuity has never been able to control. But the two-year EU-funded WEATHER project has taken this challenge forward a step and developed a wind alarm system that can predict when high winds are imminent so traffic can be aware of dangerous weather conditions, thus improving the safety of vulnerable road and rail vehicles.

Software techniques for risk analysis

The project consortium consisted of 10 partners from four EU countries (Spain, France, Italy and the UK), plus the French coordinator, Meteodyn. Eight of these, including Meteodyn, are small and medium-sized enterprises (SMEs) and three are universities (Nottingham and Birmingham in the UK and Milan in Italy).

Meteodyn is a meteorology and wind alert systems company that creates software for its customers in the meteorology field and more precisely, wind effects analysis. Some of its applications include numerical modelling, for computation of wind flow over difficult terrains (such as mountainous areas), statistics, and structures dimensioning.

The WEATHER partners decided on a package of aims that included developing spatial-time wind models that could work together

'Thanks to the WEATHER project Meteodyn has confirmed its European presence on the railway market.'

with wind alarm systems to reduce the uncertainty of wind conditions in exposed areas. They also devised a database to gauge the effects of cross winds on vehicles, and developed methods to assess the risk of accident in exposed areas.

Meteodyn provided software programs for the project that were able to analyse the risk of damage to different types of vehicle. The result was the Wind Alert System, a scientifically designed alarm for road and rail transport in high-risk places, which uses sensors to measure wind levels.

Sophisticated sensors for accident prevention

The Wind Alert System's role is to predict both winds and the risk of dangerous wind levels on exposed roads. This will allow risk evaluation and ultimately save lives and prevent damage to goods and vehicles.

The Wind Alert System has sensors that measure wind levels and climate. It also has built-in electronics including data logging, databases and software processing facilities. The system will be used by operators of exposed roads and worksites.

Jean-Francois Deshayes, the commercial director of Meteodyn says, 'The global cost for Meteodyn on this project was EUR 247 000 spread over the two and a half years, so without the EU funding we would not have been able to undertake the work.'

'The University of Birmingham helped us to find our other partners who were all very keen to work on the project.'

Success boosts company profiles

This successful outcome of the project has resulted in new orders for Meteodyn worth over EUR 100 000 for studies of the TGV train network in France.

The WEATHER project has helped Meteodyn and the other SMEs involved raise

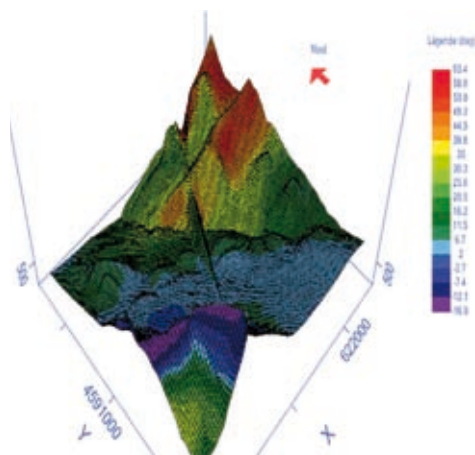
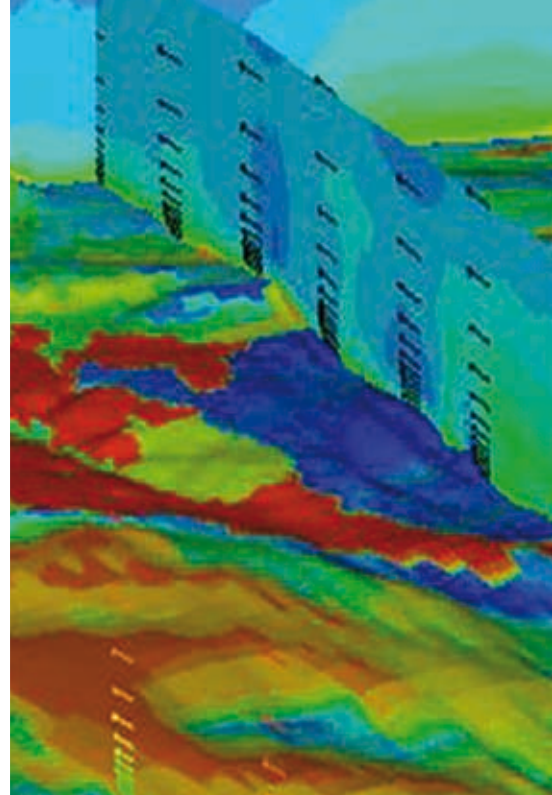
their profiles throughout Europe. 'Thanks to the WEATHER project,' says Jean-Francois Deshayes, 'Meteodyn has confirmed its European presence on the railway market, especially in Spain together with Geonica, and in the United Kingdom as a result of our cooperation with the University of Nottingham.'

There are many benefits for the other SMEs involved in the project. As well as extending their knowledge and improving their networks, they now have the knowledge and expertise to take on big new contracts. Madrid-based Geonica, as well as setting up data measurement stations with Meteodyn in Italy and France, is also working on railway security in China and on a new seaport in Spain.

Jean François Deshayes says, 'We have kept up good contacts with all of our partners, particularly Geonica and the University of Nottingham with which we will continue to work to make new business for the Wind Alert System.'

Meteodyn's collaboration with top universities during the project has also allowed it to get recognition from some of the biggest rail networks in Europe such as TGV. 'This experience is also a big help for our Beijing office, which opened in 2007, in its discussions with the Chinese transport ministry,' says Jean François Deshayes. 'They are interested in buying an important study for a 1000km railway. We are hoping for success in this negotiation!'

Meteodyn's last partnership is with the Direction Ouest des Routes (The French Western Agency for construction and safety of roads), to carry out a first study regarding wind safety of the Cheviré Bridge in Nantes.



Acronym:	WEATHER
Full Title:	Wind Early Alarm System for Terrestrial Transport Handling Evaluation of Risks
Project ref.:	512862
Call:	SME Horizontal research activities involving SMEs
Starting Date:	01/09/2004
Duration (months):	24
Total cost:	€ 1 370 000
EC Contribution:	€ 906 000
Contact Person:	Dr Didier Delaunay Meteodyn
E-mail:	info@meteodyn.com
Website:	http://www.meteodyn.com
Tel.	+332 43862124

Partners:

- 1 Geonica S.A. (ES)
- 2 Politecnico di Milano (IT)
- 3 University of Birmingham (UK)
- 4 Automatic & Telemetric Meteorological Observing Systems (FR)
- 5 Etudes et Maintenance Industrielle (FR)
- 6 Nubila S.A.S. Di Anna Prodi E.C. (IT)
- 7 Campbell Scientific (UK)
- 8 Alstom Transport S.A. (FR)
- 9 Lecinena S.A. (ES)
- 10 University of Nottingham (UK)

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Verso: Vertical and horizontal wind field_Meteodyn; Wind Modelling with WT_Meteodyn © Pictures WEATHER

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Research can help small and medium-sized enterprises (SMEs) to develop new products and services or improve existing ones, yet few SMEs have the funds or manpower to carry out research themselves.

The European Union is encouraging SMEs to participate in the Framework Programme for Research to help them meet their research needs. Projects financed under this research outsourcing scheme provide the SMEs involved with an excellent opportunity to improve their competitiveness by developing innovative products and services that put them at the cutting edge of their respective sectors.

This folder features the results of 20 projects from the Co-operative Research scheme for SMEs that were funded by the EU under the Sixth Framework Programme (FP6), which ran from 2002 to 2006. They cover fields as diverse as energy, agriculture, communications, the environment, medicine and music.

In addition to new products and increased sales, the SMEs involved in these projects report that participating in an EU-funded research project enhanced their reputation, opened up new markets and provided them with strong links with both research institutes and companies across Europe. Many of them have been well and truly bitten by the research bug and are now engaged in further research projects, thus ensuring their company's competitiveness well into the future.

NOTICE TO THE READER

For queries on the Seventh Framework Programme and the SME Specific Measures, contact the **Research Enquiry service**
<http://ec.europa.eu/research/index.cfm?pg=enquiries>

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