



ANNUAL PROGRESS REPORT 1991

# EUREKA



# INTRODUCTION

## EUREKA: An innovative tool

Launched in 1985, EUREKA has already changed the face of Research and Development cooperation within Europe. It is an innovative tool helping Europe to master and exploit the technologies, which will prove decisive in the worldwide race for competitiveness and a better quality of life.

EUREKA interacts with companies and research institutes in EUREKA member countries and helps them pool their resources in the development of leading edge technology.

The Annual Progress Report 1991 provides a general picture of EUREKA's project portfolio as at 1st October, 1991. The more than 500 projects covered in this report have a total estimated cost of more than 8.1 billion ECU and involve some 2,700 participants, 1,765 of which are larger companies, 469 small and medium sized companies, 785 research institutes including universities and 151 other organisations. 23 participants come from non-member countries. 14 of these are from other European countries.

## EUREKA's members are:

Austria  
Belgium  
Commission of the European Communities  
Denmark  
Germany  
Finland  
France  
Greece  
Iceland  
Ireland  
Italy  
Luxembourg  
Netherlands  
Norway  
Portugal  
Spain  
Sweden  
Switzerland  
Turkey  
United Kingdom

## EUREKA: An open initiative

"Bottom up" is EUREKA's ground rule. Participants have full responsibility for defining and implementing their scientific and technological cooperation projects. They are their own judges of the best course towards new markets for Europe.



EUREKA's structure is built to harness the dynamism and innovative strength in Europe's industry and research. The ground rule prevents unnecessary bureaucracy and provides a simple set of criteria for establishing EUREKA projects. The most important of these criteria requires the project to:

- involve at least two partners from different EUREKA countries
- aim at securing a significant technological advance in the product, process or service concerned
- aim at applications in the civilian sector.

Any company or research institute in a EUREKA member country, which has a proposal fitting the EUREKA project criteria is invited to contact the relevant National Project Coordinator (NPC) listed on pages 46-47 in this report.

The NPC will advise and assist the applicant and handle further contacts within the EUREKA structure, thus allowing industry and research institutes to concentrate on the content and business aspects of the proposed projects. The application procedure to establish or join a EUREKA project is very simple and only requires a few hours' work. If the application is well founded the project can, in most cases, be up and running within two months.

#### EUREKA: Added value

EUREKA projects and participants are eligible to carry the EUREKA Seal - an internationally recognised hallmark of excellence.

The participants will also be included in EUREKA's open database which lists by name and technological skills some 2,700 of Europe's foremost companies and research institutes. As such, a EUREKA participant is marketed all over Europe and is likely to attract attention and contacts from partners searching for specific technological skills to develop new products, processes or services.

EUREKA also offers itself as a forum for direct dialogue between governments and standardisation bodies on the one hand and EUREKA participants who are in need of joint industrial standards or who are hampered either by technical obstacles to trade or by barriers to public procurement on the other.

EUREKA projects have in most cases access to government financial backing of their research and development activities. The participants themselves are, however, expected to raise adequate funding.

EUREKA also acts as a contact point and support for participants seeking access to private funding sources, such as venture capital.

EUREKA possesses considerable experience in crossborder cooperation and will assist participants who request help in drafting project contracts.

#### EUREKA:

A flexible decentralised structure

#### National Project Coordinators

The NPCs are the operational core of the EUREKA network.

They run the national EUREKA offices and are the interface between participants and the EUREKA network. They also form a link with the relevant national authorities and are in close contact with their counterparts in the other EUREKA member countries.

Through the NPC network, the national EUREKA offices will usually be able to find suitable partners for national industry or research institutes and help them create sound projects.

#### EUREKA Secretariat

The Secretariat is EUREKA's central support unit located in Brussels. It gathers and distributes information on projects and EUREKA as such, runs the project database, assists the various bodies of the initiative, facilitates contacts between partners and promotes the EUREKA concept in conjunction with national authorities.

#### High Level Group

This Group is made up of High Level Representatives appointed by the EUREKA governments and the Commission of the European Communities. It formulates general EUREKA policy for approval by the Ministerial Conference. It also monitors the implementation of ministerial decisions.

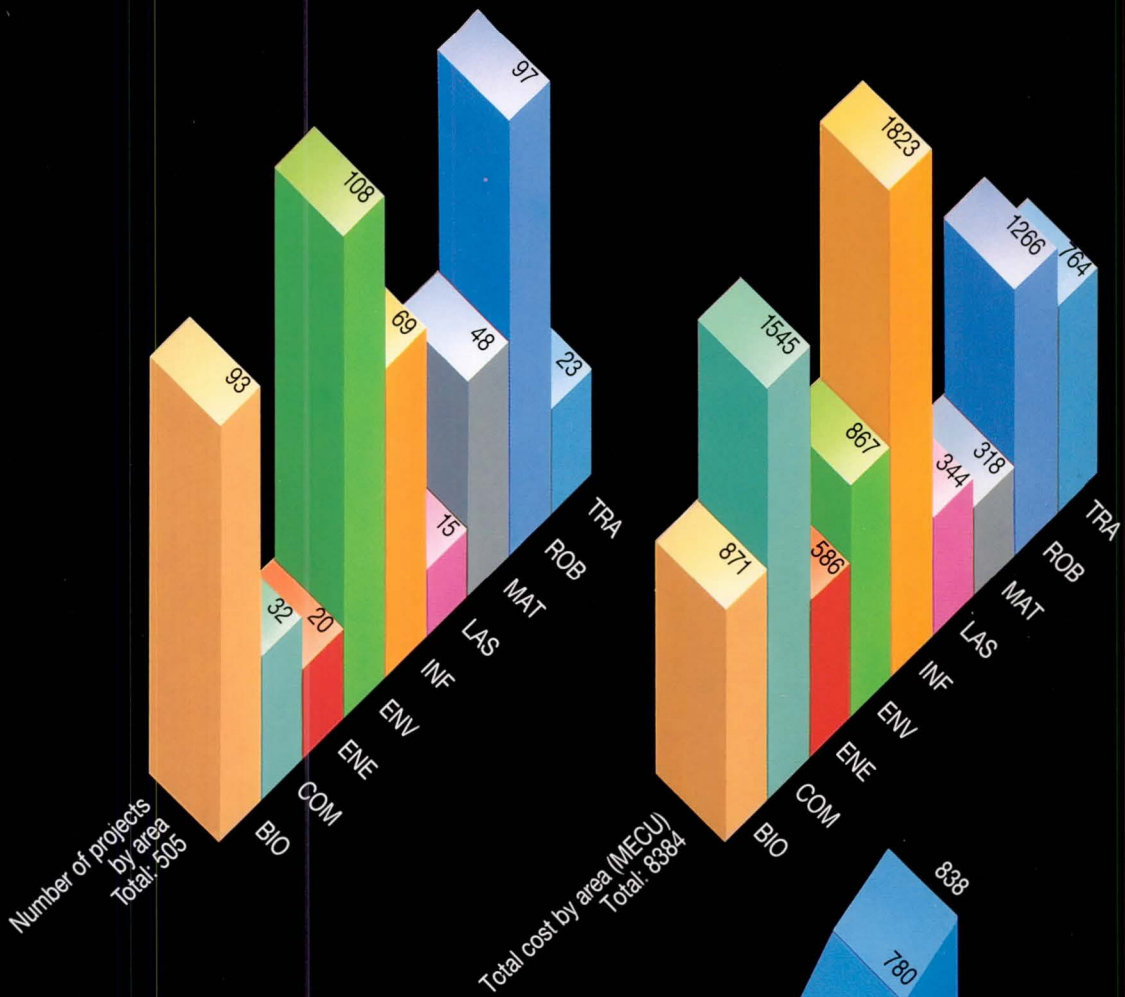
#### Ministerial Conference

The Ministerial Conference is the political body of EUREKA and is responsible for furthering the Initiative and its aims.

It is composed of Ministers from the nineteen EUREKA member countries and a Commissioner from the European Communities.

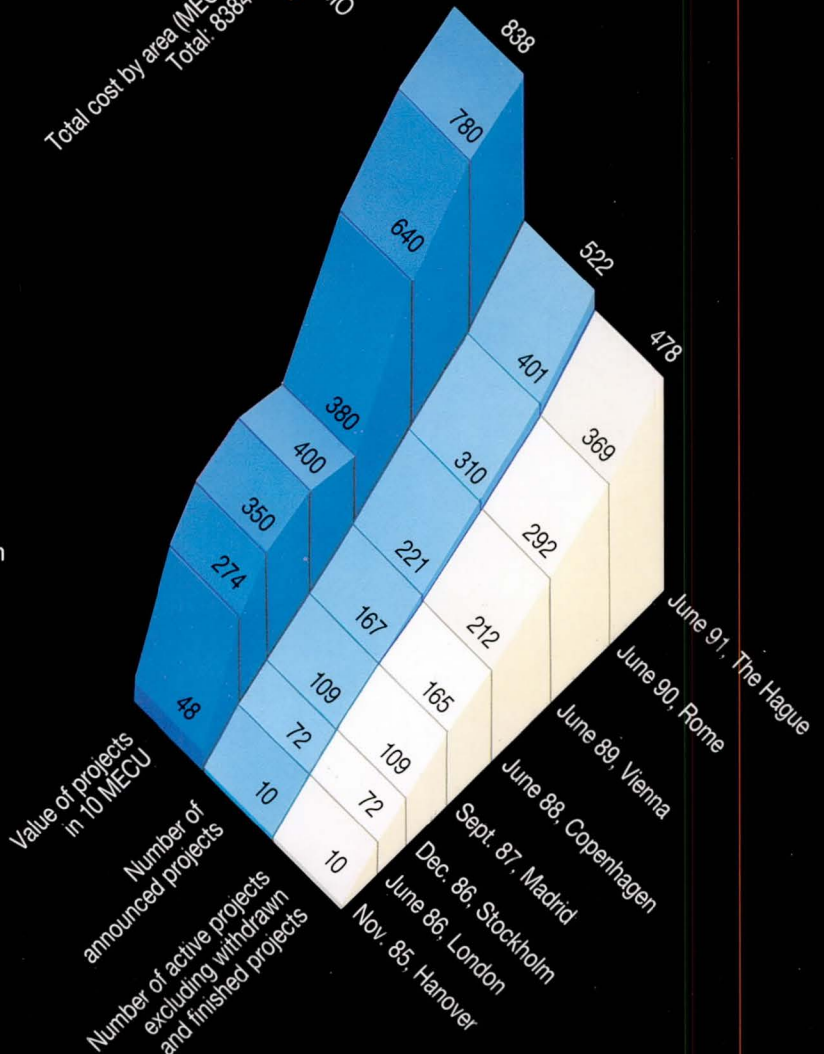
It meets a minimum of once a year to lay down the political guidelines for EUREKA's work and officially announce the new EUREKA projects launched since the previous Ministerial Conference.

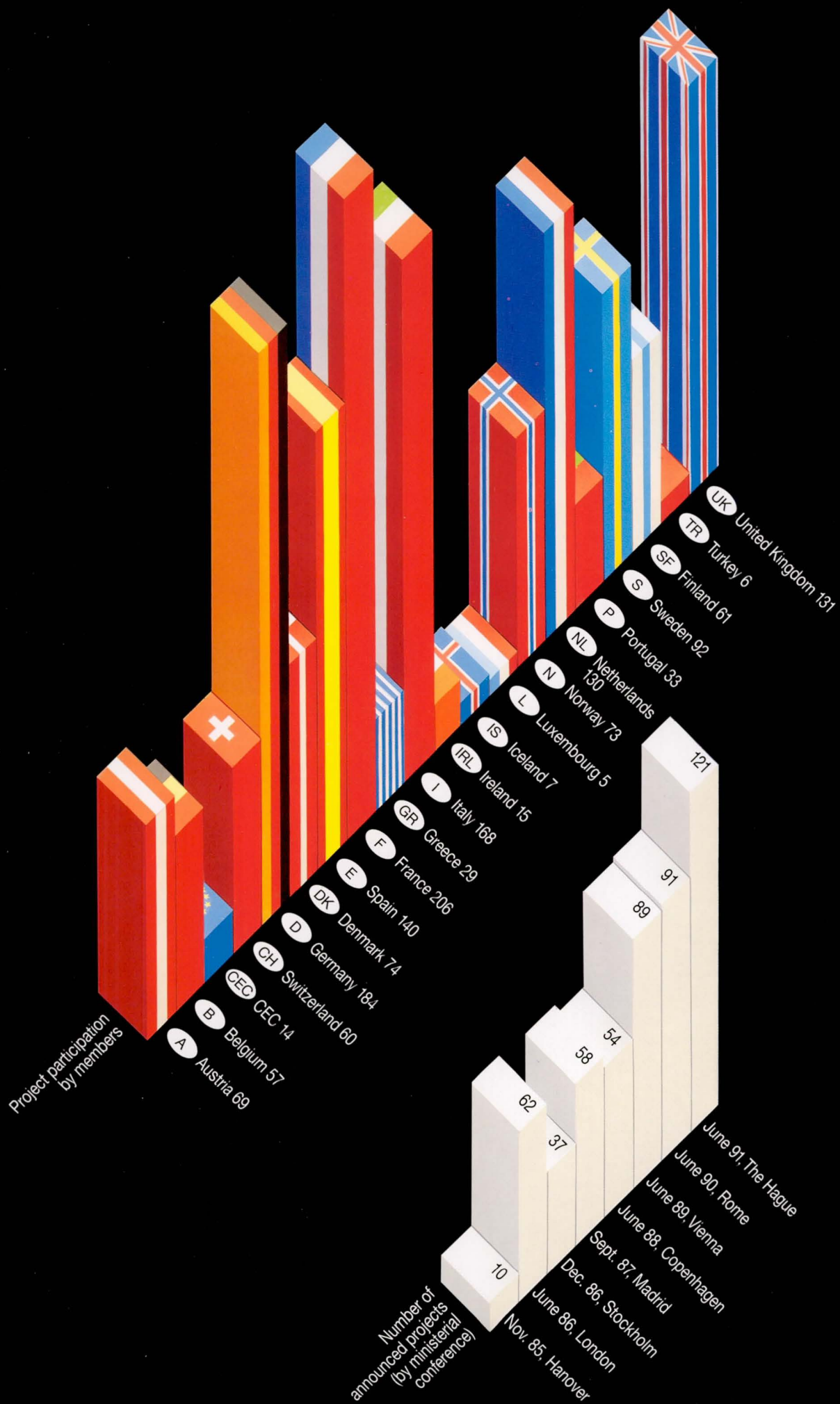
# STATISTICAL TABLES



## Abbreviations used in this brochure:

- BIO Medical and Biotechnology
- COM Communication Technology
- ENE Energy Technology
- ENV Environment Technology
- INF Information Technology
- LAS Laser Technology
- MAT Material Technology
- ROB Robotics and Production Automation
- TRA Transport Technology





# INTRODUCTION BY MR KOOS ANDRIESEN



*Mr Koos Andriessen  
Minister of Economic Affairs  
of the Netherlands*

Five years have passed since the EUREKA initiative was launched. For the Dutch chairmanship this was a good moment to look back at what has been achieved and to take stock of the challenges of the future. I recall with pleasure the celebration of 5 years of EUREKA with the French President Mitterrand, the Finnish President Koivisto and the Dutch Prime Minister Lubbers. This meeting was attended by Her Majesty the Queen of the Netherlands. Meanwhile, business continued. Many new projects were launched and existing proposals reached new stages.

To see how we can learn from the first five years of EUREKA, an international assessment panel chaired by the former Philips chairman Wisse Dekker evaluated the initiative. The results were encouraging. Firms recognise and appreciate the flexible bottom up approach. They confirm the importance of EUREKA for the competitive position of Europe on the world market. Of great importance is that not only larger firms but also SMEs share this conclusion. The Dekker panel also made some useful recommendations for further enhancing EUREKA's effectiveness and efficiency. The findings and recommendations of the EUREKA assessment panel were endorsed by the Ministerial Conference at The Hague. I am convinced that the forthcoming chairs will make useful suggestions for the implementation of the Dekker assessment, in order to make EUREKA an even stronger instrument for high quality R&D cooperation in Europe during the next five years.

In parallel with the overall assessment performed by the Dekker panel the group of National Project Coordinators evaluated the efficiency and the effectiveness of the programme at an operational level. It is with great satisfaction that I took note of the results of this so-called X-ray operation. It shows that NPCs really are functioning as a team now. NPC taskforces have been established to further detail and implement actions that have been defined to facilitate the participation of small and medium sized enterprises, to improve EUREKA's efficiency by synchronising funding procedures, etc. As for project generation, a solid foundation has been created for further strategic discussions. In addition, a number of new project generation initiatives were launched (e.g. agri-food technology, environmental measuring, etc). I am convinced that, governed by an inspiring Finnish chairmanship, concrete results can soon be shown.

Recent political changes in Central and Eastern Europe are an important challenge for EUREKA. Central and Eastern European countries are building up open market economies and developing economic contacts with Western European countries. EUREKA can be a useful and efficient mechanism in stimulating R&D cooperation with the Central and Eastern countries.

Last year important achievements were reached in intensifying cooperation between these countries and EUREKA. The starting point, not surprisingly for a pragmatic bottom up mechanism such as EUREKA, was the concrete project level. To explore possibilities for cooperation the Dutch chairmanship and the EUREKA offices and the Hungarian Government organised a EUREKA congress in Budapest in which more than 600 representatives of companies and institutes from Eastern and Western European countries participated. At this congress some 350 project suggestions were formulated.

To enhance and further improve cooperation with European non-member states a EUREKA action programme, the "The Hague Statement" was formulated at the Ministerial Conference. We committed ourselves to an extended information exchange, expanded networking, and a flexible application of the EUREKA rules, making it easier for companies and institutes from European non-member countries to participate in EUREKA projects.

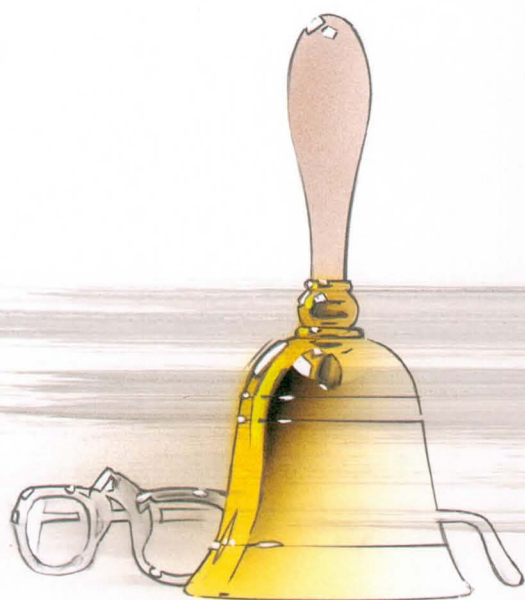
An important part of EUREKA are the so called strategic projects. These projects particularly depend on supportive actions by organisations, entities other than the participants to be successful. For example, measures may be needed in the areas of legislation, standardisation or in the development of an infrastructure. EUREKA is uniquely positioned to provide these supportive measures. Some important steps were recently made on this matter. For example, for the High Tech Definition Television project, agreement has been reached on important measures in the field of the standards and cooperation necessary for successful implementation of the project results. Work on supportive measures will continue to be an important part of the EUREKA mechanism. A good interaction between firms at the operational project level and public authorities that can create the conditions for successful implementation is essential.

EUREKA has also turned out to be an important vehicle for formulating solutions to major social problems. For example, the difficult question of solving and preventing environmental pollution is dealt with on a large scale in EUREKA. The concept of umbrella projects has turned out to be successful in this respect. The combination of formulating a framework for action, and of implementing it in a bottom up way by concrete projects does indeed work. Important steps forward have been made within the already existing umbrella, Euroenviron, and within the newly started initiatives, Prepare and Ecodesign.

This way of operating within umbrella projects once again shows the flexibility of EUREKA. I look forward to new initiatives in other areas. Suggestions have already been made in the areas of renewable energy technologies and agricultural innovation.

The core business of EUREKA is, of course, the establishment of high quality, high technology, market oriented international collaborative research projects. In this respect, the 1990/1991 harvest has been a very good one. Not only because of the new record total of over 120 new projects that were announced. But also, and more importantly, because the growth to maturity of the initiative is also reflected in the quality of the projects. It is good to see that environmental issues are again strongly represented in the newly launched projects.

To be EUREKA's chairman was an exciting, challenging and rewarding experience. I am convinced that the Finnish chairmanship and the Eureka Secretariat will lead this important initiative full speed ahead into its second five year period.



# INTRODUCTION BY MR KAUKO JUHANTALO



*Mr Kauko Juhantalo  
Finnish Minister of Trade  
and Industry*

## EUREKA TOGETHER INTO THE FUTURE

During its first five years, the main factors for EUREKA's success have been its flexible and decentralised character.

This has enabled EUREKA to develop and to go full speed ahead during these years of profound changes in many areas in Europe. During its Chairmanship year, Finland will do her best to further develop EUREKA along the jointly agreed lines.

The achievements of EUREKA have given it a prominent role within European technological cooperation. The large number of international projects, altogether more than 500 by the end of 1991, involving nearly 3000 enterprises and research institutes clearly demonstrates the success of EUREKA.

The ultimate success, however, can only be seen in concrete results. More time is needed for this, even though the amount of commercial products and services from the projects is increasing. However, there are already many indications showing that EUREKA is on the right track. They are confirmed by the thorough assessment carried out during the Netherlands Chair.

The most important tasks during the Finnish Chair include maintaining and developing flexible project-related procedures, increasing participation by small and medium-sized industries, further emphasising environmental aspects in project activities, increasing the project participation of enterprises and research institutes from Central and Eastern European countries and increasing positive interaction between EUREKA and the EC framework programmes. The Technology Development Centre TEKES is in charge of running the Finnish EUREKA Chairmanship and these activities.

## Projects: the core of EUREKA

EUREKA's hallmark and strength lies in the comprehensive development of high quality projects based on the bottom-up approach. This enables industry and research institutes to react rapidly and effectively to new demands or markets and society.

Continuous analysis of the development, progress and results of the project portfolio on the basis of recent assessments is needed. Large strategic projects, such as HDTV, JESSI, PROMETHEUS and COSINE and the conditions necessary for their generation, progress and successful completion, including supportive measures needed, are of special interest.

Finland has started making special efforts to stimulate new projects, particularly in areas poorly covered to date. One such area is industrial chemical technology, a field which is industrially, socially and environmentally significant. The EUREKA Forum on Industrial Chemical Technology held in November in Helsinki emphasised the resources and benefits that cooperation offers to European companies in their efforts to strengthen their position in international cooperation.

SME participation is often encouraged, yet it is not as good as it could be. New mechanisms to increase the number of SMEs in EUREKA should be found. Some SMEs can participate as partners of larger companies. Without special partner search mechanisms however, improvement, total freedom and flexibility may well be too high a threshold for SMEs.

EUREKA must also take care to save sufficient resources for the activation of those member countries who, until now, have only a few projects.



### New project participants from Central and Eastern Europe

Increasing cooperation with companies and research institutes in Central and Eastern Europe has been an important theme during the Netherlands' Chairmanship. It will continue to be so during the Finnish Chair, too. The Hague Manual will serve as a very useful guideline for continuing this work.

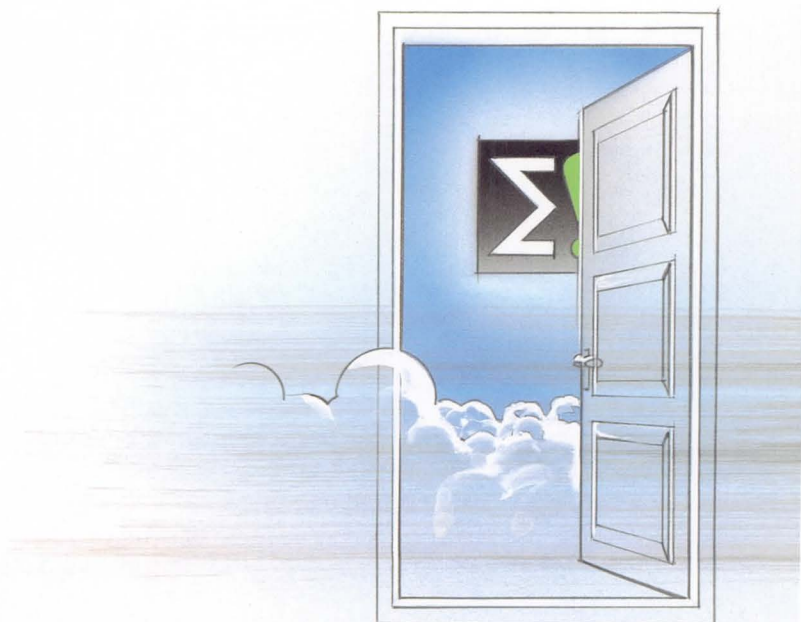
Finland will do her best to extend the project promoting and coordinating network, currently functioning in EUREKA countries, to Central and Eastern European countries. The target is to create a mechanism to exploit the scientific and technological potential of their enterprises and research institutes to develop European competitiveness and infrastructure. It is evident that emphasis will also be put on concrete project work in this case.

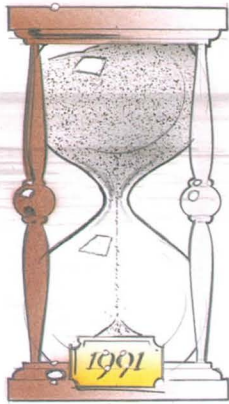
### New Medium Term Plan - Drawing future strategic outlines

One of the main tasks during the Finnish Chair will be to prepare a new Medium Term Plan (MTP) for EUREKA. Finland will, in close cooperation with the next four chair countries, France, Norway, Switzerland and Belgium, prepare the new MTP to be finalised by the High Level Group and submitted to the Ministerial Conference in May 1992 in Tampere, Finland.

The fast pace of the far-reaching changes now affecting Europe will be kept in mind. Maximum use will be made of the results of the thorough assessments carried out during the Netherlands' term as Chair. The main focus of this work, too, will be on project related activities.

The new MTP should provide outlines for future objectives and activities on the strategic level. On the operative level, the annual plans should aim for concrete achievements of these goals.





## Audiovisual HDTV SEMINAR - THE STANDARD APPROACHES

On March 11 and 12 the EUREKA Netherlands Chairmanship held a successful and well attended conference in Amsterdam on the future of High Definition Television. At this conference, "HDTV: the struggle for a standard ...continued", EUREKA succeeded for the first time ever in bringing almost all the major players in the HDTV industry together to discuss its future.

## Lasers EUROPEAN INDUSTRIAL LASER FORUM

A workshop on European industrial laser research, initiated by the Netherlands EUREKA Chairmanship, was held in the Hague on 11-12 March. The event was jointly organised by representatives of the EUREKA EUROLASER programme and the BRITE-EURAM programme of the EC. The Forum provided the participants with a unique opportunity to meet and discuss their common research activities. Most of the workshop was dedicated to the presentation of European cooperation projects.

## Robotics FAMOS AT THE HANOVER FAIR

At this year's "Hannover Messe Industrie", Europe's biggest industrial trade fair, EUREKA project EU 72 - the FAMOS umbrella project - dominated one of the major halls. The Fair, which was attended by over half a million industrialists from all over the world, was an excellent opportunity for EUREKA to present the FAMOS initiative, both for its own sake and as an example of EUREKA's ability to foster pan-European cooperation. The display also showed how EUREKA can not only help projects begin, but also help them reach their markets. If the specific projects had displayed their products individually, they would probably have been lost in the sheer size of the Fair.

## Scientific Cooperation OPENING DOORS TO EASTERN EUROPE

EUREKA's Budapest conference on 2 and 3 May was the first step in putting into action the recommendations of last year's Ministerial Conference in Rome to intensify contacts with European non member countries. It aimed to provide researchers and industrialists in Central and Eastern Europe with the information they need in order to take part in EUREKA projects.

Of the 620 people who attended, 450 came from Eastern Europe. They had the chance not only to learn how EUREKA works, but also to make personal contact with potential partners. Participants spent half their time divided among three subject workshops: Information and Communications technology, Biotechnology and Environment and Energy technology.

Towards the end of 1991 the Budapest Conference was followed by a number of information meetings in East European capitals, where the Finnish EUREKA Chairmanship and the EUREKA Secretariat assisted the national organisations in setting up National EUREKA Information Points.

## Political backing SECOND INTER PARLIAMENTARY EUREKA CONFERENCE

Following the wishes of the participants in the 1990 Interparliamentary Conference, the presidents of the two chambers in the Netherlands Parliament invited a group of their colleagues from all over Europe to meet in the Hague on 16 and 17 May to discuss EUREKA's role in European Research and Development.

The discussions this year concentrated on:

- the relation between EUREKA and the EC R&D programmes and the role of EUREKA's Medium Term Plan;
- EUREKA and the environment;
- EUREKA and its large infrastructural projects.

## Information Technology EARLY ARRIVAL - JESSI'S 16 MBIT CHIPS

On June 13, 1991, SGS-Thompson Microelectronics announced the production of the first samples of their 16 Mbit-EPROM chip. This was a significant step forward for the JESSI project and followed the announcement last year by Siemens of their 16 Mbit-DRAM chip.

The announcement came hours before the 12th JESSI Board Meeting, which subsequently stated that these achievements were truly competitive with the leading companies around the world, and provided an excellent basis for the timely execution of JESSI's ambitious application projects.

## Ministerial Conference THE EVENT OF EXCELLENCE

The Netherlands EUREKA chairmanship succeeded in fulfilling the promise of the name when they decided to launch the festivities surrounding the IXth EUREKA Ministerial Conference as "The Event of Excellence".

The Ministerial Conference itself on 19 June became a remarkable success with the Ministers announcing a record number of 121 new projects, 31 more projects than the previous record. And not only that. They also issued the Hague Statement outlining a flexible and dynamic EUREKA strategy for further cooperation with the evolving democracies in Eastern and Central Europe.

This impressive success was put in an equally impressive framework by the "Event of Excellence", which the Netherlands EUREKA chairmanship decided to organise the day before the Ministerial Conference to celebrate EUREKA's fifth anniversary. The event opened in style in the historical setting of the 'Ridderzaal' in the Hague, where her Majesty Queen Beatrix of the Netherlands honoured EUREKA with her presence and the presidents François Mitterrand of France and Mauno Koivisto of Finland spoke about EUREKA. The Dutch prime minister Mr. R. Lubbers and his cabinet colleague, the minister for Economic Affairs and outgoing EUREKA chairman, Mr. J. H. Andriessen and the chairman of the "European Round Table of Industrialists" Professor W. Dekker also spoke on EUREKA.

In the evening the EUREKA 'family' assembled again this time in Rotterdam, where The Rotterdam Philharmonic Orchestra conducted by Finnish conductor Jukka-Pekka Saraste gave the first rendition of the "EUREKA - Fantasy Overture", a specially commissioned piece by Dutch composer Eduard de Boer.

The concert was followed by a spectacular laser, sound and light show in which the Greek composer Vangelis utilised the skyscrapers along the river Maas as an enormous screen for his EUREKA show. The invited EUREKA guests watching the spectacle from boats in the middle of the river were joined by 150,000 enthusiastic spectators who joined in this once in a lifetime experience from the opposite bank of the river.

#### EUREKA assessment

#### EUREKA PASSES THE TEST

An assessment panel of 7 independent and high ranking European industrialists undertook in 1990 on the initiative of the Netherlands EUREKA chairmanship to perform a thorough assessment of Eureka's performance in its first five years.

The result of this assessment were presented to the EUREKA ministers in the Hague on 19 June by the panel's chairman Professor Wisse Dekker. The assessment was warmly welcomed by the ministers who gladly subscribed to the overall conclusions: that EUREKA due to its bottom up principle and flexible and unbureaucratic structure "offers excellent opportunities for industrial partners

to carry out the research they consider to be important, with the partners of their choice." The panel "concludes that EUREKA is considered a resounding success by an overwhelming majority of the participants. It is considered essential that EUREKA's bottom-up approach be preserved and where possible strengthened."

The assessment also included a number of concrete recommendations on how this strengthening could be helped. Recommendations, which the EUREKA ministers asked the Finnish EUREKA chairmanship to analyse and carry out where appropriate.

#### The building environment A MARKET-PLACE FOR BUILDING CONSERVATION

EUREKA Project EU 140, the EURO CARE umbrella project for building conservation, has identified an urgent need for joint action by industry, research institutes and government to stem damage to our cultural heritage and develop the sustainable development policies needed to attack the problem at its root. With the realisation that over half our wealth is locked up in "bricks and mortar", and that billions are spent on building maintenance, industrial support for EURO CARE has snowballed over recent years.

To help build up the market for new products and techniques in this field, the first EURO CARE Market Place Conference was held in Lillehammer, Norway in the first week of October.

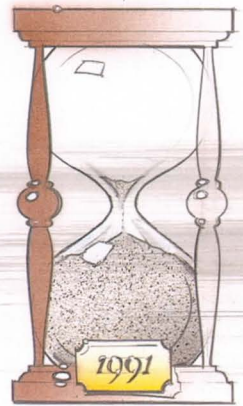
Apart from increasing the identity of this industry in general, the benefits of the Market Place Forum can be counted in projects: an estimated 20 new projects were proposed and exhibited over the two days.

#### European Chemical Industry and EUREKA

#### THE CHEMISTRY OF COOPERATION

On November 14 the EUREKA Forum on Industrial Chemical Technology, held in conjunction with the annual Finnish Chemical Congress in Helsinki, heard a range of speakers discussing and promoting cooperative research and development in the European chemical industry, which is felt to be under-represented in the EUREKA portfolio. Chaired by the EUREKA HLG Chairman, Dr Juhani Kuusi, the Forum discussed the general benefits and requirements of European cooperation in this very important field, and examined a number of specific stories of such cooperation.

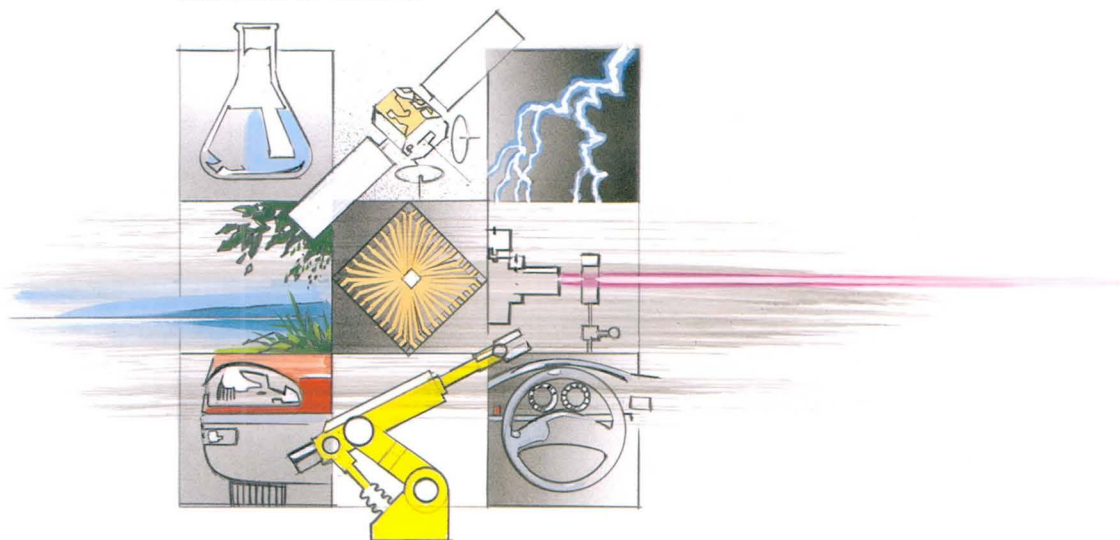
The day finished with a panel discussion on increasing European cooperation in this field, focusing on technological R&D and strategic projects.



# TECHNOLOGICAL AREAS

In this section the 505 projects are classified into 9 technological areas.

Each area is described separately in a way which provides a short overview of the EUREKA activities in the area. It is not possible in this Annual Project Report to list all the EUREKA projects in each area, but a full list is available upon request from the national EUREKA offices or at the EUREKA Secretariat in Brussels.



## SUPPORTIVE MEASURES

The successful development and implementation of the results of EUREKA projects may require certain “enabling conditions” to be met which are beyond the capabilities and influence of the project participants themselves.

In these cases the concept of “supportive measures” is an important one. The process is “bottom-up”, beginning with identification of the project needs. However, fulfilling the conditions may require action from governments and international bodies, initiated and supported by EUREKA bodies.

# MEDICAL - AND BIOTECHNOLOGY

Biotechnology is a multidisciplinary set of techniques implying a purposeful application of biological sciences. It is at the crossroads of different sectors covering aspects of biochemistry, genetics, microbiology, physiology, morphogenesis, etc., "the technology of living matter".

The first impact of biotechnology has been in human health, but it also offers benefits to many other industrial sectors which are subject to a considerable advanced research and innovation process: animal breeding, agro-biotechnology, genetic engineering of plants and biotechnological production processes.

Among the 38 projects concerned with Human and Animal Diseases three subgroups can be distinguished:

The first, covering Vaccines, Cures and Treatments presents 3 projects working with cardiovascular diseases, 2 concentrating on Malaria vaccines, a further 2 relating to other animal-human transferred diseases, 2 aimed at the treatment of cancer and tumours and finally 5 working respectively with cures for the central nervous system, for the digestive tract, free radical scavenging, a vaccine against Meningitis B and H3-receptor agonists for the treatment of - primarily - asthma.

The second, covering Diagnostics, includes 5 projects aiming at the development of new diagnostic methods such as new sensors and procedures, nucleic acid analysis and antigen/antibody determination; another 4 work with new disease specific diagnostics (allergies, syphilis, auto-immune diseases, Hepatitis C); a further 2 involve R&D on cancer and AIDS detection, whilst finally, three projects concentrate their efforts on diagnostic imaging and 3D motion analysis.

The third subgroup covers Surgical and Hospital Aids with 3 projects dealing with hospital modernisation, another 2 with blood bank management, 2 projects developing active implants, another 2 developing inactive implants and one aiming at the computer-aided manufacture of orthopaedic footwear.

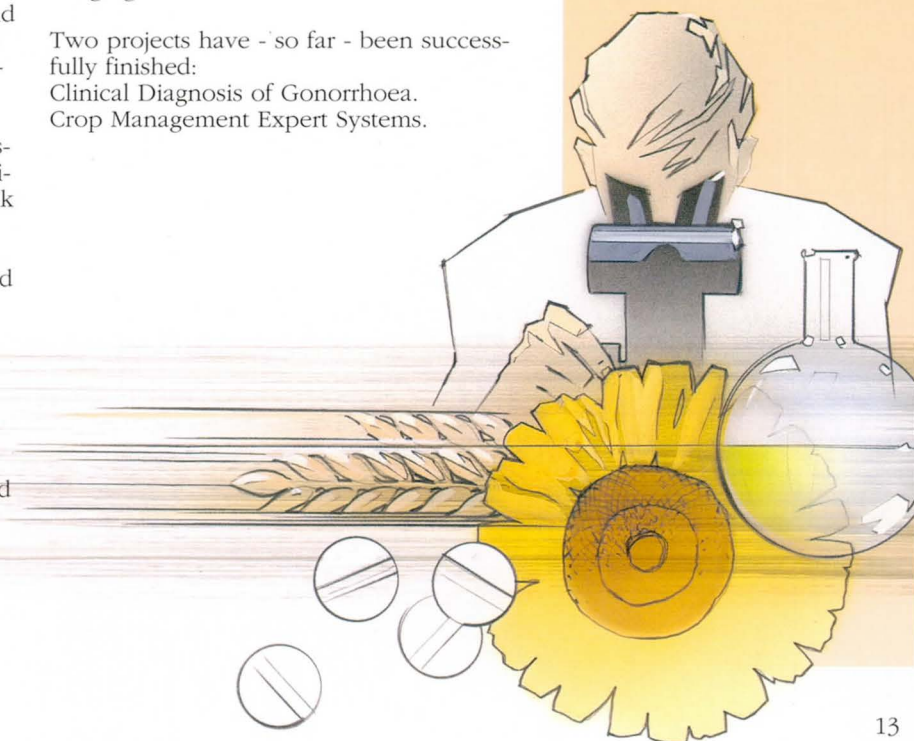
There are 11 ongoing projects in the Animal Breeding area including 6 projects working with new or improved feeds/additives and feeding processes for livestock, 4 projects aiming at fish and clam farming as well as one project dealing with the "computer-aided farm": animal identification through an implanted transponder.

Among the 23 projects in the Agro-Biotechnology area, 6 projects concentrate on genetic improvement/enzymatic modification of crops such as sunflowers, onions, carrots, brewing barley, brassica, soya protein, etc. Another 5 projects concentrate, partly with rDNA technology, on micro propagation, plant embryos and hybrids, addressing economic quality improvements of tomatoes, artichokes and others, a further 5 exploit the possibilities for higher yields using natural organisms (e.g. rhizobacteria for seedcoating or micro-organisms as natural regulators) or new farming methods (e.g. a basic improvement in carob tree care), whilst finally, no less than 7 projects concentrate their efforts on managing agro products and production ranging from the application of Expert Systems for farming to new beverages, from enzyme preparations of bitter lupin seeds to automated saffron production and environmentally improved packaging of liquidfoods.

20 of the ongoing biotechnology projects have primarily a Production Methods orientation. Protein production (5 projects) ranges from a new generation of milk products to highly specialised pharmaceutical proteins; 2 projects concentrate on cell cultures/growth, 6 others on enzymes for high yield paper pulps, on peptides, heparin and saccharides and one on a new type of natural emulsifier. In 2 further projects new mineral membranes and separation processes are being developed for high value biological production and in 4 others new analyses and screening methods, among which one is for the understanding of DNA and another for 2D gene imaging.

Two projects have - so far - been successfully finished:  
Clinical Diagnosis of Gonorrhoea.  
Crop Management Expert Systems.

Ongoing projects: 93  
of which announced  
in The Hague: 27  
Finished projects: 2  
Total Cost: 871 MECU  
of which cost of The Hague  
projects: 284 MECU  
Participating  
Organisations: 316  
Main Subjects:  
• Diagnosis and treatment  
of diseases  
• Animal breeding  
• Genetic engineering  
of plants  
• Biotechnological  
production processes



Ongoing projects: 29  
of which announced  
in The Hague: 6  
Finished projects: 3  
Total Cost: 1545 MECU  
of which cost of The Hague  
projects: 40 MECU  
Participating  
Organisations: 207  
Main Subjects:

- Standards/Norms
- High Definition Television
- Specific Systems Improvement
- Networking/Systems Integration
- Communication Techniques
- Business and industrial applications

Communications, being the nervous system of the economic environment, are crucial for the development of tomorrow's Europe. This year EUREKA has added six new projects to the area of communications, which is the second largest in terms of budget.

The projects involving standardisation aspects three aim explicitly at using the Open Systems Interconnection (OSI) reference model. One aims to strengthen the European academic and industrial research infrastructure, while another focuses on software for communications security and a third is developing man-machine interfaces complying with ISO-OSI.

Several projects deal with signal transmission: one is working on the digitalisation of radio signals; two others on algorithms used for speech coding/decoding and bit reduction rate respectively; another one on a very high bit-rate optical transmission system; a further project is dealing with CODECs which is compliant with CCITT recommendations for high quality sound in telephone sets. Of the two new projects, one is aiming to produce a transceiver to allow communication between a ground station and mobile units via a satellite system, and the other is working on the design of an electronic board to achieve fibre optic communication capability up to 1 GDBS for worldwide standard VME workstations.

Specialised applications include an improved system for stereophonic sound reproduction, intrusion identification for personal telephones, mobile communication, electromagnetic compatibility and the combination of computer imaging with computer-assisted live shooting techniques in TV and video production. A newly announced project is to develop protocols for medical data interchange throughout Europe.

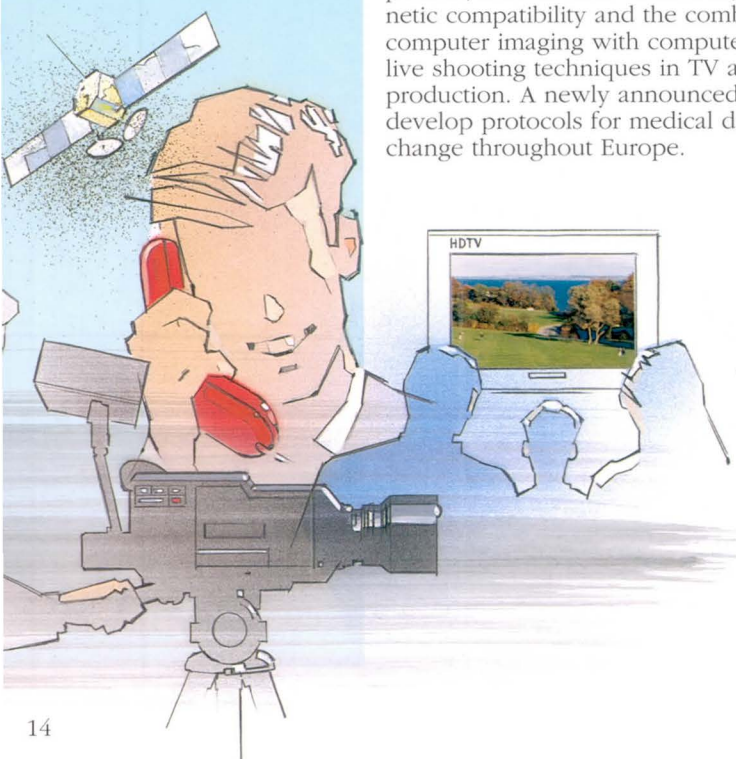
In industrial applications, one project is concentrating on fieldbus networks which meet the requirements of individual islands of automation for real-time process and machine control. Another is a model of information used for the definition, design and manufacturing of industrial products in the management of large cooperation programmes. A third project deals with setting standards for the exchange of documents between partners in joint construction and public works. Two large projects are working on the development and marketing of advanced reservation and information systems for easier travel by a cover-it-all concept in the tourism business. There are two new projects. One is working on the design of standard interfaces for intelligent sensors and actuators in manufacturing, while the other is developing an intelligent measurement and data collection system for energy management.

The most important EUREKA communications project, HDTV (High Definition Television) is proceeding in its implementation phase. The Hague Ministerial Conference reached broad consensus on the need to adopt a European HDTV standard recommending concerted cooperation between its members to actively prepare for the introduction of HDTV and to establish consistent regulations for television broadcasting throughout the continent. A related project is developing a bit rate reduction algorithm to implement CODEC prototypes in line with the standards emerging from the RACE programme. A new project is working on compatible enhancement of PAL television.

Two projects straddle the Information Technology and Robotics areas: one is dealing with thin film magnetic heads on silicon for peripheral equipment and sensors while the other is developing an integrated vacuum instrumentation system as a process improvement for the semiconductor industry.

The Integrated Home System Project has now finished its EUREKA phase - to set an industry standard for cordless, mains-borne and wired bus communications inside the home and to encourage market development by demonstrating inter-connectability between different systems.

SUPPORTIVE MEASURES: coherent and timely actions are being taken to pave the way for the acceptance of European standard proposals for HDTV, digital broadcasting, telephone security and optical transmission, to name just a few. Cooperation is proceeding effectively with the standardisation bodies such as CEN, CENELEC, CCITT and with ETSI.



Six projects relate directly to energy production. Gas turbine projects are well represented, with applications ranging from small car engine turbines to large ones for electricity supply, marine or fast train propulsion or power generation. These projects involve new materials (e.g. ceramics) or electronic control reducing turbine weight and increasing efficiency and speed. This will also reduce fuel consumption and pollution. Hydrogen-powered trucks and buses using seasonal and weekly surplus of electricity form the theme of a further project. One project aims to build a compact, non-polluting 300 MW coal-fired power station which will meet the most stringent environmental requirements in a cost effective way, even using fuels with a very high sulphur content. Finally, a high speed diesel for multi-applications is being developed in one project.

Four projects deal with solar energy. One involves the development of a commercial scale solar energy demonstration plant rated at 30 MW, which goes one step beyond existing research and test plants. Another solar power plant project places emphasis on problems due to extreme meteorological conditions, especially in alpine regions. Therefore key issues are increased system efficiency, reliance and expected lifetime, reduction of maintenance and minimisation of environmental impact. Two projects involve the use of amorphous silicon in photovoltaic cells for autonomous electric power supply. In the first project the new thin film technology is scaled up in size and production throughput with the focus on photovoltaic modules for solar energy applications. A significant number of photovoltaic modules developed in this project have already been sold and another product of this project, a photovoltaic sun roof for cars, will soon be commercialised. The second project, alongside the development of solar cells for commercialisation, focuses on amorphous silicon particle detectors for industrial, medical and synchrotron radiation experiments.

Hydrocarbon production technologies are addressed in four projects. One of these will design a low cost oil and gas production facility for small reserves in deep water. The unmanned floating station will be remotely operated from the main production platform in an offshore field. A second one studies the in-service of flexible riser systems which are normally designed by means of computer models. Now practice and theory are compared to improve on current systems.

The third one develops 3D seismic processing techniques for the accurate delineation of complex geological structures with the aim to improve the exploration of hydrocarbons. The objective of the last one is to field test a novel biotechnological process to improve recovery of oil by stimulating oil-wells in carbonate reservoirs.

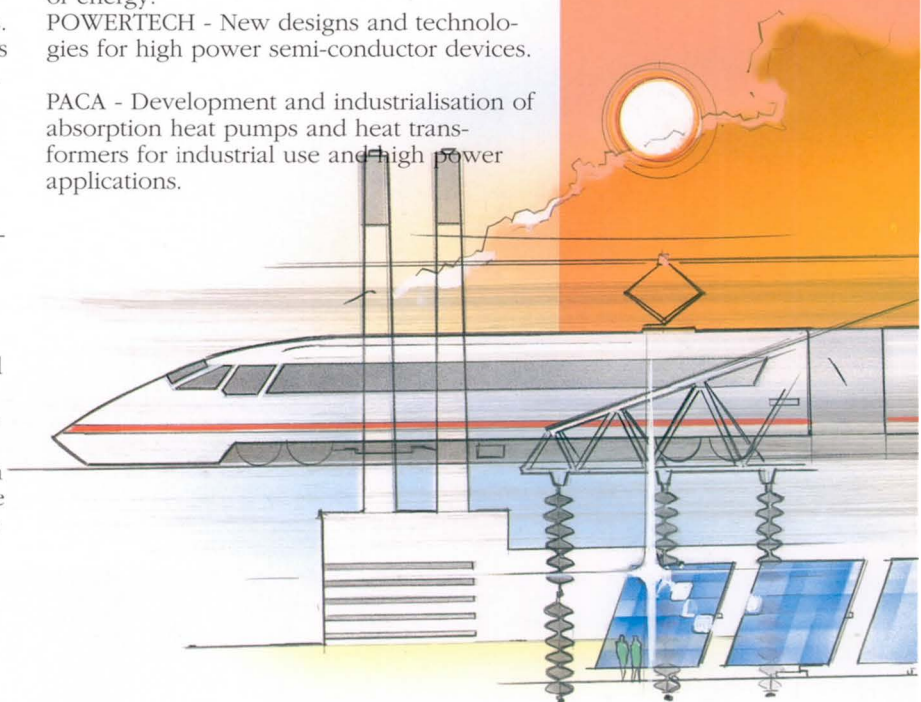
Three projects share the aim of increasing the efficiency of existing systems, while reducing costs and minimising side-effects. One project intends to develop a new concept in Uninterrupted Power Supply whereby the UPS unit, in addition to other improvements, will no longer pollute the supply network. A second one is developing advanced power and high voltage semi-conductor devices to be incorporated in new and specific AC motors' electronic controls of white line appliances. The development and construction of two wind power stations with 3 MW rated power, is the aim of a further project. The windmills will be larger, lighter, more efficient and quieter than their predecessors.

Finally, one project is endeavouring to thoroughly reshape the conventional coke-making system by demonstrating a new high capacity coking reactor which is going to reduce production costs, increase the rational use of energy, resolve the problems of environmental protection and health and safety in the workplace.

Two projects which have successfully finished have dealt with issues on rational use of energy:  
POWERTECH - New designs and technologies for high power semi-conductor devices.

PACA - Development and industrialisation of absorption heat pumps and heat transformers for industrial use and high power applications.

Ongoing Projects: 18  
of which announced  
in The Hague: 5  
Finished projects: 2  
Total Cost: 586 MECU  
of which cost of The Hague  
projects: 38 MECU  
Participating  
Organisations: 98  
Main subjects:  
• Gas turbines  
• Solar energy  
• Hydrocarbon exploration  
and production  
• Rational use of energy



Ongoing projects: 105  
of which announced  
in The Hague: 36  
Finished projects: 3  
Total Cost: 867 MECU  
of which cost of The Hague  
projects: 114 MECU  
Participating  
Organisations: 548  
Main Subjects:

- Atmospheric pollution
- Marine technology
- Restoration of cultural heritage and building-stock
- Environmental monitoring
- Water treatment

The area of environment is characterised by its number of Umbrella projects (EUROMAR, EUROCARE, EUROENVIRON), one large individual project (EUROTRAC) and a cluster of projects (ENVINET). Out of the 108 environmental projects, 80 fall into these groups leaving 28 independent projects.

EUROTRAC is the largest individual environmental EUREKA project with emphasis on the transport and transformation of pollutants over Europe. The project involves almost 150 organisations from 17 different EUREKA members plus institutes from three European non-member countries, thus representing a real European joint enterprise in atmospheric sciences.

The EUROMAR umbrella project focuses on the development, application and successful exploitation of Europe's advanced marine technology which has worldwide market potential. EUROMAR brings together marine researchers, agencies, designers and industries from thirteen European countries plus the CEC. Eighteen specific projects have been announced involving remote sensing, models, data systems, bottom systems, instruments and carrier systems and atmospheric input.

The EUROCARE umbrella project deals with conservation and restoration of the cultural heritage and building stock in Europe. Twenty individual projects have officially started addressing issues related i.a. to foundations, wood protection, wall paintings, concrete, marble, granite and Roman mosaics, copper, monitoring and control mechanisms and protection buildings.

The EUROENVIRON umbrella project concentrates on the terrestrial environment. It has so far generated 27 projects aimed at international environmental management markets. These projects deal with air pollution control, water quality, industrial and urban wastes, environmental catastrophes, clean production technologies and environment management systems.

ENVINET is the common heading for a further group of eleven projects. These projects aim to develop innovative systems of environmental monitoring. This involves advanced sensors, analysis of environmental data and integrated systems.

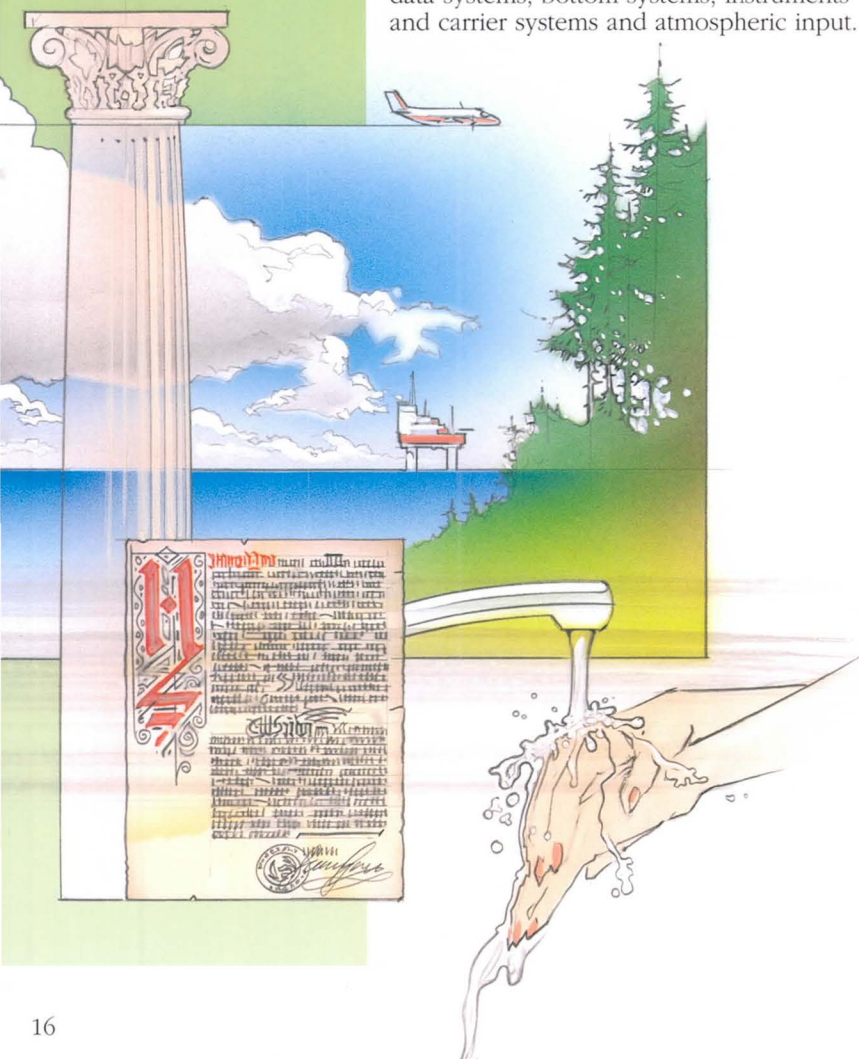
Moreover, there are four specific projects improving water treatment systems, two on sludge treatment, two developing monitoring vessels, one involving an off-road machine for reforestation. Airborne measuring of vegetation, improvement of the health of forests, smoke measurement, dust removal, plastics recycling and fluor hydrocarbon replacement are further projects.

The rest of the projects address most diverse environmental aspects - wave attenuators, oil tankers, repositories for hazardous waste, public halls in rocks, the protection of marble and hazardous gases.

Three projects have finished:  
NEWTAN - Chrome tanning-salts substitutes

EUROTRANS-SOURCE - Experimental techniques for dominant noise identification of transportation vehicles

ZEOL - Purification of air and water effluents especially from industrial outlets by the removal of organic compounds.





# INFORMATION TECHNOLOGY

The projects grouped under this heading encompass, with different emphasis, the traditional IT sectors and give preference to applications. The pervasiveness of IT is felt by virtually all industrial processes and products and affects most aspects of human life. Consequently the use and exploitation of IT can be found in all technological areas of EUREKA. Over half EUREKA projects involve IT applications and/or electronic devices.

EUREKA's contribution to Europe's endeavours in integrated circuits such as ASICs, EPROMs, hybrid circuits and power ICs, now accounts for nine projects, with further projects dealing with CAD and manufacturing techniques in interconnection and packaging. The first implementation phase of JESSI, the largest R&D collaborative activity within the European semiconductor industry, was completed at the end of 1991. 70 projects have already received the JESSI label and more than 40 are now up and running. Designed to meet the outside challenge and to guarantee the strategic independence of industry, JESSI has a vertically integrated structure covering the whole industrial spectrum of semiconductors by the development of new technologies and processes, tools for new applications and new production equipment and the carrying forward of basic research. JESSI and Sematech have now signed an agreement to cooperate on a project by project basis to best utilise mutual capabilities in Europe and America and maximise effectiveness by saving time and duplication of efforts.

Six projects deal with sensors and signal processing for acoustic, optical and mechanical data on pressure, acceleration, temperature, etc. In peripherals, a picture quality colour ink jet printer, a secure card reader in bank communication and an open control display system are under development.

Software technology projects address management of software production processes and improvement in development productivity and quality assurance. Logic programming tools are being developed for Expert System development, while parallel computing is the basis for compiler and operating system development of the Transputer. Software reusability and software quality evaluation are the aim of a number of artificial intelligence projects. The three new projects address RISC tools, CASE and a UNIX-type parallel operating system respectively.

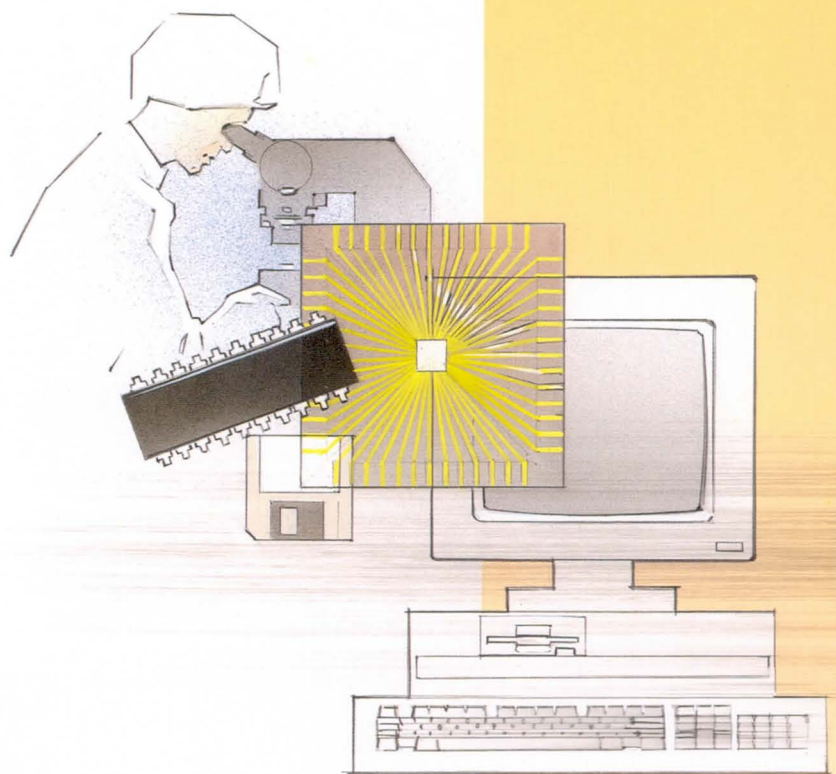
Specific software applications are applying artificial intelligence such as the computerisation of engineering tasks and the tackling of plant failures for security control. Two new projects are developing real-time control and scheduling tools. Models and simulations are employed in design tools and non-destructive testing. Natural language and linguistics are used in projects involving translations, dictionaries and thesauri, as well as education. A medical digital information system for hospitals and portable terminals for diagnostic and therapeutic decision-making in the field are important contributions to health care, to which gait analysis for clinical rehabilitation has now been added.

Radio-determination and messaging by satellite, automatic map making and a touring information system are other practical applications. New projects are tackling the identification of passenger luggage to improve security, the support of waste water treatment, biomass estimation in fish farms, CENELEC compatible audio entertainment equipment and the development of enabling technologies for digital television.

Five have successfully finished in the IT area.

SUPPORTIVE MEASURES refer particularly to standards in the software sector which have to be followed in their process of adoption by the relevant international bodies.

Ongoing projects: 64  
of which announced in The Hague: 14  
Finished projects: 5  
Total Cost: 1823 MECU  
of which cost of The Hague projects: 110 MECU  
Participating Organisations: 335  
Main Subjects:  
• Hardware Components Production  
• Software Developments Production  
• Information Storage/ and retrieval systems  
• Generic applications in Information Technology  
• Specific applications in other technology areas



# LASERS

Ongoing projects: 14  
of which announced  
in The Hague: 3  
Finished projects: 1  
Total Cost: 344 MECU  
of which cost of The Hague  
projects: 30 MECU  
Participating  
Organisations: 216  
Main Subjects:

- Evaluating  
umbrella project
- High power laser  
developments
- Industrial applications
- Safety standards
- Specialised measurement

Lasers generate intensive, coherent and monochromatic light in the visible and adjacent ultraviolet and infrared wavelength regions. Various applications offer themselves in accordance with the physical properties of different laser types and have consequently been developed over - in essence - the past 30 years. The 15 EUREKA laser projects reflect in their variety the present forefront of these developments.

Since laser technology is comparatively young, the development of various lasers per se including beam handling optics is still a challenging task.

The project area is dominated by an umbrella project - EUROLASER - which has the aim of evaluating and developing industrial lasers for material processing with special emphasis on the possibility of integration into flexible manufacturing systems. The primary technological goals are to improve efficiency and physical system properties.

In order to explore the potential offered by higher power, three projects concentrate their efforts on the development of high power CO<sub>2</sub> lasers (10 and 20 kW per cell with coupling possibilities to multiples) aiming at improved metalworking applications in industry, where currently up to 5 kW lasers are used.

Apart from power level, other laser properties are also important. Four projects are therefore developing other lasers, offering industry a choice of characteristics, particularly with regard to wavelength, but also a choice between pulsed and continuous power: two Excimer projects (pulsed UV light for high efficiency absorption in e.g. microlithography), one CO project and one solid-state project.

Besides the development of the respective laser itself, none of the projects neglect to study adjacent applications. Three projects are, however, more expressly devoted to industrial application development: solid-state, laser-based advanced manufacturing, a database for knowledge dissemination, a laser workstation for advanced surface treatment and the development of large area micro-electronics laser lithography.

In summary, the above laser projects aim at metalwork, surface treatment and fine mechanical machining with improved accuracy and tolerances, fewer influences on the surrounding material and greatly improved efficiency, all with a view to integration into the flexible machining systems of modern industry.

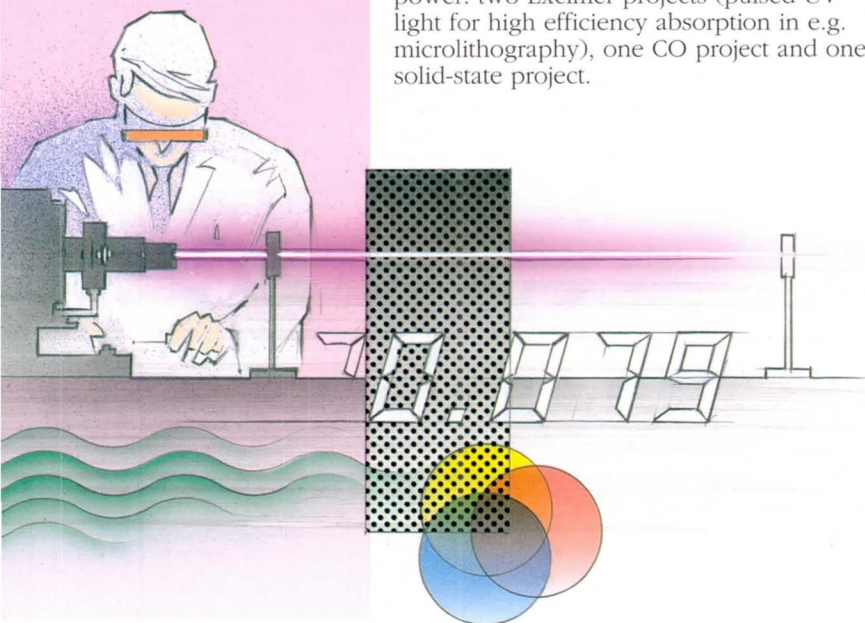
Two recently started projects concentrate their efforts on the safety and environmental aspects of work with high power lasers, one with emphasis on typical applications in the mechanics industry, the other on the medical /surgical field. In both these projects there are a large number of participants from all over Europe and - of course - intensive contacts with standardisation bodies.

Finally, there is one project in which the ability to transfer signals, not the intensity of the laser is important: remote vibration measurement with lasers avoids the old problem of interference between the sensor and the vibrating object.

Industrial progress is reported by most of the projects such as well-kept time schedules, a steady success in solving technical problems and promising market contacts. The heavy emphasis on application development can be taken as solid ground for market orientation and the efficient transfer of the findings from research to industrial reality.

One project has been successfully finished: Cooperative research in laser applications (see individual project description).

Supportive measures in the laser area are concentrated on standards - especially as regards safety - as reported in previous years and are now emphasised by two new projects devoted to safety. This work continues in close cooperation with the EUROLASER Governmental Coordination Committee and the CEC.



# NEW MATERIALS

In contrast to most other technological areas within the EUREKA project portfolio, the area of New Materials does not include any umbrella or indeed any of the remarkably large projects. Material projects are actually the "cheapest" group, with an average of 6.63 MECU per project compared to the total average of 16.60 MECU per project. The project portfolio "MATERIALS" within the EUREKA framework contains primarily 45 ongoing projects plus 3 finished projects.

After a good many centuries of development into new and better materials, modern activities on this important front of technological development do not only concentrate on "the latest" new materials such as compounds, fibre-reinforced specialities and ceramics capable of withstanding the utmost of technically motivated loads. In fact, further development in seemingly traditional materials such as steel and aluminium is also subject to advanced research and innovation.

As in so many other areas, the boundary between development of the product and the adjacent production process has also begun to disappear - and probably especially so - within the materials area, resulting in many projects concentrating on manufacturing processes for new materials rather than the development of the material itself.

All in all, an overview of the various projects is facilitated by grouping them into four subject areas: the development of new materials as such, new processes to produce new as well as conventional materials, new advanced applications and the development of testing equipment, design codes and standards within the materials field.

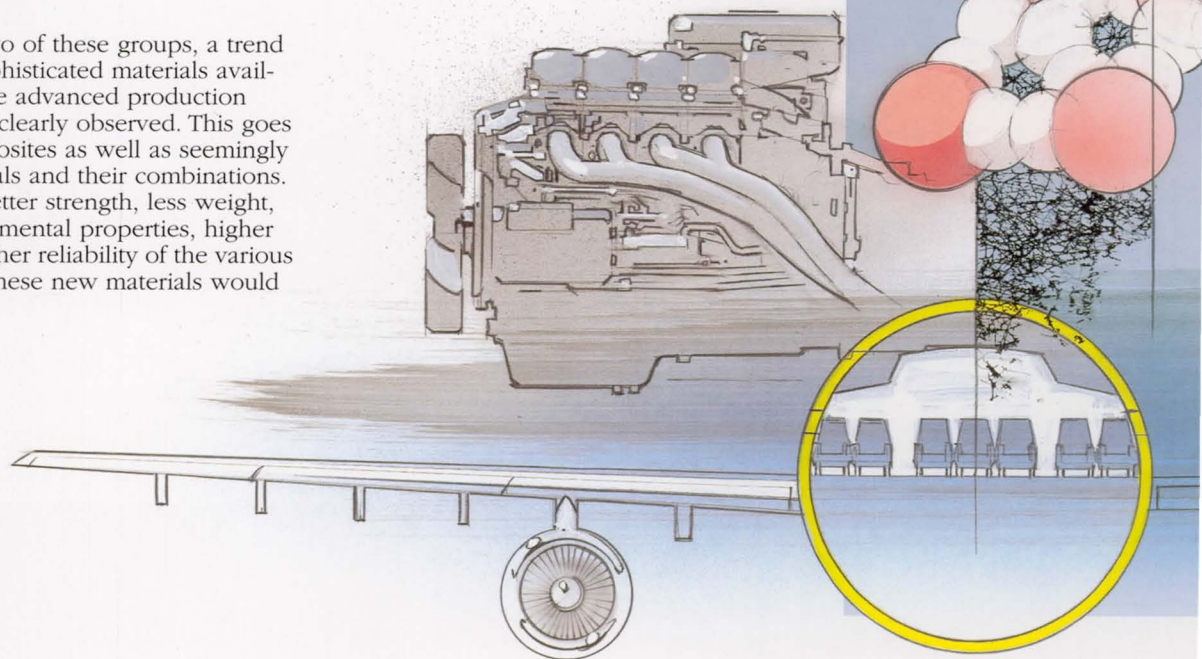
Within the first two of these groups, a trend towards more sophisticated materials available through more advanced production processes can be clearly observed. This goes for modern composites as well as seemingly conventional metals and their combinations. Emphasis is on better strength, less weight, improved environmental properties, higher efficiency and higher reliability of the various products, which these new materials would make possible.

The second group consists of 10 projects working on processes for various metals and non-metallic materials. For example, one aims to achieve strong joining by using electron and laser beam technologies for welding medium and high strength aluminium alloys. Another is trying to develop a method for hardening road/building material via the optimisation of natural phenomena, i.e. diagenesis and laterisation.

In the area of new applications, 11 projects involve the mechanical industry, 5 projects the construction sector, another 6 electrical/optical applications and finally 2 the process industry. While one of the projects in this group - as an example - concentrates on the thorough investigation of existing new materials with the emphasis on thermo-plastics and other non-metallic possibilities for car bodies, another one focuses on high pressure sub-sea piping for oil and gas from high performance fibres.

4 projects in the materials area are expressly aimed at developing new testing methods or equipment, whilst 2 concentrate their efforts on the establishment of design codes/rules databases. In this group, one of the projects aims to solve the corrosion of copper tubing used for fresh water transport and develop a commercial instrument for measuring the degree/danger of such corrosion. The development of a practical design code for components such as pultrusion, stressed skin panels, filament wound tubes and stressed roofs, etc. used in civil and structural construction is the aim of another project.

Ongoing projects: 45  
of which announced in The Hague: 14  
Finished projects: 3  
Total cost: 318 MECU  
of which cost of The Hague projects: 77 MECU  
Participating Organisations: 216  
Main Subjects:  
• new materials as such  
• new production processes  
• testing methods  
• design codes



# ROBOTICS AND PRODUCTION AUTOMATION

Ongoing Projects: 93  
of which announced  
in The Hague: 14  
Finished Projects: 4  
Total Cost: 1266 MECU  
of which cost of The Hague  
projects: 81  
Participating  
Organisations: 540  
Main Subjects:

- flexible manufacturing and automated assembly systems
- Computer Integrated Manufacturing
- enabling technologies (sensors, software tools and components)
- robots

The EUREKA project portfolio deals with all aspects of the increase in productivity of today's and tomorrow's factories and therefore covers almost the entire field of manufacturing including robotics. Consequently it remains one of the largest fields of activity within the EUREKA initiative, with a current total number of 97 projects, 14 of which were announced at the last Ministerial Conference. Projects cover areas such as Advanced Manufacturing and Factory Automation, Stand Alone Robots and Enabling Technologies.

In the area of Advanced Manufacturing and Factory Automation, 12 projects cover various aspects of the improvement of techniques, technologies and tools for the existing production of a variety of goods.

In contrast to Computer Aided Design and Engineering, only represented by a limited number of projects in this manufacturing field, Flexible Manufacturing and Automated Assembly Systems (FMS and FAS), are very well presented with 31 projects. They cover the entire spectrum of FMS, ranging from the improvement of assembly line productivity and the quality of products assembled by on-line quality control, to stock level reduction, application of just-in-time principles and flexibility enhancement of products and production.

The great number of projects in the FAS-FMS area can, of course, be explained by the existence of the Umbrella project FAMOS, a project generating mechanism which has launched 44 projects to date. This intensive network, represented in 17 countries, disseminates information on project ideas and tries to link suppliers and appliers of the assembly techniques, in the development of pilot plants and innovative tools, for a large variety of industries.

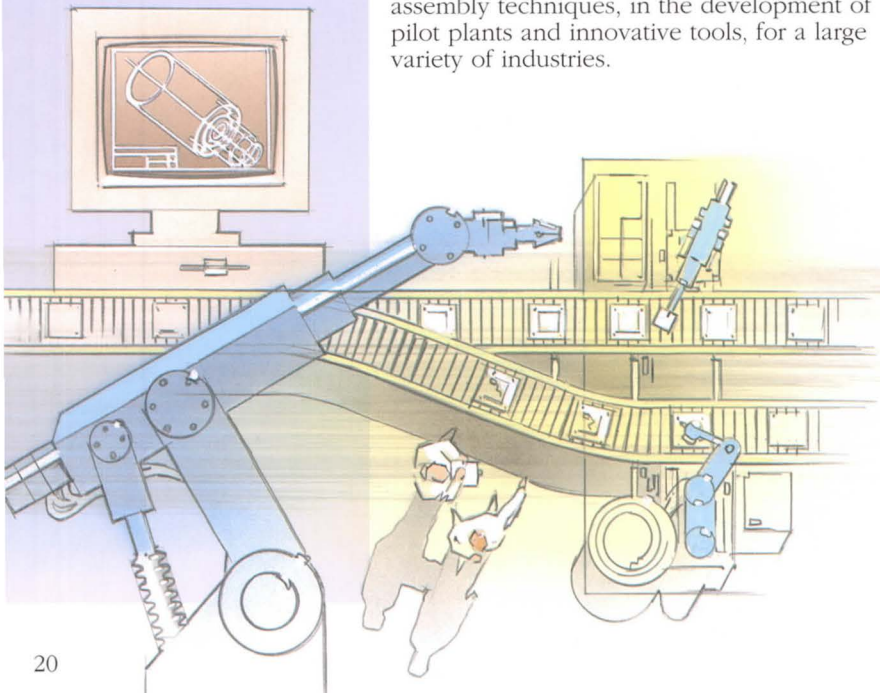
Information on ongoing FAMOS projects and activities was also disseminated at a FAMOS Forum in Toulouse and at the second summer school on flexible assembly in Venice, aimed at young researchers in industry.

More and more, FAS projects tend to go further than the scope of FAS alone and try to integrate CAD, CAM, FAS and FMS into the overall concept of Computer Integrated Manufacturing. 14 projects have this CIM concept as their main aim, offering either solutions to a variety of industrial branches or to a single sector.

Such developments are impossible without a parallel development in enabling technologies and tools for this new manufacturing scheme. 20 projects can be classified in this area. 3 of them deal with the development of sensors of high accuracy and/or applicable for quality control systems in CIM. 12 deal with the development of special software. Among them is the project EUROPARI which has 4 running projects, thereby creating more than 80 modules for applications in various areas of aircraft manufacturing systems. 5 of the 20 projects are working towards the development of special tools and components in some special manufacturing processes.

The last area in the Robotics and Production Automation sector contains 16 projects devoted to the design and development of independent movable robots in and outside traditional industrial conditions. 2 of them involve an application in more traditional industrial sectors (welding and warehousing). 4 projects deal with robots intended for applications in the building and construction sector. 4 others deal with applications in the agriculture and fishing area. 3 projects focus on special underwater applications. Finally, 3 projects aim to use robots for interventions and surveillance in conditions in which it is too dangerous for humans to operate.

Although most of the projects in the Robotics and Production Automation area have a rather long duration (more than 24 months) the industrial and/or feasibility results are now steadily increasing.



# TRANSPORT

Mobility is one of the predominant characteristics of our modern society. Safeguarding and increasing this mobility for man and goods transport, offering solutions to the environmental problems of this mobility and increasing its efficiency, comfort and safety, are the main aims of the 23 projects listed in this area. Two of them were announced in The Hague.

The main group of projects in the transport area is related to road and inland water transport. The largest project in this sector aims to create concepts and solutions to improve all the features of road traffic in Europe; it therefore teams up the automobile industry with both the electronics and the vehicle components supply industry and basic research specialists, linking in this way almost 160 participants with the main European car manufacturers and contractors in the project.

Some practical solutions to these features are under development in separate EUREKA projects (car status information and environmental information).

In this information package for the driver, the development of digital cartography plays a major role. It was the basis of two projects focusing on the development of a common standard in this area and on digital databases for various countries.

3 projects focus on the development of components for all sorts of vehicles: a range of gearboxes and engines for industrial vehicles, new gear technology for all terrain vehicles and a new vehicle headlight system based on short arc discharge lamps.

Transport needs an adequate infrastructure. 4 projects are working on the development of certain aspects of infrastructure such as fire protection in tunnels, new concrete highway surfaces to be applied in a cold environment, new infrastructural systems and devices for guided buses and advanced systems and technologies to be added to the traditional road infrastructure in order to solve problems faced by today's urban and interurban road traffic.

1 project deals with the development of a fuel cell bus, an entirely new public transport vehicle with interesting performances in environment, energy consumption and infrastructural requirements.

Logistics is another important project area, covered by 5 projects: Some of the main aims of the projects in this area are: controlling the product flows on land and inland waterways, thereby creating integrated information and transport networks throughout Europe, including contact and data exchange between vehicles and their home base and the development of a concept for physical centres of trade and transport.

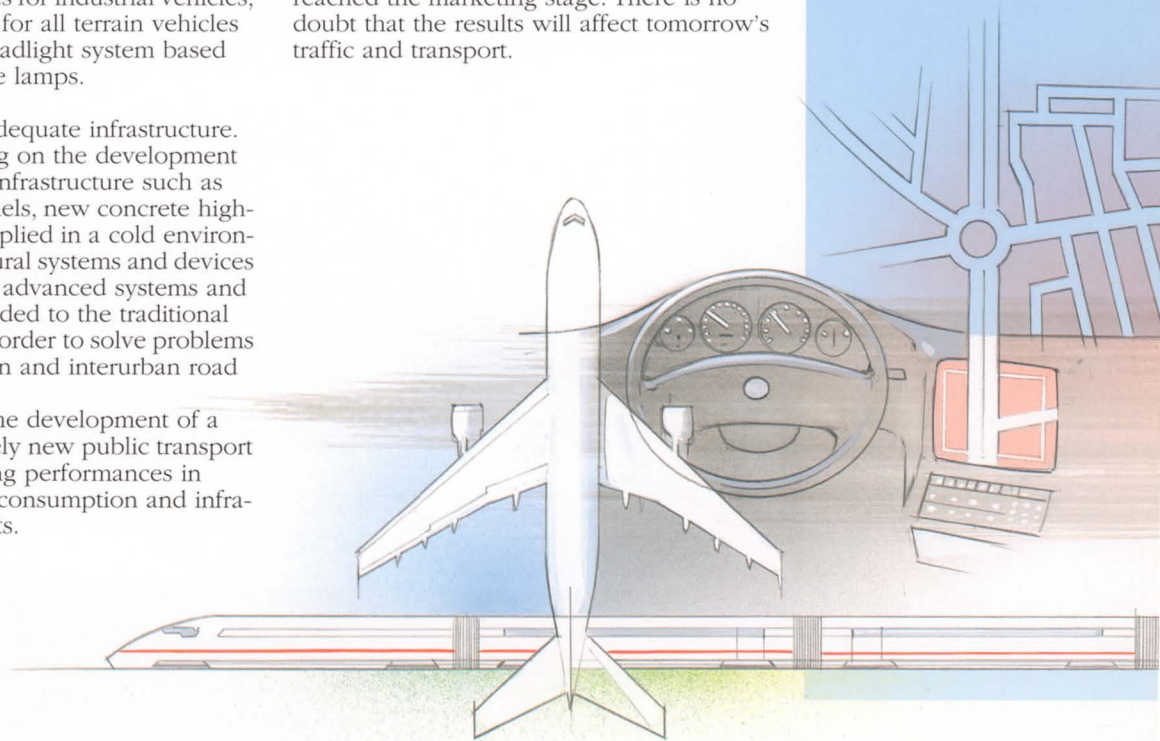
Railway improvement is the goal of 3 other projects. The aims of these projects range from the development of a new generation of high power thyristors for railway traction to, especially for high speed trains, the development of a linear train motor on the one hand and new engineering solutions for expansion joints for the continuous rail on the other.

2 projects focus on aircraft development and air transport: the development of an advanced amphibious aircraft and feasibility studies on the introduction of a new type of aerial transportation system based on the tilt rotor aircraft.

Finally, the transport sector has also become increasingly aware of the time and efficiency lost in transferring goods and men from one transport mode to another. One project therefore centres its activities around this topic, proposing road trailers capable of transformation into a normal train freight car.

A number of these projects have already reached the marketing stage. There is no doubt that the results will affect tomorrow's traffic and transport.

Ongoing Projects: 19  
of which announced  
in The Hague: 2  
Finished Projects: 4  
Total Cost: 764 MECU  
of which cost of The Hague  
projects: 4 MECU  
Participating  
Organisations: 225  
Main Subjects:  
• road transport  
• logistics  
• infrastructure  
• air transport systems  
• railway improvement  
• integration of transport  
modes



# STATISTICAL TABLES

## FINANCIAL SIZE OF PROJECTS (PC) IN MECU

N° of projects per area

Project Cost (MECU)	Total N° of projects	BIO	COM	ENE	ENV	INF	LAS	MAT	ROB	TRA
PC ≤ 1	74	11	3	2	27	11	1	9	8	2
1 < PC ≤ 2	67	18	3	2	17	3	1	11	8	4
2 < PC ≤ 5	133	24	4	4	33	23	2	16	22	5
5 < PC ≤ 10	77	16	4	2	15	7	1	4	24	4
10 < PC ≤ 20	68	13	7	2	8	14	4	4	15	1
20 < PC ≤ 40	44	6	5	4	3	5	2	2	14	3
PC > 40	42	5	6	4	5	6	4	2	6	4

## PROJECT PROGRESS

N° of projects per area

According to schedule	Total N° of projects*	BIO	COM	ENE	ENV	INF	LAS	MAT	ROB	TRA
≤ 1/4	110	30	6	2	33	13	3	9	13	1
1/4 - 1/2	96	12	4	5	34	8	1	10	19	3
1/2 - 3/4	82	16	3	3	14	12	4	10	17	3
> 3/4	190	33	16	8	24	31	6	16	44	12

\*) Based on 478 on-going projects

## PLANNED PROJECT DURATION (PD)

N° of projects per area

Project Duration (months)	Total N° of projects	BIO	COM	ENE	ENV	INF	LAS	MAT	ROB	TRA
PD ≤ 24	87	7	4	3	28	12	2	4	18	9
24 < PD ≤ 48	254	47	17	10	53	38	4	28	48	9
48 < PD ≤ 72	131	30	10	5	17	14	8	14	29	4
PD > 72	33	9	1	2	10	5	1	2	2	1

## PLANNED PROJECT END DATES

N° of projects per area

Project End Dates	Total N° of projects*	BIO	COM	ENE	ENV	INF	LAS	MAT	ROB	TRA
≤ 31.12.91	87	13	9	4	16	22	2	7	24	10
≤ 31.12.92	98	20	8	6	16	11	5	9	26	3
≤ 31.12.93	111	14	7	3	24	14	4	17	19	2
≤ 31.12.94	85	20	3	2	24	11	1	9	13	2
≥ 01.01.95	78	24	2	3	25	6	2	3	11	2

\*) Based on 478 on-going projects

# STATISTICAL TABLES

## PARTICIPATING ORGANISATIONS PER EUREKA MEMBER

Number of organisations

Member	Industry		Research		Government/ Nat. Bodies & Others	Total
		of which SME		of which University		
(A) Austria	61	14	25	17	8	94
(B) Belgium	51	15	20	14	3	74
(CEC) CCE	-	-	5	-	1	6
(CH) Switzerland	58	37	29	19	5	92
(D) Germany	241	70	166	85	17	424
(DK) Denmark	47	14	25	9	5	77
(E) Spain	143	42	60	31	10	213
(F) France	345	47	140	44	14	499
(GR) Greece	24	12	13	9	1	38
(I) Italy	202	29	70	28	7	279
(IRL) Ireland	6	1	7	7	2	15
(IS) Iceland	9	9	4	1	1	14
(L) Luxembourg	5	2	-	-	1	6
(N) Norway	70	27	38	11	16	124
(NL) Netherlands	147	47	39	12	14	200
(P) Portugal	22	6	25	16	7	54
(S) Sweden	84	31	36	16	11	131
(SF) Finland	69	21	15	3	6	90
(TR) Turkey	2	-	5	4	-	7
(UK) United Kingdom	179	45	63	35	22	264
	1765	469	785	361	151	2701





# PARTICIPATION OF THE EUROPEAN COMMUNITY IN EUREKA

The European Community has been a full member of EUREKA since its inception and has contributed to its setting up and evolution. The EC R&D programmes and EUREKA converge towards the same goal: the creation of a European technological space.

As indicated in the Hanover Declaration, the Community participates as a partner in EUREKA, e.g. through its own research capacity, R&D programmes and financial facilities, as well as through the creation of suitable general conditions and an environment for technological co-operation. Thus the EC R&D programmes are open to applications from EUREKA project participants.

The Community's commitment to the promotion of significant synergies between its R&D programmes and EUREKA is enshrined in the Third Framework Programme of research and technological development (1990 to 1994), adopted on 23 April 1990.

The Commission and the Finnish Chairmanship have agreed to report on the progress achieved in this regard to the Ministerial Conference in Tampere, Finland, in May 1992.

In 1991, fora were organised jointly by the Commission and EUREKA on industrial lasers (The Hague, March) and on polymers (Ferrara, May); and the Commission participated actively in the congress 'EUREKA, exploring cooperation between East and West' (Budapest, May).

The Community doubled the number of projects of which it is a member to fourteen. Some examples of its involvement are the following:

The Commission has now formally joined the umbrella projects EURO CARE and EURO ENVIRON and their governmental steering committees, and is now a member of all but one of the existing umbrella projects (FAMOS, on whose committee the Commission is active), in view of the increasing synergy between these projects and Brite-EuRam, ESPRIT, EPOCH, STEP and the programmes of the Joint Research Centre.

The COSINE project is funded substantially by ESPRIT and VALUE. It aims to set up a high quality telematic infrastructure for use by the European R&D community, and is now well into its Implementation Phase.

The International X.25 Infrastructure (IXI) backbone network continues to connect the European research and public networks and there are plans to increase its capacity. First services, such as electronic messaging, file transfer, directories, user support, gateways to US networks and others, have also been made available by COSINE during 1991.

PROMETHEUS and the Community's DRIVE programme are recognised to be fully complementary in the road safety areas.

Further to the Council Decision of 27 April 1989, the Commission has been very supportive of the EUREKA HDTV project. Additional HDTV research has been proposed in the context of the RACE and ESPRIT programmes. Also, the Commission was instrumental in the creation of the EEIG Vision 1250, which will ensure the availability of production equipment and programmes for pilot and pre-operational services.

On JESSI (microelectronics), the Commission, along with the national administrations involved, has established a framework governing the relation between their respective domains of activities. The Commission has pursued discussion with the participating countries on the terms of launching the main phase of JESSI as from 1 January 1992 and has received requests to fund four projects within the newly revised JESSI programme, from ESPRIT funds.

Finally, the Commission announced active participation by the Joint Research Centre in TRACY (data-base for toxic metals in human tissues and fluids), Mobile Analytical Laboratory (for in-situ sampling and analysis of wastes, soil, soil-air and water contaminants) and CEFIR (high-temperature ceramic fibres), the latter two as prime partner. The Commission's participation in these projects and in the overall management of EUROTRAC (trace constituents in the troposphere), and the environment-related umbrella projects EUROMAR, EURO CARE and EURO ENVIRON reflect the increasing Community concern with environmental matters.



# PARTICIPATION FROM NON-MEMBER COUNTRIES

In compliance with the decision reached at the VIIIth Ministerial Conference in Rome in June 1990, special importance has been given to the subject of participation in EUREKA projects of entities from European non-member countries in 1991.

In Rome, the Ministers and Vice President of the Commission decided that, "... advantage be taken of the flexibility of the EUREKA rules to favour increased and earlier co-operation of companies and research institutes from Central and Eastern Europe."

In that spirit the first Eastern European Congress "EUREKA, exploring cooperation between East and West" was jointly organised by the Netherlands EUREKA Chairmanship and the Hungarian Government in Budapest in May 1991. The Congress demonstrated the opportunities arising from the developments in Central and Eastern Europe and confirmed that there is a mutual interest in the development of cooperation between EUREKA and European non-member countries and the significant potential of such cooperation.

At the IXth Ministerial Conference in The Hague on 19 June 1991, the Ministers of the EUREKA member states and the Vice President of the Commission took note of the developments with satisfaction. They stressed not only the importance of enhancing co-operation with companies and institutes from European non-member countries but also the need to use and improve the transparency of EUREKA's supportive structures for them as they move towards market economy.

In this respect, the Ministerial Conference decided upon an action programme, also referred to as the "The Hague Statement", which entails an extended information policy, expanded networking and a flexible application of the EUREKA rules in order to enable them (i.e. entities from European non-member countries) to participate in EUREKA projects at an earlier stage. Within this framework, the Ministerial Conference, "... invited the Finnish Chairmanship to prepare further steps that would allow Central and Eastern European countries to become more closely connected with EUREKA and eventually become full members, in accordance with the philosophy and mechanisms of EUREKA."

On the other hand, the existing procedures offer a flexible and pragmatic channel for specific cooperation, thus enabling EUREKA to contribute towards developing cooperative relations on a case-by-case basis with other non-member countries in a diversified and highly dynamic international context.

23 companies or research institutes from non-member countries are already taking part in 18 different EUREKA projects.



EU No	Acronym	Country	Sector
5	ULTRAMEM	Canada	Environment
7	EUROTRAC	Russia Hungary Yugoslavia	Environment
8	COSINE	Yugoslavia	Communications
20	EAST	Canada	Informatics
22	DIANE	Russia	New Materials
37	EUROMAR	Yugoslavia	Environment
226	EUROLASER	Canada	Laser
294	BIOMATERIALS	Yugoslavia	Biotechnology
316	EUROCARE-COPAL	Czechoslovakia Russia	Environment
325	GALILEO	Russia	Communications
334	EUROCASE	Hungary	Informatics
338	SOCOMAT	Hungary	Materials
384	DYMECHROM	Argentina	Biotechnology
417	EUROMAR-MERMAID	Canada	Environment
419	DUMIP	Russia	Robotics
493	EUROMAR-ELANI	Yugoslavia	Environment
496	EUROCARE	Russia	Environment
642	STILMED	Israel Russia	Laser

# INTRODUCTION TO INDIVIDUAL PROJECT DESCRIPTIONS



In this section 16 individual EUREKA projects are presented as examples of what EUREKA projects actually involve. The projects have been selected to give a taste of the wide variety inherent in EUREKA projects. This variety is reflected in the technological span of the projects as well as the geographical distribution of the participants. Furthermore, the wide scope of project participants ranging from multinational corporations to very small companies and from dedicated production industries to university institutes serves to prove that EUREKA really does work as a catalyst in making European industry and research work together to improve European competitiveness.

In fact, although the Initiative is only six years old, some EUREKA-developed products, processes and services, some of which can also be found in this section, have already been successfully launched onto the market.

# CROP MANAGEMENT EXPERT SYSTEMS

Over the years, crop growing in modern agriculture has developed into a very complex activity. Declining margins on most crops and the necessity to produce high quality products in an environmentally friendly way, emphasises the need to fine-tune the production processes. Scientific knowledge along with detailed process information must be made available to the farmer in order to optimise his crop management.

Crop Management Systems (CMS) are computer programmes which give crop related advice to the farmer, in order to increase the quality of his management decisions. These systems provide him with accurate information at the right time. The Eureka project EU 63 was a preliminary feasibility study on Crop Management Systems. By combining the knowledge and the resources of the partners, it has been possible to acquire a good understanding of the needs of the farmer with respect to his information requirements for optimising his crop management. Moreover, by working with several prototypes, the partners developed a good understanding of the way in which this information has to be presented to the farmer.

The conclusion of this study was that Crop Management Systems can effectively support the decisions of the farmer and can also bring research results to the farmers faster.

As a result of the EUREKA project, Prolion (a management-buy-out of the VICON High Tech Development Department) completed the development of a Crop Management System for the control of *Phytophthora infestans* (Blight) in potatoes: "ProPhy".

Blight is a dangerous potato disease which can cause severe damage to the crop. During the growing season the farmers have to spray their potatoes 10-15 times to prevent the disease from infecting the crop.

ProPhy advises the farmer when to spray against blight and what chemical to use. ProPhy is an Expert System and contains detailed information on the characteristics and the control of the disease. Of particular importance in this Expert System is the influence of weather and crop data and the characteristics of the chemicals employed.

Weather data are measured among the crops by means of a weather station, which can either be used by individual farmers, or by a local group of farmers by logging into the weather station with a modem/telephone communication (thus drastically reducing hardware costs). When available, a weather forecast can be downloaded from a videotex system (e.g. VITAK or AGROTEL in Holland).

During tests on farms, the use of ProPhy resulted in a better understanding of the disease, better decisions and up to a 20% reduction in the consumption of chemicals. ProPhy has turned out to be an excellent example of the possibilities of Crop Management Systems. The sophisticated technology used to combine scientific knowledge and specific on-farm data has proved very successful in improving farm management.

Based on this experience, Prolion is continuing its research and development into new systems. It has now expanded its interest and work to cover more aspects of crop growing as well as better measuring equipment.

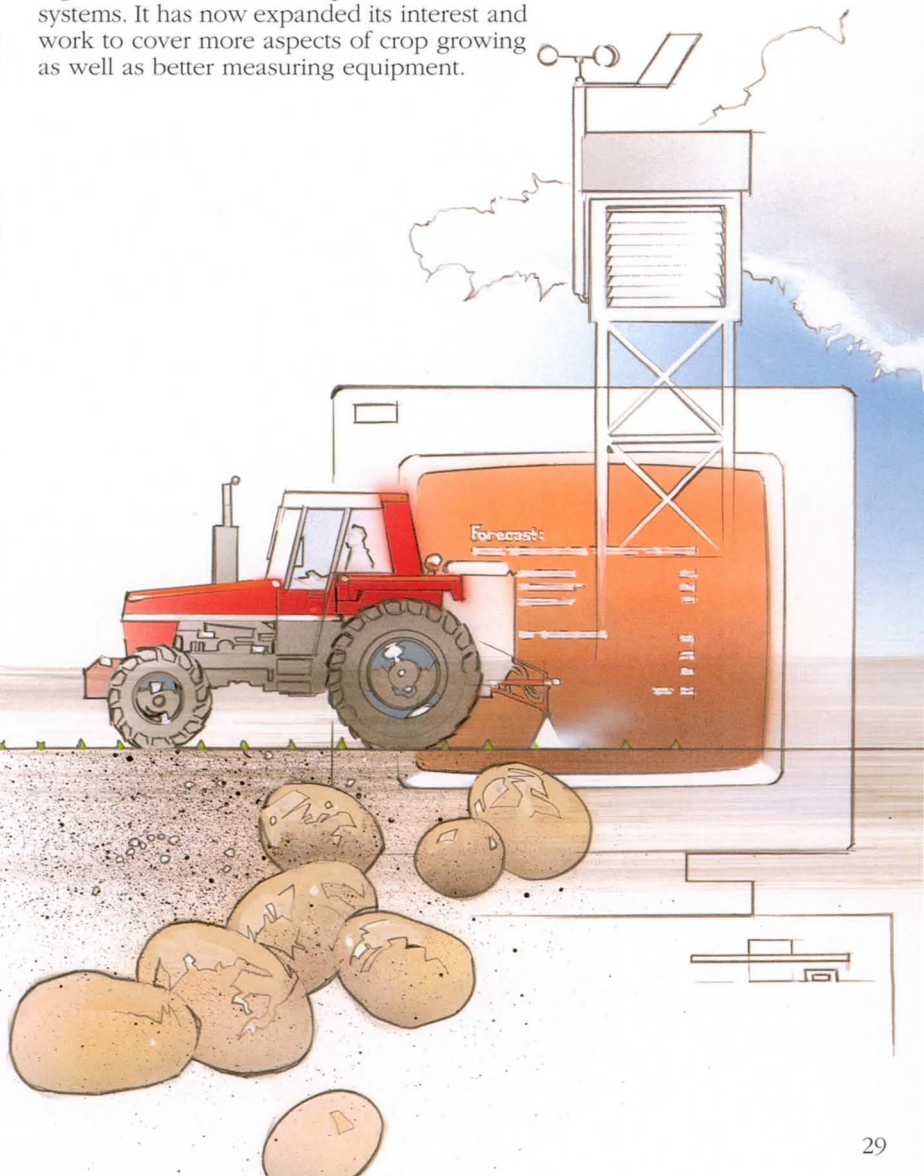
## EU 63

*Medical- and Biotechnology  
Acronym: CROPMAN*

*Title: Crop Management  
Expert Systems  
Announced at: London 1986*

*Participants:  
The Netherlands:  
Prolion Development  
United Kingdom:  
CIBA-GEIGY*

*Main Contact: PROLION  
Development  
Dr. Leon SPÄTJENS  
Tel +31 25 08 1200  
Fax +31 25 08 33 44  
Estimated Costs: 2 MECU  
Time Scale: 48 months*



# MICRO-ORGANISMS INSTEAD OF CHEMICALS FOR SEED PROTECTION

## EU 78

Medical- and Biotechnology  
Acronym: BACTEPROD

Title: *Development of Biological Agents for Control of Soil-Borne Fungal Diseases*  
Announced at: Stockholm, 1986

Participants:

Belgium:

ICI Seeds-SES

Italy:

SES and AGRA

Spain:

SES

United Kingdom:

ICI Agrochemicals PLC

Main Contact:

ICI Seeds-SES

Mr. Marc LEFEBVRE

Tel +32 16 82 11 11

Fax +32 16 81 68 48

Estimated Costs: 2.7 MECU

Time Scale: 58 months

The objective of this project is to develop Biological Control Agents (BCA) that offer alternatives to chemical treatments currently used to protect seeds against soil-borne diseases.

Targeted biological agents are essentially soil bacteria selected as to their effect on major soil-borne plant pathogens (causes of disease). Selected bacterial strains have to be tested to demonstrate that they are reliable and environmentally acceptable.

Such active strains have then to be applied to seeds using an appropriate technology (e.g. coating or pelleting) ensuring their survival during industrial seed processing and storage. Application of BCA in horticulture and for ornamentals will also be envisaged.

Modern agricultural practices permit the farmer to sow the same crop every second or third year on his field. Consequently, soils conducive to various pathogenic organisms are created. The accumulation of soil-borne pathogens induces a shift in the natural rhizoflora which causes substantial crop losses. Seeds for most crops have therefore to be protected against fungal pathogens during the first weeks of growth.

Treating the seeds with chemicals is the common technical solution. However, more recent concerns about health and environmental hazards associated with the widespread use of chemicals have given new impetus to the search for BCAs.

The partners have designed an original selection scheme for isolating potential BCA strains from a range of soil samples. Nearly 10,000 bacteria strains went through a primary screening which revealed the antifungal activity of each specific strain against the selected target diseases (*Pythium* sp., *Fusarium* sp., *Rhizoctonia* sp.).

A second set of screening tests was then applied using soil Bio-assays. In those, the BCA effect was assessed under controlled conditions on a sample of seeds sown in infected soil. Chemical treatments were used for comparison. The best strains were then tested in greenhouses and finally in the field.

The leading strains have now been tested for 3 years in an extensive trial network, mainly on sugar beet and pea seeds. Results have shown that the major soil-borne pathogens targeted on those crops were controlled with a level of efficacy comparable to standard chemical treatments.

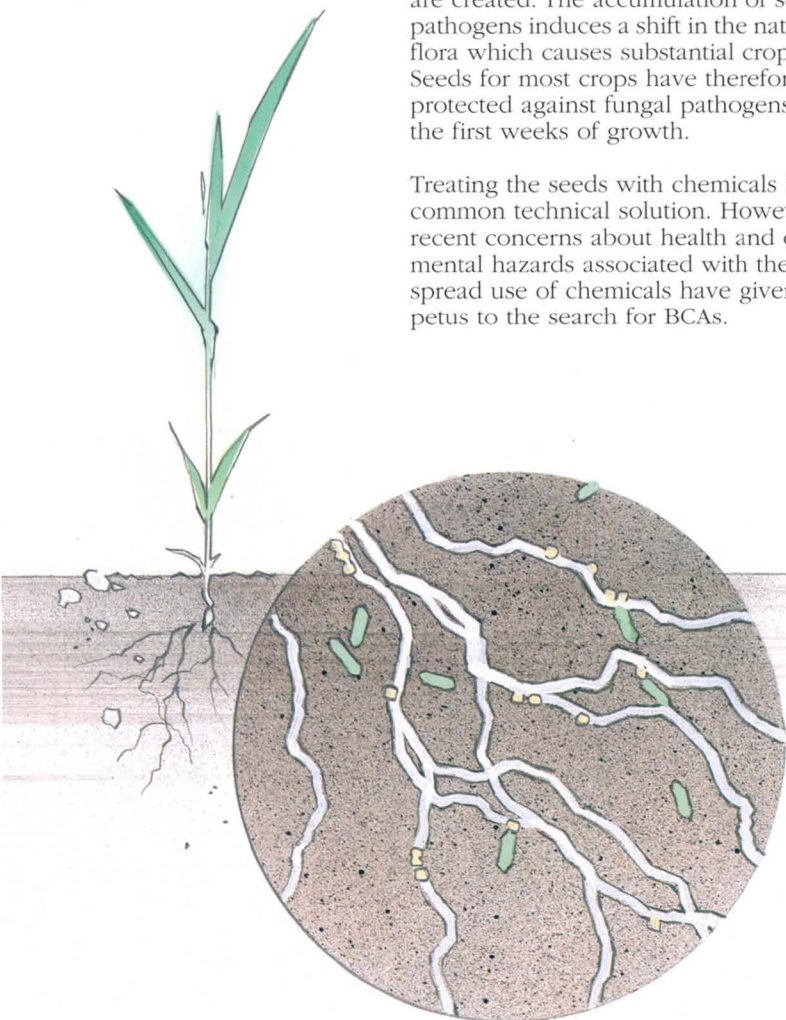
In this first phase, partners demonstrated that selected micro-organisms show a significant control of target diseases, also under agronomical field conditions. All leading strains are members of *Pseudomonas* - excellent root colonisers. Some strains did show antagonism against specific pathogens while others possess a broad spectrum antagonism - most promising for field conditions.

The second phase of the project, started in late 1989, consisted of developing a bacteria seed formulation compatible with the large-scale seed processing. The partners first focused on sugar beet seeds, a very high value product subject to a range of "damping-off", soil-borne diseases. Selected active BCA strains are being incorporated into the pelleting technology applied on the seeds.

Compatibility with physical process conditions as well as long-term storage is now being studied. After slight process modifications a first formulation of BCA treated commercial seeds should be released soon.

The feasibility of the BCA technology opens the way to the exploitation of natural mechanisms: micro-organisms as sources of effective plant disease controlling molecules. BCAs offer a real alternative to chemical treatment:

- Safe and environmentally friendly
- Do not require complex chemistry to produce
- Based on naturally occurring micro-organisms.



# MALARIA VACCINE

The aim of the project is to define antigens of *Plasmodium falciparum* for use as a human vaccine against malaria, and to prepare these vaccines.

Malaria has been known since ancient times and occurred even in Europe. Due to improved living conditions and the introduction of insecticides, the disease disappeared in most developed countries with a moderate climate but continues to claim victims in tropical and subtropical areas: one fourth of humanity is at risk of being exposed to the disease and several hundred millions of cases of malaria occur throughout the world each year.

Among the four types of *Plasmodium* that infect man, *Plasmodium falciparum* is the most virulent and has a very high morbidity and mortality rate. The number of children under 5 dying each year from malaria in Africa is estimated at one million.

From the end of the 19th century quinine was used to treat malaria, and later synthetic anti-malarial drugs. However, now strains of *Plasmodium falciparum* with resistance to these antimalarial drugs have emerged.

This resistance, together with the failure of programmes to eradicate the mosquitoes, underscore the importance of a vaccine, but this has proved to be extraordinarily complex.

The parasite is indeed a complex organism that passes through several phases in the *Anopheles* mosquito and in man. Each phase has different antigenic structures and the parasite has developed subtle mechanisms to evade the human immunological response.

Research on antimalarial vaccines is being carried out by the partners in close cooperation with their laboratory facilities in tropical/subtropical countries.

In France alone, some fifty researchers and technicians are at present involved in the project. The teams are multidisciplinary and cover molecular biology, immunology, parasitology, biochemistry, primatology, epidemiology and tropical medicine.

The results obtained in "*Saimiri sciureus*" monkeys have demonstrated the possibility of obtaining a protective immunological status against the blood infection in natural conditions of repeated infection which status can be passively transferred with immunoglobulins to monkeys and humans. It is therefore based on antibodies.

These results justify the vaccination approach and have led to the hope - soon expected in Europe as well - that using the right antigens in combination with proper adjuvants and/or cytokines should induce an adequate production of protective antibodies.

Once the mechanism had been defined, laboratory tests were developed to assess in vitro the ability of the parasitic antigens (*P. falciparum*) to induce the immunoprotective response.

Gradually a dozen such antigens of *Plasmodium falciparum* were identified, five of which were the most immunogenic in humans in endemic areas and able to induce a better protection in squirrel monkeys. The genes coding for these antigens were cloned and brought to expression in bacteria using genetic engineering. A mixture of three of these antigens has led to the induction of a good level of protection in *Saimiri* apes.

Further work aims at even more active antigens or combinations and the definition of adjuvants and/or cytokines for use in man to obtain the best protective immunological response.

The support by EUREKA has enabled the project:

- to build the installations for breeding the animals and carrying out the experiments, which is indispensable in determining the effectiveness of a vaccine,
- to equip the research laboratories and speed up research,
- to concentrate the efforts and to coordinate between different partners involved in this long term venture.

## EU 101

Medical- and Biotechnology  
Acronym: MALAVACC

Title: Malaria Vaccine  
Announced: London, 1986  
Participants:

France:

Institut Pasteur,  
Pasteur Vaccins,

Germany:

Bebringwerke AG

Main Contact: Institut Pasteur

Prof. Luis Pereira Da Silva

Tel: +33 1 45 68 86 27

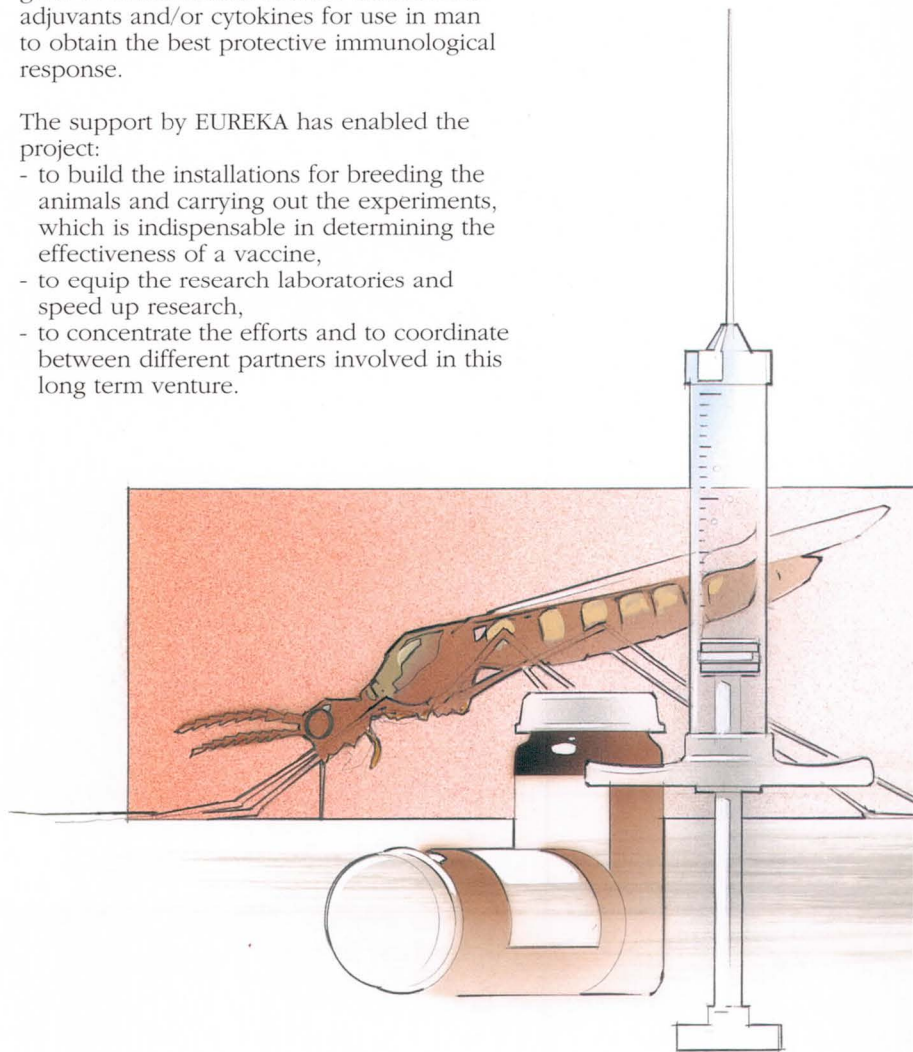
Fax: +33 1 45 73 22 40

Estimated Costs: 33 MECU

(research phase)

Time Scale: 60 months

(research phase)



# BITTRANS

## EU 189

Communications  
Acronym: BITTRANS

Title: Very high bit rate optical  
transmission system

Announced at: Madrid 1987

Participants:

France:

Societe Anonyme de  
Telecommunications Telettra

Germany:

Ant Nachrichtentechnik  
GmbH

Italy:

Telefonia Elettronica e  
Radio S.p.A.

United Kingdom:

GEC Plessey

Telecommunications Ltd

Main Contact: Telettra S.p.A.

Giuseppe Maria Firrao

Tel: +39 39 66 55 384

Fax: +39 39 60 81 293

Estimated Costs: 37 MECU

Time Scale: 54 months

This project, in which participants from France, Great Britain, Germany and Italy are cooperating, envisages the development of an operational 2.5 Gb/s transmission system on optical fibre. The choice of this bit rate (currently 2.488 Gb/s) results from the recent CCITT Recommendations G 707, G 708 and G 709 relevant to the new synchronous hierarchy.

At an earlier phase of the project uncertainty on the technological aspects was considerable; therefore, only the joining of the four companies to work on the project made it possible to compare in economic terms alternative solutions of some critical units to enable the optimum choice within the right timescale to be made.

Moreover, the development of European communication networks is so rapid that we can envisage in the near future i.e. starting in 1993, the capacity on optical backbone routes increasing from the present 565 Mb/s to 2.5 Gb/s as soon as systems become commercially available: the right way to face such a problem of European dimensions was to try and solve it jointly.

## Background and results

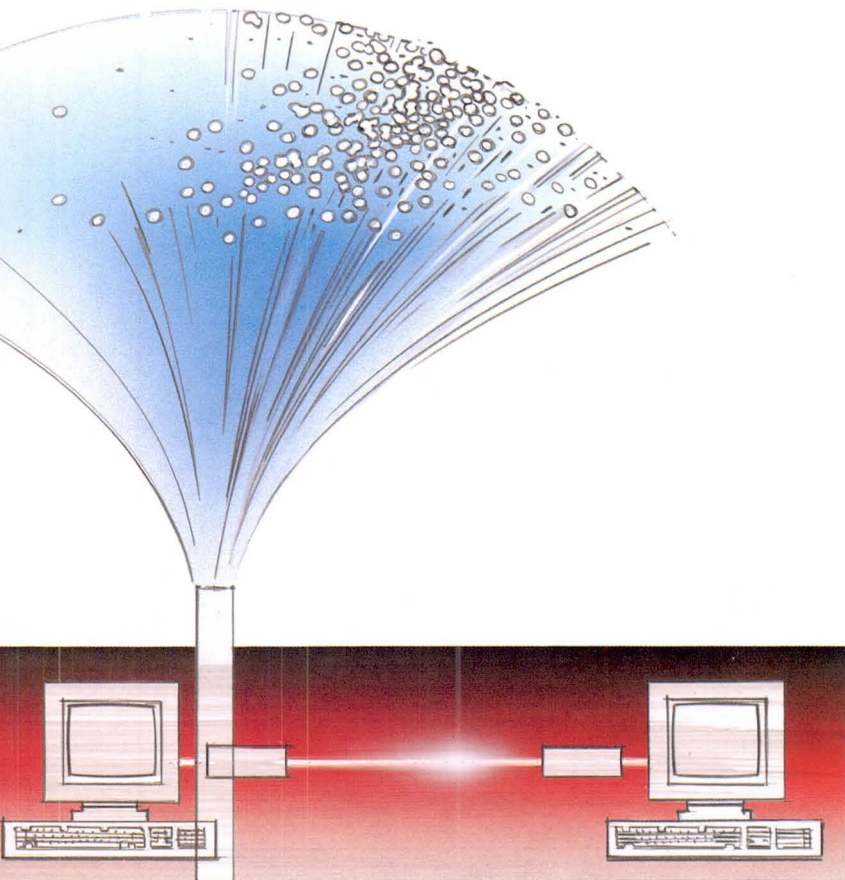
Just at the beginning of the feasibility phase of the project, a revolutionary proposal, coming from the U.S., for a new worldwide transmission standard appeared on the stage, based on the principle of synchronous multiplexing. This standard, called SDH, was adopted as a world standard by CCITT, after useful debates with the main European administrations that made it compatible with the two different previous standards existing in U.S. and Japan.

This four company Consortium immediately appreciated the potential advantages of the new proposed multiplexing method and supported its definition as an international standard through the relevant domestic administrations, while deciding to revise the design of the 2.5 Gb/s systems to match both the existing and the future standard. This was indeed the right decision. At present the SDH standard is replacing the plesiochronous digital transmission standard in all applications, both for long distance and distribution networks, starting in the most advanced countries.

Such a fast reaction, enabling the product to appear on the market now in timely competition with American and Japanese products, is a sound demonstration of the advantages of cooperation; different national policies would have made a choice such as this too uncertain and risky for any single company to take.

The system consists of two basic pieces of equipment, having a high degree of commonality: the terminal and the line repeater, and, due to the collaboration among the four companies, it will appear on the market ahead of or at the same time as a few other similarly advanced products of the same speed. It has been selected after a careful test comparison among European and non-European suppliers.

The research will finish, as planned, by the end of this year making available to each partner one prototype of both the terminal and the generator.





# JUMBO COKE

In cokemaking the conventional multi-chamber system has reached the end of its technological development. Comprehensive engineering work by German carbonisation experts has shown the way to a new resource conserving and environment protecting coking system based on individual, independent Jumbo Coking Reactors with rigid side walls.

It is the objective of the project to develop this new coking system to operational maturity on a demonstration plant which will be erected at Prosper coke plant (Bottrop, Germany).

The construction and process essentials of the new coking system are:

- the individual reactor system with huge chamber dimensions (10 m high, 10 m long, 0.85 m wide), rigid side walls and only 60 mm thick liner,
- coal preheating in direct combination with coke dry quenching,
- programmed heating with flue temperature up to 1350° C resulting in 24 hours of coking time,
- integrated components and systems without environmental impact.

The demonstration plant will include two Jumbo Coking Reactors as prototypes of the two construction variations; one with the bottom arranged regenerator representing the traditional construction type and another with the side-arranged regenerator based on a new construction approach with particular advantages.

Moreover, the set-up involves a pusher machine, two coke cassettes for dry coke cooling as well as a preheater and a permanently connected charging chain conveyor based on the Precarbon technology.

The new coking system also includes high-tech insulation as well as a new door sealing with different sealing levels corresponding to three different temperature levels.

In contrast to the most modern current 2 million ton coke plant equipped with 120 coke ovens of the multi-chamber system, the Jumbo Coking Reactor System would need only 55 chambers based on the lay-out of the demonstration plant with a 100 tonne coking capacity. Only 33 chambers would be needed in a further envisaged industrial plant with a 165 tonne coking capacity.

The capacity increase will be achieved primarily by increasing the width and height of the chamber, secondly by lengthening the chamber. The excellent productivity of the Jumbo Coking Reactors allows a significant reduction in production units. Compared to the state-of-the art coke plants, the advantages in terms of the environmental and operational aspects are obvious.

Moreover, resources will be saved as the range of coking coal is expected to be widened towards the high and low volatile coals and as thermal efficiency will improve from 38% to 70%. All this is due to coal preheating in combination with coke dry quenching and to programmed heating.

For the final evaluation of a new system the most important figure, however, is the total production costs per ton of coke. A saving of up to 20% is expected, depending on the location of the coke plant, mainly due to reducing coal costs by 10-15%, energy costs by 25-35%, environmental protection costs by 40-60% and labour costs by 10-15%.

The commissioning of the demonstration plant is planned for the beginning of 1993.

## EU 500

Energy Technology  
Acronym: JUMBOCOKE

Title: Development and Testing of a New Resource-Conserving and Environment-Protecting Coking System

Announced at: Rome, 1990

Participants:

Austria:

Voest-Alpine Stahl Linz GmbH

Belgium:  
NV Sidmar

Finland:  
Rautaruukki Oy  
Research Centre

Germany:

Ruhrkohle AG  
Didier Werke AG  
Dr. C. Otto Feuerfest & Co. GmbH

Rütgerswerke AG  
Syndicate of: Didier OFU  
Engineering GmbH

Krupp Koppers GmbH  
Still Otto GmbH

Italy:

Ilva S.P.A.

Spain:

Altos Hornos de Vizcaya S.A. Ensidesa

Main Contact:

Dr.-Ing. W. ROHDE  
Europäisches Entwicklungszentrum für Kokertechnik GmbH

Rellinghauser Str. 1

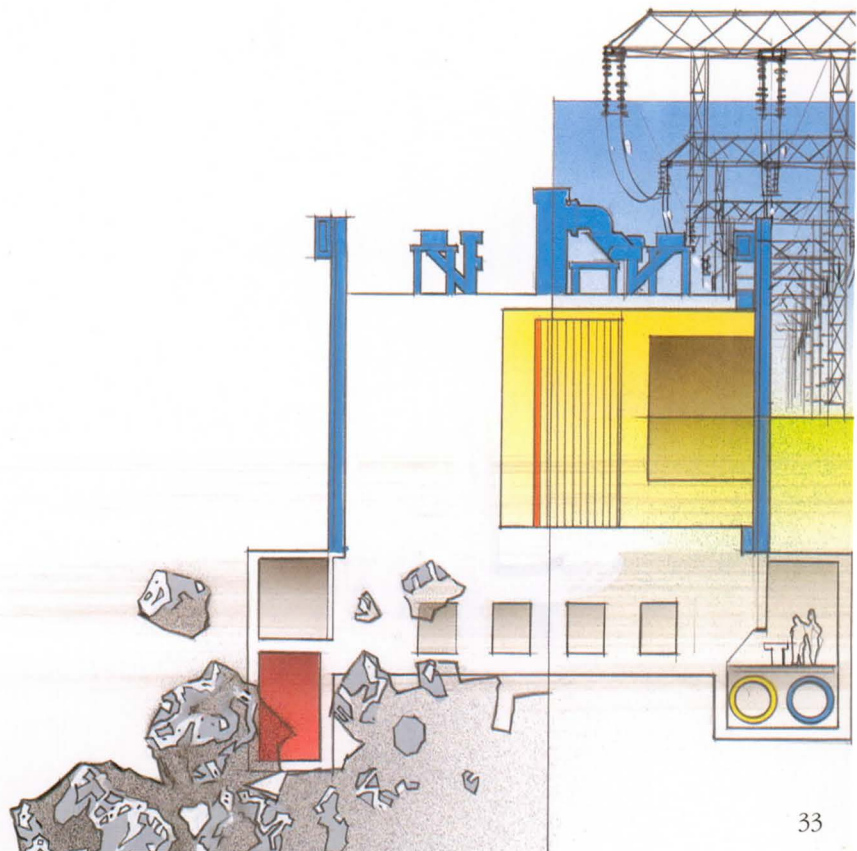
D-4300 Essen 1

Tel: +49 201 172 15 82

Fax: +49 201 172 12 79

Estimated Costs: 25.5 MECU

Time Scale: 84 months



# A NEW APPROACH TO NUTRIENT REMOVAL FROM WASTEWATER

## EU 253

Environment Technology  
Acronym: HYPRO

Title: *Advanced Treatment of Wastewater*

Announced at: *Copenhagen, June 1988*

Participants:  
Denmark:

*I. Krüger A.S.  
Water Quality Institute  
Technical University of Denmark*

Finland:  
*Kemira OY*

Norway:  
*Ferriklor A/S  
Norwegian Hydrotechnical Laboratory*

Sweden:  
*Kemira Water Treatment  
Main Contact: I. Krüger A.S.  
Erik Bundgaard*

Tel: +45 39 69 02 22  
Fax: +45 39 69 08 06  
Estimated Costs: 4,0 MECU  
Time Scale: 48 months

Nitrogen and phosphorus in wastewater discharged in to lakes, rivers and seas act as nutrients and result in a massive growth of plant life. This so-called eutrophication subsequently leads to oxygen depletion and the death of the aquatic fauna such as fish and mussels. The waters thereby become unfit for fishing and recreational uses and fresh water sources for potable water deteriorate.

In an effort to forestall this, stringent demands for nutrient removal from wastewater are now being implemented all over Europe.

HYPRO is a joint Scandinavian research project aimed at developing more efficient and cost-effective treatment processes for nutrient removal, with participants from Denmark, Norway, Sweden and Finland.

The HYPRO concept is based on three elements:

- chemical precipitation of the wastewater for the removal of organic matter and phosphorus and decreasing the load on the subsequent biological treatment,
- hydrolysis of the precipitated sludge in order to produce a supplementary carbon source for the biological nitrogen removal process,
- biological nitrogen removal using the fermentation products from hydrolysis as a means of obtaining high reaction rates and quantitative removal.

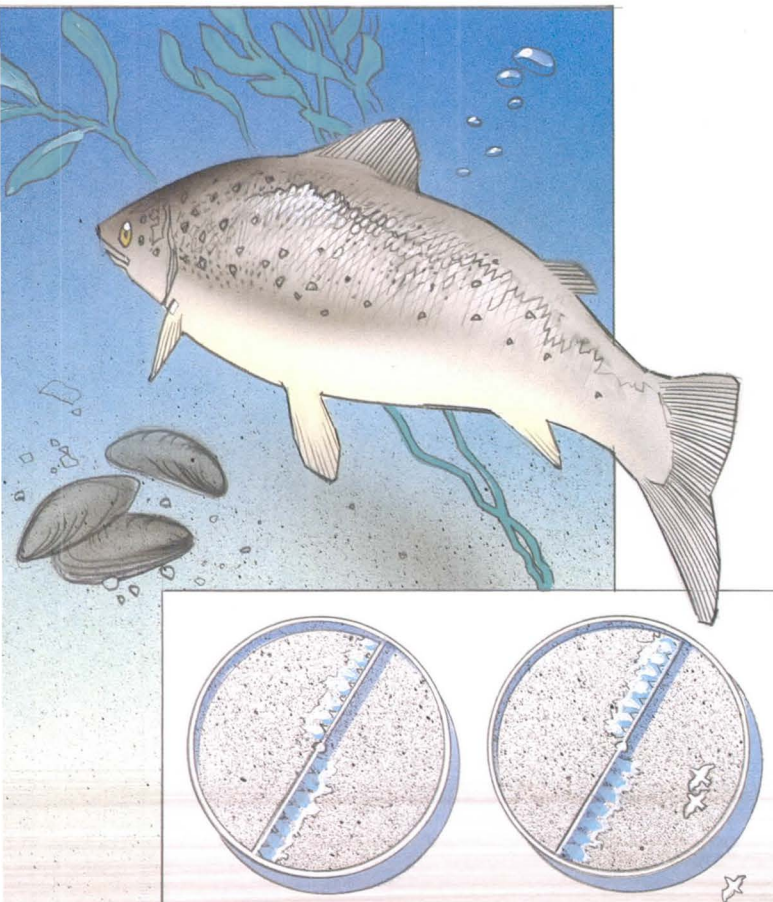
In the HYPRO concept the chemical and biological processes are integrated to give a new approach to nutrient removal from wastewater, with emphasis on compactness. A key element is the introduction of a hydrolysis step to overcome the lack of a sufficient carbon source, one of the fundamental problems to biological nitrogen removal.

During the first two years the HYPRO project was devoted to intensive studies of the various parts of the process:

- Characterisation of wastewater and micro-organisms.
- Precipitation.
- Biological and thermal hydrolysis.
- Biological nitrogen removal.

The investigations have been carried out in separate studies as well as in continuous pilot plant experiments. The results have demonstrated the combined process as highly flexible and well suited for compact wastewater treatment with extensive nutrient removal. The process is also very suitable for retrofitting existing plants.

Having established the feasibility of the concept in the first phase, the project is currently entering a full scale demonstration phase at municipal treatment plants in Denmark and Finland.



# A BIOREACTOR FOR INDUSTRIAL LAUNDRY WASHING MACHINES

An innovative combination of a unique washing method, microfiltration and a membrane bioreactor offers a solution to an environmental problem created by dry cleaning. In dry cleaning, harmful environment polluting fluids such as perchloroethylene are released. These are among the more persistent pollutants to the water supply. However, the EUREKA project will provide a more environmentally beneficial alternative to the dry cleaning of industrial workwear in laundries.

An example: in the Netherlands over 800,000 overalls are sent to industrial laundries for cleaning every week. Some of these articles are washed in water but up to one half - the most heavily soiled - are dry cleaned. The dry cleaning process uses aggressive agents such as perchloroethylene to dissolve the oil and grease from the overalls. However, perchloroethylene is reported to cause cancer and has poor biodegrading properties. In the Netherlands 200 to 1,000 tonnes of such chlorinated hydrocarbons are lost in the air and soil by laundries. A substantial proportion of this occurs through evaporation during the cleaning process, and the remainder is attributable to inefficient machine operation.

The Anglo Dutch company, Unilever, will test and improve the new alternative less environmentally harmful technology. The Swedish industrial laundry company Leitex AB in collaboration with the University of Stockholm has developed the heavy duty cleaning process without the use of chlorinated hydrocarbons. The special detergents used in this wet wash method are supplied by the Leverindus, Lever Otarès, Lever Sutter and Lever Industrial subsidiaries of Unilever. The washing and rinsing water is filtered for re-use by special membranes produced by X-Flow B.V. The waste is treated by a biological process developed by the University of Twente. Unilever will provide the fully operational commercial process, marketed under the brand name CLAXMATIC AQUA.

The new system involves an innovative combination of technologies to produce an effective bleaching process which is also water and energy efficient. The effluent water is pressed through a newly developed membrane to filter the dirt, particularly oil and heavy metals.

The membrane is hydrophilic and therefore resistant to fouling. This ensures a high capacity throughput. The filtered effluent water can be re-used in the washing process; it also retains its heat content. The new microfiltration process therefore saves on both water and energy. The membrane acts as a partial filter to detergent, thereby reducing the quantity required. The remaining dirt is then placed in a membrane bioreactor and through the use of selected cultivated bacteria, converted into carbon dioxide, water and sludge. This sludge can be treated as domestic waste. The EUREKA project aims to optimise the various process stages; particularly promising are the results from the University of Twente's experimental bioreactor.

The industrial detergent subsidiaries of Unilever will make the new system commercially available as CLAXMATIC AQUA. This system will be particularly suited to large industrial laundries replacing their dry cleaning machinery.

## EU 375

*Environment Technology  
Acronym: NEWDRY*

*Title: Dry Cleaning  
Replacement  
Announced at: Vienna, 1989  
Participants:*

*The Netherlands:  
Unilever Development &  
Application Centre /  
Universiteit Twente /  
X-Flow B.V.*

*Sweden:  
Leverindus AB /  
Stockholm Tvätt AB  
Main Contact: Unilever  
Industrial  
Development & Application  
Centre*

*Mr. P. J. van de Graaf  
Tel: +31 30 47 63 27  
Fax: +31 30 47 63 19*

*Estimated Costs: Feasibility  
and marketing study:  
0.214 MECU  
Research programme:  
1.3 MECU  
Time Scale: 2 years*



# PUTTING OUR CULTURAL HERITAGE ON GLASS DISC

## EU 390

Environment Technology  
Acronym: EUROCARE-LAST

Title: Optical disc product  
designed for long-term  
archival storage

Announced at: Rome 1990

Participants:

Belgium:

Glaverbel S.A.

France:

Digipress S.A.

Main Contact: Digipress S.A.

Mr. Jean Ledieu

Tel: +33 31 47 25 00

Fax: +33 31 47 25 01

Estimated Costs: 0.9 MECU

Time Scale: 24 Months

Some of our cultural heritage is disappearing for want of a storage medium with a really long life. However, soon it may be possible to stop this loss thanks to a new project aiming to develop an optical disc with a life of several centuries.

The project leader, Digipress S.A. in France, is a leading producer of compact disc masters and stampers. For some years some of its clients have been archivists so the firm was familiar with their information storage problem: wax and PVC records, magnetic tape and disks, film and paper -all these media used by organisations in the field of preservation can decay over anything from a few years to several decades. Even the polycarbonate compact disc (CD), hailed as "ever-lasting" is not reliable enough.

CDs were attractive because they could store all forms of audio and visual images and thus offered a very elegant solution, if only their longevity could be improved.

Digipress teamed up with Glaverbel S.A. in Belgium, the third largest European supplier of sheet glass. Together they looked at the problems with polycarbonate CDs, which are prone to warping and scratches and may corrode, thus losing their optical clarity, and came up with the possibility of one made of toughened glass with a life expectancy of several hundred years.

The basis of EUROCARE-LAST is the "Century TM Technology developed by Digipress S.A. to resolve the problem of CDs. They undertook to replace the organic components of the disc with more stable but compatible minerals. They replaced the aluminium reflector with a metal that would not corrode (such as gold) and investigated the best protection against accidents while in use and from environmental forces. They also looked at the behaviour of the different layers of this disc when put next to each other.

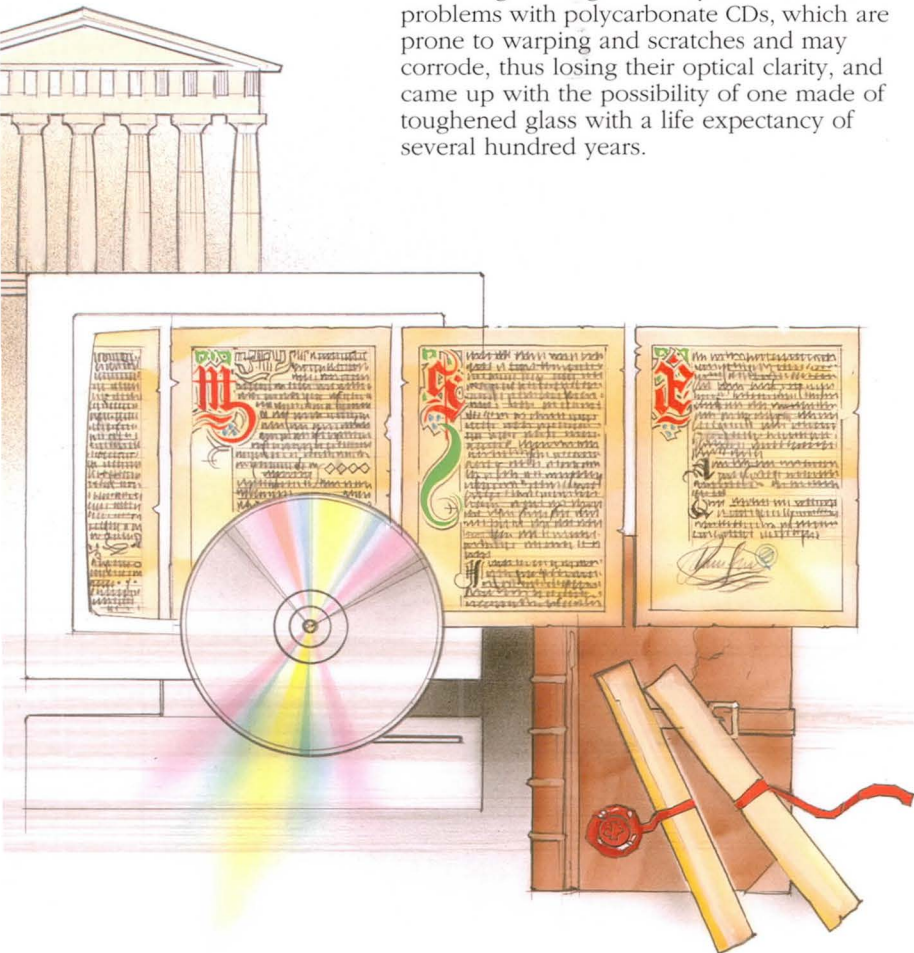
In addition, not much was known about the ways in which toughened glass ages. Glaverbel had previously developed glass for optical and magnetic disc memory. Now they focused not only on the ageing process, but also on the effect which the chemical toughening has on the resistance of the glass. They looked for the best possible reflector for laser reading of the information engraved on the glass, and for the right process to encapsulate and mark the structure of the reflective glass to give it optimum protection.

One of the great strengths of the discs being developed is that they can be read by existing laser drives. Thus archives with tight budgets will not have to invest heavily in masses of new equipment. This advantage, coupled with the medium's long life, has the partners hoping that they will contribute towards international standards for performance standards and testing methods for archive media. For it is in the world of national archives that their largest market for these disks lies.

The robust nature of this optical disc allows for other applications e.g. for space projects and for use in other extreme working conditions and climates.

A spin-off of the project is the notion of a limited CD edition to equal a luxury limited edition of a book. A gold plated disc is very handsome, like a sort of jewel. This idea is being developed in parallel with the other applications, but it may take a couple of years more. The technology could also lead to the development of substrates for erasable optical discs, particularly for magneto-optical layers which are notoriously susceptible to corrosion.

The final phase of the project will concern itself with improving and refining the manufacturing process. This EUROCARE-LAST technology could become an international standard and reference in the field of archival media.



# ION PROJECTION

Telecommunications and Information Technology are frontier sectors that call for an increasing integration of electronic components, namely leading edge ICs, aiming at cost reduction and improved system reliability. This can be achieved by improving resolution through the further reduction of line width in electronic chips, to be mastered in the mass production of memory devices such as the 64 Mbit DRAM expected to reach the market in the mid nineties, and by improvements in materials.

Optical lithography for mass fabrication using lens or mirror projection systems is approaching its physical limits down to a line width of approximately 0.15 micrometers.

X-ray lithography of synchrotron radiation will set the lower limit to approximately 0.10 micrometers and requires considerable investment. In order to go beyond 0.25 micrometers or even less, as certain specific applications seem to require, demagnifying charged particle projection may provide decisive advantages. Demagnifying electron projection was studied in the 70's and early 80's in Europe, the USA and Japan but suffers from the large scattering of electrons in resist layers.

Using ions instead of electrons to demagnify stencil mask to wafer pattern transfer has the advantage that ions are scattered considerably less than electrons and may be stopped within resist layers, thus not causing damage in critical layers or substrates.

Demagnifying Ion Projection Lithography (IPL) is based on the same principles as an optical wafer stepper, but it uses ions instead of light to image patterns on an open-stencil mask onto a wafer, and does so on a 1:10 or 1:5 reduction, thus offering several benefits:

- Use of a large variety of different ion species,
- Excellent mask durability;
- Adjustable depth of ion penetration with ion energy and ion species (Hydrogen or Helium ions).
- sub-0.1-micrometer resolution with considerable depth of focus;
- use of both conventional organic resists and high resolution inorganic resists;
- electronic alignment (operative on-line during chip exposure) in X/Y direction, rotation, X/Y scale and trapezoidal intra field distortion.

As a consequence IPL productivity potential is as high as that of optical wafer steppers.

Based on a successful feasibility study with an existing prototype machine, two research type Ion Projection Lithography Machines have been built by IMS GMBH of Vienna with sub-micrometer resolution. The Society for Microelectronics of the Vienna Technical University is focusing R&D on interactions of the projected ion image with resist layers and semiconductor substrates.

The Fraunhofer Institute for Microstructure Techniques is carrying out the development of a suitable technology for the manufacture of open stencil masks. Siemens AG and the Fraunhofer Institute have cooperated in the evaluation of Ion Projection Lithography techniques for integrated optics, surface acoustic wave devices, sensor technology and GaAs devices.

## EU 50

Information Technology  
Acronym: ION-PROJECTION

Title: Sub 0.1 Micrometer  
Ion Projection  
Announced at: London 1986

### Participants:

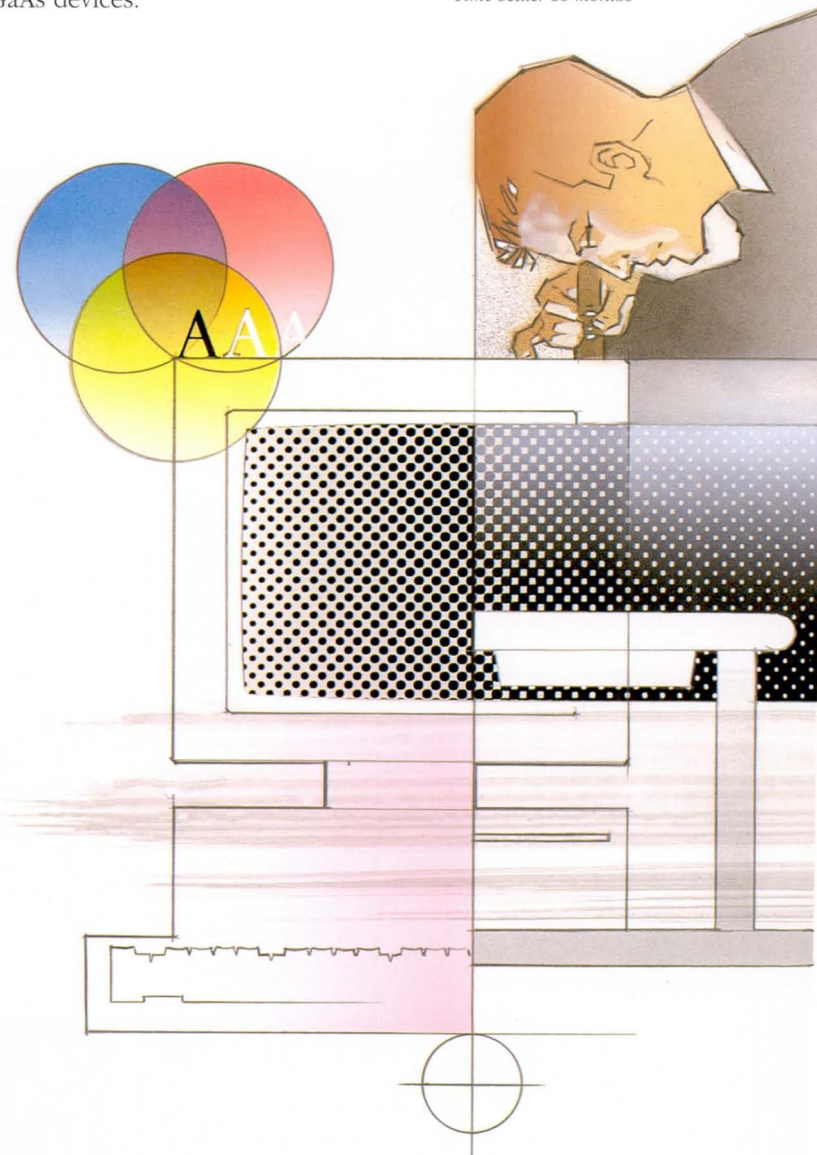
Austria:  
Fa. IMS Ionen Mikrofabrikationssysteme GMBH / Technische Universität, Wien / Institut für Allgemeine Elektrotechnik und Elektronik

Germany:  
Fraunhofer Institut für Mikrostrukturtechnik / Siemens AG

Main Contact: Fa. IMS Ionen-Mikrofabrikationssysteme GMBH

Dr. Hans Loeschner  
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Estimated Costs: 10 MECU  
Time Scale: 60 months



# MEDICAL EXPERT SYSTEM FOR DIFFICULT ENVIRONMENTAL CIRCUMSTANCES ON CD-ROM

## EU 211

Information Technology  
Acronym: Mecdin

Title: Expert System on  
Portable CD ROM Terminal;  
Visually Explanatory  
Assistance for Decision  
Making in the Field

Announced at: Madrid 1987

Participants:

Belgium:

Devlonics Terminals n.v.

France:

Computers  
Communications & Visions

Main Contact:

Mr Dirk Gbekiere

Devlonics Terminals n.v.

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Fax: +32 56 20 21 83

Estimated Cost: 2.57 MECU

Time Scale: 48 months

In difficult environmental circumstances, necessary information, though sometimes vital, is not always at hand.

A typical example is in the medical environment. In rural countries, surgery is often a question of time and availability of medically skilled people. This is the case in particular for third world or underdeveloped areas. For this reason the aim of the Mecdin project was the design of an information retrieval tool capable of being consulted in difficult hazardous circumstances.

So, boldly baptised 'XPLORE', the hardware component of the 'MECDIN' project has now been completed. It will enable doctors, or non-skilled people, to carry out diagnoses and therapeutic evaluations under extremely hostile conditions - for instance at the scene of natural disasters, fires or accidents.

On the software side, an easy to use Expert System was designed to obtain the right information at the right time. This software is built to be used by non-computer specialists, and should therefore be logical as well as easy to consult and use. Thus, access to massive amounts of information stored on the CD-ROM with a potential of 275,000 A4 pages can be assured.

The combination of this advanced Expert software and the ruggedized equipment which houses the entire system, makes this the ultimate consultation tool for these difficult environmental circumstances.

Xplore is a portable database platform with a capacity of up to 16 Megabytes in RAM and 650 Megabytes in CD-ROM. It is capable of stand-alone operations for up to 5 hours, and withstands extremes of shock, heat, cold, humidity and dryness.

Apart from its strictly medical uses, Xplore will be of interest to fire brigades and rescue services, and will find markets in industrial maintenance under severe conditions.



# CO-OPERATIVE LASER RESEARCH TRANSFERRED TO INDUSTRIAL APPLICATIONS

The aim of the - now finished - project EU 155 was to accelerate the transfer of laser technology into the metal working industry, especially into medium-sized enterprises. This was achieved by joint projects, carried out by institutes and companies in the field of cutting, welding and surface treatment, applying Nd: YAG-, excimer- and especially CO<sub>2</sub>-lasers. The project was organised into three working groups according to the thematic orientation of the partners. The topics treated and a brief summary of the results are as follows:

## Working group I - Three Dimensional (3-D) Production:

- \* New concepts for multi-axial beam delivery systems have been developed, including investigations into
  - the effects of elastic deformations and tolerances on the stability of the beam position
  - the vibration behaviour of the beam delivery system
  - the possibility of using fibre composite materials.
- \* A commercial laser was coupled with a 6-axis industrial robot.
- \* For the welding of radiators, processing parameters relating to various seam geometries and angles of beam incidence were developed. The actual construction of a new laser-based production line is planned.
- \* In the field of 3-D surface treatment, a hardening station was constructed.

## Working group II - Cutting and Welding:

- \* The plasma, induced by the radiation of an excimer laser was investigated; it turned out that in the ablation process physical and chemical bonds are broken up (irradiation of PMMA).
- \* A triangulation scanner, especially developed for tracking laser weld seams has been constructed and tested.
- \* The gases, vapours and deposits, produced by laser cutting wooden materials have been investigated and analysed. Investigations showed that when cutting natural wood, a series of compounds are generated which are dangerous to health. The investigations will be continued with regard to glued and coated wooden materials in the newly started Laser Safety EUREKA-Project (EU 643).
- \* A model describing the cutting process was improved: the effect of vaporisation and material expulsion was taken into account.

## Working group III - Surface Treatment

- \* Steel alloying techniques with the alloy components WC, CrC, WC/Co and NiCrBSi have been investigated including various methods of introducing the alloy components (screen printing, powder injection and plasma spraying).
- \* The development of powder supply systems resulted in improvements to the portioning of smaller quantities.
- \* The potential of alloying high speed steels with Co and VC was evaluated.
- \* Hardfacing of brass with NiCrB turned out to be a good technique.
- \* Laser surface remelting and cladding have been investigated numerically and experimentally. In two and three dimensional calculations the evolution of the temperature field and the melting pool have been simulated and the microstructure has been predicted.
- \* The Laser Assisted Deposition (LAD) technique was investigated to produce metallic (Cu, Ni, Au, etc.) layers on non-conducting substrates.

The project has been successfully finished enhancing the transfer of laser processing techniques to the metal working industry. Applications and knowledge transfer have primarily taken place between the industrial partners of the project itself (a laser robot is now provided commercially, a research 3D hardening machine is being built, the radiator welding mentioned above is being commercially pursued, etc.). The results of the projects are also instrumental in the schooling of professionals for the industry, of the "Laser Strahl Fachmann", now being available on a routine basis.

## EU 155

*Lasers*  
Acronym: CORESLAP

*Title: Cooperative Research in Laser Applications  
Announced at: Stockholm 1986  
Participants:*

*Austria:*  
University Leoben (IFMW) /  
University Vienna (IFHS) /  
Sport AG,

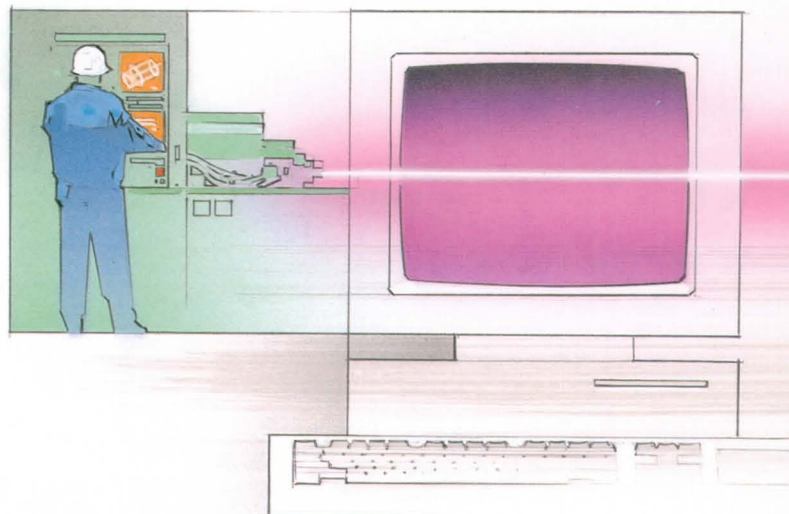
*France:*  
IREPA

*Germany:*  
DLR (ITP) / Bosch /  
Hüttinger / Rauschenberger /  
LKS / IST Strahltechnik /  
DODUCO /  
Stuttgart University  
(IPE, ITO, IFSW, MPA) /  
Fraunhofer Institute (IPA) /  
Transferzentrum Reutlingen,

*Switzerland:*  
Ecole Polytechnique Federale  
de Lausanne (EPFL)

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Fax +49 711 686 27 88  
Estimated Costs: 3.7 MECU  
Time Scale: 36 months*



# RADIATION DETECTORS FOR ROOM TEMPERATURE X-RAY SPECTROMETRY

## EU 39

New Materials  
Acronym: SCINTIGAS

Title: Gas Proportional  
Scintillation Counters  
Announced at: London, 1986  
Participants:

Portugal:  
University of Coimbra /  
SOMEPAL / Mealhada,  
United Kingdom:  
Harwell Laboratories  
Main Contact:

Professor C.A.N. Conde  
University of Coimbra  
Tel. +351 39 28 725  
Fax: +351 39 29 158  
Estimated Costs: 4 MECU  
Time Scale: 96 months

The application of radiation detectors to the non-destructive analysis of materials by X-ray fluorescence (XRF) spectrometry has been in wide use for a few years; a radiation source excites a material and X-rays characteristic of the chemical elements present are emitted and detected by an X-ray detector. A qualitative and semi-quantitative analysis of the composition of typically the outer 10 to 20  $\mu\text{m}$  of the material investigated can be made in this way.

Unfortunately, the detectors currently being used either require cooling at liquid nitrogen temperatures or else have a limited capacity to resolve chemical elements in nearby positions of the periodic table. This is due to the fact that every element is detected as a distinctive peak in a spectrogram - a method which of course has its limitations in the possible resolution between the peaks: they may overlap.

A new type of radiation detector developed at the University of Coimbra, the Gas Proportional Scintillation Counter, offers the best resolving power amongst room temperature X-ray detectors.

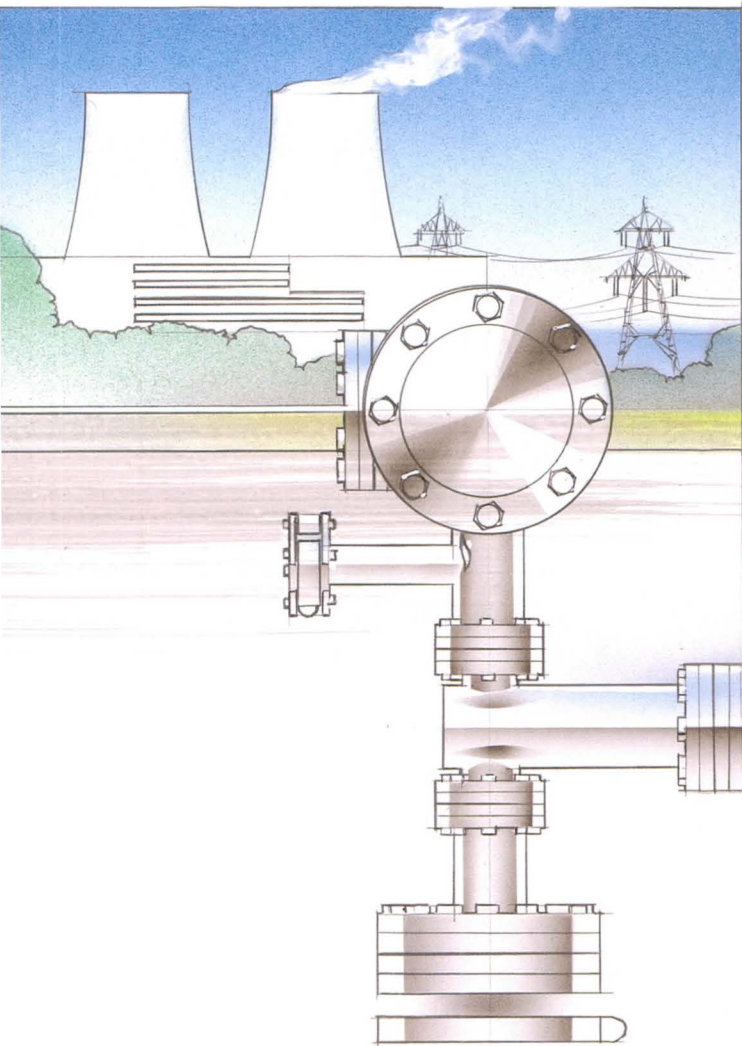
However, they are not available anywhere in the market though there is a need for such devices for applications in both on-line and portable XRF analysis systems in industries such as mining, cement, oil, aircraft, the environment, etc. A practical example for a useful application of such an on-line and portable analysis system - if it existed - could be the following: moving machine elements in early stages of failure could be traced by identifying via XRF spectrometry the particles of metal they lose in the lubrication oil of the machine in question. Major disasters could then be avoided by early action.

The radiation detectors, which are the subject of the project, are based on the secondary scintillation produced by the primary ionization electrons while drifting between two grids in a noble gas (xenon) under an electric field strong enough for excitation but below the threshold for ionization.

New techniques have been developed aimed at improving the performance and reducing the price so to make them competitive with existing standard proportional ionization counters.

At the University of Coimbra, a prototype is currently being completed that still requires continuous purification of the noble gas with which the counter is filled. This stage will be followed by the development of a prototype not requiring purification. Still later, a neutron detector based on the same physical principles will be developed.

The other partners in the project will develop applications and software for spectrum analysis, and will also start producing these devices.





# SINAPSE SHIFTING MICRO-ELECTRONICS BACK TO EUROPE

The repatriation to Europe of jobs previously exported to the Far East will be the consequence of a successful conclusion to state-of-the-art applied electronics research now being carried out by the SINAPSE project, in Paris, Madrid and Turin.

For the last two decades the production of electronics equipment has increasingly shifted to the cheap labour countries of East Asia where the abundant labour forces of Singapore, Taiwan, Korea, Hong Kong and the Philippines have assembled electronic circuitry at low wages for Western consumption.

These days are fast drawing to a close. The micro-miniaturisation of the latest electronic components means that they are too small and too sensitive to be assembled by hand. They can only be put together by highly computerised assembly equipment of pin-head accuracy and operational consistency, which is where EUREKA's SINAPSE project comes in. SINAPSE is a French acronym whose English equivalent is Integrated System for the Automation of Production in the field of Electronics.

The aim of the project, being undertaken by French, Italian and Spanish participants, is to develop flexible automated equipment for the precision assembly of advanced electronic components on printed circuit boards or electronic cards. These components are known as SMD (Surface Mounted Devices) or SMC (Surface Mounted Components).

## Chips of the future

The need for the project has arisen because the whole electronics industry is changing.

The miniaturisation has come about because it has become technically possible and advantageous to incorporate more and more electronic functions on a single silicon chip.

The method of assembly has also changed. Whereas up until now the components have generally been inserted on boards, today they must be mounted with high precision on the surface of the boards - a process which is beyond the capacity of human operators.

SINAPSE is working to create a completely automated assembly workshop that will link the CAD (Computer Aided Design) of the printed circuit board with the CAM (Computer Aided Manufacturing) of the assembly line. This link is achieved through ensuring that the CAD and CAM software can communicate easily with each other. The whole process is known as CIM (Computer Integrated Manufacturing).

The result is a substantial increase in assembly speed and the elimination of errors. The end-product is, as a result, of a higher quality than in the past and because it can be produced more quickly, it can be marketed more cheaply.

## Avant-garde

Other organisations are working in this field in Japan, the United States and Europe.

The specific character of the SINAPSE project is two-fold:

- it is geared to the assembly needs of the small and medium-sized enterprises which abound in Europe by contrast with the multinational monoliths of Japan
- it is aimed at creating a flexible assembly process which can be adapted easily, quickly and cheaply to the output of a wide variety of products.

To date several concrete results have come out of the SINAPSE project, including an optic centring device, which has already found buyers in the United Kingdom, the Netherlands, Federal Republic of Germany, Spain and Sweden. Organisations of production workshops have also been developed for ALCATEL TELIC and SMEs.

## EU 14

Robotics and  
Production Automation  
Acronym: SINAPSE

Title: Development of a flexible  
automated workshop  
for the production of  
electronic cards.

Announced at: London, 1986

Participants:

France:

Eurosoft Robotique / Sagem

Italy:

CSEA

Spain:

INISEL

Main Contact:

Eurosoft Robotique

Mr Gabriel Chataigner

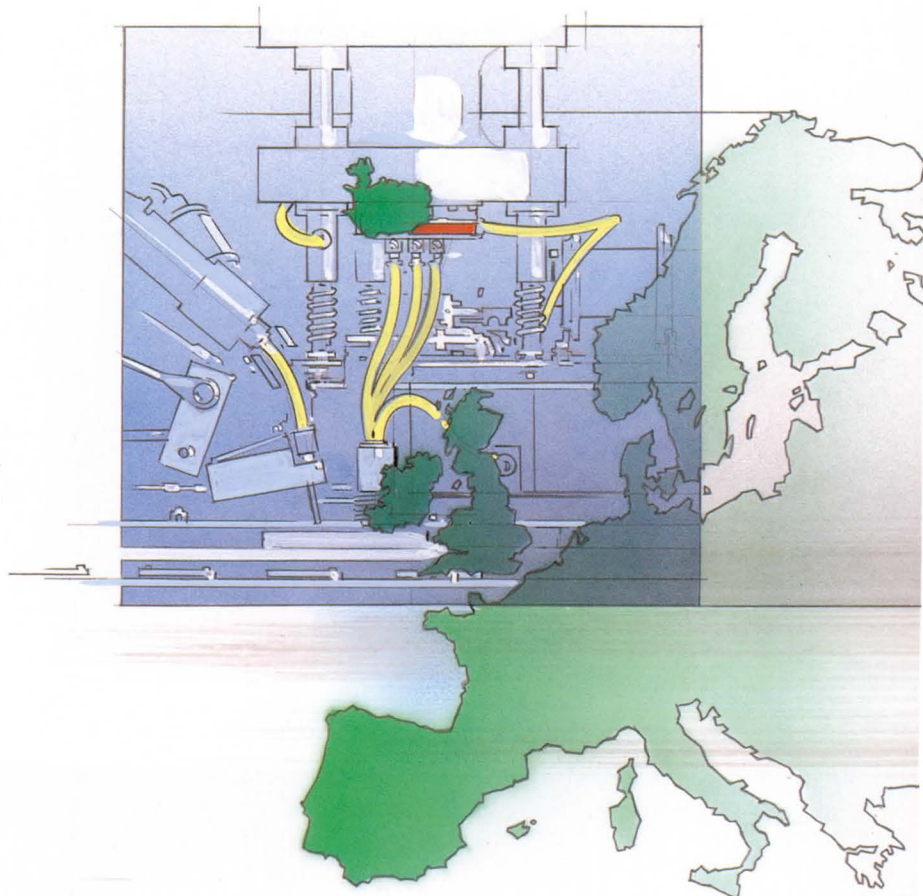
Tel.: +33 16 51 94 96 64

Fax: +33 16 51 06 56 12

Estimated Costs: 29 MECU

Time Scale: 5 years

(1987- 1991)



# CIMSTEEL

## EU 130

Robotics and  
Production Automation  
Acronym: CIMSTEEL

Title: *Computer Integrated  
Manufacturing for  
Constructional Steelwork*  
Announced at: *Madrid 1987*

Participants:

Austria  
Denmark  
Finland  
France  
Italy

The Netherlands

Sweden

United Kingdom

Main Contact:

*The British Constructional  
Steelwork Association Ltd*

*Mr Tony Oakbill*

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*Fax: +44 71 976 16 34*

*Estimated Costs: 49 MECU*

*Time Scale: 96 months*

The overall objective of this project is to provide the European Structural Steelwork Industry with the means to overhaul itself by introducing purpose developed Computer Integrated Manufacturing systems similar to those in common use within the aerospace, automobile and general manufacturing industries. The target is an automated process from client brief to finished structure, using a standard data format which can be transmitted electronically.

This broadly based project with partners from 8 different EUREKA countries will examine and develop communication standards, product information models, improved codes of practice, structural analysis and design methods, structural steelwork specifications, rationalised raw material standards, applications software, design guidelines for more efficient manufacture and, eventually, automated manufacturing cells.

The project aims to produce a working integrated system including marketable software modules. This will result in improved and more competitive structural steelwork.

The project has been divided into three main areas of activity - standards, design and manufacture.

Standards are essential to the creation of a common market in steelwork. At present there is a paradoxical situation in that each time a steel beam crosses a national border, it actually becomes weaker or stronger, depending on the national standards in operation. Through input into the European standards body, CEN, it is hoped that the steelwork standard - EUROCODE 3 - will be simplified and accepted as mandatory throughout the EC, and probably beyond, by the year 2000.

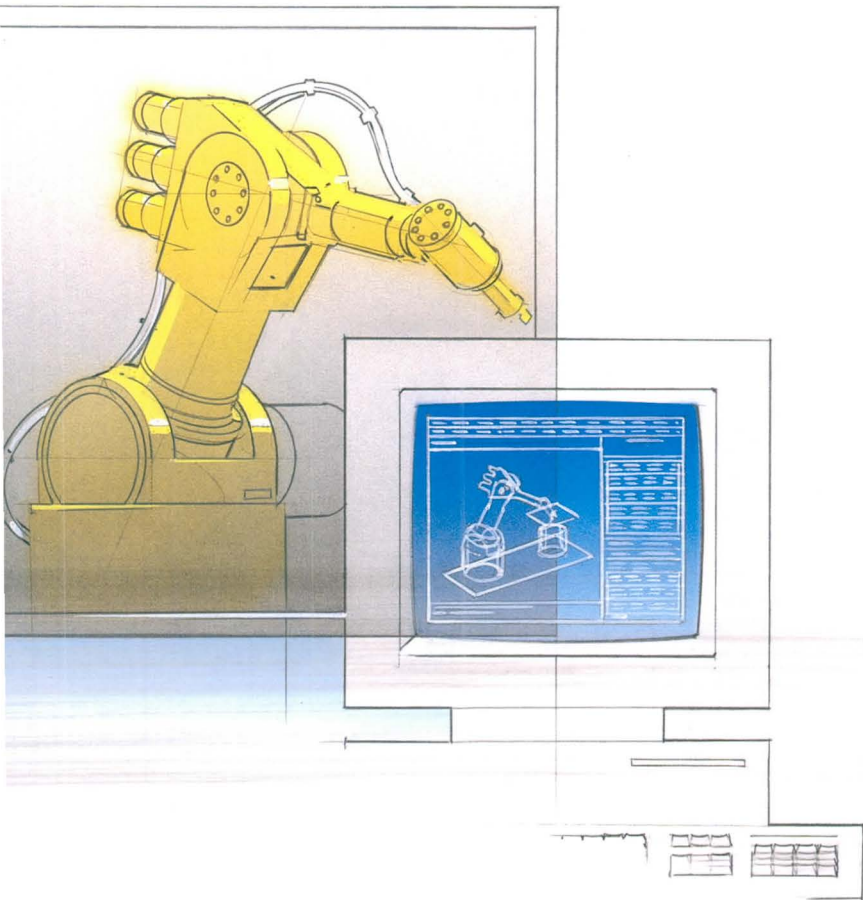
The issue of standards is not purely academic. Indeed, major market opportunities will result from harmonised standards. This work will ensure that designers consider steel early in their plans.

The design aspects are not intended to create a boring uniformity in Europe's buildings - the presence of major architectural and design practices as collaborators will ensure continued diversity and innovation. In fact, much of the work at this level is concerned with reducing the immense range of bolted and welded connections currently in use. Generally, however, the project intends to establish agreed European technical specifications for key design tasks, and to use these in the preparation of software modules and stand-alone packages for the design of low rise and multi-storey buildings.

The manufacturing task group has four areas of work: a welding cell, materials handling, computer-aided design (CAD) and erection and safety. The aim is to automate the entire fabrication process from stock-yard to factory gate, monitoring progress at several demonstrator sites across Europe.

Integrating the process right the way through from client brief to the handover of the finished structure is the Manufacturing Information System. This part of the project, as with the others, will result in a saleable product - an accessible software system for steel fabricators.

The major beneficiaries of the system will be the small and medium-sized firms. A suite of twenty or more stand-alone modules which will run on personal computers is envisaged. There will be, for instance, modules for transport, design, detailing, estimating and accounts. Buyers will be able to select those that are relevant to them, and install the system for a few thousand ECUs. The 'MIS', being written for the job, will cope with the specific problems of the steelwork industry much better than any currently available software. Also, standard software will allow electronic transmissions to replace paper.



# FAMOS ARIA SPEEDY ASSEMBLY

Turning out small to medium-sized equipment in large quantities and as rapidly as possible poses a constant challenge for companies at the forefront of the electrical industry. The way forward lies in the development of new automated assembly lines, the basis of the FAMOS-ARIA project which received EUREKA status in September 1987.

The ARIA project, a member of the FAMOS family, is spearheaded by one of Europe's most important manufacturers of electrical equipment, Merlin Gerin of Grenoble, France. It has provided an opportunity for top level cooperation with other major companies in France, Italy, Spain and Switzerland.

The ARIA project breaks down the assembly process into a number of operations handled by mechanical modules activated by step motors. A programmable controller takes care of sequencing and synchronisation. But "machine assembly" is not all Merlin Gerin and its partners have in mind. They have also considered the assembly line in terms of managing buffer stocks and other branches of the line.

At the heart of the project they provided some very sophisticated computing equipment. A local area network connects the computer and the programmable controllers. The software is being specially developed for ARIA.

ARIA is able to pass from one variant to another without interruption. The manufacturer can therefore begin making very small quantities of a product at a time without losing productivity. On top of this, some 2000 variants of the manufactured range of products can be produced on the line, the result of the combination of a certain number of parameters.

On the factory floor the system comprises assembly modules which carry out traditional functions such as the insertion of pieces, welding and control. They are, in turn, equipped with an indexing device to ensure that a specific product is "served up" to the different modules. The workstations are equipped with active modules while convergence machines make the connection between the principal assembly line and the feeder lines on which the sub units are elaborated.

Compared to present installations and in the context of EU 212, the assembly lines represent a big step forward as far as instantaneous work rate is concerned. A single line can now achieve mass production while at the level of integration a very short production cycle can be obtained with a correlative reduction of rejects. High flexibility means that short series can be produced which makes it possible to adapt more efficiently to fluctuating market requirements.

The first applications of the project, scheduled in the field of low voltage mini circuit breakers manufactured by Merlin Gerin in its European subsidiary VANOSSI-SUD in Rieti in Italy are now being carried out. The first machines for these lines have been installed and tested with successful results.

Subsequently, this type of assembly line would be able to accommodate many other types of products, even outside the electrical equipment manufacturing field enabling "tailor-made" production to meet market demand, thus eliminating stock piling, raising quality and reducing costs.

## EU 212

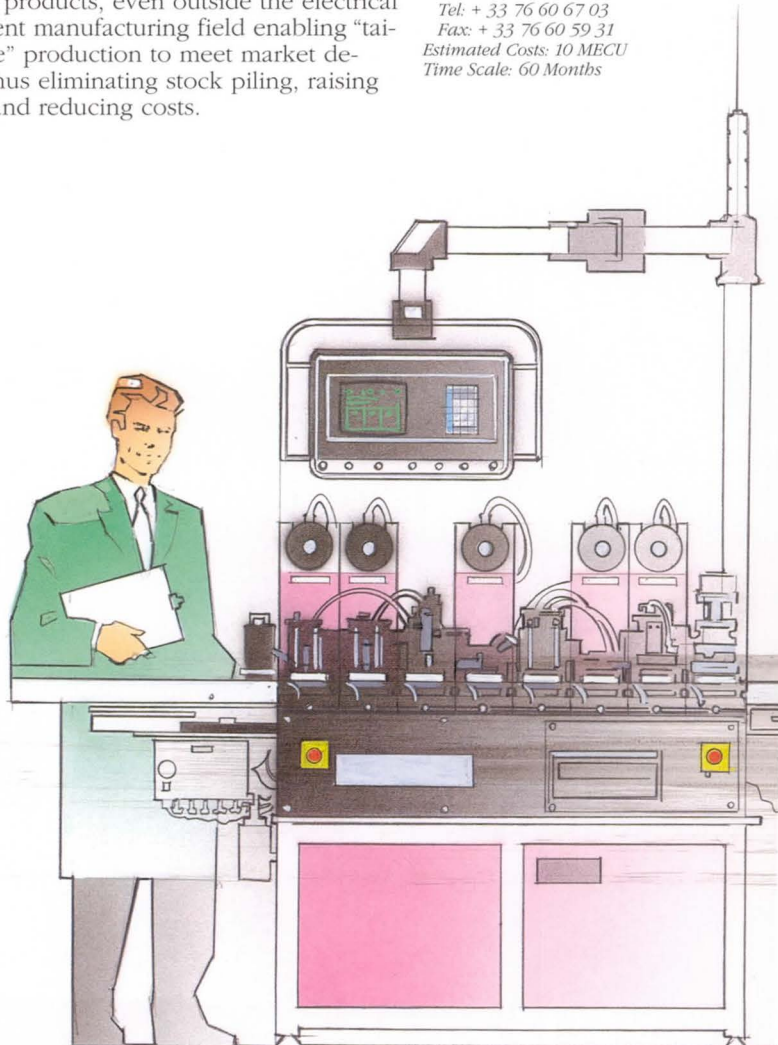
*Robotics and  
Production Automation  
Acronym: FAMOS - ARIA*

*Title: Automated Rapid  
Integrated Assembly  
Announced at: Madrid, 1987  
Participants:*

*France:  
Cybernetix / Institut de  
Recherche Economique et de  
Planification / Industries et  
Techniques de la Machine  
Intelligente (ITM) /  
Merlin Gerin*

*Italy:  
Mesarteam / Vanossi Sud  
s.p.a  
Spain:  
Centunion-Espanola  
de Coordinacion tecnica y  
Financiera / Merlin Gerin  
Gandy / Serra Soldadura*

*Switzerland:  
Ismeca S.A.  
Main Contact :  
Merlin Gerin (Usine M3)  
Mr. Claude Terracol  
Tel: + 33 76 60 67 03  
Fax: + 33 76 60 59 31  
Estimated Costs: 10 MECU  
Time Scale: 60 Months*



# LOGIMAX

## A LOGISTIC NETWORK TO CONTROL MATERIAL FLOWS

### EU 227

Transport  
Acronym: LOGIMAX

Title: LOGIMAX  
Announced at: Madrid, 1987

#### Participants:

Germany:

NCR GmbH

The Netherlands:

Frans Maas Holding b.v.

Main Contact:

Frans Maas Holding b.v.

Mr J van Ooyen

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Fax: +31 77 54 79 98

Estimated Costs: 3.2 MECU

Time Scale: 36 months

The Single European Market, where internal barriers to trade and competition are removed throughout Europe, will trigger a series of changes in the way European multinational companies do business.

In order to respond readily and flexibly to market demands, it is becoming increasingly important for businesses to optimise their material flows and to keep costs to a minimum.

The Single European Market could revolutionise the commercial transport industry, which moves raw materials to commodity producers, and then these products to consumers, usually via a complex system of warehouses. This whole 'logistic chain', from raw material to factory to shop window, is set to change into a system with a centralised warehouse that supplies the whole European market from one site. EUREKA project 227, LOGIMAX, is at the forefront of this transformation.

It is a comprehensive logistic system, which keeps the entire supply and distribution flow under control. This monitoring system is combined with a hub-and-spoke transport network that spreads across Europe. Changes can be directly implemented. This means that LOGIMAX can promptly react to users' demands, thereby facilitating efficient product planning.

LOGIMAX has two participants: the forwarding and transport group Frans Maas from the Netherlands and the German computer company NCR, which is responsible for linking the system together into an integrated network.

The operational part of LOGIMAX is composed of three main modules. The first, the Material Management System, deals with the

flow of raw materials from the supplier to production plants. The second, the Physical Distribution System, controls the flow from producers to the consumers, whilst the third is an operating system within warehouses.

The network is equipped with NCR Tower and NCR 9800 systems, both of which can handle large flows of information. By means of conversion, other equipment can also be connected. An OSI-based structure network, based on X 25 communications was chosen.

The modules were pilot tested in 1991 and can be either operated by themselves or integrated into a forwarding system. Future developments within the LOGIMAX system will be the development of a Management Information and Decision Support System, and a so-called Floor to Floor System (a further development of the Door to Door transport concept). The final goal of the LOGIMAX system is a complete integration of all activities within the logistics chain. This can mean that a single procurement or sales order, entered in the logistics chain, could flow through the system right up to the warehouse stage, and automatically control warehouse activities so that the sales order is fulfilled. High quality through speed, flexibility and reliability is the keystone of LOGIMAX.

One of the three subsystems became operational in the beginning of 1991. The other two were implemented in a pilot environment during 1991.

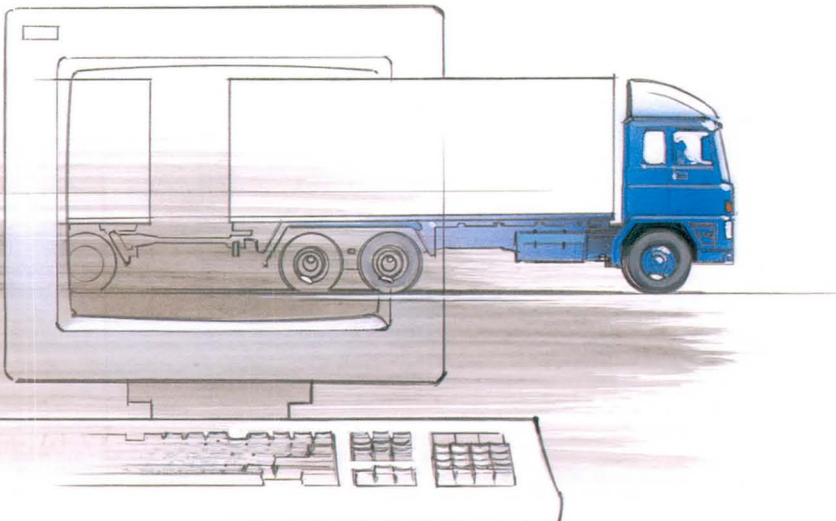
The main applications are:

- organising the physical transportation of materials
- processing the necessary flow of information
- fitting in with the needs of the user (manufacturer or trading company).

At all times these applications can be controlled.

LOGIMAX can also be used for other purposes such as, for instance, purchasing and sales planning, which runs via the EDI-network (Electronic Data Interchange). With this system, enormous streams of information can be processed which are related to suppliers, producers, traders and customs authorities.

For users, the advantage is that they are connected to the network via their own systems. Most of the standard applications need only be implemented for incoming data, which is not visible to the user. Extra training to communicate with the network is therefore not necessary.





## EUREKA BIBLIOGRAPHY

For the interested reader, further material on EUREKA is available upon request from the respective National Project Coordinators or the EUREKA Secretariat (see addresses on previous page).

Material available in English, French, German, Italian and Spanish includes:

- Annual Progress Report.
- EUREKA News (published quarterly)
- EUREKA Brochure (containing a short general description of the Initiative).
- Vade Mecum (containing:
  - The Medium Term Plan.
  - Declaration of Hanover.
  - Procedures for EUREKA projects.
  - Memorandum of Understanding on the EUREKA Secretariat).

Other publications only available in certain languages :

- EUREKA 5 year Jubilee Book - Event of Excellence
- EUREKA Assessment Report
- EUREKA Robotics and Production Automation folder
- EUREKA Environment folder
- EUREKA Transport folder
- Open the Door to EUREKA. The Madrid Rules on EUREKA participation from non-member countries
- Checklist for the Negotiation and Drafting of an International R & D Cooperation Agreement in the Framework of a EUREKA Project
- Guide pour la Préparation et la Negociation d'un Accord de Coopération Internationale dans le Cadre d'un Projet EUREKA
- Guidelines for the Protection of Technological Information
- Guide pour la Protection de l'Information Technologique
- Guide de la Normalisation pour les Industriels impliqués dans un Project EUREKA

- Guide to Standardization for Companies involved in EUREKA Projects
- Cross Border Innovation - Managing Co-operative Ventures in Industrial R&D
- Le Contrat Modulaire d'Assurance des Projets EUREKA

### The EUREKA Database

The EUREKA database, which is run by the EUREKA Secretariat, contains a wealth of information on announced or proposed projects. It can divulge the R&D fields covered in EUREKA, technological goals, the implementation schedule of projects, budget, participants' names and contact addresses. It is a contact tool for potential industrial and scientific partners.

The information contained in the EUREKA database can be:

- Supplied on request by National Project Coordinators or by the EUREKA Secretariat in Brussels. (see pages 46-47 for addresses).
- Accessed directly via ECHO (European Commission Host Organisation) host computer in Luxembourg. This can be done through a standard terminal linked to ECHO via the X25 data network (international address 0270 448 112 or A9270 448 112 for users accessing from the United Kingdom) or via the international telephone network (+ 352 43 64 28 if you use a 300 bits modem and +352 42 03 47 if you use a 1200 bits modem: Password: EUREKA in both cases).
- Accessed via the TELETEL network in France using a Minitel terminal (code 3617- EUROBASE).
- Accessed via the French Transpac network (Code 3617) or via an international line (+33 36 43 15 15). Select EUROBASE service.

In addition, several brochures and newsletters are published at national level.



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