



EUROREKA

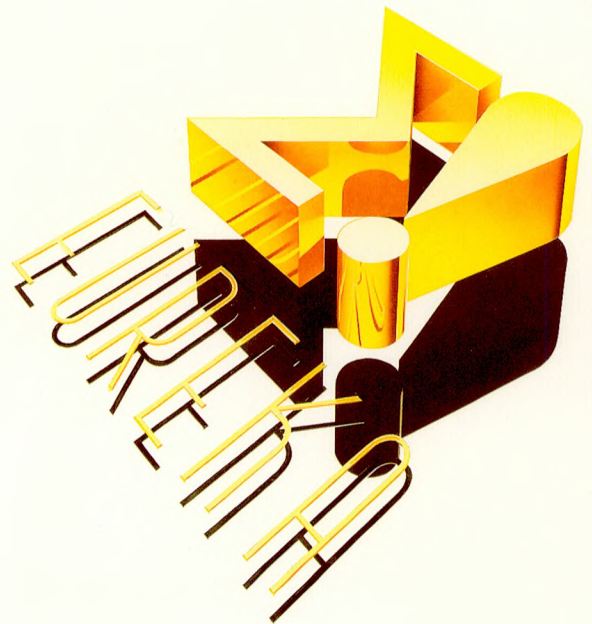
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Annual Project Report 1989

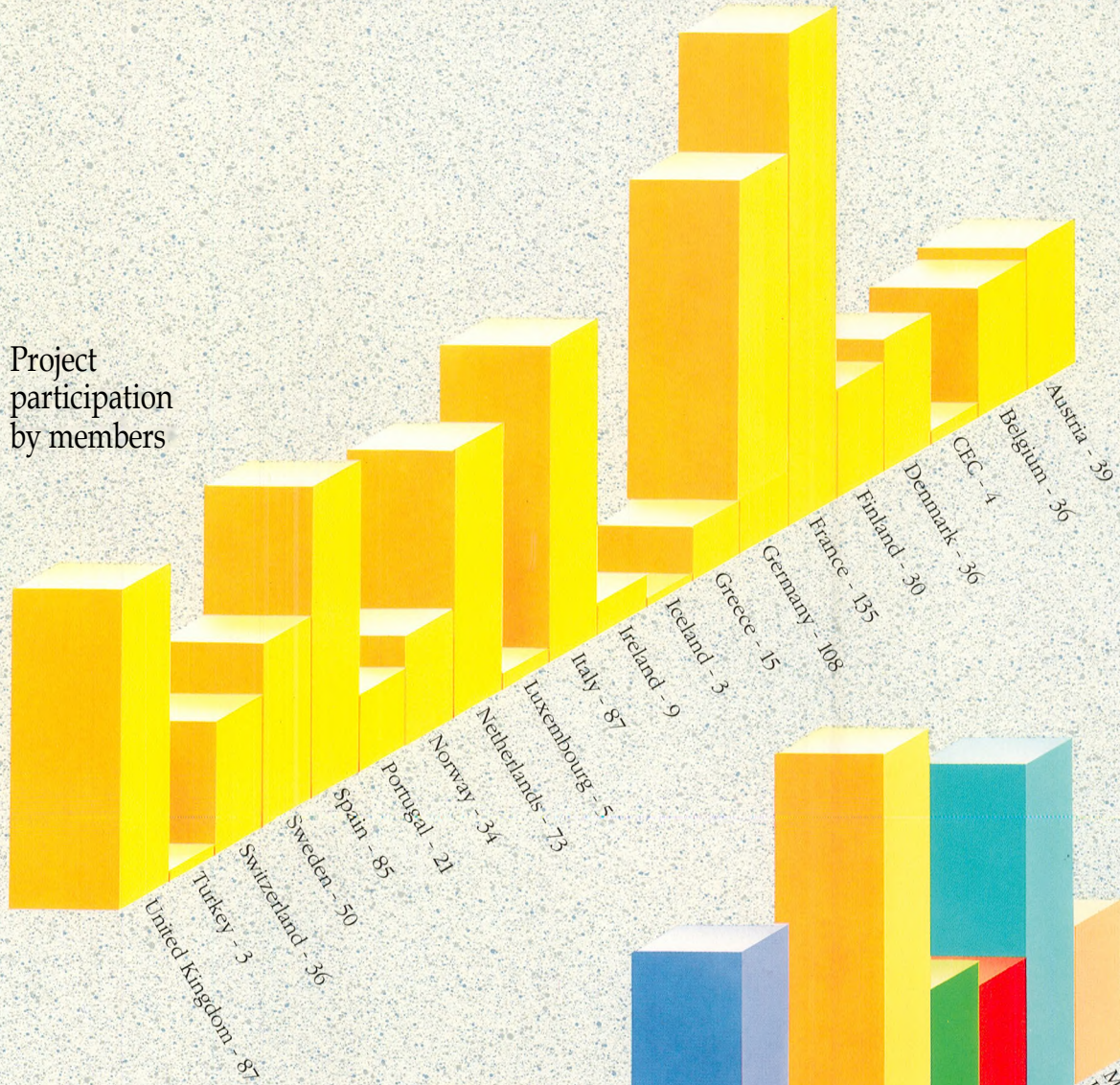


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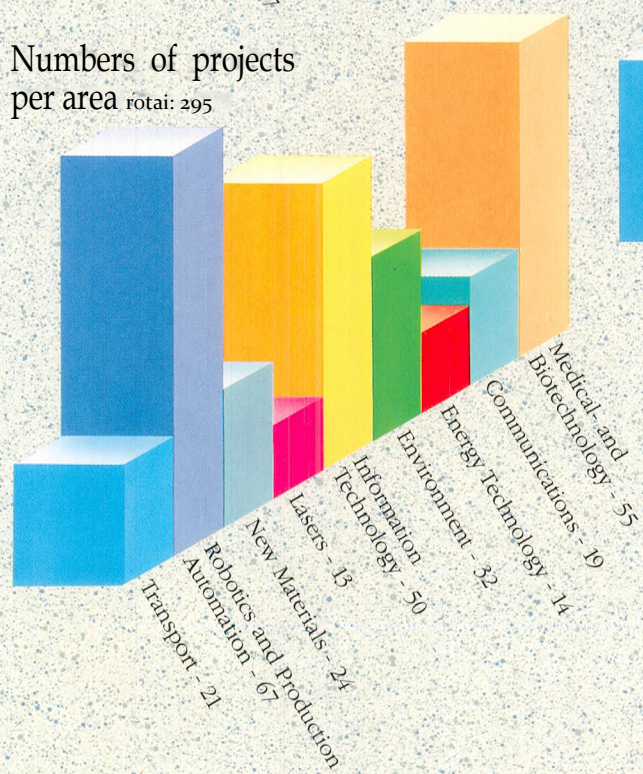
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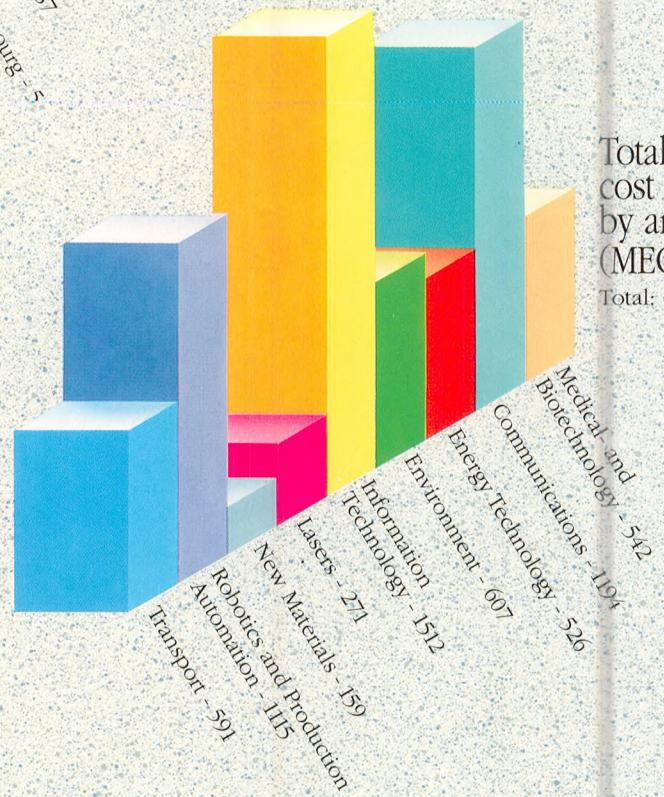
Project participation by members



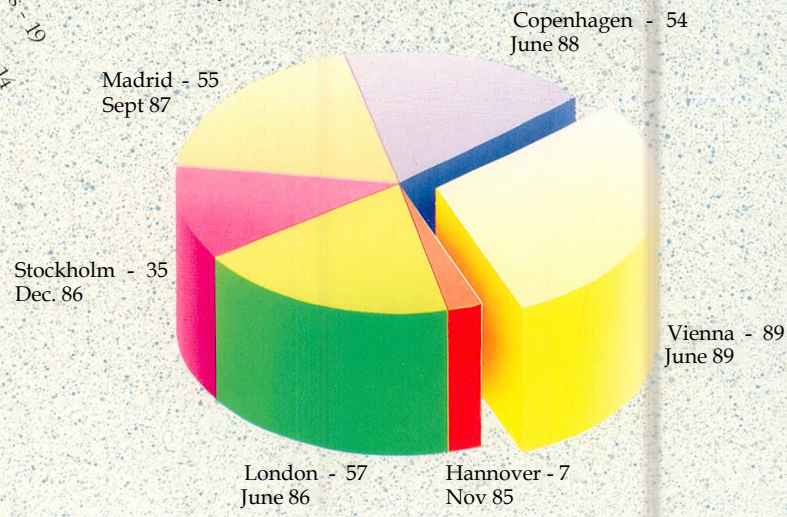
Numbers of projects per area *rotai: 295*



Total cost by area (MECU)
Total: 6517



Number of announced projects (by ministerial conferences)



Withdrawn projects are not included in the statistics.

INTRODUCTION

EUREKA was launched in 1985. Its objective is to raise the productivity and competitiveness of Europe in the fields of advanced technology through collaboration among enterprises and research institutes.

This Annual Project Report 1989 provides a description of the projects announced up until June 1989, when the 7th Ministerial Conference was held in Vienna.

The nearly 300 projects covered in this report have a total estimated cost of more than 6.4 billion ECU and involve over 1500 participants, 700 of which are larger companies, 300 SMEs, 450 research institutes including universities and 80 other organizations. 13 organizations come from non-member countries.

EUREKA projects relate primarily to products, processes and services in the areas of advanced technology. EUREKA also embraces important advanced technology research and development projects aimed at the creation of the technical prerequisites for a modern infrastructure and the solution of transboundary problems. Consultation and coordination frameworks among the participants of different projects dealing with the same sector (such as transportation, environment, manufacturing technologies) have been established in order to facilitate the exchange of information, to ensure the effective use of available resources and to allow for the identification of possible areas of cooperation.

The supportive measure requests so far received belong mainly to the area of standardization.

EUREKA AND THE EUROPEAN COMMUNITY

The European Community has been a full member of the Eureka Initiative since its inception and has contributed to its set up.

This is explicitly confirmed through the Hanover Declaration which says that the European Communities may participate as a partner in EUREKA, e.g. through their own research capacity, research and development programmes and financial facilities.

Cooperation has been implemented through the Commission's involvement in specific EUREKA projects on a case-by-case basis and the broader context of the Community's role, in fostering a general economic and business environment suitable to the flourishing of transnational R&D ventures.

The EC R&D programmes and the EUREKA projects are convergent towards the same ultimate goal: the creation of a European Technological space. However, EUREKA projects cover a larger geographical area and have different institutional frameworks.

EUREKA projects are expected to lead to applications or markets.

The Community programmes - as with other sources of public funding for R&D - are especially focused on pre-competitive activities, including pre-competitive phases of EUREKA projects. So, the two frameworks are intended to be complementary: on one hand EUREKA projects or phases of such projects of a precompetitive nature may receive finance or other support from EC programmes if proposals are submitted via the normal procedures for these programmes.

On the other hand EUREKA can provide an additional framework for the continuation of the work started in projects launched under EC programmes. These programmes, hence, can be an important source of support to the generation of EUREKA projects.

Conversely, for example, EUREKA can help to indicate to the EC authorities sectors of projects which by their specific nature or importance may benefit from efforts in EC programmes.

Good progress has been made in developing synergies between the Community's R&D programmes and EUREKA. Several factors pointed to the need to strengthen this cooperation.

The Community's third Framework Programme for Research and Technological Development adopted on 15 December 1989 spells out the means for promoting the development of complementarities between Community actions and EUREKA projects which extend their strategy. This includes the participation of the Joint Research Centre, the financial participation into EUREKA projects by the normal procedures of EC programmes and the exploitation of the possibilities offered by the single European act notably as regards supplementary programmes and participations in other programmes.

At present, the European Community involvement in Eureka projects takes the following forms:

- Providing a direct financial contribution to projects, e.g. EUROTRAC (EU 7), COSINE (EU 8), JESSI (EU 127), or the realisation of some research activities by the Community's Joint Research Centre as a project participant, e.g. in EUROTRAC (EU 7), FORMENTOR (EU 19).

- Cooperation has been established with specific projects linked to the EC programmes. On a case-by-case basis, the technical objectives and the contents of some Community programmes have taken the existing EUREKA projects into account, e.g. the programmes ESPRIT, DRIVE, STEP, RACE, MAST. Vice versa, the participants of some EUREKA projects are taking the EC programmes into consideration.

- Supportive Measures: Examples relating to HDTV, EUROLASER and the EUREKA Road Transport projects are described below under the Communication, Laser and Transport headings.

PROJECTS

In this section the 295 projects are classified into 9 technological areas. An overall description is provided (of the ongoing work and on the supportive measure requests already formulated).

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**" proves to be important. The process is "bottom-up", beginning with the identification of project needs. However, the fulfilling of the conditions may require action by governments and international bodies, initiated and supported by EUREKA bodies.

MEDICAL- AND BIOTECHNOLOGY

Projects : 55
of which announced
in Vienna: 14

Total Cost:
542MECU
of which costs of
Vienna projects:
100MECU

Participating
Organisations: 190

Main Subjects:

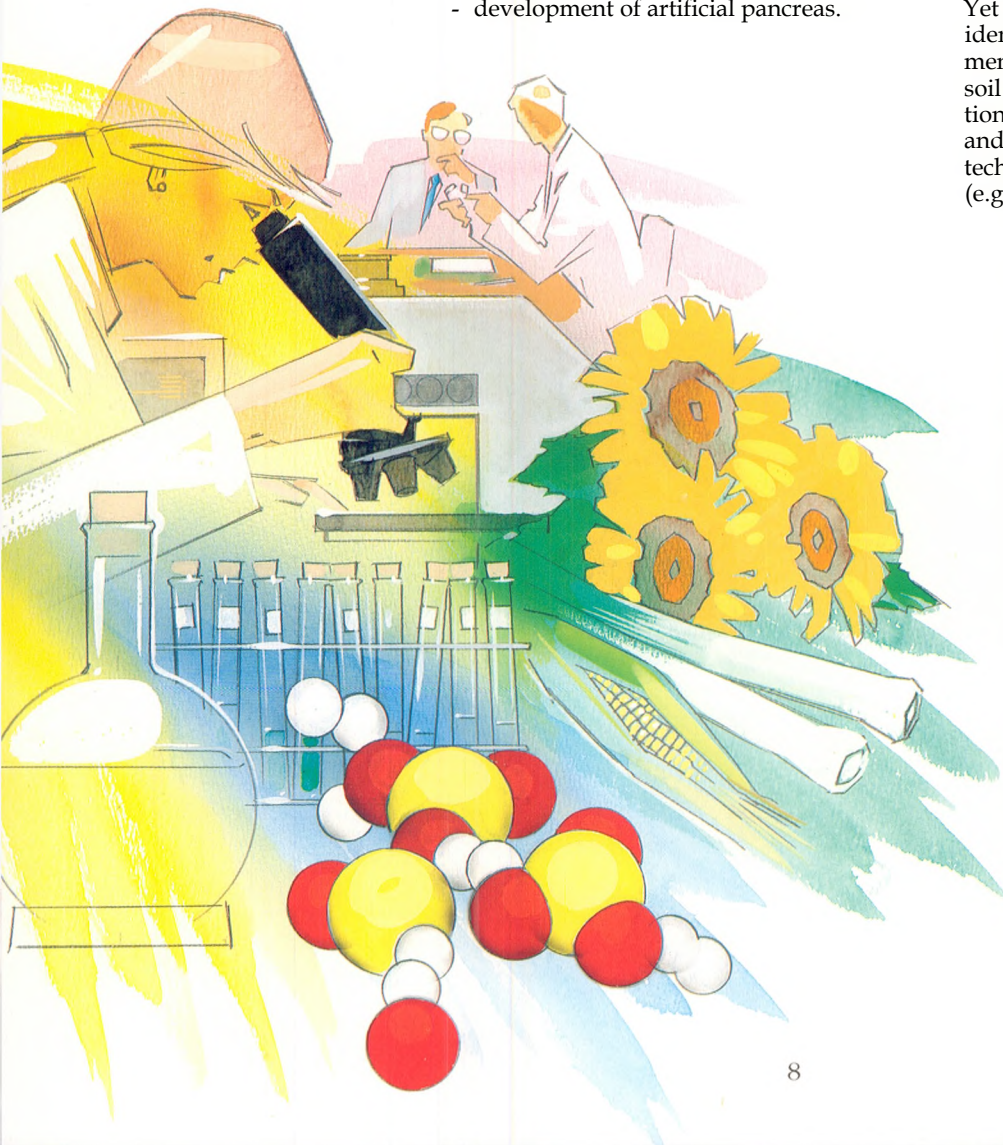
- Diagnosis and treatment of diseases
- Genetic engineering of plants
- Biotechnological production processes
- Animal breeding

Of the total 55 projects in this area, 25 are directly or indirectly linked to medical technology. These biotechnology projects cover both clinical and diagnostic applications touching upon a range of diseases. Three projects involve R&D on cancer detection and treatment, one of them also includes AIDS detection and treatment. Three deal with sexually transmitted diseases, others aim at developing a malaria vaccine, diagnosis and vaccination against fasciola hepatica, advanced diagnosis and treatment of diabetes, allergies and high blood pressure. Further work is in progress on a variety of different aspects such as:

- an expert system for health examination;
- the electronic identification of blood bags;
- the functional restoration of the ability to walk by implanted neurostimulation;
- bio-medical sensors;
- new biocompatible ceramics;
- development of artificial pancreas.

There are 14 projects in the agrobiotech area, some relating to genetic engineering to improve the quality and disease-resistance of plants such as the sunflower, the tomato, corn, onions, leeks, carrots, peppers, etc. Others deal with the production of growth promoters, natural flavours and the development of new sparkling beverages.

16 of the biotechnology projects have primarily a production methods orientation. Several of these projects centre on process applications, such as the high volume production of animal and/or human cell cultures, antigen marking and filtration/separation techniques, production of synthetic peptides for clinical nutrition, flexible fabrication of fresh fermented dairy products and the production of salmonidés. Another project deals with separation processes functioning under zero gravity conditions (e.g. in space), another with an automated and programmable laboratory for work with DNA (analysis, hybridisation, cloning, sequencing, etc.). Yet other projects deal with animal identification and registration, development of a special off-road machine for soil preparation, biochemical applications for the animal breeding industry and the development of a production technology for the culture of flat fish (e.g. turbot).



COMMUNICATIONS

Although most of the projects in this area at least touch upon aspects of standardization, some aim explicitly at developing or preparing standards. Two of these use the Open Systems Interconnection (OSI) reference model as a basis: one project tries to set up a Europe-wide network of public and private research centres, which can cope with the diversity of information technology equipment installed via open (i.e. non-manufacturer based) standards, and to develop and test new communication services. The other project deals with communications security, which is becoming increasingly important as the use of open networks grows.

A further project studies the technical feasibility of a digital audio broadcasting system, and the remaining two deal with the specific problems of developing algorithms for speech coding/decoding schemes and bit reduction respectively.

The eight projects in the second group, specific systems improvement, deal with a wide range of specialized applications:

- stereophonic sound reproduction
- development of a more sophisticated telephone
- development of a personal security system based on domestic telephone sets
- process improvement for vacuum processes in the semiconductor industry (this latter project is therefore also related to the area of production automation)
- a new high stability miniature frequency source for navigation, telecommunications and metrology applications
- the synthesis of computer images
- computerized information exchange in the context of large industrial cooperation activities
- combining image generation by computer with computer-assisted live shooting techniques in TV and video production.

Two projects aim at networking/systems integration for real-time process and machine control using industrial local area networks (LANs) and for private communication within and outside the home. In addition, two large projects are working on the development and marketing of a new generation of computerized distribution systems to meet the overall needs of the travel and tourist industry.

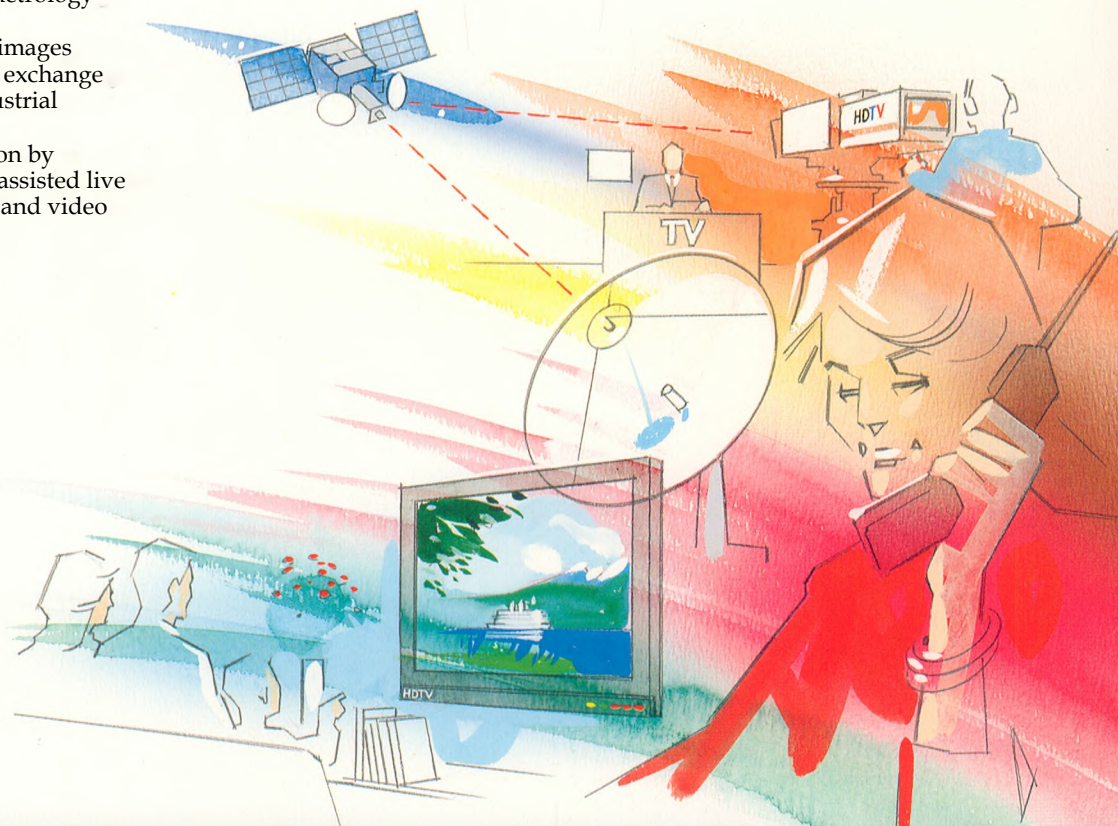
Two projects in communications techniques deal with problems of high bit-rate (up to 2.5 Gigabit/second) optical transmission systems.

The most costly and far reaching communications project - and simultaneously one of the most high profile EUREKA projects - relates to High Definition Television. It aims at developing a new standard for future TV, which has the advantage of full compatibility with "traditional" TV equipment. In addition to standards, the development of the operational equipment for the next generation of TV is also part of the project.

SUPPORTIVE MEASURES

HDTV: Coherent and timely action is now being taken to pave the way for the acceptance of the European standards proposal and the introduction of the European HDTV system. In addition, the Commission has supported its promotion by funding a studio.

Projects: 19
of which announced in Vienna: 4
Total Cost: 1194 MECUs
of which costs of Vienna projects: 390 MECU
Participating Organisations: 150
Main Subjects:
- Standards/Norms
- High Definition Television
- Specific Systems Improvement
- Networking/Systems Integration
- Communication Techniques



ENERGY TECHNOLOGY

Projects: 14
of which announced
in Vienna: 3
Total Cost: 526 MECU
of which costs of
Vienna projects:
30 MECU
Participating
Organisations: 70
Main Subjects:
- Gas turbines
- Drilling of
hydrocarbon wells
- Power plants
- Energy saving
machinery

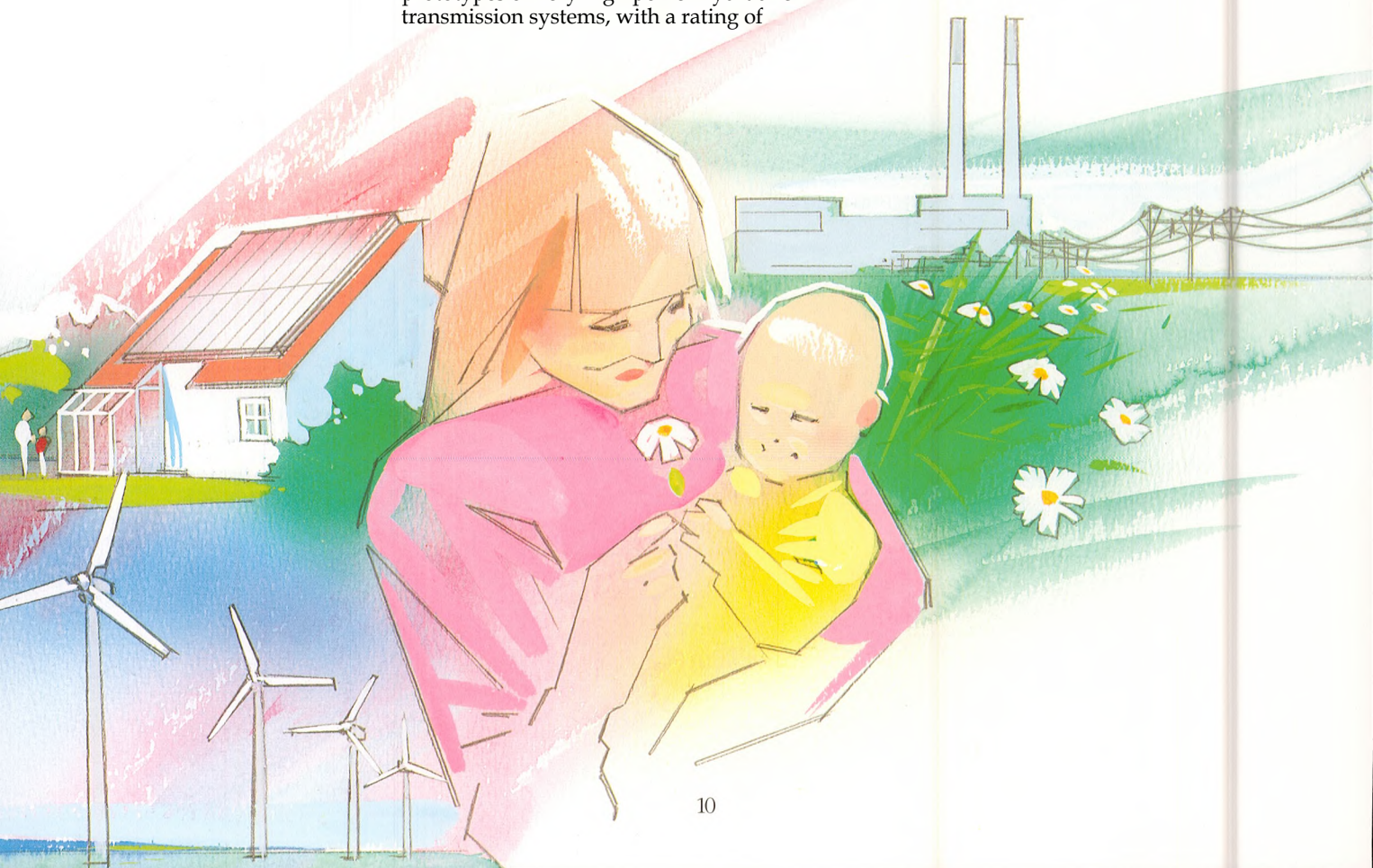
Gas turbine projects predominate, with applications ranging from small car engine turbines to large ones for electricity supply or marine propulsion. Most of these projects involve new materials, e.g. ceramics, or electronic-control reducing turbine weight and increasing efficiency and speed. This will also reduce fuel consumption or pollution.

Two projects aim to substantially reduce the costs of drilling hydrocarbon wells by combining new materials and advanced technologies such as robotics and artificial intelligence. Three other projects are in the field of power plants. 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 focuses on extreme meteorological conditions especially in alpine locations. A third project aims to build a compact non-polluting 300 MW coal-fired power station which economically meets the most stringent environmental requirements, even using fuels with a very high sulphur content.

The remaining projects all share the aim of increasing the efficiency of existing systems, while reducing costs and minimizing side-effects. Among them, one aims to build and thoroughly test prototypes of very high power hydraulic transmission systems, with a rating of

up to 5.5 MW - roughly 3-5 times the power of the largest hydraulic machinery built to date. Two other include the use of amorphous silicon in photovoltaic cells for autonomous electric power supply. The other projects are intended to develop a new concept in uninterrupted power supply; new designs and technologies for high power semi-conductor devices; the development and construction of two wind power stations with 3 MW; the research, development and industrialization of absorption heat pumps and heat transformers for industrial use and high power applications; and the creation of an integrated electric drive for home automation.

Lastly, there is a project for developing hydrogen-powered buses and lorries, taking advantage of seasonal and weekly electricity surpluses. These vehicles will "kill three birds **with** one **stone**", by using the seasonal storage of energy, substituting fossil fuels and reducing environmental damage, especially in urban areas.



ENVIRONMENT

The 32 projects are grouped in four categories; large scale research and systems studies, development of clean and purifying technologies, protection applications and finally the development of instrumentation.

Three projects undertake large scale research and technology development during the actual project implementation phase in:

- the transport and transformation of pollutants in the atmosphere over Europe
- the vertical and lateral exchanges between the ocean, the atmosphere, the shelf sea and the coastal zone
- the effects of pollution on historic objects and monuments.

Two additional projects have a similar systems approach, one aiming at the reduction of water contamination due to industrial effluents through the use of local pre-treatment and final central process-treatment, and the other surveying the option of repositing hazardous waste underground in caverns, granite or similar rocks.

The number of projects in which the main emphasis is on the development of clean and purifying technologies are nine. Five projects focus in particular on water or air treatment, by way of developing membranes, new filter materials and developing technologies for efficient and reliable wastewater treatment processes.

Three projects focus on specific problems of contaminated harbour sludge, water contamination by chrome salts during the tanning of leather and noise sources in vehicles.

In addition there is an umbrella project with special emphasis on environmental technology. This has generated a separate project which focuses on problems due to foams used in fire fighting especially in industrial facilities.

The third category on protection applications comprises three projects in the area of problems linked to pollution of historic objects and monuments such as bronze and granitic monuments and Roman mosaics.

Preservation of wooden grids and piles in buildings and the measuring of corrosion of steel reinforcements in concrete structures are the subjects in two other projects.

Three projects seek to develop research and monitoring vessels for various operations along sea shorelines and inland waterways, on marshland and unstable ground and on European seas.

The two remaining protection application projects strive to develop a new type of wave attenuator and new products based on microorganisms to improve the resistance of plants to diseases.

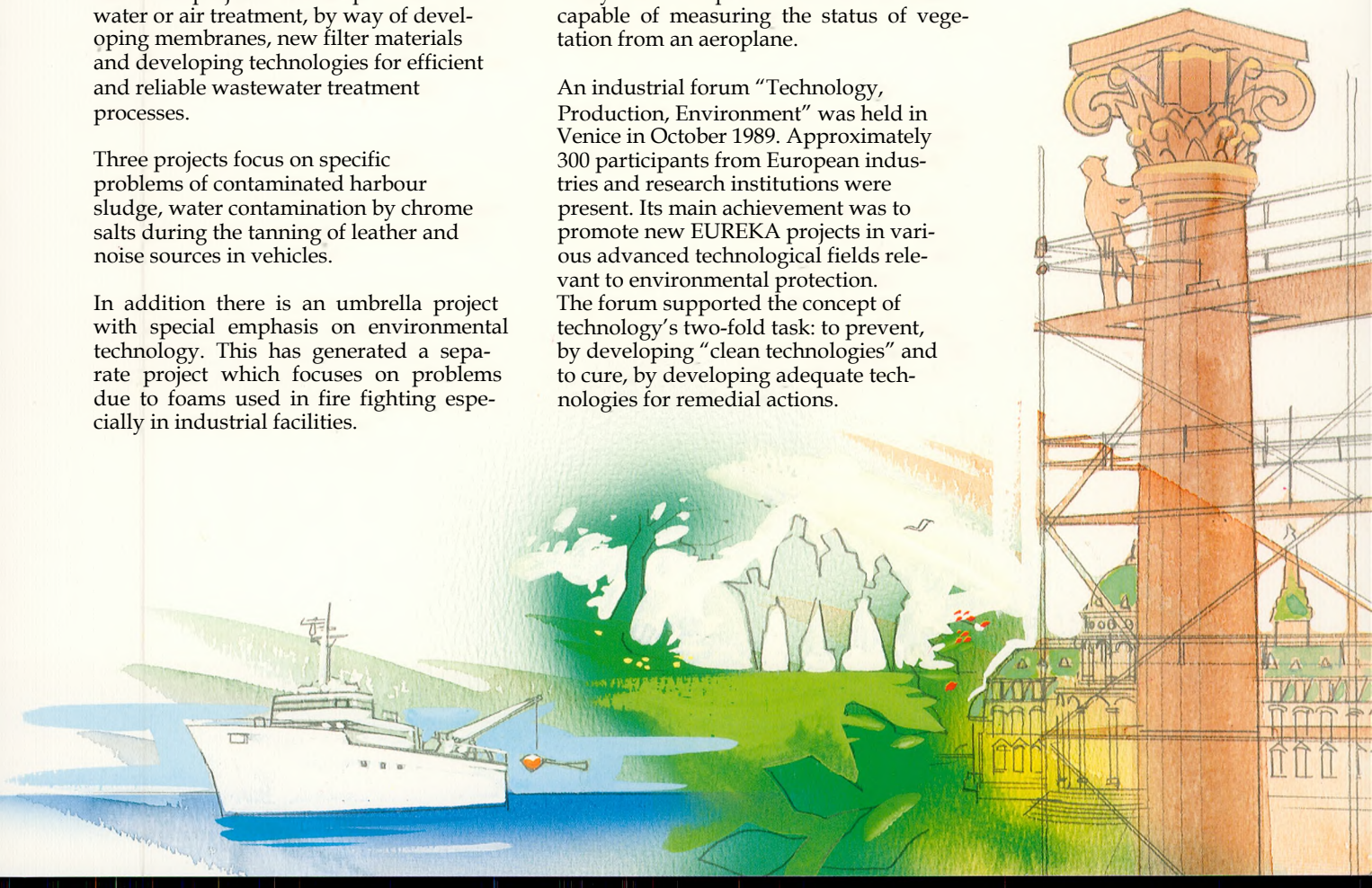
The last group of eight projects involving the development of instrumentation includes six projects which deal with instrumentation and equipment for marine research purposes.

The remaining two projects strive to develop low-weight, easily operated equipment able to identify and measure simultaneously many gases and respectively to develop and test an instrument capable of measuring the status of vegetation from an aeroplane.

An industrial forum "Technology, Production, Environment" was held in Venice in October 1989. Approximately 300 participants from European industries and research institutions were present. Its main achievement was to promote new EUREKA projects in various advanced technological fields relevant to environmental protection. The forum supported the concept of technology's two-fold task: to prevent, by developing "clean technologies" and to cure, by developing adequate technologies for remedial actions.

*Projects: 32
of which announced
in Vienna: 21
Total cost: 607 MECU
of which costs of projects
announced in Vienna:
80 MECU*

*Participating
Organisations: 350
Main subjects:
- Water treatment
- Atmospheric pollution
- Restoration and
preservation of
buildings and artifacts
- Marine technology*



INFORMATION TECHNOLOGY

Projects: 50
of which announced
in Vienna: 15
Total Cost: 1512 MECU
of which costs of Vienna
projects: 180 MECU
Participating
Organisations: 200
Main Subjects:

- Hardware components production
- Software development systems
- Information storage/ and retrieval systems
- Specific applications of information technology

The projects grouped under this heading deal principally with the technologies for producing hardware components (integrated circuits, sensors and peripherals), and software components (computer programs). A further category is formed by information storage and retrieval systems, and various specific IT applications.

In the hardware sector, three projects represent major European efforts to gain a measure of sufficiency in the production of ICs.

One aims to create a production capability for Application Specific Integrated Circuits (ASICs) with production cycles of under two weeks, using "direct writing" technology.

The other addresses the production of 4 Mbit non-volatile memories (EPROMs), and the feasibility and architecture of 16 Mbit ones. Upon completion of its definition and planning phase, the Vienna Ministerial Conference announced the execution phase of a third project.

Jessi is the largest collaborative R&D activity within the European semiconductor industry. This 8 year integrated project is aimed at:

- development of advanced technologies for memory and logic devices
- production equipment and materials related to semiconductor production
- and new standard CAD tools for advanced circuits.

Other contributions to the development of I.C. technology come from projects for all-dry single layer photolithography, 0.1 micron ion projection and intelligent automated inspection and analysis of integrated circuits. Extremely short prototype and production turnaround is the aim of an analogue transistor array project which uses direct writing by laser.

Several projects involve sensors and signal processing for acoustic and optical data as well as mechanical data on pressure and acceleration.

In the peripherals sector, an ink jet-printing project aiming at colour reproduction of photographic quality and a secure card reader in bank communication are being developed.

In the software sector a number of projects address the problem of managing the production process of software components.

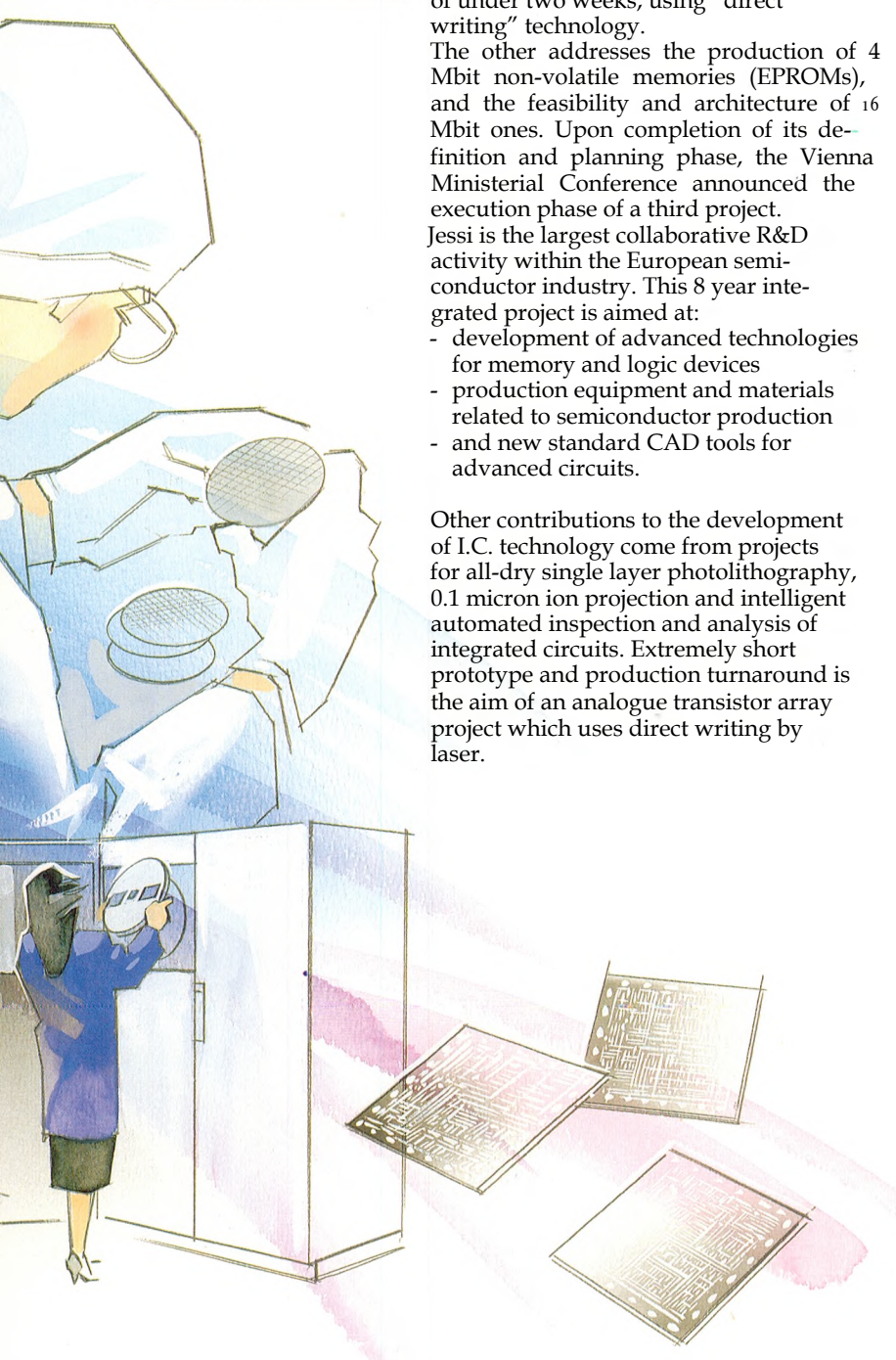
The largest project is based on a standardised user interface bus; another is based on the emerging standard Portable Common Tool Environment (PCTE) resulting from ESPRIT.

Two projects aim at software development environments specifically oriented towards the ADA programming language.

Tool-kits are being created for the "Prolog" language (a common basis for many expert systems), for the standardization of LISP (also used extensively in expert systems programming). Compilers and operating systems research for the Transputer (a proprietary highly parallel processor) are also dealt with.

A new line of software products/ services is being developed for the audiovisual market in order to reduce production time. Improvement of text retrieval systems with artificial intelligence, and a manufacturing interface to make it easier to develop, exchange and adapt factory automation and CIM applications are other significant software projects.

Direct applications of information technology are the goal of several projects, dealing with topics such as - enhancement of security, safety and reliability of industrial systems using an expert system approach; natural language translation support with on-line dictionaries and thesauri; a medical digital information system for hospitals and a system of radio-determination by satellites with European coverage.



LASERS

The 13 laser projects deal with different laser types for highly different applications.

Two projects relate to high power CO₂ (carbon dioxide) lasers rated respectively at 10 and 25 KW, mainly for metal-working applications. At present, manufacturing industry especially the automotive industry predominantly uses 5 KW CO₂ lasers, but for other more advanced applications in aerospace, ship-building and metalworking industries higher powers are required.

Four projects are developing alternatives to the CO₂ lasers, to offer industry a better choice of characteristics, particularly as regards wavelength. Among these are two involving excimer lasers with a very short wavelength in the ultraviolet range, for applications in microlithography and material processing. The intention is first to develop 1 KW lasers, and subsequently to increase power up to 5 KW. One project relates to the development of a solid state laser for industrial applications for such uses as welding and metal cutting. Moreover one project deals with new sources of laser power, aiming at developing a 0.5 KW CO (carbon monoxide) laser, which can later be increased to 5 KW.

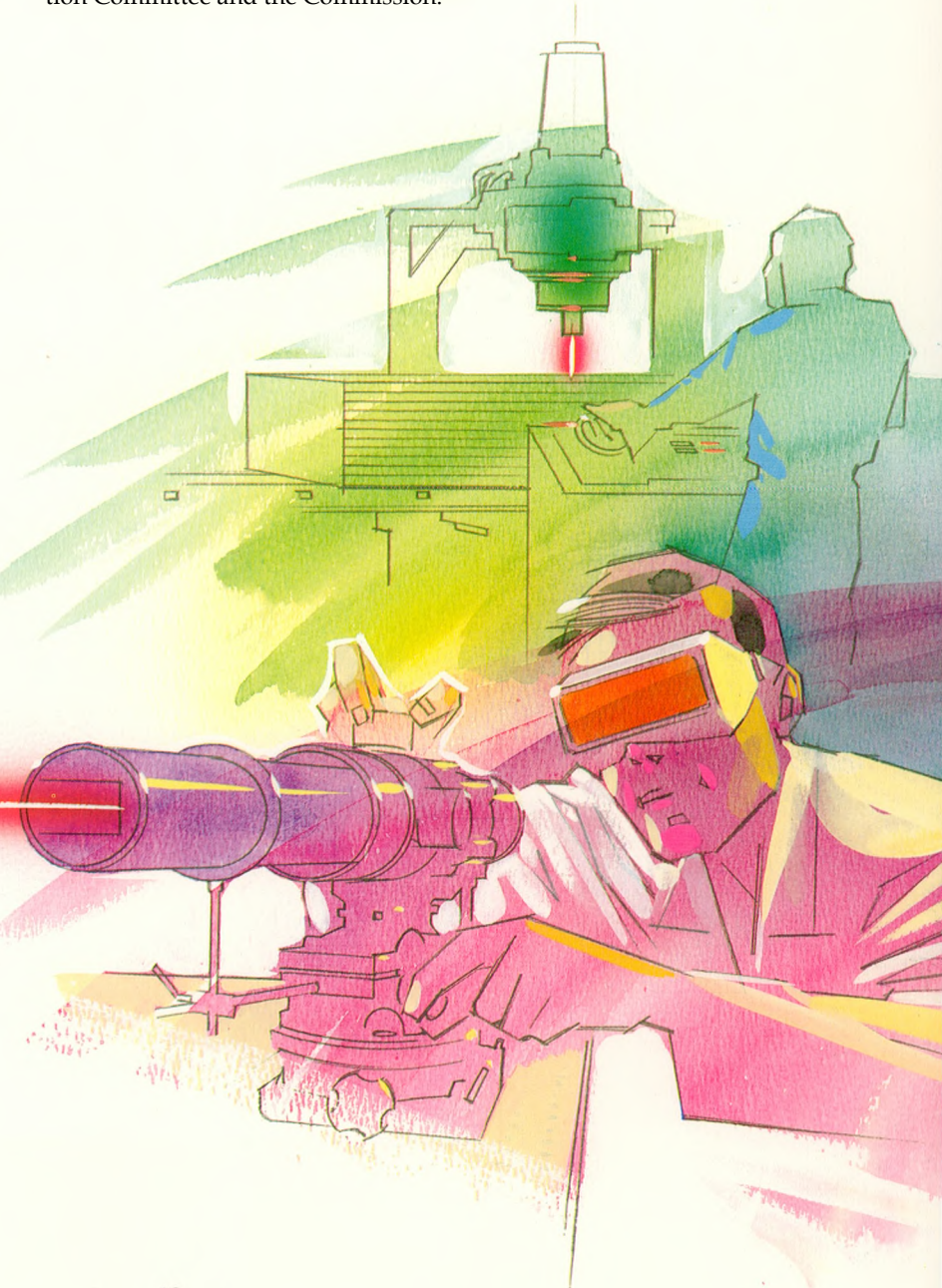
Four projects aim to develop the application and utilisation of lasers in the manufacturing industry. Three of them aim to increase the use of high-power lasers of which one is specifically involved with surface treatment, an expensive process which at present has to be carried out in ad hoc plants. Within the fourth of these projects a database will be created to promote the use of solid state lasers by facilitating contacts between suppliers and users.

Finally, two recently instigated projects concentrate on a new type of application of lasers for highly specialised measurement tasks. One of them deals with monitoring individual vehicle exhaust values while in ongoing traffic, the other with vibration measurement, where conventional methods fail.

SUPPORTIVE MEASURES

As the industrial use of lasers becomes widespread, existing standards and regulations have to be adapted and made more application-oriented. As regards matters of safety and health, EUREKA is looking to identify and solve problems before they arise in practice (the so-called preventive approach) in close cooperation with the participants, the EUROLASER Governmental Coordination Committee and the Commission.

Projects: 13
of which announced in Vienna: 2
Total Cost: 271 MECUs
of which costs of Vienna projects: 2 MECU
Participating Organisations: 170
Main Subjects:
- High Power Lasers
- New Laser Sources
- Industrial Applications
- Specialised Measurements



NEW MATERIALS

Projects: 24
of which announced
in Vienna: 7
Total Cost: 159 MECUs
of which costs of Vienna
projects: 20 MECU
Participating
Organisations: 110
Main Subjects:
- Engineering
ceramics in engines
and turbines
- Development
of new materials
- Fabrication and
design requirements
- Testing equipment

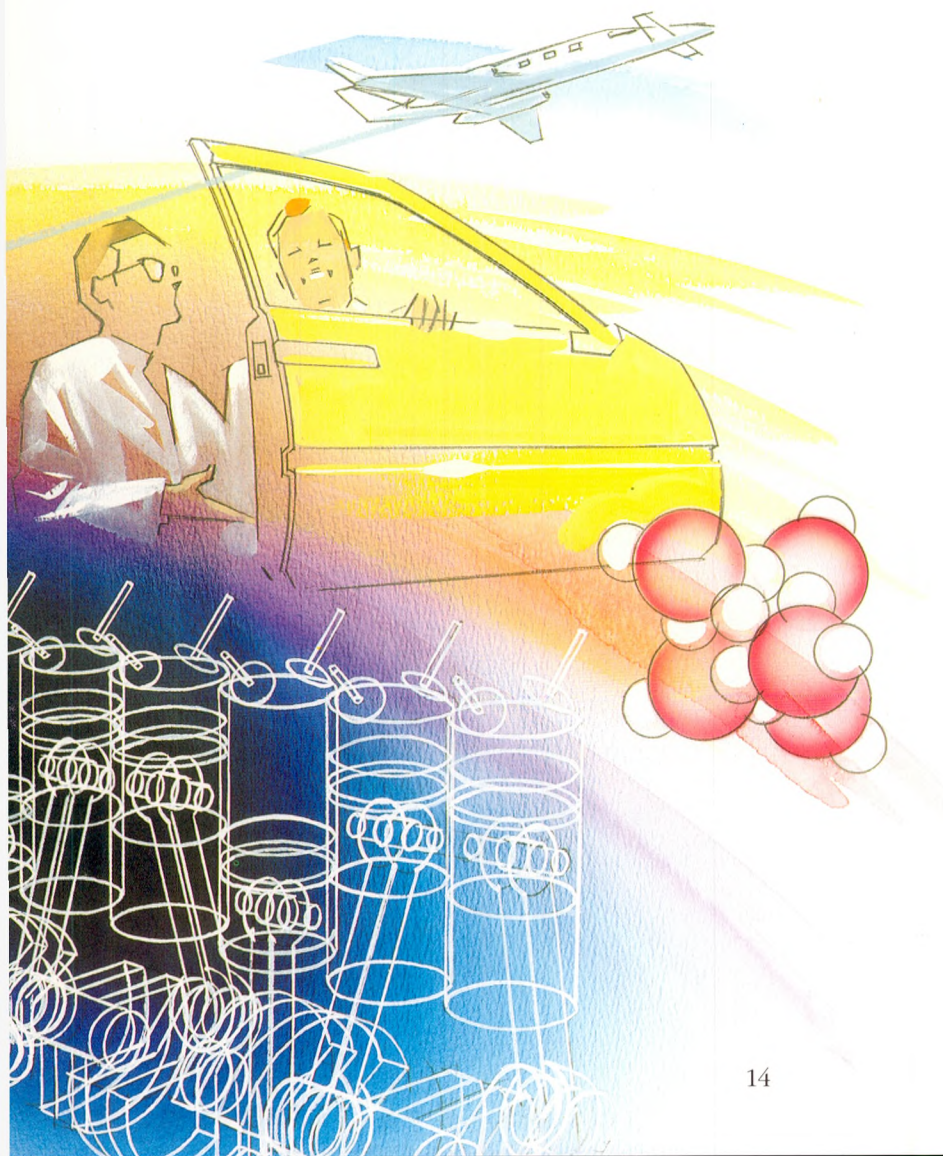
Application fields include the use of ceramics in diesel engines and gas turbines to achieve improved efficiency and lower emission of pollutants, and the use of fibre-reinforced plastics for lighter and more resistant aircraft floor panels.

This application oriented work is complemented by twelve projects in the development of new materials in a strict sense of the term. While two projects aim at using the mineral wollastonite to develop new composite materials, another endeavours to further develop polyolefine grades, tailor-made for specific applications in medicine and for concrete reinforcement. A further project studies a new superconducting material with the aim of producing magnetic coils which will operate at much higher magnetic field strengths than is currently possible. Yet another project deals with new methods of producing precursors of ceramic material in order to achieve better property control of the ceramics.

The latest three projects added here aim at the development of an isolating electrical mineral coating on metallic support, of a soft coating material for heavy duty slide bearings with enhanced mechanical, chemical and tribological properties and of new steels with high static, dynamic and fatigue strength for automotive applications.

Eight projects are more oriented towards manufacturing and design technology. They deal in particular with car body production, the use of compact reinforced composite as a substitute for cast iron in mine shaft and tunnel linings, the effective use of electrochromic and thermochromic coatings based on various metal oxides for industrial products and the welding of aluminium alloys and the design of aluminium structures tailored to resist specific stresses (fatigue loading). Three recently instigated projects aim at new techniques for joining metals and ceramics using ion beams, the industrial production of large moulded parts from liquid silicon rubber, and the production of isolating textiles such as those used for e.g. ski suits, reducing production costs and the environmental impact of present methods.

Finally, 3 projects are developing various types of equipment to test materials and study their microstructure.



ROBOTICS AND PRODUCTION AUTOMATION

The "family" of flexible assembly projects recently comprised 16 projects which ranged from the development of refrigerator compressor cells and telephone subset assembly to automated flexible plants for making washing machines, shoes and more complicated items such as electronic cards and metering equipment. The Vienna Ministerial conference enlarged this area with 12 new projects.

The remaining projects in manufacturing automation are split into those which will lead to new generic production techniques not necessarily related to a single product, and those dealing with the automation or improvement of a specific product line or a continuous production process.

In the first category there are four projects developing new computer-integrated manufacturing methodologies adaptable to several different production lines.

Another nine projects deal with the development of expert systems and technologies for integration into more complex production systems. These include the study of interaction between fluids and pipelines, the development of a new automation and remote control system for hydraulic machinery, the in-process based quality control in the textile industry and expert systems in welding and civil engineering steelwork.

The second category comprises sixteen projects aiming at the development of specific production lines which are flexible or introduce advanced processes. Applications include innovative units for the manufacture of garments, ships, cigars, electronic equipment, sub-sea pipes, leather, printed textiles, drugs, material treatment, fish handling, wood coating, elements for a circular tunnel lining system and the application of enzymes to the mechanical pulping process, etc. Last but not least comes fishing through the development of an innovative fishing ship.

A group of nine projects deals with remote controlled operations and mobile robots. Three of the projects relate to mobile robots which eliminate laborious or dangerous physical tasks in highly hazardous sites. Another three projects aim to develop submarine robots for deep underwater tasks such as the surveillance, maintenance and repair of cables and offshore structures and the inspection of wrecks. The last three projects aim to build robots for agricultural applications such as harvesting, soil treatment or rose plant handling.

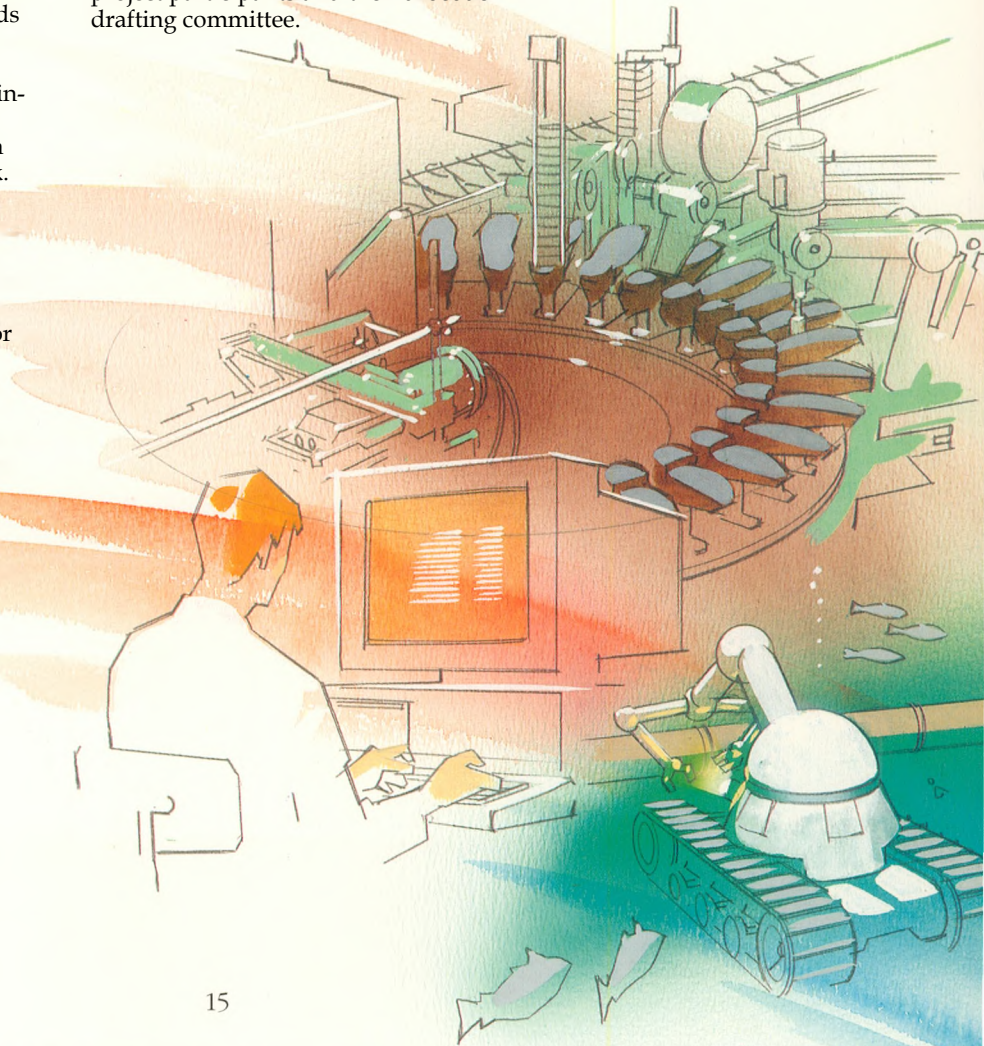
Finally, three new projects have started which deal with special production technologies, e.g. vibrating wire technology.

*Projects: 67
of which announced
in Vienna: 20
Total Cost: 1115 MECUs
of which costs of Vienna
projects: 200 MECU
Participating
Organisations: 420
Main Subjects:*

- Flexible automated assembly
- Computer Integrated manufacturing
- Process Control
- Robots

SUPPORTIVE MEASURES

The CIM project in Constructional Steelwork has identified an urgent need for the relevant code of practice (known as Eurocode 3) to be made available, so that its suitability for computerised use can be checked. Close contacts have already been established between the project participants and the Eurocode drafting committee.



TRANSPORT

Projects: 21
 of which announced
 in Vienna: 3
 Total Cost: 591 MECUs
 of which costs of Vienna
 projects: 30 MECU
 Participating
 Organisations: 100
 Main Subjects:
 - Road traffic and
 transport
 - Air transport systems
 - Associated
 technologies/products

The largest group of more or less coherent projects involves road traffic and transport. Three further endeavours are being devoted to specialised forms of air transport. A few projects are providing individual technologies/products for traction, braking and the like. Finally, one project involves a fuel cell bus, and another - one of the projects started recently - aims at an all terrain amphibious vehicle, whereas the last one deals with new road surfaces.

The EUREKA Road Transport Projects (ERTPs) aim to contribute significantly to safer, more efficient and cleaner vehicle traffic and transport. The widest-ranging and best-resourced one among them, initiated by the European automobile industry, will create concepts and solutions for improved traffic systems by developing new on-board and roadside information control and management systems. Urban and interurban traffic is the focus of another major project, while the rest of the "traffic" projects could be seen as important precursors, providers of technology and data and developers of pre-standards.

Several projects deal with the "logistics" sector (goods transport): one for specialised transport centres providing integration with other modes of transport, one which will provide information systems for general use, one for a system serving the needs of manufacturers with many facilities in Europe and one for electronic data exchange between drivers and base via satellite link.

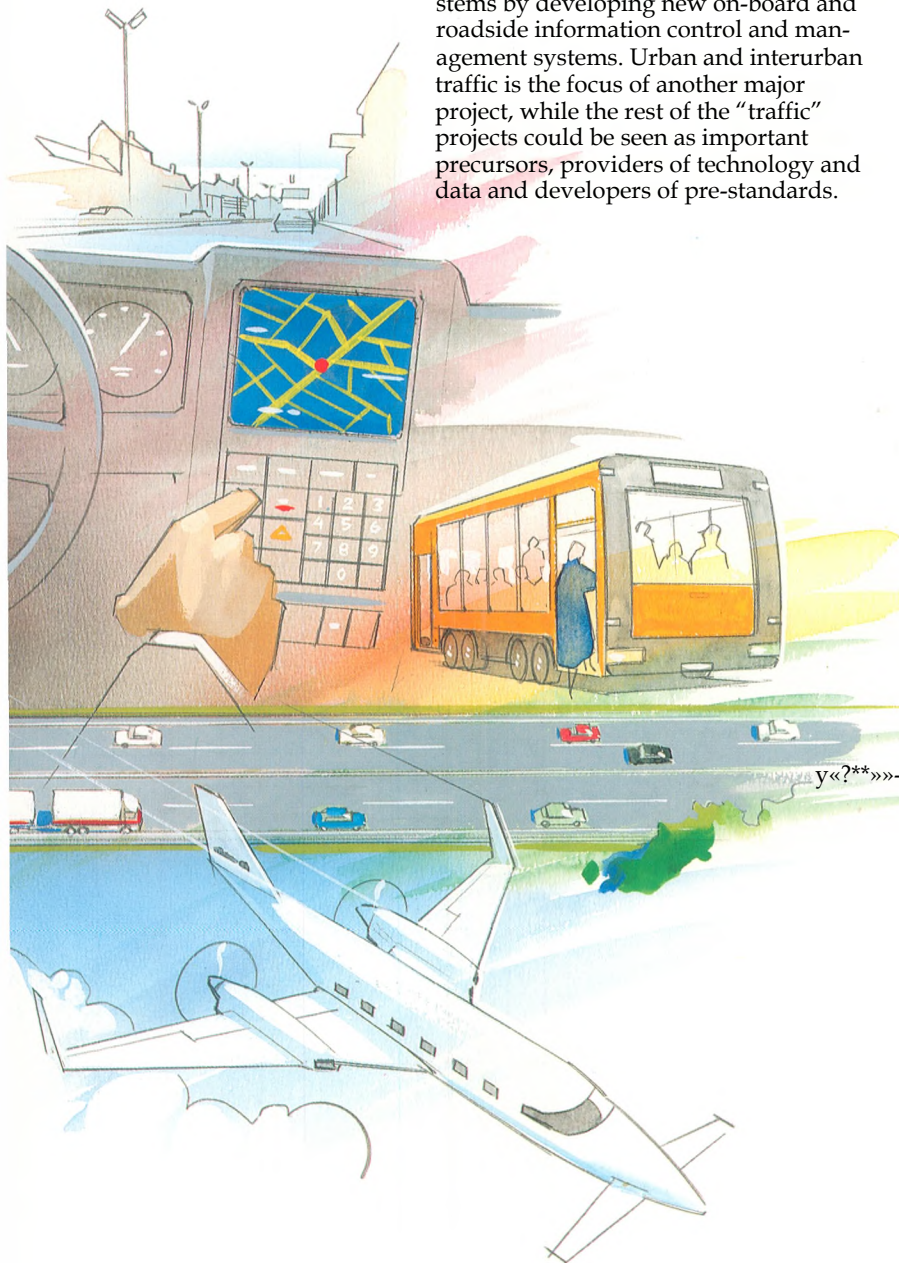
The specialised air transport systems projects are for a European Future Advanced Rotorcraft (a convertible short/medium range plane), for a Flying Boat (mainly for specialised tasks such as forest fire-fighting in coastal zones, environmental inspection, surveillance and control) and for the transport of factory-built houses by manoeuvrable airship.

The fuel cell bus will incorporate a fuel cell unit powered by stored hydrogen, and a gate turn-off thyristor drive. Industrial production of a new range of such high-power semiconductors has been the achievement of a recently completed project.

SUPPORTIVE MEASURES

Common concerns for government supportive measures were identified early on, namely to improve transport infrastructure, traffic control and information, and standardization (especially for navigation and positioning systems) and to harmonise and liberalise transport services. These are now being treated within the EUREKA Road Transport Projects Monitoring Group, composed of representatives from the governments involved and of the CEC. Representatives of ERTprojects and from organizations such as ECMT, EBU, CEPT, CEN/CENELEC will be invited as guests where appropriate.

Concrete inter-project activity has been started in Digital Cartography, a basic requirement for traffic improvement. A Task Force has been established to carry out a benchmark test in order to create a European Digital Road Database. Data acquisition started in early 1989 and assessment and road testing started in July. For the period of the Benchmark Test, a standstill agreement on copyright has been negotiated.



STATISTICAL TABLES:

FINANCIAL SIZE OF PROJECTS (IN MECU)

Project Cost (MECU)	Total N° of projects**	N° of projects per area								
		BIO	COM	ENE	ENV	INF	MAT	ROB	LAS	TRA
< = 5	136	30	5	4	22	24	16	21	4	10
> 5 < = 10	48	8	2	1	4	7	4	19	–	3
> 10 < = 20	47	9	3	2	1	11	3	11	4	3
> 20 < = 40	27	5	2	4	2	3	–	8	2	1
> 40	37	3	7	3	3	5	1	8	3	4

* Of the total N° of projects, 45 are still in their Definition phase

PROJECT PROGRESS

According to schedule	Total N° of projects*/**	N° of projects per area								
		BIO	COM	ENE	ENV	INF	MAT	ROB	LAS	TRA
Announced, June -89	89	14	4	3	21	15	2	20	2	3
< 1/4	15	5	–	–	1	2	2	4	–	1
1/4 - 1/2	76	16	3	4	2	13	8	17	7	6
1/2 - 3/4	46	3	6	3	3	6	3	16	1	5
> 3/4	26	3	3	–	3	6	2	4	1	4

* Based on information received from 252 projects
 ** Of the total N° of projects, 45 are still in their Definition phase

PLANNED PROJECT DURATION

Project Duration (months)	Total N° of projects*	N° of projects per area								
		BIO	COM	ENE	ENV	INF	MAT	ROB	LAS	TRA
< = 24 (Short-term)	44	4	1	–	8	7	2	15	2	5
25 - 48 (Middle-term)	135	29	8	6	14	27	11	26	3	11
> = 49 (Long-term)	116	22	10	8	10	16	11	26	8	5

* Of the total N° of projects, 45 are still in their Definition phase

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PLANNED PROJECT END DATES

Planned End Dates	Total N° of projects**	N° of projects per area								
		BIO	COM	ENE	ENV	INF	MAT	ROB	LAS	TRA
< = 31.12.1989	23	5	1	1	2	6	–	5	–	3
< = 31.12.1990	45	9	4	2	5	8	4	5	3	5
< = 31.12.1991	81	9	5	5	6	13	6	29	3	5
> = 01.01.1992	134	28	8	6	18	18	13	29	7	7

* Based on information received from 283 projects
 ** Of the total N° of projects, 45 are still in their Definition phase

PARTICIPATING ORGANISATIONS PER EUREKA MEMBER

Member	Number of organisations				
	Industry	of which SMF	Research	of which Univ.	Others
Austria	33	10	17	13	3
Belgium	30	17	17	15	1
Denmark	28	10	15	6	2
Finland	29	6	5	1	3
France	191	44	72	17	8
Germany	143	33	102	56	5
Greece	12	5	8	4	1
Iceland	2	1	1	1	—
Ireland	4	1	5	4	2
Italy	119	23	35	10	7
Luxembourg	6	5	—	—	1
Netherlands	84	31	27	7	13
Norway	41	18	13	4	5
Portugal	14	3	18	9	3
Spain	86	32	35	16	6
Sweden	51	17	18	10	4
Switzerland	35	23	18	14	2
Turkey	1	—	3	2	—
United Kingdom	118	40	35	20	12
EC	—	—	2	—	2

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JOINT PROJECT PARTICIPATION BETWEEN EUREKA MEMBERS

Member	Member																			
	A	B	DK	SF	F	D	GR	ICE	IRL	I	L	NL	N	P	E	S	CH	TR	UK	EC
Austria	X	8	8	4	14	22	6	1	6	14	2	14	8	5	9	9	13	²	13	2
Belgium	8	X	5	8	16	10	4	1	4	9	2	13	4	3	12	5	5	1	13	2
Denmark	8	5	X	10	16	13	6	1	5	12	2	13	12	6	12	14	5	3	16	3
Finland	4	8	10	X	10	12	4	1	4	13	3	11	8	4	8	11	4	²	¹	3
France	14	16	16	10	X	48	9	2	6	48	4	30	14	7	48	18	17	²	43	4
Germany	22	10	13	12	48	X	10	1	6	41	3	34	15	8	27	24	¹	3	38	3
Greece	6	4	6	4	9	10	X	1	4	10	2	8	4	5	7	5	4	²	8	3
Iceland	1	1	1	1	2	1	1	X	1	1	1	1	1	2	2	1	1	—	1	1
Ireland	6	4	5	4	6	6	4	1	X	7	2	7	4	6	5	4	4	²	6	2
Italy	14	9	12	13	48	41	10	1	7	X	2	21	10	9	34	15	11	3	³	3
Luxembourg	2	2	2	3	4	3	2	1	2	2	X	2	2	2	2	2	²	—	²	1
Netherlands	14	13	13	11	30	34	8	1	7	21	2	X	11	6	17	17	13	3	33	3
Norway	8	4	12	8	14	15	4	1	4	10	2	11	X	4	10	15	6	3	16	4
Portugal	5	3	6	4	7	8	5	2	6	9	2	6	4	X	12	4	4	²	9	2
Spain	9	12	12	8	48	27	7	2	5	34	2	17	10	12	X	15	8	3	27	3
Sweden	9	5	14	11	18	24	5	1	4	15	2	17	15	4	15	X	10	3	15	3
Switzerland	13	5	5	4	17	12	4	1	4	11	2	13	6	4	8	10	X	1	11	2
Turkey	2	1	3	2	2	3	2	—	2	3	—	3	3	2	3	3	1	X	2	2
United Kingdom	13	13	16	12	43	38	8	1	6	32	2	33	16	9	27	15	11	²	X	3
EC	2	2	3	3	4	3	3	1	2	3	1	3	4	2	3	3	²	²	3	X

OUTLOOK

At the 7th EUREKA Ministerial Conference in Vienna on 18-19 June 1989, 89 new projects were announced. This increase indicates that EUREKA is on course towards its goal.

Since also in the meantime a considerable number of project proposals have been reported by the National Project Coordinators to be under consideration, a further growth in projects can surely be envisaged.

The EUREKA Initiative - started only in 1985 - must be called young compared to the overall duration of most EUREKA projects from start to completion. Out of the set of projects announced before the Vienna Ministerial Conference, approximately 15% are approaching completion, 60% are in their development or implementation phase and 25% are still in their definition phase. This, of course, changes with time and EUREKA will therefore soon be able to reflect a marked increase in completed projects.

EUREKA projects vary greatly in their scope and financial impact. Some are highly specialised towards a particular market niche. Others, though specialised, have a long-term perspective and are of real strategic value. Some EUREKA projects have, through their sheer size, gained widespread awareness and have created a favourable image for the Initiative: JESSI, HDTV, PROMETHEUS, COSINE and EUROTRAC for example, are genuine continent-wide projects with potential spin-offs in many dimensions.

Moreover, projects such as FAMOS, EUROLASER and EUROENVIRON have shown the merit of a systematic approach in promising areas. Others are much more limited in their resources and intentions. Nevertheless, they are developing important solutions to specific problems and will have their own economic impact.

EUREKA's cooperation formula - characterized by the project participants themselves defining the projects and the EUREKA organisation supporting them - has met with wide international recognition and appreciation. Currently, other initiatives which have been instigated recently, have adopted the very same formula, a fact which EUREKA may count as success per se.

Against this backdrop, the EUREKA Initiative will continue to strengthen its role as facilitator and supporter of cross-border high tech cooperation projects aiming at the improved competitiveness of Europe.



PHOTOTRONICS

PHOTOTRONICS is a project in which the new thin film electronic technology based on amorphous silicon and its alloys is scaled up in size (near 1 M²) and production throughput (40000 M²/year). PHOTOTRONICS will develop a specific component all the way to high throughput pilot operation and will focus on photovoltaic modules for solar energy applications.

The amorphous silicon technology provides the photovoltaic modules with moderate efficiency but has a great potential for cost effectiveness and integration flexibility (shape, dimension, voltage, semi-transparency).

The project includes two principal partners, the German MBB and the French TOTAL. During the course of the EUREKA project the two partners have combined all their terrestrial photovoltaic activities to form the company PHOTOTRONICS which is now managing the entire project. The activity is shared by two nearly equal sized companies fully owned by PHOTOTRONICS OHG, PST GmbH near Munich and SOLEMS near Paris.

PHOTOTRONICS concentrates, at least in the first phase, on photovoltaics. This is a specific new technology where a thin film semiconductor is deposited on a large size low cost substrate (mostly glass, sometimes metal, possibly plastic). It is then patterned and interconnected in order to generate an array of active electronic components (we would call it macroelectronic). These have many other potential applications such as Flat Video Displays, Reading line Scanners, X-ray retina, etc.

PHOTOTRONICS is, in a pioneering way, scaling up this new macroelectronic technology towards an industrial scale. In the course of this, PHOTOTRONICS is developing specific process machines. The development is carried out in close relation with several industrial development centres which deal with displays or detectors, in order to make the process machines as flexible as possible. The machine engineering design and assembly is carried out with equipment manufacturers who will subsequently make these special machines available to companies willing to develop and produce macroelectronic components.

PHOTOTRONICS is currently assembling a photovoltaic pilot line. It will produce 1 x 0.6 M² photovoltaic modules with an output of 45 W per unit under full sun illumination. Uniform thin film semiconductor deposition has already been achieved in a full size development machine. The pilot line is planned to be completed by the end of 1990 and the first modules are expected early in 1991. The pilot line should reach full capacity (3 MW equivalent peak power produced per year) about one year later.

PHOTOTRONICS is also working at present on the markets of its future product. Prototypes of solar car roofs are being tested by car companies. Smaller size amorphous silicon modules produced by SOLEMS are being sampled in Europe to power all sorts of stand alone electronic systems (road emergency' phone, cattle electric fence, local climate monitor, security guard, traffic beacon, etc.). Other applications such as building walls and roofs, water pumping and village power are also being developed.



BIOKIT. CLINICAL DIAGNOSIS OF GONORRHOEA

This project is the first Anglo-Spanish biotechnology project supported by EUREKA. It has reached the final phase of the laboratory research.

The work carried out over three years by BIOKIT along with PA Technology Ltd from the UK, has resulted in a prototype kit being developed for the diagnosis of gonorrhoea, a sexually transmitted disease spread worldwide.

The project's goal is the direct detection of the *Neisseria infectious* micro-organism from clinical orogenital samples avoiding the long, tedious, and not always accurate, procedures now available, and contributing at the same time to the control and prevention of the disease.

A good diagnostic test has to be highly specific to avoid erroneous positive results and sensitive enough to detect those infections caused by low numbers of germs as it is the case of asymptomatic carriers.

Therefore, the follow-up strategy focused on obtaining monoclonal antibodies directed against specific *Neisseria gonorrhoeae* antigens not present in other related micro-organisms, as the only way to obtain the required specificity.

As read-out technology Enzyme Immunoassay (EIA) was selected for its high sensitivity.

During the development of the research programme both companies benefited from the collaboration and support of Dr. John Heckles from Southampton University, one of the world's leading experts.

The prototype kit evaluated on library strains has an antigen detection level of 20 ng/ml and it is 100% specific. The test takes 3 hours to perform and all the reagents are ready to use. Results are read off the generally available automatic micro-ELISA-readers.

Following these promising results, the prototype will be evaluated on clinical orogenital samples in various hospitals prior to its development.

The kit could be on the market within 1991 and it is hoped to close the gap which currently exists in the diagnosis of Gonorrhoea.



"EAST"

"EAST" (EUREKA Advanced Software Technology) is a single tool providing a large range of services to cope with the changing nature of software development.

Today's software development requirements are currently only met by partial solutions. Because of this, a number of the largest information technology companies have jointly launched the "EAST" project. They are the following: Société Française du Génie Logiciel (France) - subsidiary of CAP-SESA, BULL, CISI, SEMA-GROUP and STERIA - NOKIA (Finland), DMR (Canada), and four Italian companies, viz. LPS, INTECS, DATAMAT, BULL-ITALIA.

Their objective is to develop software engineering factories constructed around UNIX system V and the EMERAUDE acceptance structure the industrial version of "PCTE" (Portable Common Tool Environment) ESPRIT prototype.

The "EAST" project is developing an Integrated Project Support Environment (IPSE) which will ultimately cover all phases of the software life-cycle.

An organisation can use "EAST" to capitalize on existing experience, without having to abandon or modify its method of working. The life-cycle modelling tool enables a described method or the adaption of a pre-existing model offered by "EAST" to be integrated.

Using a customized life-cycle enables an organisation to structure the development of its applications, to organize team work and monitor progress. "EAST" ensures the rigorous application of the chosen development method.

The "EAST" IPSE behaves as a management-oriented IPSE, supporting development activities: project management, configuration management, structured document editing and use assistance.

Above all, "EAST" is an open IPSE: new tools relating to all life-cycle phases will be progressively integrated.

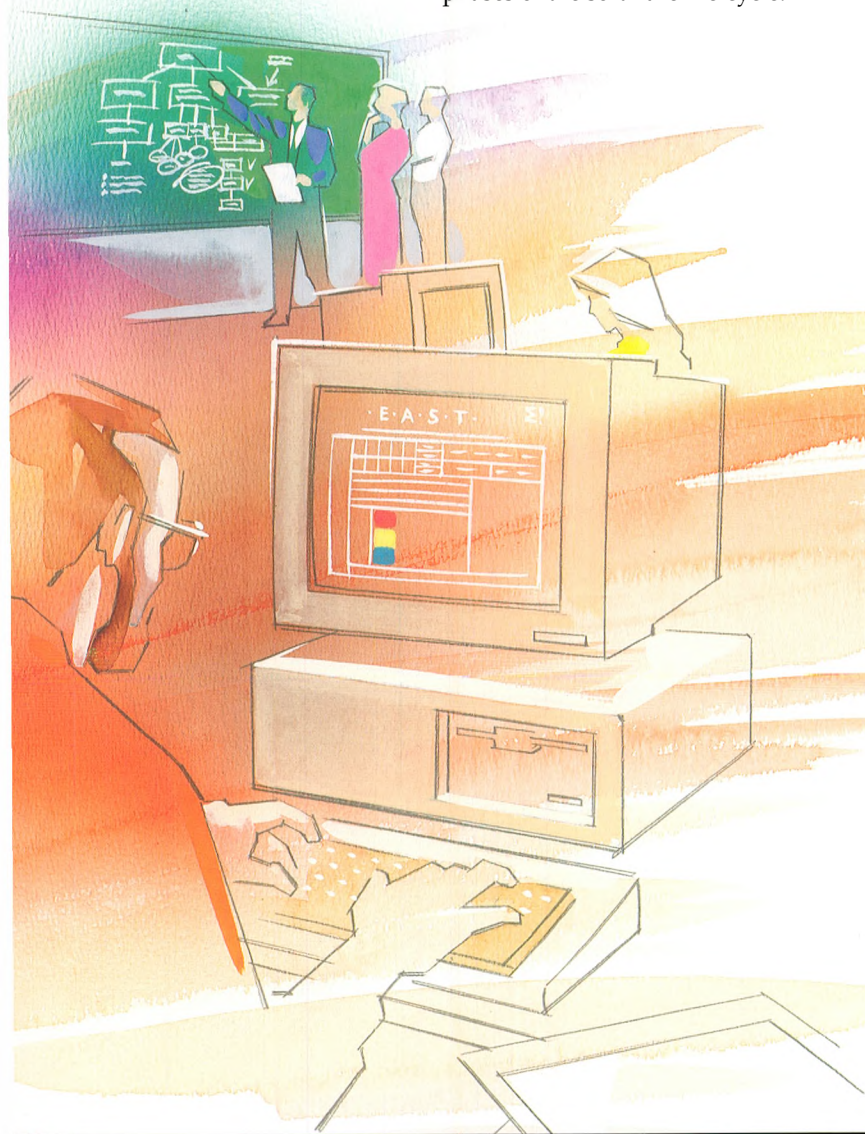
The "EAST" IPSE is designed to simultaneously improve team productivity and software quality by increasing development achieved without imposing a particular development methodology.

Through the integration of tools, the "EAST" IPSE acts as a single tool offering a rich set of services. Integration results principally from the provision of a single repository which stores all information generated or manipulated throughout the various phases of application development.

Unnecessary duplications are avoided, simplifying development by encouraging cooperation between tools and ensuring the integrity of the results. Optionally, the "EAST" repository can be distributed across several UNIX work-stations of a LAN.

"EAST" integration is reinforced through homogeneous user interaction with all tools. This uniform user interface facilitates easy learning and use of the IPSE. "EAST" exploits the graphical facilities of modern work-stations in a well-structured way, facilitating user understanding. On-line help is always available. It can be customised to take a particular organisation's needs into account.

"EAST" deliverables will be completed by the end of 1990, for marketing in 1991 as originally scheduled.



COMPACT NON-POLLUTING 300 MW COAL-FIRED POWER STATION

Development of a single-flow low pressure turbine with titanium blading for a compact 300 MW coal-fired power station.

The project forms part of a minimum-pollution, adaptable, compact coal-fired power station with a unit output of 300 MW which is being developed under a joint project by two German and two French companies.

The adoption of a circulating atmospheric fluidized bed firing system will result in the low-pollution burning of coal of differing qualities and will eliminate the need for expensive cleaning equipment on the secondary side which reduces plant efficiency.

By the adoption of a supra-conducting magnetic energy accumulator, line instabilities will be balanced, thereby increasing flexibility and availability. The system will be particularly suitable for countries where the electric power supply is in the development stage.

The main innovative feature of the turbine will be the last-stage blade of titanium which, owing to its low specific gravity, can be made longer and slimmer and installed with the same safety on a larger diameter than a steel blade. This will result in an axial leaving area of 14.5 m², enabling turbine outputs of over 300 MW to be achieved by single-flow designs. Using a combined high/low pressure section will result in a turbine which, compared with conventional designs, will be one third lighter and one third shorter. In view of the low leaving losses, especially at the low pressure outlet, and the low boundary zone losses, due to the single-flow stages, the achievable turbine efficiency will be superior to that of conventional designs.

The middle of the condenser tubing will be located at the level of the turbine axis, enabling the exhaust steam to flow without the customary deflection over the shortest route into the axial-flow condenser.

This arrangement will enable the turbine generator set to be installed almost at ground level, thereby reducing the volume of the turbine house by about 50%.

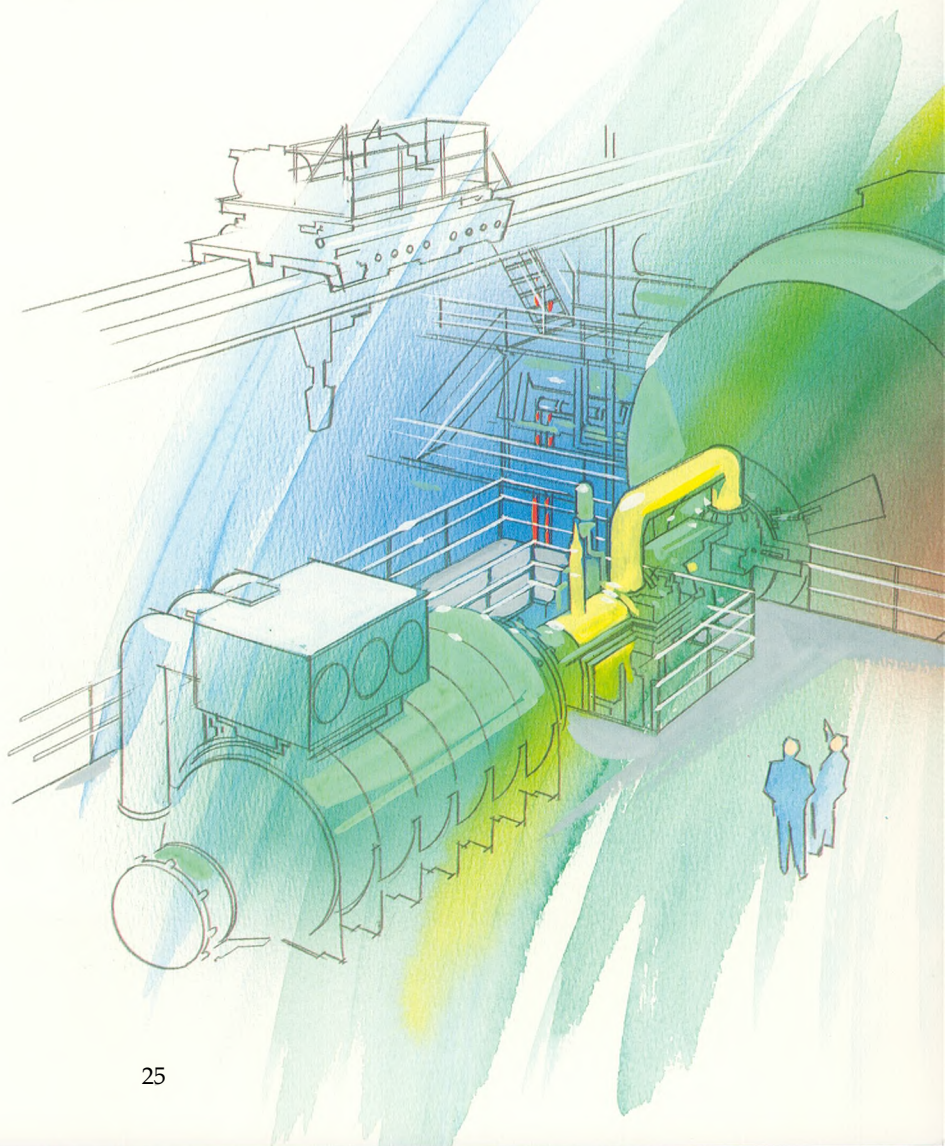
The generator will be located ahead of the high pressure section of the turbine.

The project is scheduled to finish by the end of 1990.

Tasks to be handled during the remaining period of project's life:

- Development of titanium last-stage blading
- Development of axial-flow condenser
- Development of stage before titanium last-stage
- Wind tunnel tests in subsonic and transonic range
- Study of low pressure casing structure
- Study of shaft dynamics of complete rotor line
- Material studies for titanium alloy and low pressure rotor steel

In parallel with the development work, various contacts have already been established with electric utilities to develop a prototype plant which is expected to be built over the next few years.



USE OF COMPOSITE CERAMICS IN AXIAL-FLOW TURBINES

The materials presently used for the manufacture of axial-flow turbines often limit the operative possibilities of the engine given the mechanical and thermal stresses to which they are submitted.

The aim of the project, which is pooling the experience of several major European gas turbine manufacturers with that of one European leader in composite ceramics, is to establish the performance gains to be expected from the introduction of a new composite ceramic into axial-flow gas turbines of a power not exceeding 10 megawatts.

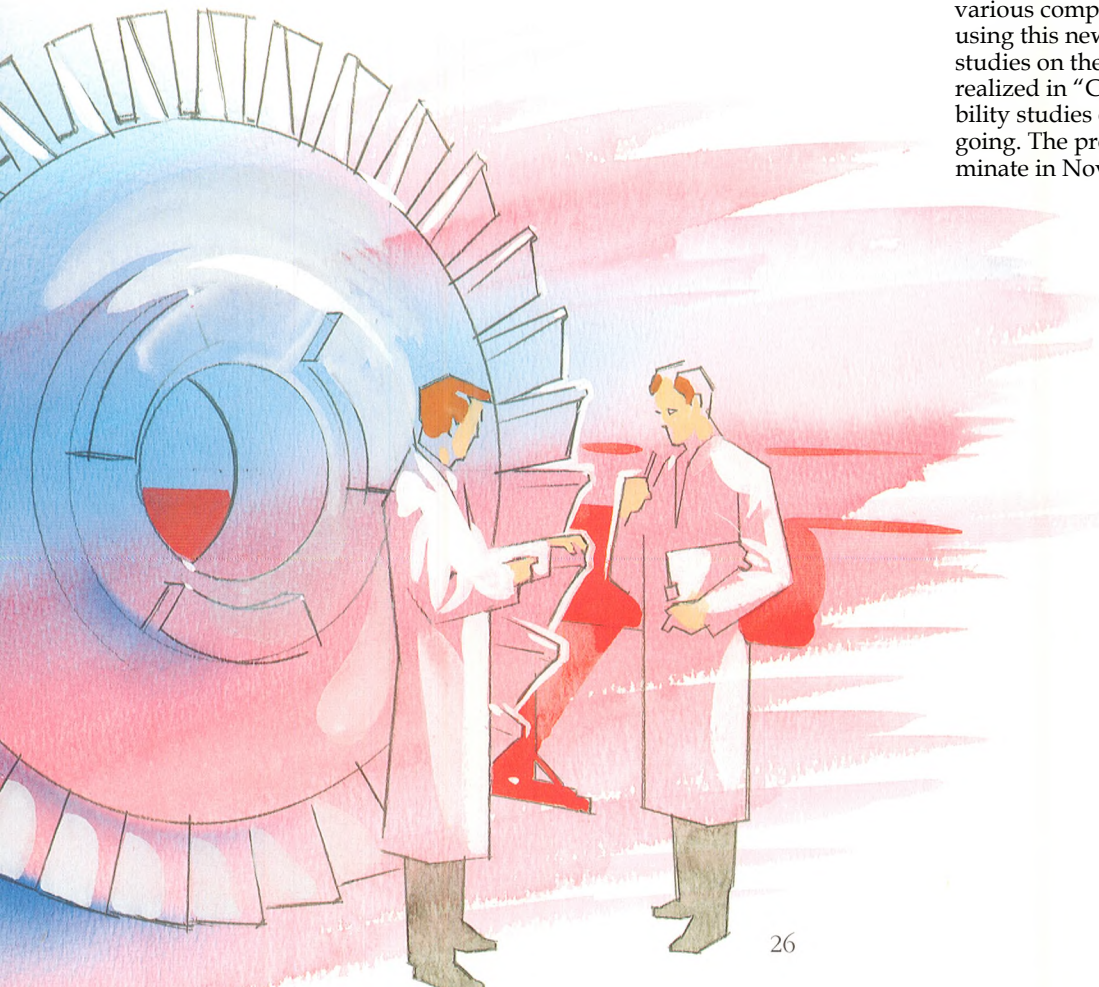
The new composite ceramic is called "CERASEP", a material based on large utilization of silicon carbide fibres with very high resistance performances in conditions of mechanical and thermal stresses.

Initially, the project involves the improvement of the basic knowledge of "CERASEP", and then the design, production and testing of the hottest turbo engine components such as combustion chambers, integral turbine rotors and turbine blades made from this new material.

The advantage of using this new material is that it can withstand much higher temperatures than the metal alloys presently used. In the hottest parts of turbo engines, gas temperatures easily reach 1400-1500 K°. Here, the present need for complicated and heavy cooling systems would be eliminated by using components made of this new material. Moreover, the possibility of operating at such high temperatures will increase the efficiency of the turbine.

The study will be made using components for aircraft propulsion and industrial application of gas turbines, but the technologies so developed will have potential spin-offs for industrial gas turbines of a power up to around 10 megawatts.

Analyses have already been carried out to examine the possible reactions of the various components with a view to using this new material, and preliminary studies on the design of components realized in "CERASEP" as well as feasibility studies on their realization are ongoing. The project is scheduled to terminate in November 1993-



EUROMAR

EUROMAR is focusing on the development, application and successful exploitation of Europe's advanced marine technology having worldwide market potential.

The main objectives of the project are to:

- foster technological progress for integrated ecological management of the marine environment
- promote cooperation between industry and science in developing marine instrumentation, methods and operational systems
- improve the productivity and competitiveness in European marine industry for worldwide application

EUROMAR bears witness to the ecological awareness which has grown remarkably during recent years. Man has long allowed effluent discharges from towns to run into the seas, dumped radioactive waste and hazardous substances, caused oil and chemical accidents on the seas, etc. These are now threatening the life of the seas upon which mankind is dependent now as well as in the future.

In order to combat pollution in the seas, its causes must be tackled. For this we have to understand the cause-and-effect chains in the marine environment. This again requires new technical tools and methods for measuring, monitoring, data evaluation and distribution. EUROMAR therefore looks into advanced surveillance and information technologies with the ultimate aim being the protection of the sea.

EUROMAR brings together marine researchers, agencies, designers and industries from thirteen European countries (including institutions from Yugoslavia) plus the EC. As an umbrella project, EUROMAR's purpose is to hatch out specific daughter projects within its area of operation. More than twenty daughter projects have been successfully initiated. These include both marine surveillance systems undertaken for the purpose of combatting pollution and more product-oriented projects, geared to the industrial development of marine technology in specific fields.

Projects such as MERMAID and SEAMOS, for example, will develop remote-controlled monitoring systems in the sea, BIMS, a system at the sediment-water interface and ATMOMAR for measuring atmospheric input into the sea. SEASTARS aims at an airborne multi-sensor package. FIESTA will link these projects by selection of interface standards.

CHARISMA, ACOUSTIC CAMERA, ARMS, SEDIFLUX and HYDROFAN will make use of the sound to characterize sediments and suspended matter while DISC explores the engineering properties of the sea bed.

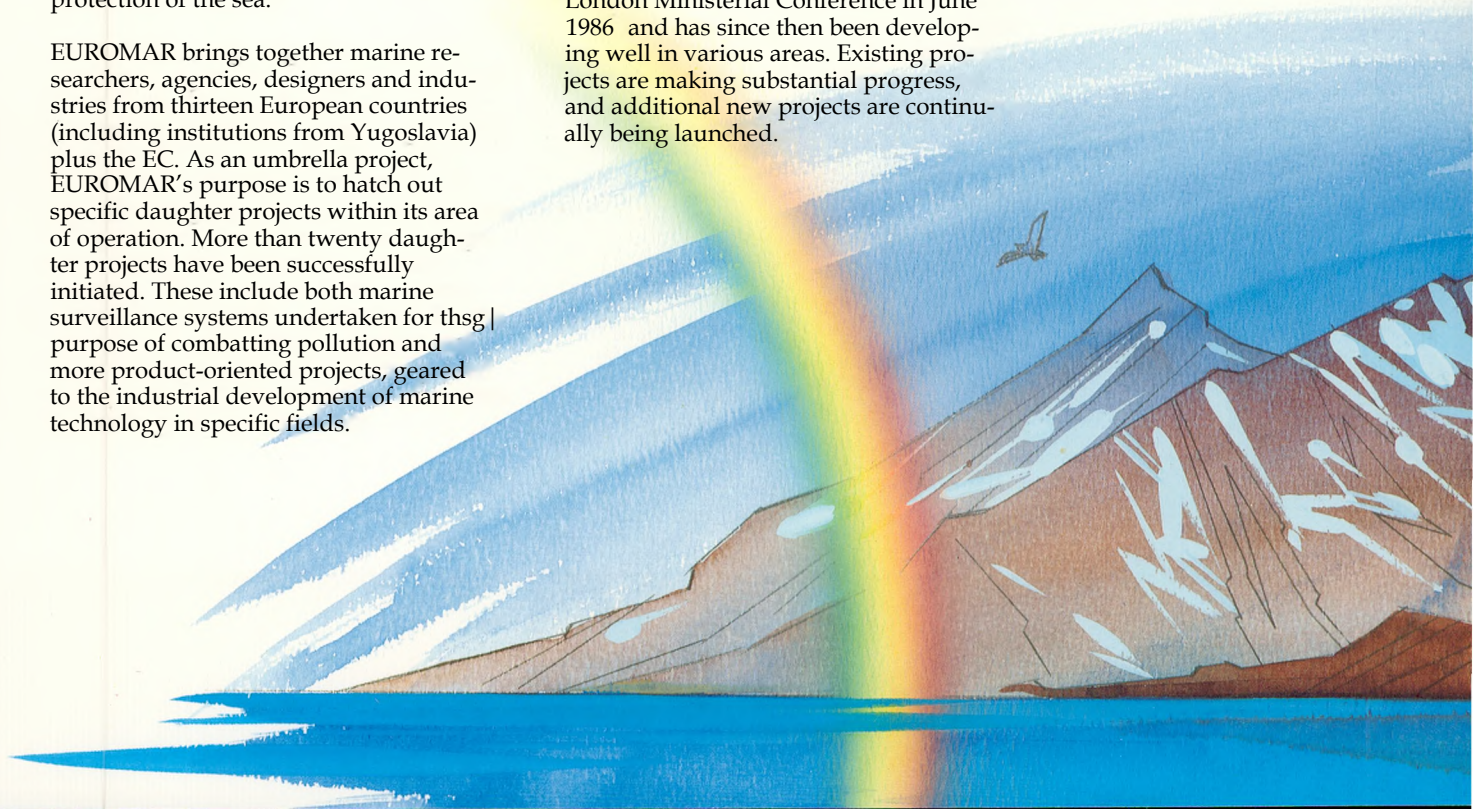
SMURF will develop an advanced prototype of a flexible multi-purpose research vessel. MOSES aims at the construction of containerized mobile laboratories and instrumentation.

ELANI will design advanced electrochemical instrumentation. MAROPT is working on an underwater video camera for plankton identification.

ISLE focuses on a comprehensive information system for the local environment while MARSIS will offer professional use of remote sensing information.

VISIMAR will create video animation to depict marine environmental processes. OPMOD is developing a computer model which will enable short-term forecasts to be made during accidents such as oil spills or the spread of chemicals.

EUROMAR started officially at the London Ministerial Conference in June 1986 and has since then been developing well in various areas. Existing projects are making substantial progress, and additional new projects are continually being launched.



FIELD BUS

FIELD BUS is a EUREKA project aimed at communication architecture, based on field bus networks (LAN), for real-time control of industrial processes and machines and the development of compatible products.

The objective of the project is the realization of industrial control and monitoring products - actuators, sensors, programmable logical controllers, supervision work-stations - capable of communicating between each other through a field bus, and the possibility of realizing distributed automation architectures. The project envisages promoting basic concepts by means of industrial demonstrations. The development of integrated circuits required for the realization of products is also planned.

The project brings together 15 partners from six countries, namely Finland, France, Germany, Italy, Norway and the U.K. all representing manufacturers active in the automation field but having varied company size.

The high complexity of the project stems from a lack of standards in the sector, a high market demand and heavy competition between potential suppliers, as well as from the interaction between the project and standardization committees. The first phase of the project, terminated in 1988 with the basic and evaluation studies, is followed by phase two: developing components and connected devices by 1991. Phase three will set up full system demonstrations.

The achievements so far consist of:

- establishing a list of functional needs
- evaluating candidate solutions according to multiple criteria
- analysing instruments to be connected to a field bus
- guidelines for the continuation of the project.

The objectives of phase two imply general actions:

- specification-related actions
- information, promotion and demonstration actions

and specific actions, such as:

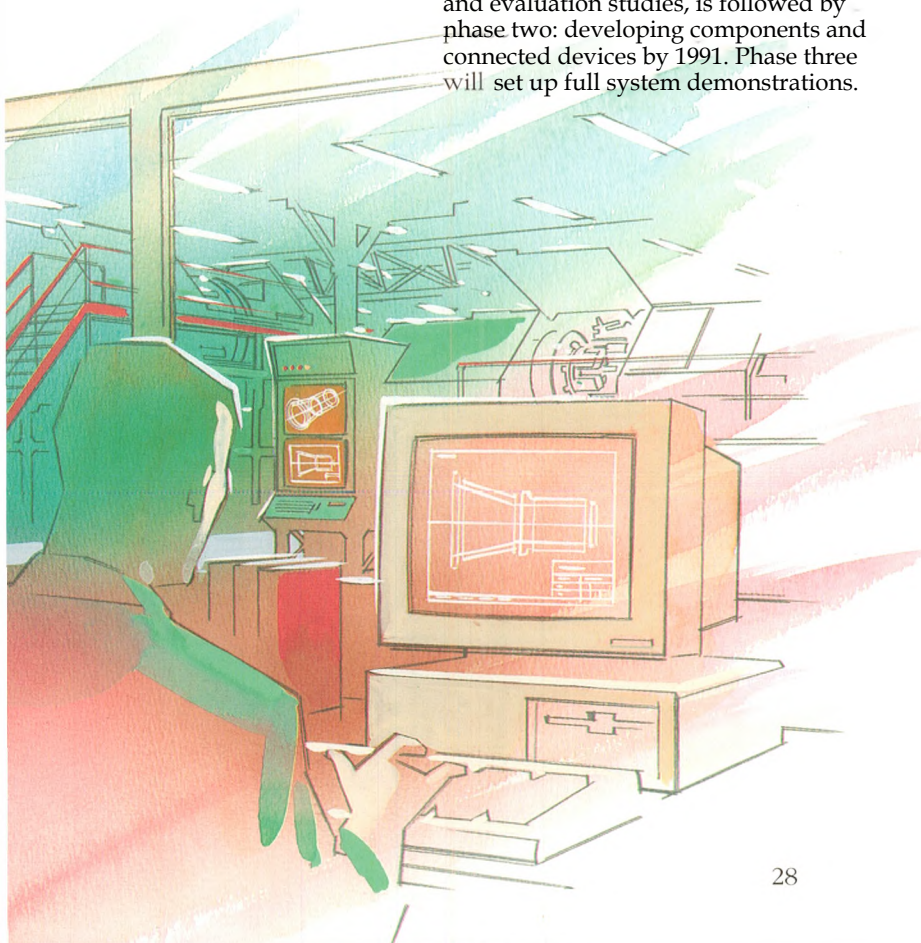
- development of components and connected devices
- industrial cooperation action resulting from agreement initiatives between EUREKA partners.

The former will lead specifically to the selection of profiles suitable for the instrumentation developed by the participating industries, carried out by an ad hoc task force, besides tackling problems of intrinsic safety for devices connected to a network crossing a dangerous area.

The latter aim at achieving industrial cooperation agreements between a restricted number of partners within the FIELD BUS framework, while maintaining the cohesion of the project.

From the third phase there will emerge industrial products enabling demonstrations of communication architectures to be performed in the oil and petrochemical industry and food industry as well as in energy production and distribution, manufacturing industry and centralized building management.

FIELD BUS is an ambitious project, having a budget in line with its ambitions (of the order of 30 MECU). The framework has widely evolved since its launch and is very difficult owing to the problems at stake, and also because of the large numbers of committees involved often exhibiting conflicting interests. However, project results are carefully brought to the attention of all international standardization bodies. The implementation of industrial projects early in 1990 is going to provide a new impetus while creating an important dynamism with concrete demonstration objectives aimed at validating the actions adopted.



POLYVALENT MEASURING SYSTEM FOR HAZARDOUS GASES

The Belgo-Finnish project aims to create a new generation of sensors capable of identifying and measuring, simultaneously and with precision, a number of different hazardous gases.

The maintenance of safety in increasingly complex industrial plants which handle dangerous substances, especially in the chemical and petrochemical industry, has become an important problem. Leaks have to be prevented, and in many sectors continuous monitoring of the emissions of hazardous gases is needed to guard against the possible appearance of any kind of hazard.

One of the most delicate and complex problems to be overcome is undoubtedly that of detecting accidental emissions of hazardous gases. For example butane, hydrogen or CO constitute a major source of potential danger despite their widespread use.

Various systems for detecting such gases already exist. They monitor continuously the presence and level of hazardous gases, whether explosive or not, in the atmosphere. These procedures, however, are not always entirely reliable. They also have the disadvantage of being relatively expensive and having a limited life span, currently about six months.

Therefore the technological and economic goal of the project is to ensure that the products to be made at the end of this project can be mass-produced and that their cost should be lower than that of the present sensors. They would also last longer and be more reliable than existing systems.

Modern microelectronics technology offers the answer in this project to the problem of how to attain the technological and economic goals. The system is based on a process whereby gas-reactive semi-conductor compounds are printed onto an aluminium oxide substrate using silk-screen printing techniques. The various components involved in this process have the advantage of increasing the sensitivity and selectivity of the sensors, particularly towards methane, carbon monoxide, chlorine, sulphur dioxide and nitrogen oxides.

It is planned to develop the hardware and software of the final product so that it becomes as user-friendly as possible.

Some prototypes of gas sensitive detectors, especially for hydrogen sulphide and carbon monoxide are currently being field tested. Soon the first prototypes of instruments will also be ready. Finally, the products, the monitoring instruments, will be on the market in 1992.

The scope for the use of these monitoring instruments may go well beyond the strictly industrial field. Sensors of this kind could be of great value to the research being undertaken, in particular, by the EUROTRAC project on extending knowledge of atmospheric pollution.



HALIOS

The HALIOS project was created within the framework of the EUREKA Programme to promote and improve the development of equipment and new technologies for fishing vessels to make them more profitable, more efficient and safer.

The project also includes the definitions and constructions of several fishing vessel prototypes in its final phase.

In the project the Spanish provide the expertise of one of Europe's largest fishing and fishing vessel-building nations. France contributes its experience in high technology and Iceland contribute with its vast operative experience in fishing activities.

Currently, twelve subprojects have been approved within the HALIOS framework. Ten of these have already received funds from the Administration or are on the verge of doing so.

The VICS Subproject (Vessel Information and Control System) involves the definition and development of a computerised system of information processing and control of some parameters produced during on board operations.

The AGRO Subproject (Arrastreros de Gran Rendimiento Operativo) involves the adaptation of FORAN informatic design systems relating to the definition and optimisation of the shape of fishing trawlers. Moreover, following the project phase, it incorporates the study of the vessel's behaviour at sea as well as estimating its drag resistance in water.

The subproject "net and trawl doors system for prawn fishing" seeks to considerably improve the entire trawl-

door for shrimp catches, basically modifying the currently used method from two to four trawls. The main innovation is the study and improvement of the trawls and door materials.

The "Safety on Board and Ergonomy" subproject is working on compiling a guide using informatic support to improve the ergonomic aspects of the design of the vessel rooms and elements with special attention being paid to crew safety.

The "Automation of Holds" subproject involves an automatic system for the loading and unloading of fresh fish from the holds of fishing vessels.

The "Multi-beam Echosounder" subproject will study and develop a multi-beam echosounder to improve vision of the seabed and the location of fish. This innovation will make it possible to pin-point a single fish at a depth of 400 m and will display it on a high resolution colour screen on the bridge (in stereoscopic vision).

The "Safety net" subproject deals with the improvement in the design of a life-net, which is predominantly used in the cold waters off northern countries - where its use is obligatory in some cases- to heighten the chances of survival of crewmen who fall overboard, and are waiting to be rescued by the vessel.

The VIS subproject involves the development of an on board local information net which will facilitate real-time knowledge of the most important data related to the functions and performance during fishing operations.

"Troll doors" are a new type of trawl door in combination with the corresponding net developments.

Finally, a system to improve the on-board processing and handling of fresh fish is being developed.



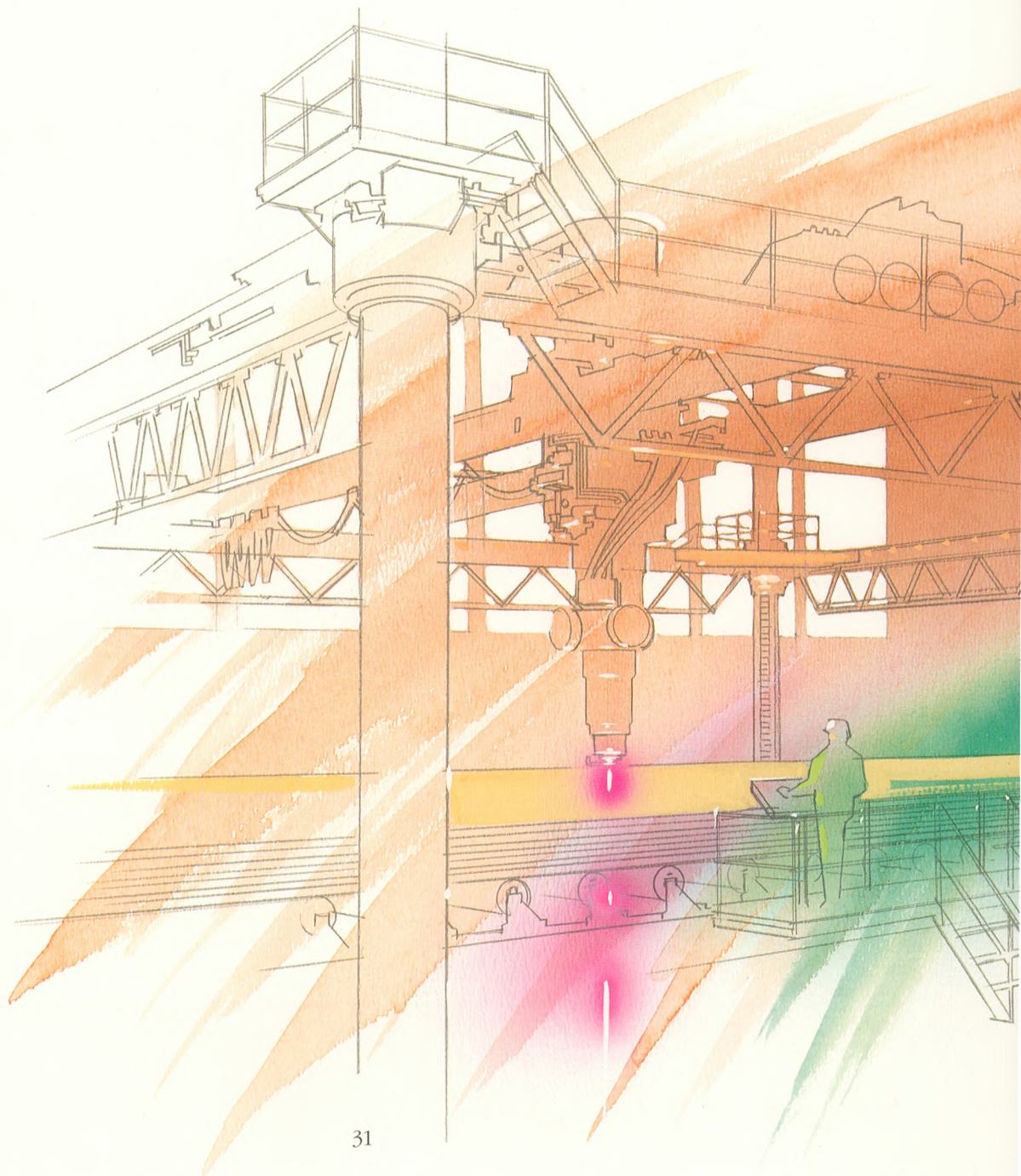
EUROLASER - CO LASER

This project is one outcome of the EUROLASER Umbrella initiative. The definition phase of the project brings together an international grouping of twelve organisations from four EUREKA member countries to assess the industrial potential of carbon monoxide (CO) gas lasers for laser materials processing (e.g. for cutting, welding, drilling, marking and heat treatments of metals and non-metals).

Having a wavelength intermediate between that of the CO₂ gas lasers and Nd: YAG solid state lasers now increasingly used in industry, this laser has favourable focusing, absorption and optical-fibre transmission characteristics which are currently being assessed and quantified.

A formal collaboration agreement has been signed by all the participants and market surveys are being undertaken to assess the full range of powers and advanced beam manipulation systems considered to be of commercial importance. (It should be stressed that it is technically possible to construct systems generating many tens of kW of power; the objective is to define complete processing cells of practical industrial interest).

It is anticipated that additional organisations will wish to collaborate during the realisation phases, which will probably extend to the mid 1990s.



JESSI

JESSI (Joint European Submicron Silicon Initiative) is an eight year programme on silicon-based microelectronics and its integration into systems.

By the end of the century, ICs (Integrated-electrical Circuits) - commonly called "chips" - will be involved in virtually all industrial processes and products and they will affect most aspects of human life. The main objective of the JESSI programme is to secure the availability of world competitive microelectronics which is vital for Europe's industrial and economic future.

The JESSI programme planning is the result of the cooperation of a broad range of industries and research institutes. Upon completion of the definition phase in 1988, the execution phase of JESSI was announced at the Vienna **Ministerial** Conference and **its implementation** initiated in September 1989 along four inter-related sub-programmes extending up to 1996.

TECHNOLOGY

Development of the basics and the establishment of the validity of a flexible competitive manufacturing technology for advanced systems applications to be available by the mid 1990s. The most ambitious technical goal is a C-MOS process down to 3 micrometer range, to be achieved through intermediate steps implying the adoption of innovative processes enabling significant reductions in manufacturing costs to be made.

APPLICATION

Elaborating flexible competitive system design methods and tools, applicable throughout Europe, for the development

of high complexity ICs and their integration into system and their verification in advanced joint pilot projects of important applications.

EQUIPMENT AND MATERIALS

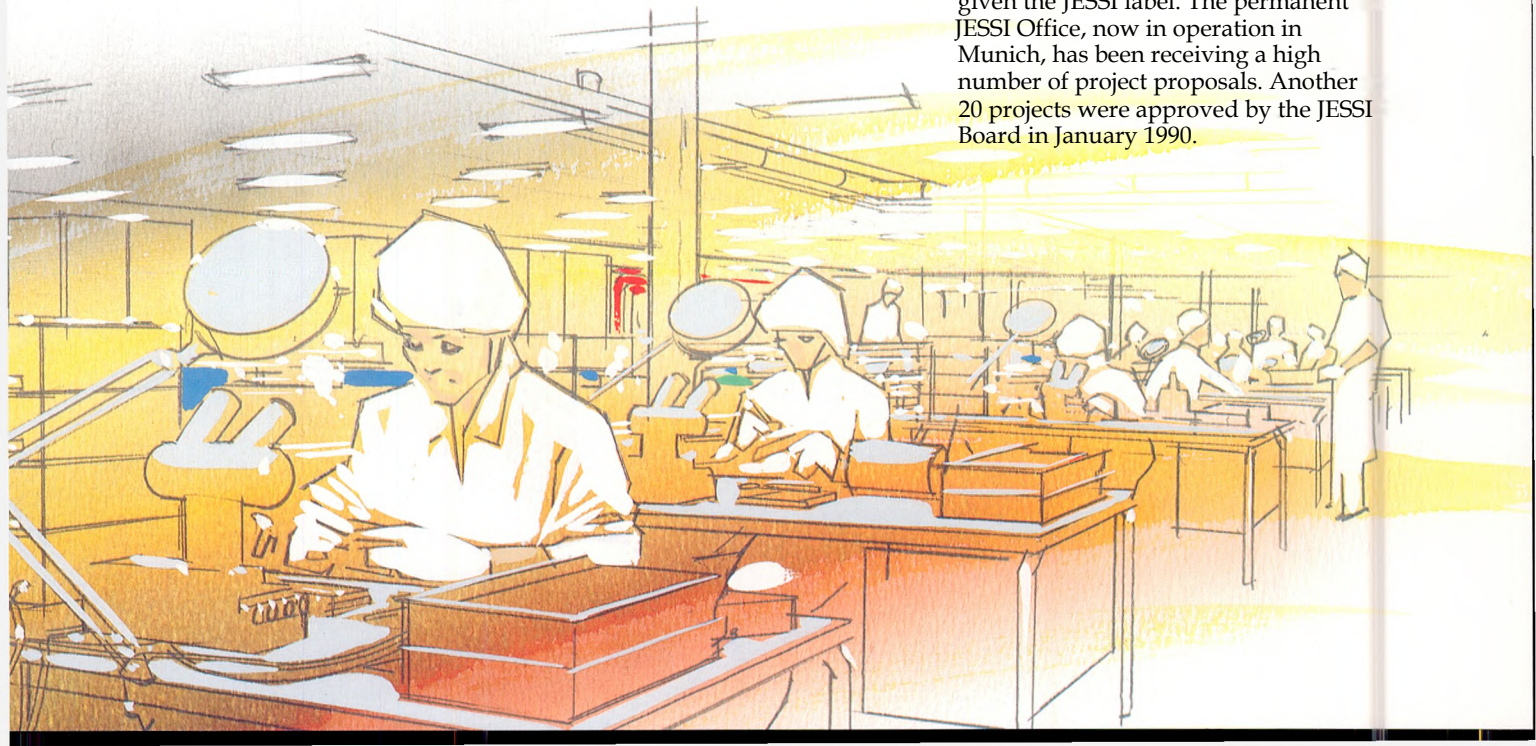
Development of manufacturing equipment and materials for microelectronics in selected areas of the European supply industry. Close cooperation between IC manufacturers and the European equipment manufacturers and suppliers is essential to achieve world competitiveness for the European semi-conductor industry.

BASIC AND LONG-TERM RESEARCH

Complementary applied research to secure Europe's long-term economic interests implies well organized interaction between the electronic industry and research institutes in four major areas, viz: design methodology, modeling and simulation, advanced processing steps in products and process integration.

The contribution to JESSI may vary by country, depending on industrial and academic infrastructure and on national political and financial strategies. A balance has to be found in Europe between a uniform approach for JESSI for all countries and partners and a participation according to national and sectorial interests.

In mid 1989 the JESSI Board of Directors was appointed to monitor the progress of the programme, and in November the first projects emanating from technology and application sub-programmes were given the JESSI label. The permanent JESSI Office, now in operation in Munich, has been receiving a high number of project proposals. Another 20 projects were approved by the JESSI Board in January 1990.



IMPROFEED

The framework of the IMPROFEED research project involving the French and the Dutch parties relates to legume and oil seeds. It consists mainly of developing new processes to improve the digestibility of the non-starch polysaccharides and to inactivate the antinutritional factors after being identified.

This joint research project was the first one in the food and agriculture sector to have been granted EUREKA status in December 1986.

Legume and oilseeds, grown and produced in EUREKA countries are protein and energy rich products. The aim of IMPROFEED is to increase their use by pigs and poultry.

The Dutch party is represented by CEHAVE bv, (cooperative feed producer), the PRODUKTSCHAP VOOR VEEVODER (organisation of feed industries) and by IGMB-TNO (organisation for applied scientific research).

In France, the Group of Economic interest called EURETEC is a body involving the main feed industries in the private and cooperative sectors as well as the oil and legume seeds extension organisation. The projects are being carried out with the cooperation of several research units from the INRA Institute, the University and members of EURETEC.

In the IMPROFEED framework, two areas are being researched: composition and utilisation of non-starch polysaccharides:

- composition of hulls and cotyledons of rape, sunflower and pea seeds
- effect of industrial oil extraction processes and fine grinding on protein digestibility
- the suggestion and utilisation after enzymatic hydrolysis

physiological effects of antinutritional factors (ANF) from oil and legume seeds on animals

- trypsin inhibitors and lectins from peas and beans
- glucosinolates and tannins of rapeseed 00

The two year feasibility phase has been characterised by close collaboration between the French and the Dutch partners through the services provided at IGMB-TNO by a French scientist sent by EURETEC to participate in the ANF project, and of the INRA Institute in Nantes where a project has been performed to separate proteins of peas in fractions with different types of ANF's.

Research programmes are being planned over the next 3 years, aiming at improving nutrient digestibility of the peas, beans, rapeseed and sunflower seed.



EUROFAR. EUROPEAN FUTURE ADVANCED ROTORCRAFT

The EUROFAR EUREKA project is a three-year (1988-1990) Feasibility Programme, devoted to the introduction of a new aerial transportation system, based on the Tilt-Rotor Aircraft.

The countries involved in this Programme are France, Germany, Italy, Spain, U.K., with the active participation of some major European Aeronautical Companies (Aerospatiale, MBB, Agusta, Casa, Westland), smaller subcontractors, and with the cooperation of important Research Agencies.

The project is based on the theoretical and experimental evaluation of the technical problems related to the tilt-rotor aircraft, the aircraft validity having been demonstrated by the USA (through research programmes).

The tilt-rotor looks like a traditional propeller aircraft, but the two wing tip-mounted rotors can tilt, providing vertical take-off and landing, nice controllability near the ground (like a helicopter) but with high performance in "airplane mode", with a speed and a range twice that of the helicopter and equivalent to that of a standard aeroplane.

The pre-design activities (based on a 30 passenger aircraft) include the utilisation of several of the most advanced European technologies and the utilisation of modern ground installations (wind tunnels, simulators).

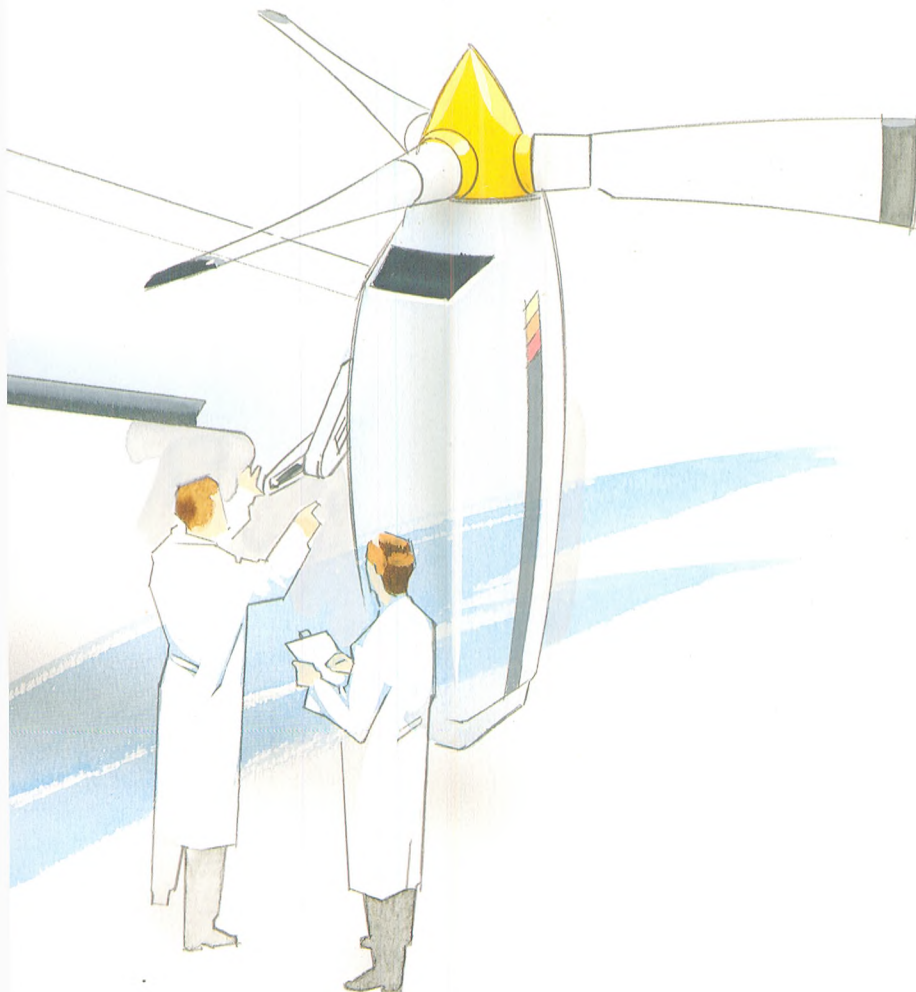
The development relies upon the determination of the world civil market, using an original and advanced macro-economical modelization. It appears that this system could help solve congestion problems at large airports (through hub feeder missions).

It could also reduce downtown transportation time (through the utilisation of vertiports).

Finally it could be used for long off-shore missions, and parapublic utilisation (Medical evacuation, liaisons with isolated areas, drug and disaster surveys, etc.)

The project needs the examination (with relevant agencies) of the problems related to vertiport establishment, air traffic control, nuisances, etc.

EUROFAR, through utilisation of the advanced European technology, demonstrates the European effectiveness, promoting a new concept which could be one of the solutions to aerial transportation problems at the turn of the century.



FAMOS - STANDARD

In project EU 196, the company Alcatel-SESA Spain - together with its partners Alcatel Belgium, Centunion in Spain and Taylor Hitec Ltd in the United Kingdom - is working on the development of a new, flexible manufacturing cell for telephone subset assembly. This initiative falls under the FAMOS umbrella of projects, which aims to develop flexible automated assembly systems in a number of manufacturing areas.

All functions, from transport and supply to testing and packing, will be controlled by different computers and software modules linked by a Local Area Network. It is this feature that gives FAS (Flexible Assembly System) the kind of flexibility needed to produce different types of subsets.

Definition and basic engineering development began in October 1987 and the project is not expected to become fully operational before April 1991 •

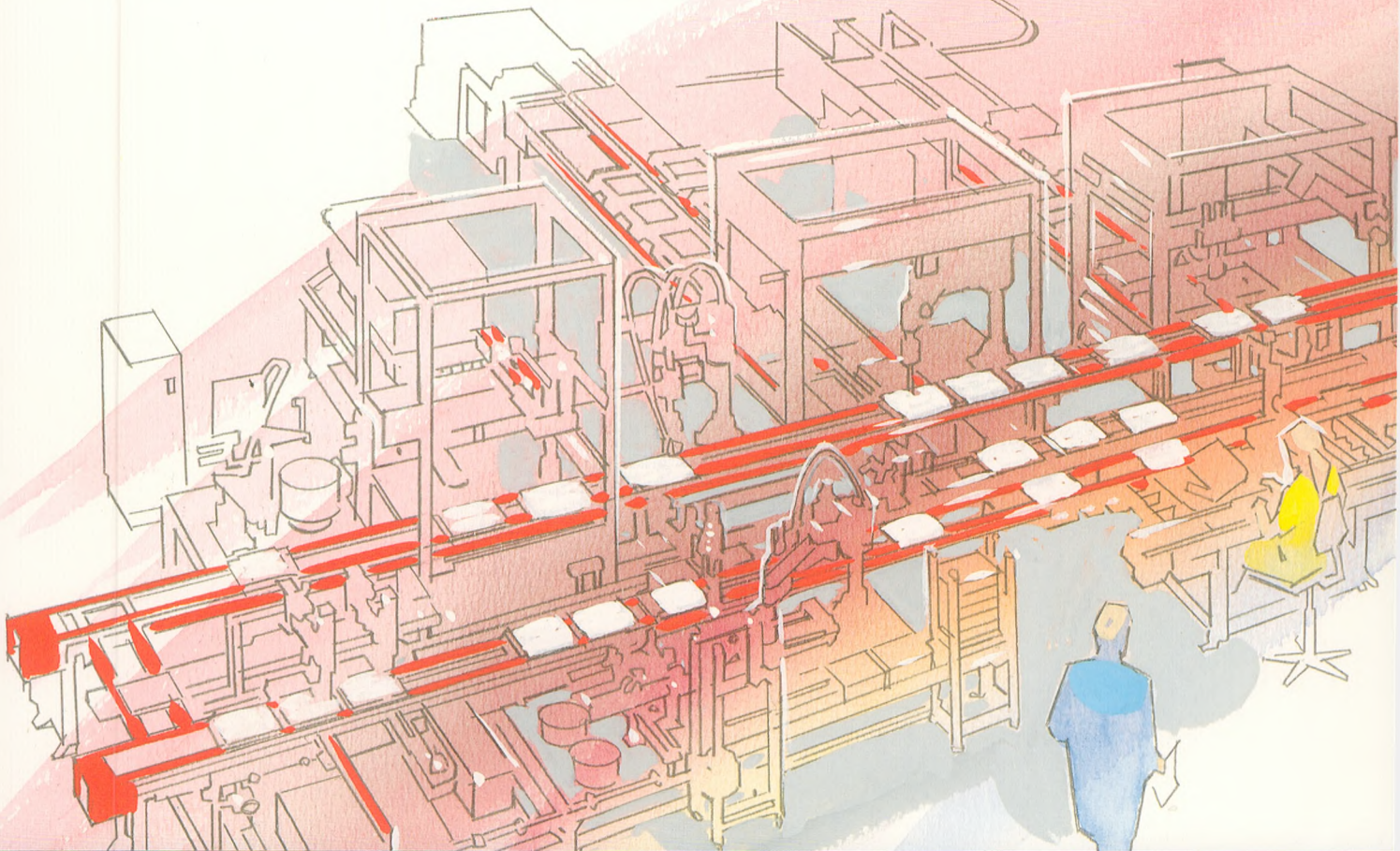
In this EUREKA partnership, ALCATEL is jointly developing the detailed technical and managerial specifications of the Flexible Assembly System with SESA. CENTUNION is developing and building the robotised assembly and transport systems as well as the first level of the control system, while TAYLOR HITEC will develop and install the complete control system to achieve a CAM environment for the manufacturing and testing facilities.

The actual manufacturing cell comprises a Transport System that links the different manufacturing equipment. The latter is integrated by automatic and manual work stations such as robot cells for handset, keyblock and final assembly, manual stations for cabling and closing up the telephone, repair stations, manual/automatic packing stations and a Test System.

The Supply System includes a local store and automatically guided vehicles while the Complete Controls System connects all other computers and drives them through the Local Area Network. This ensures that the assembly process remains under constant management supervision.

The flexible transport system with its jig identification and tracking will minimise production bottlenecks. Quick and precise robot manipulators in key-block and base assembly, apart from cutting back on labour will "achieve repeatability by removing manual operator inconsistencies".

More automation, a judicious use of computing techniques in key areas of the production process and development of automatic functional testing equipment should effectively reduce the number of warranty claims and customer complaints and lead to greater confidence in the industry, providing better sets at lower prices.



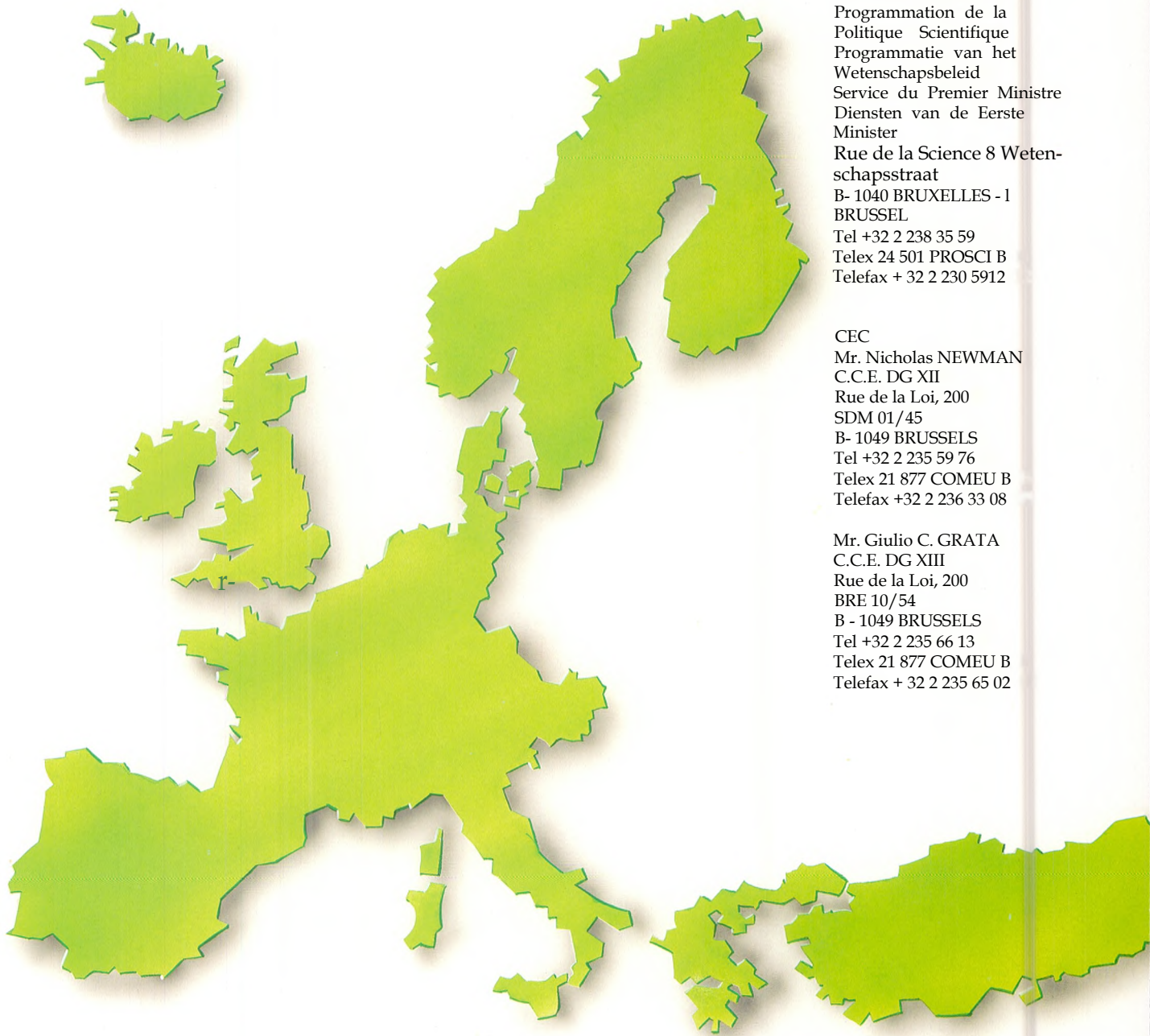
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For the interested reader, further material on EUREKA is available upon request from the respective National Project Coordinators or the EUREKA Secretariat (see addresses overleaf).

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

- EUREKA Brochure (containing a short general description of the Initiative)
- EUREKA Newsletter (published quarterly)
- EUREKA VADEMECUM (containing:
The Medium Term Plan
Declaration of Hanover
Procedures for EUREKA
Projects
Memorandum of Understanding on
the EUREKA Secretariat)

Material available in English:

- CHECKLIST for the negotiation and drafting of an international R&D cooperation agreement in the framework of a EUREKA project
- STANDARDS GUIDE for industrialists involved in a EUREKA project (also in French)
- GUIDELINES for the protection of technological information (also in French)
- EUREKA ENVIRONMENT FOLDER with the description of all EUREKA projects in the Environment area
- EUREKA ROBOTICS AND PRODUCTION AUTOMATION FOLDER with the description of all EUREKA projects in the Robotics and Production Automation area.
Available June 1st 1990.

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





EUREKA