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West Europe Report

SCIENCE AND TECHNOLOGY

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WEST EUROPE REPORT

SCIENCE AND TECHNOLOGY

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BIOTECHNOLOGY

FRENCH ENTREPRENEUR LAUNCHES BIOEUROPE

Paris BIOFUTUR in French Nov 85 pp 23-25

[Interview with Jean-Bernard Borfiga, chief executive officer of BioEurope, by P. Darbon: "A French-Style Capital Venture"; date and place not given; first paragraph is BIOFUTUR introduction]

[Text] Jean-Bernard Borfiga is one of the founders and the chief executive officer of BioEurope, a research and service company in biotechnology created in France in 1984. We asked him to tell us about his "venture." Indeed, BioEurope is one of the (still) rare French biotechnology companies which were created in the same spirit as California venture-capital companies: A small group of people unite on a project; for this project, they will risk their careers. Their determination and their expertise are the best guarantees for the financiers who will trust them, with the hope, though not the certainty (in the United States, about 25 percent succeed) that they will get their stake back many times over after a few years.

BIOFUTUR: A chemist from Harvard becomes a manager in the oil industry due to various circumstances and winds up in biotechnology when he is in his thirties. He develops a taste for this field and after 6 years creates his own company. What demon made you do it?

J.B. Borfiga: The demon of success. The creation of a small venture company such as BioEurope is first and foremost a personal decision. The large group whose European biotechnology division I was managing decided that, to face international competition, they had to concentrate on their main activity, glass. I decided to stay in biotechnology for two reasons. One, I believe in biotechnology. Having considered the probable evolution of potential markets for 6 years, I have grown certain that the biotech venture will be a profitable one. Two, in contrast to what they used to teach at Harvard, I think that, as much as possible, a manager should move up in the same type of industry in order to optimize his personal contribution: Switching from lingerie to microscopes and from microscopes to excavators may not be very efficient. After I decided to remain in the field that I was getting to know, I contacted the California biotech companies which I knew well. It was my American friends who told me, "Start a business in Europe. Once you have established yourself, you will make a good partner for us. We are not very familiar with Europe, but we know that biotechnology has enormous potential there."

BIOFUTUR: And you started out without trepidation?

J.B. Borfiga: Rather calmly. I anticipated the difficulties that awaited me. However, I took my risks. I knew that I was swimming against the tide. Even in the United States, the enormous investments from which biotech companies had once benefited had fallen off considerably. In France neither the mentality nor the fiscal laws are favorable to venture capital. Moreover, the specificity of biotechnology, the hazards of upstream research which confronts the complexity of living beings and the regulatory constraints which handicap products downstream, in pharmaceutics as well as in the food sector, mean that return time on investments can be longer in biotechnology than in electronics or data processing.

American financiers have been burned by the slow return on some investments. Some of them, such as our shareholder Citicorp Venture Capital, are betting on appreciation, like everybody else, while adapting to the specific nature of a biotechnological institute.

I think I had a lot going for me. I knew the market and the people. With the permission of my previous employer, I knew where to find high-quality partners in the still intact research team that I had directed. I had enough connections in the United States and elsewhere to hope to be able to give BioEurope an international component right from the start. In fact, without that, I would not have done it.

BIOFUTUR: You are familiar with the expression: a man, an idea.... You are the man. But what is the idea?

J.B. Borfiga: Right from the start I eliminated recombination--overcrowded--and monoclonal antibodies because I am unfamiliar with the market and the techniques. I concentrated on biocatalysis. From my previous activities I knew a little bit about it, and it has very significant industrial possibilities. I chose the food industry as one of the first fields of application because it is a sector in great need of new ingredients, products, and procedures, owing to changes in lifestyle and nutritional habits and also owing to agricultural surpluses. I chose this field, even though Europe is not the United States, even though the market is fragmented, with national dietary habits still strong and regulation excessive, especially in France, which must of course be our first client because of our location. And finally, I knew that there was a specialist of international reputation in Toulouse in charge of the laboratory for enzymatic catalysis of INSA [National Institute for Applied Sciences]. I needed only a few minutes to tempt Pierre Monsan, but it took me several months to convince him.

BIOFUTUR: So it is an association of a manager and a scientist. One idea, two men.

J.B. Borfiga: Add a young woman, Linda Casella, who joined the founders very soon afterwards. A nutritionist trained in the United States, she is a specialist in formulation and flavors. We knew where to look for associates in order to create a small but productive research team. From the beginning,

we combined it with a market research and consultant team in the United States and in Europe. As a matter of fact, it is more difficult to evaluate the chances and the market for a new ingredient than--paradoxically--for a new medicine generated by genetic engineering. Market dimensions in the agro-food industry are harder to define and products involving biotechnology are far more numerous than the above example. Hence, the absolute necessity of improving our research effort based on extensive market contacts.

BIOFUTUR: The strike force was ready. But what about the battle plan?

J.B. Borfiga: I drafted a very pessimistic business plan to make the contract with potential shareholders very clear. I had no illusions about the difficulty of raising significant capital. I knew, more specifically, that it would be impossible for us to raise an American-style war chest, allowing us to live off its financial proceeds.

There were two possible financing schemes. First was the traditional venture-capital company. The founding members create a company with a modest capital and sell 10 to 20 percent of the shares to venture capitalists, whose initial infusion will allow the company to start up. They speculate on the appreciation of the shares resulting from the company's first successes or expectations of success. As soon as the company succeeds, new shares are sold...at a much higher price than the first ones, etc.

We had the opportunity to raise Fr 3 or 4 million in the first round, and we might have taken that opportunity if we had not defined ourselves as a contracting R&D company from the beginning. We were sure we would get contracts very soon. But with a starting capital of Fr 3 or 4 million, we would probably run out after a few months because we would not be able to show prospects tempting enough to find a first complement of financing. We did not want to ask our partners to raise the capital to Fr 20 million.

Therefore, we had to choose a French-style venture-capital solution. In order to be able to subsist for 2 years, we invited manufacturers into our first fund raising instead of asking only bankers. This gave us three types of partners: venture capitalists, bankers, and manufacturers. Three different cultures, especially where the association of the manager to the capital is concerned.

Besides, France is still in the prehistoric stage as far as these association problems are concerned (stock options, bonus shares). It has to be said that even though some improvement has been seen recently (accelerated amortization of research investments, tax exemption of employee shares), the French system does not sufficiently encourage creation and development of companies which depend on the often tardy result of their advanced research to break even. An increase of capital, for example, is very difficult for this type of company. The auditors who have to monitor the value of assets find it easier to enter material assets such as buildings and equipment in the accounts than nonmaterial assets such as research in progress, competence acquired....

Finally, after long discussions and after some venture capitalists had dropped out, a memorandum of understanding was signed. (Footnote 1) (Industrial shareholders (40 percent): Roussel-Uclaf, Sucre-Union. Financial shareholders and individuals (60 percent): Banexi, Credit-Agricole, Citicorp Venture Capital, Compagnie Financiere de Suez, Mr Jean Hardy, founding members.) It guaranteed: 1) The company's independence vis-a-vis its industrial partners. This is an absolute guarantee of discretion for third parties who contract with us; 2) the possibility for BioEurope to implement its own research in its own best interest; 3) the involvement of the personnel in the company's success; 10 percent of the shares were held back and will be awarded to researchers by the board of directors upon the recommendation of the chief executive officer when goals are achieved.

BIOFUTUR: BioEurope is 1 year old. How was this first year spent?

J.B. Borfiga: We had to look for and find contracts, first among pharmaceutical and agro-food companies: procedure improvement, formulation, and adaptation to the market. Naturally we do not exclude ambitious projects or manufacturers from the pharmaceutical and chemical sector. First, however, we had to prove we were good, we had to be successful. We proposed relatively modest projects--one or two man-years--which, while concentrating on advanced technologies, also had to be in touch with the industry, close to the market so that production would not be delayed.

BIOFUTUR: How did you find these contracts?

J.B. Borfiga: I will give two examples. We know many manufacturers who trust us, first of all our industrial shareholders. They explain their problems to us. We think about them. We go back to them with proposals, sometimes simple suggestions, sometimes well-defined projects. This requires two types of investment from us, without any obligation on their part: a market analysis and laboratory work for an initial feasibility assessment. Second example: Sometimes, through our studies, through our contacts in Europe and in the United States, we see an opportunity which might interest a manufacturer. We present it to him.

BIOFUTUR: What type of contract do you offer?

J.B. Borfiga: Short-term contracts, usually 1 year, divided in separate phases with well-defined objectives. We cannot guarantee success. But we assume part of the risk: If the objective is not reached in time, we commit ourselves to continue the work for a certain period at our own expense.

BIOFUTUR: What is your position with regard to researchers in the public sector, who also often have contracts with industry?

J.B. Borfiga: We do not compete with university researchers, we complement them. We can only rejoice that the universities, after many years of isolation, are opening up more and more to industry.

University research, however, should remain more theoretical, in connection with its educational mission. That is the origin of its duty to publish.

We on the contrary are a private company. It is vital for us to provide our clients with rapid and excellent results. If we do not succeed, our funds disappear. Also, it is of fundamental importance that our clients be able to tell us in complete confidence about strategically important projects. That is why our researchers know they will not become famous because of their publications.

Besides, we are much closer to the market than the university could ever be, and rightly so.

Finally, we collaborate regularly with university teams on projects where upstream research is important. Do not forget we are located on a campus.

Having said that, I would like to stress that in some European countries, relations between industry and universities are much closer, and because of national particularities some manufacturers slightly distrust a service company with an international calling but of French origin. We are making efforts to penetrate there and we will be more successful once our research has proved itself, probably through the United States. Then BioEurope will truly deserve its name.

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BIOTECHNOLOGY

BMFT OF FRG BEGINS NEW BIOTECH RESEARCH GRANT PROGRAM

Solothurn CHEMISCHE RUNDSCHAU in German 10 Jan 86 p 3

[Article: "Research Stipends--For 200 Scientists"]

[Text] de. Early in 1986 there commences a program of subsidies entitled "Research Stipends in Biotechnology" on the part of the German Federal Ministry of Research and Technology. Responsibility for the technical and administrative handling of this program has been assigned to the German Society for Chemical Apparatus, Chemical Technology, and Biotechnology (Dechema).

The subsidy program intends during the next 3 or 4 years to provide 200 young scientists with an interdisciplinary and practice-oriented additional training. The prerequisites for granting of the stipends are: German citizenship, completed advanced school study (graduation with diploma or by state examination), and above-average scholastic records.

In the case of stipends for doctoral candidates the interdisciplinary and practice-oriented content of the planned research work must be proven. In the case of postdoctoral stipends there is also required besides these prerequisites a change in the previous work domain within the context of biotechnology together with a change in institute or advanced school affiliation.

It is required that there shall be performance of biotechnologically oriented research--also conducted using genetically modified organisms--in the FRG in the area of biological process technology, in particular in the development of bioreactors and the associated measuring and control technology together with special process developments.

Support is also being given to the development of new processing methods for special practice-oriented bioprocesses and is also being given to innovative microbiological procedures for the purification of wastewater and spent air as well as for garbage treatment. Support is also being given to the search for metabolic products of microorganisms and higher forms of cell life having interesting technical applications. No support is being given to the recombination of nucleic acids.

A bulletin regarding the granting of research stipends for doctoral candidates and postdoctorals in the area of biotechnology may be obtained together with application blanks from Dechema in Frankfurt/M.

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BIOTECHNOLOGY

EC ASKED TO FORMULATE UNIFORM BIOTECH SAFETY GUIDELINES

Solothurn CHEMISCHE RUNDSCHAU in German 24 Jan 86 p 2

[Article: "Biotechnology Program--Looking for the Workers"]

[Text] pd. The chemical industry unions of the countries of the European Community (EC) are demanding that employee interests be taken into consideration in the biotechnology research program which is being supported by the EC.

On the occasion of a consultation with representatives of the EC Commission in Brussels, the chairman of the Chemical Industry Labor Union Committee in the EC, Peter Kripzak, emphasized that biotechnology will give rise to special requirements in health protection, in job site configuration, and in the training of employees. He asserted that therefore it is necessary that the EC Commission should expend part of the provided support funds in investigating these questions.

Unpredictable Effects

In the opinion of the members of the Chemical Industry Labor Union Committee biotechnology and genetic engineering will have substantial effects upon the chemical and pharmaceutical industry because with good reason the multinational chemical companies are investing millions in this area. The effects upon the number of jobs and on production methods, according to Kripzak, are at the present time still unpredictable. But, he said, as in the case of all new technologies so too in biotechnology and genetic engineering one must reckon on a possible decrease in the number of jobs rather than an increase. But, he declared, it is one of the tasks of the EC Commission to make sure that the number of jobs within the EC suffers no further reduction.

Taking Small and Medium-Sized Enterprises Into Account

In view of the unions any research subsidy out of public funds must in particular put the small and medium-sized enterprises into such a position that in biotechnology and genetic engineering they are subject to no competitive disadvantages as compared with the giants of the chemical industry. In addition, Peter Kripzak challenged the EC Commission to establish uniform safety guidelines for the industrial application of biotechnology within the EC so that each EC country does not burden the industry with diverse regulations which in

the end interfere with the competitive capability of all enterprises. The European chemical unions also demand of the EC Commission that questions in the area of biotechnology and genetic engineering shall in future be discussed in three-member consultations among the EC Commission, employers, and labor unions. He asserted that only in such three-member conversations is a constructive and rational exchange of opinion possible.

The chemical unions of the International Federation of Chemical Unions, unions in the field of energy, and factory worker unions (ICEF) in the EC represent the interests of the approximately 1.7 million employees working in the chemical industry of the European Community.

8008
CSO: 3698/305

CIVIL AVIATION

AUTOMATED AIRBUS PRODUCTION FACILITIES AT MBB IN FRG

Frankfurt/Main FRANKFURTER ZEITUNG/BLICK DURCH DIE WIRTSCHAFT in German
23 Jan 86 p 7

[Article: "MBB Automating the Manufacture of the Airbus Rudder Assembly--'Miniature Factory' in the Laboratory of Manufacturing Technology/Operation on Strict Economic Principles"]

[Text] re. Frankfurt--The development of new manufacturing techniques and optimization of production techniques already in use are for the aircraft industry an essential basis of future security. It is not enough to have a mastery of particular technologies; it must also be possible to use them productively. In the MBB Entrepreneurial Group for Transport Aircraft and Passenger Aircraft (UT) in Hamburg a development team is now working, on the basis of this philosophy, toward the realization of future manufacturing processes. Their special aim in this is to achieve high productivity and flexibility as well as a consistently good product quality.

Industrial robots, computer-controlled machines, and transport mechanisms are to be so organized for the rational manufacture of aircraft structural components and the automated assembly of larger components that the maintenance of required production times is in each case assured. In the five manufacturing plants of UT there are numerous examples of the successful employment of these new manufacturing techniques. These include among others the largely computer-controlled sheet metal manufacturing center in the Bremen MBB Plant, the high-performance milling machine center in the Varel MBB Plant, fuselage manufacturing in the Einswarden MBB Plant, as well as the fuselage assembly and cabin outfitting which is being carried out with a high degree of efficiency in the Hamburg MBB Plant.

A further example of future-oriented production technologies is the mechanized manufacture of the Airbus rudder assembly out of carbon fiber bonded material (CFK) in the Stade MBB Plant. This novel manufacturing process is currently being developed at MBB-UT. This longer-service-life product must be capable of yielding the requisite aeronautical performance when in large-scale mass production. Further, it must have a price which corresponds to the market situation and to the Airbus operating cost analyses. Moreover, during its long service life it must give rise to a minimum of maintenance costs. Hitherto, the control surface components have been manufactured manually. In

order to be able to manufacture them in the future out of carbon fiber bonded material by a largely automated method of manufacturing heavy demands will be placed on the development of manufacturing technology by MBB, according to its own statements. And "design to cost"--a method of cost reduction during the phase of product development--obliges the developer always to keep his eye on cost objectives.

Subject to these constraints, workers in the development of manufacturing technology, in investment planning, and in manufacturing-fixture engineering have begun to incorporate the big "CFK rudder assembly components" into MBB's manufacturing. That is to say, into the flexible computer-controlled manufacturing technology of MBB's Entrepreneurial Group for Transport Aircraft and Passenger Aircraft. In order to verify the possibility of producing this large component in mechanized manufacturing a "miniature factory" has been created in the Hamburg Manufacturing Technology Laboratory. Here, the future mechanized manufacturing of the CFK rudder assembly is being tested. A number of manufacturing facilities and tools had first of all to be newly developed and built for this purpose.

The modular construction of the CFK rudder assembly framework is characterized by a multitude of geometrically similar elements which are arranged relatively to one another within a fixed grid. Each of these modules is produced by winding a shaped blank cut out of impregnated CFK sheets about an aluminum form block (module core). For the 9-meter-high rudder assembly shell a total of 264 module cores must be "bandaged." They are finally pressed together, covered with unidirectional CFK tape, lowered onto the outer skin, and hardened at 125° Celsius in an autoclave under vacuum and pressure. In this, use is made of the greater thermal expansion of the aluminum as compared with the synthetic material so that an increase in temperature produces compression of the laminate.

The various steps in the manufacture of a CFK rudder assembly are to be combined in the Synthetics Center of Stade MBB Plant into a single continuous production process. This new system is being tested in the manufacturing technology laboratory--under contract to the Federal Ministry of Research. Here, the governing consideration is to use robots and automated transport systems on the basis of strict economic principles. In every instance in which the machine operates with greater precision and speed than that of conventional procedures in the manufacture of the CFK rudder assembly, the use of the machine is tested in the technology laboratory. Thus, there now exists a production system for the Airbus CFK rudder assembly in which the individual manufacturing groups are linked together: After the mechanical cutting to shape of the CFK "prepregs," or impregnated sheets, with a cutting knife the prepreg is wound about the aluminum module core. Then its overhanging edges are automatically folded, yielding the box shape of the module. Finally, a robot inserts the modules into a lattice frame pallet; they are then pressed together in longitudinal and transverse directions within a lattice frame. This lattice frame is finally united with the CFK skin surface which is laminated to the CFK on a device which produces light adhesion. Thus, the CFK modules and the CFK external skin surfaces become a single unit which after subsequent hardening in an autoclave yields a highly integrated aircraft structure.

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CIVIL AVIATION

MBB ADAPTS FACILITIES FOR AIRBUS 330, 340 PRODUCTION

Frankfurt/Main FRANKFURTER ZEITUNG/BLICK DURCH DIE WIRTSCHAFT in German
4 Feb 86 p 5

[Article: "Two Airbus Models Have a Wing in Common--MBB: Development Costs Lowered/Variable Wing Camber"]

[Text] re. Frankfurt--In the north German MBB plants a start has already been made with preliminary development work for the coming long-range large-scale aircraft Airbus A340. According to reports from the Messerschmitt-Boelkow-Blohm Co., the first wind tunnel model of this aircraft is being tested in the high-speed wind tunnel of the Netherlands Aeronautical and Astronautical Laboratory. The first results of this testing are said to have confirmed the high expectations existing with regard to the design of a new type of wing system. This wing system is considered to be important particularly because it is to be used not only for the long-range version of the Airbus, but also in the construction of the two-engine short- and medium-range A330 variant. Both aircraft models are to have as many components as possible in common. MBB includes here the fuselage, the undercarriage, the control system, various on-board systems, and in particular the wing.

The Airbus group expects to gain from the new wing design considerable savings in development and production of a second aircraft. Related investigations are being carried out with respect to new materials, new methods of construction, the use of very up-to-date system technologies, and not least of all the employment of advanced aerodynamics which will build upon knowledge gained from the high-performance wings of the Airbus A310 and Airbus A320. The company considers that here systems of variable wing camber will be a very decisive help. Carbon fiber bonded materials are to be employed in component construction. Also, new systems of structural load relief and control system load relief are to be used.

According to information provided by MBB, the new wing as compared with the previous Airbus wings will have a greater span and a modified plan projection in order to achieve with a high degree of economy the great flying speeds required by long-range airplanes. The Airbus A340 is expected to permit economical nonstop flights up to about 13,000 km while the short- and middle-range version A330 will still be able to fly on extremely short routes "with high economy." The goals of development also include high take-off and climb performance for the A340 because for economical operation of this aircraft it is important to reach rapidly those flight altitudes in which flying is economical. There are similar aims for landing performance, where safety questions play an important role.

COMPUTERS

FRENCH LOCATIONS, SCIENTISTS DOING SOFTWARE ENGINEERING

Paris ZERO UN INFORMATIQUE HEBDO in French 18 Nov 85 pp 52-53

[Article by Pierre Lombard: "A Common Language for Industry and Research"]

[Excerpts] The development of a major piece of software is a complex task. It requires that the concepts expressed heretofore by a human brain be coded in a language comprehensible to a machine. The interfacing of these two entities is called software engineering. It is being equipped today with new tools.

The software engineering group of AFCET [French Economic and Technical Cybernetics Association] has just completed the organizing of a symposium under the heading "New Languages for Software Engineering." In comments preceding the opening of the symposium, Michel Lissandre, of the IGL Company, indicated that its aim is "to discuss the new languages that are being or can be used in software engineering, as well as for possible associated tools. The term 'language,'" he says, "must be understood in its broad sense, as a means of communication: This includes not only programming languages, algorithmic or not, but also display models, and formalisms associated with methods of description and of utilization of a software tool.

"The panoply of languages concerned," Michel Lissandre continues, "includes especially the formal languages of specification and design, the functional languages, languages adapted to configuration management, control languages for use by workstations, and languages enabling the production of specific applications. These new languages and their tools are having an impact on the developmental processes, on validation mechanisms, and, more generally speaking, on the future orientations of software engineering workshops."

The LASSIF Language

Current research in the field of software engineering thus spans a range of concerns, the primary one being undoubtedly the specifying of information systems. In the view of O. Thierry, J.-P. Finance (CRIN [Nancy Data Processing Research Center] of Nancy), and C. Rolland (University of Paris I), the specification of an information system for management data

processing consists of a formal organizational plan which describes its static components (the data) and its dynamic ones (the operations to be performed on the data and the instructions for carrying out these operations).

In laying out this plan, the usual programming languages (COBOL,PL/1, GAP, etc.) have proven limited. Why? For one thing, because they manipulate data processing objects in terms of the structuring of data: They require a knowledge of the concepts of file, table, recording, etc. And secondly, because they require a procedural definition of the algorithm: Their stress is on describing the calculations used to obtain the desired results instead instead of on the elements that are being specified.

With these considerations in mind, the aforementioned research team has developed the LASSIF language. By means of this language, the specifying of an information system boils down to describing in formal, readable and automatable manner all the details of the result of the design phase. LASSIF thus facilitates the expressing of:

--The structure of the information system, the different classes of objects, the events, the operations and the integrity constraints associated with the data:

--The accesses to the information in the system itself, in the form of predicative expressions;

--The conversion of the data into textual, conditional, factorial and operating rule forms.

"LASSIF thus contains at one and the same time structural constructs and dynamic constructs," the authors say. "It is simultaneously a structural language and a statement language. As a structural language, it enables the describing of the information system's classes. As a statement language, it enables the defining of its operating rules. It covers the expressing of its predicates (accesses to the data and integrity constraints) and of its texts strictly speaking (conditions, factors and operations)."

Another development in the same domain is that of the PLUSS language by Michel Bidoit and Marie-Claude Gaudel (LRI [Industrial Center] of the University of Paris-Sud [South]). PLUSS is aimed at facilitating large-scale formal specifications. It is currently in the design and testing phase. But an initial version of the language has been tested with real samples for over a year.

Systems Modeling

PLUSS distinguishes between two types of specification: On the one hand, a specification completed in every respect, whose signification no longer needs to be put at issue. This might be, for example, the specification

of a subsystem already in the course of being built. And on the other hand, a specification in the course of being designed, not completed as yet, and to which all constructs are applicable.

Another approach to the modeling of an information system is to build a mockup of it. A mockup that is not frozen and that permits constant evolution of the system. This is precisely the objective of the ML [Meta-Language] language by P. Jouvelot (University of Paris VI).

This university professor comments as follows: "In the advanced domains of data processing, it is being generally agreed that the development cycle based on the classic sequence 'analysis - design - programming - maintenance' is unsuitable. The trend is, on the contrary, toward a preference for an 'incremental' approach, centered around a mockup in a perpetual state of evolution."

From Analysis to Design

"This therefore means coming to terms with the designer's way of thinking: trial, failure, and 'back to the drawing board.' This approach is viable only if powerful and flexible tools are available that enable both the guiding of the analysis (to avoid easily detectable errors) and the facilitating of frequent modifications to a software which, as a matter of principle, is 'changeable.'"

The problem is how to narrow the gap between the period of the analysis and that of the design. P. Jouvelot views this problem as having a simple solution: The specifications used in the design phase must be made executable. Furthermore, changes to the mockup place a constraint on the specification and programming languages. The latter must conform to the abstract concept of data. Only this concept can make possible the efficient structuring of a program and subsequent local modifications within modules.

These constraints have led the MASI [Data Processing Systems Methodology and Architecture Laboratory of the University of Paris VI] to choose the ML language for the design and building of information system mockups incorporating possibilities of parallelization.

Engineering and Intelligence

The mockup, as we have just seen, is a first approach to the objective of direct passage from specifications to programming. As a matter of interest, P. Jouvelot, in effect, advocates that the specifications be executable, thus comprising the program itself.

In this domain, the PROLOG language opens up interesting possibilities. [Further] according to Michel Rueher, the principal advantages of PROLOG for the building of prototypes lies in its high level of abstraction and

in its declarative representation of knowledge. The conciseness of PROLOG programs can greatly facilitate the writing of the prototype. PROLOG also makes possible the abstraction of implementation problems.

[Boxed material p 52]:

Software Engineering Industry Leader

Recently, several SSII's [not further identified] joined with each other to form a software engineering industry leader within the SFGL [French Software Engineering Company].

To begin with, the SFGL associated the Bull group with five SSII's: CERCI, EUROSOFT, SESA, STERIA and SYSECA. More recently, Informatique Internationale (a subsidiary of CISI [International Data Processing Service Company]) joined the SFGL, whidh is headed by Jacques Arnould (SESA). The new company expects to have its own independent staff of experts by the end of this year. In part, it will be working on certain national projects, such as Emeraude. It will also contribute to certain other projects. SESA and CERCI are already participating in the SPMS [Software Production and Management Support] project together with CIT-Alcatel, TECSI, TRT, STC Technology (Great Britain) and Data Management (Italy), under the leadership of Siemens.

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COMPUTERS

JANUARY 1986 STATUS OF FRENCH 'COMPUTERS FOR ALL' PLAN

Paris AFP SCIENCES in French 9 Jan 86 p 3

[Excerpts] PARIS--120,000 additional microcomputers and 700 software programs have been distributed to educational institutions, and 110,000 teachers trained during summer vacation. The "Computers for All" plan is doing quite well 1 year after its introduction by Mr. Fabius, stated Mrs. Georgina Dufoix, government spokesperson, after the 8 January cabinet meeting during which Mr. Jean-Pierre Chevenement, minister of national education, presented a report on the implementation of this plan.

Here is a portion of the cabinet's report on this plan: "Under the direction of the delegate for new functions, carried out within each department by a member of the prefectorial corps, and with the assistance of the new technology division of the Ministry of Education and all the services involved, this implementation has been provided for under the planned conditions and within particularly short periods:

"--more than 120,000 additional microcomputers have been installed in universities, secondary schools, high schools, and grammar schools;

"--the software necessary for instruction has been distributed to institutions;

"--more than 110,000 teachers have been trained during summer vacation training sessions;

"--arrangements have been made to introduce computer science into the curriculum in grammar schools, high schools, and secondary schools.

"The 'Computers for All' plan has been financed with approximately 2 billion francs. It will allow each student to have access to the new language known as computer science. Many foreign countries are currently expressing interest in this operation, which provides opportunities for international cooperation as well as export.

"The work accomplished thus far places France in the forefront of the dissemination of computer science education."
13146/9435
CSO: 3698/300

DEFENSE INDUSTRIES

FRENCH EDF OPERATING PHEBUS RESEARCH LASER

Paris L'USINE NOUVELLE in French 27 Feb 86 p 10

[Article: "The Phebus Laser: A Power of 20,000 Billion Watts"]

[Text] A special building had to be erected at Limeil-Valenton to accomodate the Phebus laser, because the latest product of CEA's [Atomic Energy Commission] directorate for military applications measures no less than 100 meters in length. Between the source (the oscillator) and the target, the beam covers 250 meters.

The power of Phebus reaches 20 terawatts (20,000 billion watts), i.e., several 100 times the electrical power of the EDF [French Electricity Company] network, but only for periods of between 0.3 and 3 billionths of a second, and that happens once or twice a day. At the target level, the energy released (20,000 joules) corresponds to 400 kilograms of explosives per cubic centimeter. Intended for light-matter interaction studies, Phebus will also be used to analyze the effects of laser shots upon missile warheads taking into account their "hardening."

The Phebus oscillator, which generates the laser pulses, is followed by a group of amplifiers. These amplifiers multiply the initial energy by 10 million and are made of neodymium glass. Their excitation is caused by 1,000 flash tubes which are supplied by the discharge of 1,500 capacitors.

In order to reduce the slow drift--which must not exceed a few microns--of the optical axis, 600 pulse motors with 1-micron accuracy automatically correct any mechanical variations of the equipment. For throughout its trajectory of 250 meters, the beam passes through 1,000 optical components, the largest of which--the mirrors at the chain's end--have a 1-meter diameter. Two computers with an 8-mega-byte memory manage the system, correct the alignments, and receive and process data.

Some 60 French companies participated in the construction of Phebus, for which EDF drew upon the skills of American, Japanese and German laboratories.

25004
CSO: 3698/A352

FACTORY AUTOMATION

COMAU PRODUCTS, PROJECTS INCLUDE FMS, CAD/CAM

Turin MEDIA DUEMILA in Italian No 1, Jan 86 p 24

[Article: "Men and Technologies: Prestige of the Group"]

[Text] Comau, the leading company in the Means and Production Systems Sector of the FIAT group, started in 1977 as a natural development of the earlier Machine Tool Association, founded 4 years before with the initial partnership of MST, Morando, and Colubra Lamsat, Imp. It represents the successful aggregation of productive structures and professional experiences developed during 60 years in the Turin and Modena area. Comau cooperates all over the world with leading corporations involved in process innovations in order to supply automatic and flexible equipment and keep up with the demand of mechanical engineering: from general feasibility studies to the singling out of the appropriate technologies; from machining to mounting and assembling systems; from materials handling to storage systems.

In terms of the number of employees and business volume, Comau has for years been one of the most important suppliers of production systems in the world. In 1984 its turnover reached 498 billion (up 21 percent over the preceding year); the order list at the close of the year went up to 816 billion (up 72 percent over the preceding year) with an export share as high as 56 percent.

The number of employees is as high as 3144, with five factories: two in Grugliasco (Turin), and one in Modena, Borgaretto (Turin), and Beinasco (Turin).

From 1981 to 1984 research and development expenses increased at an average annual rate of 18 percent for a total of 21 billion lire.

Comay, which is divided into three operating divisions (machining systems, assembling and handling systems, and industrial automation) works in the following product lines:

-flexible machining systems;
-transfer machining line for high frequency;
-NC [Numerically controlled] processing cells, integrable in flexible systems;
-robotics for mechanical assembly;

-laser production systems;
-horizontal and vertical turning systems;
-robotized flexible systems for spot and arc welding;
-automatic spot and arc welding systems;
-final body assembling systems;
-warm and cold engine test rooms;
-industrial robots;
-tall computerized automatic storages;
-automatic transport systems;
-automatic intake and transport means for palletized and nonpalletized materials;
-industrial electronic controls;
-computerized monitoring and control systems for production and storage plants;
-simulation, analytical modelling and resource allocation systems for integrated flexible equipment;
-support and CAD-CAM equipment connection systems for planning and management of integrated production plants;
-computerized systems for diagnostics, monitoring and operational and decision-making support to production plant mangement.

Some Significant Projects

-Robogate for Fiat Auto, Alfa Romeo, Volvo, BMW;
-manufacturing and assembling automated plant for the Fire 1000 motor for Fiat Auto;
-non-monitored cell for Caterpillar track link processing;
-truck motor base processing plant for Kamaz, USSR;
-FMS [Flexible Manufacturing System] production of clutch and transmission boxes boxes for Phonix Fiat tractors for Flygt Sweden;
-robotized storing and automatic merchandise sorting center for Benetton;
-robotized storing and automatic merchandise sorting center for La Rinascente;
-flexible working line for 85 different compressor parts for Borg-Warner;
-robotized system for cylinder head assembling for General Motors.

In the coming years when Comau's technological progress greatly accelerates, important developments will occur because of their specialized product lines.

Flexibility and advanced technologies will be the key characteristics of future integrated production systems throughout the industrial world.

According to opinions emerging in seminars and meetings all over the world a convergence of interests toward computer integrated manufacturing [CIM] has appeared.

Although CIM is still in its early stages, most people think its progressive diffusion, which is reducing costs and improving the ergonomic conditions of worksites, will contribute to quality far more than all other technological innovations.

8604/12951
CSO:3698/M028

FACTORY AUTOMATION

FRANCE DEVELOPS ROBOTS FOR PUBLIC APPLICATIONS

Turin MEDIA DUEMILA in Italian No 11, Dec 85 pp 60-61

[Article by Antonella Tarquini: "The Robot-Sweeper in the Paris Metro"]

[Text] Paris--Industrial France has been preparing for robotization and in order to face this new era the public and private bodies interested in advanced research in robotics have been grouped since 1980 under the program ARA (Automation and Advanced Robotics). As a basic element of the program on robotics of the Ministry for Research and Technology, the ARA program is being carried out the CNRS [National Center for Scientific Research] in association with Adepa (Agency for the Development of Automated Production), CEA (the Atomic Energy Commission), the Center for Study and Research of Toulouse of the National Bureau for Space and Technology Research, the Technical Center for Mechanical Industry (Cetim), the CNES (National Center for Space Space Studies), l'Inria (National Institute for Informatics and Automation Research), and Regie Renault and Telemecanique. ARA is meant to conduct research and development of all-purpose robots and integrated automated systems such as all-purpose workshops. ARA's objectives is twofold: first it will develop research in this field in France while pursuing at the same time the development, evaluation, and dissemination of systems and general technical advances. Research workers, 160 in all, are divided into 45 teams and operate on four main subjects: advanced remote control and operation, mechanics and technology, general robotics, and all-purpose workshops.

With regard to the budget of the ARA program, concerning the exploitation and the relationship between industry and research, the official figures are not known yet. But ARA is acting as a primary mover and, in fact, promotes educational training through grants, creates regional research groups, and supports the transfer of technologies such as the one which is taking place at the electrotechnic laboratory of Grenoble: Two research workers of the laboratory work jointly with a company which produces engines and another which acts as a consultant in microelectronics in order to develop an integrated command chart for robots.

Robotic research in France is well advanced in the medical field and results are already considerable. For example, the robot for functional exploration of the ear vestibule, the first prototype of which presently operates at the

Strasbourg hospital, is capable of detecting ear impairments caused by trauma, benign diseases, and tumors. Also, a micro-manipulator for eye surgery has been built by research workers of the Center for Automation of Villeneuve d'Ascq and by the opthalmologists of the University of Lille and will be produced and marketed next year. With this device the surgeon will be able to sit in front of a video monitor and guide the robot's movements by remote control over the patient's eye. In certain phases of the operation and with the addition of special sensors, the robot will also be able to act autonomously, although under the constant control of the surgeon.

Robotics in medicine was one of the main topics discussed at the end of October in Paris in a debate promoted by Cesta (Center for the Study of Systems and Advanced Technologies), a division of the Ministry of Research. In the course of this conference devoted to "robotics for the general public", French and foreign experts discussed the possible functions of a robot for public use and the transfer of industrial robotics know-how to small robots. They also talked about the introduction of robots in the teaching of habitat automation. One of the lecturers, Roland Prajoux, responsible for the automation and systems analysis laboratory of Toulouse, believes that there are three categories of robots likely to be of interest to the general public, that is, household robots, which will require a decade to produce before problems connected with artificial intelligence are solved; "playtime' robots, such as Japanese Elehobby's "turtles;" and finally, educational robots, which will train students and professors in robotics.

In order to facilitate pursuing this objective, CESTA opened the first European "robot display room" where the main educational robots available on the French market are gathered thanks to the cooperation of French and foreign manufacturers.

The French are becoming acquainted with robots: At all hours, dozens of people watch the shop windows of Galeries Lafayette, where small industrial robots which dance and move are displayed.

But the first true and direct contact between Parisians and robotics will take place in a rather unusual way and in a most popular place: the metro. Beginning in 1986, there will be a gradual introduction of robotsweeper in the underground stations. These robots will perform all cleaning operations: floor washing to emptying of the dustbins, and vacuuming of waste paper to cleaning of ceilings. This is not all-there will be 500 telephones in the stations for the public to directly call offices in charge of street cleaning when a place is particularly dirty and prompt action is required. Soon the robot will be there and will be able to move easily and politely also among the crowd.

This "revolution," which will span a 10-year period in which 165 million francs will be invested, should reduce the RATP [Paris Transport Authority] budget by 25 percent by the end of 1995. RATP is also confident that it will be able to export the new system as a "package" along with the metro supply. The operation will be gradual: after the first step of mechanization, with the introduction of washing devices and of a prototype robot, first generation

robots will be introduced in 1986-1987, followed by second and third generation robots and, finally, in 1993-1995, the operation of autonomous all-purpose robots under remote monitoring. In order to "robotize" the cleaning of the Paris metro, RATP has signed contracts with Comatec a branch of [General Water Company] to which the Genost group belongs, Camiva (branch of Renault industrial vehicles for mechanics and robotics), and Ceas and Midi Robot of Tolouse.

8606/12951
CSO: 3698/M001

FACTORY AUTOMATION

SELENIA-ELSAG SUBSIDIARY MAKES MEASUREMENT, ASSEMBLY ROBOTS

Turin MEDIA DUEMILA in Italian No 1, Jan 86 pp 56-57

[Article: "Every 18 Seconds A Piece Is ready"]

[Text] Measuring and assembly robots...if the former represent one of the sectors with the greatest technological and innovative content in the automatic factory, the latter have the most interesting development prospects, particularly with regard to medium-weight assembly (that is, for elements up to 10 kg). DEA of Turin, a company of the Selenia-Elsag firm, has developed for its customers both types of plants, which are described below.

Measurement Robots

"The aim of these systems in the automatic factory," DEA explains, "is not so much to identify defective pieces for rejection, as it is to prevent their manufacture and to give suggestions about the productive process in order to make it work at an optimum level." They cite as an example of "integrated dimensional testing" the one produced by the Turin company for a flexible manufacturing system (FMS) of an American aeronautics manufacturer.

The system can produce 600 pieces of different shapes and dimensions with a very high degree of resource utilization obtained through flexible programming.

The FMS is composed of eight manufacturing centers, an automatic washing station, an automatic system with wire-guided trolley for piece transport, two local warehouses, and two robot measuring FMS which direct in a completely automatic and flexible way the "dimensional testing" of pieces. Both programs and instructions are transmitted to the measuring robots by the supervising data processing equipment. Other specific application programs developed by DEA control all operations related to the identification of pieces and handling within the measuring cells.

Calculations on measured elements, statistical data processing, and correlations on results are achieved by control units placed in the same cells, Data is then transmitted to the supervising device where they are registered and analyzed to control the quality of the product.

Assembling Robots

A typical example of the "integrated assembling cell" is the one recently made by DEA for a French automobile company for the production of oil pumps.

The cell comprises 6 Pragma robots and can assemble over 3000 pumps a day, one piece every 18 seconds.

Robots practically behave like human workers: they take and set pieces down, perform assembling operations both directly and by means of tools and other instruments. When the cycle is over, they unload the finished pieces. A network of sensors and survey stations oversees the whole production cycle. At the end, an automatic station performs the functional inspection of the pumps and sorts them, rejecting defective ones. Medium-weight assembling robots are destinated for great development," says DEA. "Today their market share is still lower than that of welding robots but, according to expectations, by 1990 they should have a growth rate of 35-37 percent a year." Who will use them mostly? "The traditional automobile, electric appliances, and electronics industries. But that's not all. The food sector, for example, is now greatly interested in the possibility of introducing flexible robotized manufacturing lines in its production processes. These lines can be compared to the more classic assembling lines."

8604/12951
CSO: 3698/M029

MICROELECTRONICS

FIRMS IN FRG, FRANCE COOPERATE ON OPTICAL DATA STORAGE

Solothurn CHEMISCHE RUNDSCHAU in German 10 Jan 86 p 10

[Article: "Licensing Agreement--Optical Data Storage"]

[Text] Hi. Hoechst and Alcatel Thomson Gigadisc (ATG) have concluded a licensing agreement in the domain of optical data storage. The intention is to exploit the considerable marketing opportunities for optical storage systems.

The agreement provides for the building of production capacity for optical storage disks by ATG and for their further development. According to an announcement by Hoechst, information technology, as it becomes ever more complex, increasingly demands products which can be very rapidly developed only through a close intermeshing of chemistry, electronics, and optics.

For the manufacture of optical storage disks Hoechst will bring in its special experience in the chemistry of polymers and dyes and in the technology of film deposition. Hoechst will market the products under its own name through its worldwide sales organization.

Because of their large capacity optical media are considered to be the mass storage devices of the future. On a 30-cm-diameter disk, for example, it is possible to store on each side about 500,000 standard [DIN A4] pages of text. The principal areas of application are expected to be in office automation, information distribution, public libraries, data banks, and in telephonic information services. Optical storage devices are also especially appropriate in electronic image processing in medicine, astronomy, and in instruction materials.

ATG, whose shares are mainly held by the two leading French electronic firms Thomson and CGE, has committed itself entirely to optical storage technology and is among the leading enterprises in the world in this domain. In Toulouse, France, a new production facility has just been placed in operation for the manufacture of devices and expendable materials in the area of optical storage technology.

On the basis of research results obtained in photochemistry Hoechst along with the commercial field of information technology (sales in 1985 about DM 1.8 billion) holds a leading market position in the fields of typographic forms manufacture and copying technology. For the electronics industry Hoechst supplies photoresists for the manufacture of printed circuits and integrated circuits.

8008
CSO: 3698/306

TELEFONICA OF SPAIN, BULL OF FRANCE JOIN ES2

Paris ZERO UN INFORMATIQUE in French 13 Jan 86 p 7

[Text] Launched last September by four experts in the semiconductor industry, European Silicon Structures (ES2) has just gotten support from two new manufacturers. Olivetti, Philips, Brown Boveri, Saab Scania, British Aerospace and Bosch, whose contributions of equity have reached a total of $25 million, have joined Telefonica--the Spanish national manufacturer in partnership with Fujitsu and AT&T (cf 01 INFORMATIQUE No 885)--and, quite recently, Bull.

Telefonica's participation in ES2 has been assessed at $2.5 million. Bull's participation has not been disclosed, but may be on the same order of magnitude, and is, in any case, markedly less than the investment agreed upon by each of the six members of the group cited above. On the average, each spent $4 million.

Bull, last of the eight to join, must somehow pay the price of admission to the club. This French manufacturer does not have an immediate need for the services of ES2, that is, the production of small quantities of custom-made integrated circuits (fewer than 5000 units). For the DPS 7 series, Bull's Angers factory will continue to supply custom-made components to Honeywell, NEC and RTC. The SPS 9 line (Ridge), based on Risc architecture, relies exclusively on standard components. Bull's use of ES2 will henceforth concern only future development of its product lines. This explains its late and comparatively modest participation in the project.

Nevertheless, the contribution of Bull, which still expects French government support for the report presented by ES2 within the framework of Eureka, may allow a more rapid finalization of the budget ($65 million). Having amassed $36 in equity, ES2 now is attempting to obtain $25 million in loans from European financiers to be added to several millions of dollars in public funds.

Without waiting for the final financial round, ES2, which has about 30 people, has just opened a circuit design center in Munich, and is preparing to open a second in Paris (within a few days) and a third in London (at the end of January).

13146/9435
CSO: 3698/300

MICROELECTRONICS

SIEMENS DEVELOPS MORE POWERFUL SEMICONDUCTOR LASER ARRAYS

Frankfurt/Main FRANKFURTER ZEITUNG/BLICK DURCH DIE WIRTSCHAFT in German 27 Jan 86 p 7

[Article: "Semiconductor Lasers With High Output--Higher Optical Outputs With Low Thermal Stress on the Mirrors"]

[Text] re. Frankfurt--In the laboratories of Siemens AG there have now been developed semiconductor laser arrays having very high optical output power and good coherence properties. This opens up new applications for the laser diode in addition to its use in optical communications technology. These are applications which hitherto have been impossible because of insufficient power.

The new laser diode arrays provide an optical output power of more than 1.5 watts per array at a wavelength of lambda = 0.88 micrometers. The company reports that the beam characteristics of an array are adaptable to the particular applications. They say that the electro-optical total efficiency is over 30 percent. Laser diodes of conventional construction seldom permit more than 50 milliwatts of optical output power because the mirrors are destroyed at these outputs. With laser arrays it is possible to achieve much higher optical powers. Thus the thermal stress on the mirrors is less than in the case of an individual diode.

The arrays consist of a maximum of 40 individual laser diodes integrated on a substrate. Monolithic phase-coupled laser arrays of gallium-aluminum-arsenide (Ga-Al-As) offer new possible applications, for example, in the ignition of high-performance thyristors via optical wave guides. Other examples are the active distribution of information over several optical wave guides, pumping solid-state lasers such as yttrium-aluminum-garnet (YAG) or frequency doubling with the aid of nonlinear crystals. Simple and reliable coherent blue light sources, for example, for measuring purposes, are achievable in principle. Siemens reports that laser-array chips having 8, 10, or 12 strips per chip with DH structure are available from their manufacture for experimental purposes. They say that for applications which require a specific geometric arrangement of the arrays corresponding designs having reliable heat dissipation are producible.

8008
CSO: 3698/306

MICROELECTRONICS

BRIEFS

SGS, TOSHIBA AGREEMENT--SGS and Toshiba recently arrived at an important agreement in the field of electronic components for telecommunications, with particular reference to integrated circuits, which will lead to joint development of new products. The first phase of the agreement foresees the transfer to Toshiba, on the part of the Italian firm, of the second-source production rights of three chips for VLSI telecommunications; namely, the PCM codifier with the M 5913 single chip; the M 9910 modem, and the PCM M088 switching matrix, capable of interconnecting a total of 256 telephone users. The first two products are elaborations of products already in existence, entirely compatible with current industrial standards. The M088 switching matrix, if reinforced with similar devices, presents noteworthy possibilities of expansion toward more complex commutation networks. During the second phase, both joint effort and independent programs will be carried out for the development of public switching projects and transmission and contact modems for telematic terminals. The agrement is important for the prospects it offers to Italian telephone systems. In fact, SGS belongs to the STET group, which is IRI's [Industrial Reconstruction Institute] financer for telecommunications which promote telephony it Italy. [Text] [Milan INFORMATICA OGGI in Italian No 13 Jan 86 p 16] 8602

8602/12951
CSO: 3698/M038

SCIENTIFIC AND INDUSTRIAL POLICY

EC'S POLICY ON 'RACE' DETAILED

Milan SISTEMI E AUTOMAZIONE in Italian Oct 85 pp 1083-1084

[Text] The 29 July 1985 Official Bulletin of the European Communities, No C 188/16, published the following view of the Economic and Social Committee on the council's proposal regarding the preliminary work of a Community Research and Development program on telecommunications technologies in Europe (RACE) and on the ommission's report to the Council on RACE (85/C 188/07).

On 16 April 1985, the Council decided, in accordance with the regulations of the treaty that established the European Economic Community, to consult the Economic and Social Committee on: "The Council's decision proposal regarding the preliminary work of a community research and development program on telecommunications technologies in Europe (RACE)" and on "the commission's report to the Council on RACE)." The "industry, trade, crafts, and services" section, entrusted with preparing the proceedings on the matter, formulated the view on the basis of Mr Nierhaus' 8 May 1985 report.

On 30 May 1985 (227th plenary session) the Committee unanimously adopted the following view:

The scheduled preliminary work (definition phase of RACE) falls under a long-term program of research and development in the sector of Advanced Communications Technologies in Europe (RACE) detailed in the commission's report to the Council on the need for R&D in the telecommunications technology sector. Therefore, the following view also concerns the abovementioned report.

I. General Observations

1. In several member states of the Community, the development of telecommunications has progressed to varying degrees. Substantially, however, there is a broad agreement on the long-term technological objectives, that is, the creation of a uniform network for all transfer services of verbal messages, images, and data. It is a question of an evolutionary tendency in the technological sector that is felt worldwide and that has profound effects on the economic and social level: in this context the Community must obtain, or maintain, a primary position particularly with regard to Japan and the United States.

2. These developments have a direct economic importance for industries involved in the advanced technology sector, which are increasingly dependent on large markets, as well as an indirect importance for all sectors of the economy and social life, since a rapid and flawless transmission of information is an economic factor of fundamental importance.

3. The committee therefore supports the commission's programs on Research and Development in the sector of Advanced Communications in Europe (RACE), and in particular the proposal regarding preliminary work (RACE, definition phase).

II. Special Observations on RACE

1. In the committee's opinion it is fundamentally important to clearly define the roles to be played by work done by the individual member states and Community initiatives. The development and completion of the networks will occur first in the member states of the Community, and developments at the national level will proceed independently from Community initiatives.

2. The main task of the RACE program will be to effectively coordinate developments in individual member states with Community objectives so as to avoid having divergent technologies delay or hinder integration. The committee considers the development of a reference model for broadband communications [IBC] particularly important and urgent because this would allow an increase in the intelligibility of technological data and establish the conditions for political decisions at the national level.

3. Unlike, for example, the United States, in introducing large-scale integrated broadband networks (in this case communitywide) the Community will have to overcome linguistic barriers that are posed by the transmissions of voice and data. This feature, which perhaps could still be of secondary importance in the precompetitive technological R&D, will assume considerable importance for the qualitative and quantitative development of information exchanges among the states. This poses further problems of standardization (for example, in the case of terminals for the input of data). The committee plans to take this aspect into account in the development of an IBC reference model.

The committee agrees with the commission on the fact that a rapprochement of different developments made in member states on broadband technology could be effective only if the strategies and work of member states are also appropriately coordinated. The Community, for its part, must be actively concerned with the standardization and interface in the across-the-border information exchanges. Therefore, the committee also stresses the need for the work of the Special Broadband Group which, like CEPT [European Conference of Postal and Telecommunications Administrations], should especially take steps to detail recommendations for the coordination of initiatives of businessmen in the telecommunications sector.

4. The committee believes that, on the one hand, it is necessary to avoid possible duplication with some aspects of other programs and that, on the other hand, it is necessary to also use the useful results achieved with other

programs, for example ESPRIT. It is, therefore, necessary to accurately coordinate the use of funds provided for by other programs for the realization of specific objectives within the framework of the problems mentioned.

The committee intends to provide varying amounts of aid so as to offer, if necessary, possibilities for innovation especially to firms that may have the technical potential but are weaker financially. In particular cases it may be possible to provide aid equal to 100 percent of the costs (as happens in other countries, for example the United States and Japan), to research activities which, although offering prospects for industrial development after an extended period of time, nonetheless have a fundamental importance.

It should not be forgotten that the abovementioned countries apply the same system to the defense sector: now, while it is true that the Community will not intervene in this sector, it is necessary to keep in mind that it has considerable effects on the civil sector.

It is also indispensable to provide complete information on the potential contracting parties, especially on small and medium-sized firms.

Moreover, the committee wonders if the 18-month period allotted for the granting of aid to such R&D projects, which require long technical timeframes to yield useful results, is sufficient even though the projects in question are limited to exploratory work for the critical analysis of technological options of the RACE program.

5. The commission remembers what happened in the past with the introduction of new communications services: it showed the dangers directly to users caused by the separation of technical aspects from market research. The committee therefore hopes that starting from the definition phase there will be an in-depth examination of the relationship between users of the services and their supplies on the one hand, and the options available from the technological viewpoint on the other. A satisfactory response, for example, to the following questions will facilitate among other things a decision to be made on when, to what degree and in what cost/benefit relationship to use the new broadband technologies:

--What qualitative and quantitative changes are to be expected in working market conditions as a result of the integrated networks?

--How will jobs change? What are the foreseeable social consequences? What requirements will result as far as professional training and specialization are concerned?

--How will a satisfactory, complete, and convincing solution be found to the problems of protecting copyright and information on persons (for example, regarding software and especially the use of data banks) with regard to all those who apply and use these instruments?

--What is the private need of new services such as the Btx (Bildschirmtext, a type of videotex), cable TV, videophone? And what other factor, besides costs, influences this need? Are there particular "critical" cost limits that influence the private use of the services in question?

6. In short, the committee believes that the development and introduction of integrated broadband networks (based to a large degree on optoelectronics) are important tasks in the technological sector for the next decade: it is indispensable that the European Community, because of its economic structure, obtain a primary position in this sector on the world level. It is, therefore, necessary to immediately begin the preliminary work for the construction of a community network. The drive towards R&D and their concrete realization will nevertheless be promoted more intensively at the level of member states, whereby the national networks will increasingly tend to be developed concretely, within the range of a long enough process (that will last, for example, until the end of the century) on the condition, however, that in the Community the necessary requirements be created at an opportune time and in an adequate manner. It is, therefore, the Community's task to create the necessary general conditions so that this process can develop appropriately, without extensive delays and in a direct manner. The Community believes that the RACE program is a coherent and logical initiative in this direction and strives to emphasize the urgency of it.

7. The committee, therefore, urges the council to create without delays all the necessary conditions in order to avoid having any delay hinder the start and promote implementation of a program considered indispensable in this sector.

The President of the
Economic and Social Committee
Gerd Muhr
Brussels, 30 May 1985

13209/9365
CSO: 3698/249

SCIENTIFIC AND INDUSTRIAL POLICY

MAINZ NUCLEAR PHYSICS INSTITUTE'S MICROTRON LEADS FIELD

Frankfurt/Main FRANKFURTER ALLGEMEINE in German 20 Feb 86 p 8

[Article by mtz: "In the World of the Infinitely Small--Nuclear Physicists With the University of Mainz in the Forefront of Research"]

[Text] Mainz, 19 February--Some 14 meters below the surface of the earth on the Mainz campus, the physicists at this university are going into details in the truest sense of the word. Under the catchword "Mami" (Mainz Microtron), the Institute for Nuclear Physics is sending electrons along a racetrack at an energy of many millions of electron volts. Upon being brought close to the velocity of light and then colliding with a sample of material, these particles can convey information that has to do with the last step in the microcosm known so far--as the physicist Herminghaus cautiously puts it--namely, the building blocks of the protons and neutrons, which in term form the atomic nucleus. In groups of two or three, these smallest building blocks of matter, the quarks, which must be imagined as being point-like, still lead a mysterious existence for the time being.

The entry by Mainz into the world of the infinitely small has brought the scientists working at the Institute for Nuclear Physics (thirty holders of doctorates, of whom twelve are professors) into the forefront of research in their field. Because the Mainz concept, which was developed in the mid-1970's (for university president Beyermann, a comment on the necessity of long-range approaches to successful research activity), circumvents the handicap that the conventional accelerators have--namely, their characteristic of being able to make the produced electron beam available only for a short time, in the form of pulses. In its first construction stage, "Mami A" has already been furnishing a continuous electron beam of up to 180 million electron volts since early in 1983, the only accelerator of its type to do so up to now. The beam is trapped by magnets and returned again and again to the accelerator on a "racetrack," and thus it is further charged with energy.

Presently housed temporarily in one of the many underground sheds (during operation, an intense nuclear radiation arises, which necessitates special precautionary measures), "Mami A" had already attracted numerous foreign scientists. The development stage B, to be finished by the year 1989, will bring the Mainz project again into the lead in the world of research. This

expansion essentially consists in the addition of another racetrack microtron that increases the energy of the "Mami A" to as much as 840 million electron volts. This energy output corresponds to a radiation having wave lengths of about 10 percent of the linear dimensions of a "quark bag," by which the nuclear physicists mean the envelope that surrounds the quarks. With that, the researchers get their hands on an instrument that can be used to investigate the size and shape of elementary particles. Since May 1985, two underground sheds have been under construction with an overall length of 60 meters and a width of 13 meters, which will accommodate the 60-meter long beam guidance tunnel. This extension of "Mami" will require 30 million marks. It will be financed from funds of the university building-assistance program, which is sustained half-and-half by the Federal Government and the Land.

The as-yet unrivaled position of Mainz Microtron will probably not last long: Two accelerators based on the Mainz model are under construction at present in the United States, of which one, located at the National Bureau of Standards in Washington, D.C., will go into operation possibly by the end of the year, with likewise 180 million electron volts. This will be followed in the next few years by the second facility at the University of Illinois, with 450 million electron volts. The Canadians as well will have a similar accelerator available in 1987. In the FRG, the University of Bonn is giving competition to the people at Mainz. There, a facility with an output of 2,500 million electron volts will be built, which however can produce only a very small-intensity beam current.

For the physicist Herminghaus what is happening at "Mami" is an example of how much of an effort must be exerted even in university research to maintain international competitiveness. To be sure, the university teacher regards the ambitious project as lying already at the limits of what can be done at a university institute with respect to expenditures of material and the use of personnel, and also with respect to the teaching obligation of the university. At any rate, 40 to 50 students are working on their dissertations at present.

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SCIENTIFIC AND INDUSTRIAL POLICY

FRENCH STRATEGY FOR COMPONENTS MARKET

Paris ZERO UN INFORMATIQUE HEBDO in French 12 Nov 85 p 3

[Article by P.M.: "European Semiconductors: Between Doubt and Hope"; first paragraph is ZERO UN INFORMATIQUE HEBDO introduction]

[Text] Is Europe's semiconductor sector pulling itself together again? Yes, it is, if one believes the figures that credit it with 10 percent of the 1985 world market. "Not so sure!" retort the manufacturers, who are demanding vigorous measures.

At a time when Thomson is announcing the spectacular recovery of its accounts in the electronic components sector, and when Europe's share in the world semiconductor market is noticeably improving, the attitude of European manufacturers remains singularly cautious and reserved. Optimism is out of place. "I fear that before long we will have to speak Japanese," Pasquale Pistorio, the president of SGS [General Semiconductor Company], remarked jokingly. Invited along with five other personalities from the electronics industry to a round-table conference on the topic "The European Market: Which Obstacles Must Be Removed To Realize Its Growth Potential?," he admitted of course that going from 8.5 percent of the world market in 1984 to 10 percent in 1985 "was good," but he immediately added that "Europe should control up to 25 percent of the world market." He recalled that in 5 years Japanese semiconductor production has soared from 19 percent to 40 percent of total world volume, whereas American production dropped from 64 to 51 percent, and Europe only accounted for 8.5 percent of world production last year, compared to 17 percent 5 years before.

From this trend, Pasquale Pistorio drew the conclusion that the three Japanese manufacturers, Hitachi, NEC [Nippon Electronic Company], and Toshiba, which are now close behind Texas Instruments and Motorola on the world ranking list, could well take the first three places beginning in 1987.

How, under these circumstances, can a trend be reversed that threatens, purely and simply, to eliminate Europe from the world map of the components industry? By relying on Europe's human potential as well as on the "colonial ties" it still has with very many countries in the world, as Mohan Rao of Texas Instruments suggests? Or else, by organizing a genuine European market based on ESPRIT [European Strategic Program for Research in Information Technologies]

and EUREKA [European Research Coordination Agency], as Jacques Bouyer (EECA [European Electronic Component Manufacturers Association]) advocates? Or by directing the European industry toward more specific targets?

On this last issue, there is no lack of ideas or convergent opinions. Begin with the selection of components that have to be manufactured, where, for example, specific integrated circuits are preferred to memories. Were the RAM [Random Access Memory] manufacturers not the first to bear the cost of the current semiconductor crisis?

Choose specific components, but also choose particular markets: That is the advice given today by European electronics manufacturers. "Neither consumer electronics nor data processing will constitute the best outlets for our components industry in the future." According to Hermann Franz, general manager of the components department at Siemens, it is more judicious to concentrate on the industrial electronics and automobile markets.

For still others, the major priority consists of attacking the European market before tackling the American and Japanese markets. All of them, or almost all, call upon the Europeans to develop more alliances among themselves.

So many remedies give rise to a multitude of possible combinations and solutions.

"Not enough!" some exclaim, with Pasquale Pistorio acting as their ardent spokesman. "We really have to change our current policy and, in particular, stop spending billions on the steel industry. If no political measures are taken at the regulatory and commercial levels, Europe risks death."

The SGS chief executive advocates four government measures: labor flexibility (i.e., the freedom for companies to hire and lay off); government financial support (in addition to what is given through ESPRIT and EUREKA) following the example of efforts made in Japan and in the United States; standardization, "in order to establish a coherent market"; and long-term rather than annual measurement of return on investments.

Afterwards, it is up to the companies to make the right choices: to emphasize the principal markets and to take action at the personnel level through training and motivation. A sign of a possible change of mentality is the fact that nobody is advocating protectionist measures. However, do we have to attach such urgency to flexibility, which is many people's stock argument, if history is moving toward an ever more complete robotization of factories?

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SCIENTIFIC AND INDUSTRIAL POLICY

PROJECT BIDS FOR ESPRIT PHASE 2 TO BEGIN IN 1987

Paris ZERO UN INFORMATIQUE in French 13 Jan 86 p 80

[Text] After examining the report submitted to them in October 1985, the special evaluation committee and the people responsible for the EEC Esprit program in Brussels last week decided to launch the second phase starting in 1987.

After 1 year of the pilot phase and almost one and a half years of the first operational phase, the Esprit program is, according to Andre Danzin (one of three people who made up the mid-course evaluation committee), "considered beneficial by almost all the participants, except only 2 or 3 percent. It is a success." This was also the primary conclusion of a report submitted to the responsible authorities last October (cf. 01 HEBDO No 882). Despite this satisfactory appraisal, certain criticisms have emerged: In particular, they concern cumbersome administrative procedures. Other criticisms concern delays in payment, the slowness of the selection system, and the inadequacy of Eurocom communication services.

This message received full approval by the Esprit "task force," stated one of its representatives, Jean-Francois Omnes, during a press conference held last Wednesday at the Ministry of Research and Technology. "And, since we have accumulated the 268 million ECU already allotted for financing for the 106 projects remaining to be funded before the end of the first phase, we will already have accumulated a total of almost 700 million ECU; so we can see that only about 20 million ECU remain, when expenses are deducted, to devote to competitive bids in 1986." Remember that the first phase of Esprit was officially launched 28 February 1984 with a budget of 750 million ECU allocated by the EEC to an operating committee given the responsibility of managing the contracts. This budget corresponds to a first phase planned for a period of 5 years. The second phase will start up only after the end of the first; nevertheless, taking into account the success of Esprit and the progress made in achieving financing, the operating committee is of the opinion that it is "desirable to make the first competitive bids for the second phase starting in 1987."

Will Esprit No. 2 resemble Esprit No. 1? Not quite; apparently, a certain continuity will be provided and the projects will remain in what is called

the area of noncompetitive research: they will never result in directly marketable products. However, criticisms voiced by the evaluation committee will be taken into consideration:

--administrative procedures will be reduced, and payments accelerated by a decrease in the number of intermediaries; contracts between different partners on the same project will be processed at the same time, not sequentially;
--certain PME's and certain small laboratories who have not been able to participate in the first phase may be authorized to do so;
--countries which are not EEC members, which previously were not able to participate in projects except as subcontractors, may henceforth participate with full privileges. In addition, the recent entry of Spain and Portugal into the Community will have certain consequences;
--efforts will be concentrated in three areas instead of the five of the first phase, i.e.: microelectronics and peripherals (these have been added); software technology and information processing (consolidation of two previously distinct sectors); applications (office and industrial automation will be eliminated; they will henceforth be considered to be applications of other areas).

The question of means to be implemented was considered only within the framework of the overall work force, which is estimated to be 30,000 man/years for the first phase, so it will now be necessary for the EEC to allot Esprit a budget approximately threefold higher than the first, or 2.25 billion ECU over a period of 5 years. A nice deal, the more so since it must be doubled to obtain the total financial obligation; in fact, the principle of Esprit requires manufacturers to contribute the same amount of money as the EEC. Thus it is necessary for 6 billion ECU to be contributed over a period of 10 years for Europe to achieve a level of technology comparable to that of Japan or the United States in the area of information processing. This is still not a purely noncompetitive stage... To advance further and manufacture products, look at Eureka!

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ACTIVITIES OF VENTURE CAPITAL FIRMS EVCA, SOFINNOVA

Projects, Firms Supported by EVCA

Paris LA TRIBUNE DE L'ECONOMIE in French 13 Jan 86 pp 1, 4

[Text] Created in 1983 by the Commission of European Communities, the European Venture Capital Association (EVCA) has been experiencing a slow but steady increase in potential. It currently includes more than 120 members, 67 of which are European venture capital companies, and notably disposes the financing granted by the Commission within the framework of the Venture Consort program launched in 1984. To date, more than 2 million ECU's (1 ECU equals 6.7 FF) have been granted by the Commission and EVCA within the framework of this program to projects presented by at least two venture capital firms of member countries of the Communities. It is a question of encouraging European cofinancing, joining a French venture capital company and a British venture capital company, for example, in the organizational plan required in carrying out a project of business creation or development. The Commission is participating then in the plan within the limit of 200,000 ECU's. However, French interest in this type of achievement is still quite insufficient: among the members of EVCA, one finds 15 French venture capital companies but no regional development company (SDR). As for the IDI (Institute of Industrial Development), which has recently been touting its image as France's "first venture capitalist," it stands out by its absence. One will note furthermore that many of the projects "rewarded" by the Venture Consort program are British and that most of the associate members of EVCA (consulting or auditing agencies) are Anglo-Saxon. The Americans and the English have understood for a long time that tomorrow's market was within the ranks of companies financed by venture capital.

The Venture Consort Program

The European program Venture Consort (VC), launched in 1984 by the Commission of European Communities with a view toward facilitating cofinancing the creation or development of companies supported by venture capital companies from different countries of the Communities, has made it possible to contribute to the financing of 11 projects for a total of 21.8 million ECU's, or more than 146 million francs (see table).

Table 1:

Company (Country)	SCR	Activity	Financing VC (in ECU's)	Total Financing (in ECU's)
Intepro (Ireland)	Sofinova, Alta Berkeley Dcc	Automatic Power Functioning	100.000	345.000
Diamond Biotech	Advent, APA, Transtl. Cap.	Monoclonal Antibodies	200.000	2.353.000
European Silicon Struct. (Luxemburg)	Advent, TVM, Alpha Associates	Electronic Components	200.000	3.697.980
Power Compact (France)	Sofineti, Finovectron, Finovelec IVCP, Charterhouse	Power Hybrids	200.000	1.470.000
IMC Acrylguss (FRG)	IVCP, TIG	BTP industrial	200.000	1.160.000
Nava Leisure (Italy)	Eurovenca Euroventures Neder	Sports Articles	200.000	1.000.000
Dilloa Tech. (Great Britain)	Baronsmead Inv. In Industry Clarion Property	Information Management Systems	100.000	873.000
Innogenetics (Holland)	GIMV Alta Berkeley	Biotechnology	200.000	4.533.000
Advent Systems (Great Britain)	Oakland Manag. Gilde Venture	Sales Aids	200.000	883.064
Telebeam Intern. (Great Britain)	Baring Bros H & Q Advent Oakland Manag. New Europa	Teletext Terminal	200.000	1.696.000
Kalamazoo (France)	APA France APA GK APA USA	Management Systems	200.000	3.843.242

The idea advocated by the Commission and put into practice by EVCA (Footnote 1) (Information: EVCA, [illegible] du Parnasses, 11 F B-1040, Brussels, tel 2/513-7439) (European Venture Capital Association), headed since 1983 by Mr Robert Ceurvorst, former administrator of Cockerill Sambre SA, consists of contributing, on community funds, back-up financing for projects presented and financed by at least two European venture capital companies of different nationalities. Of course the project should have a transnational impact, that is, be a product capable of interesting all markets of the countries of the Communities. Two blocks totaling 2.7 million ECU's have been released so far.

After a slow start at the beginning of 1985, which bothered EVCA officials, projects have multiplied during the course of the second semester. Let us recall that the "community" contribution has a ceiling set at 30 percent of the total amount of financing, in the limit of 200,000 ECU's (1.34 million French francs) and 300,000 ECU's if it is a question of a project which aims to create an SCR in the Mediterranean countries of the Communities. Around 21.8 million ECU's or 146 million francs, have been raised by carrying out financing, 2 million ECU's of which were for Venture Consort's only financings.

Let it be noted that the European Commission has the right, on the basis of its contribution, to 50 percent of the appreciation realized by the SCR's cofinancing the project in case of "outflow", but takes the risk of exchange upon itself. The decision to cofinance was made, on the advice of the Commission's DG XIII (General Board of Technology and Innovation), by the EVCA office which includes six representatives of European SCR's (Baring Brothers, Sofineti, Investors in Industry, Prominvest, NMB Participatie Beheer, Techno Venture Management). Created in 1983 by the DG XIII, Eurobusiness Network, of the Office for Bringing Companies Together, and TII (European Association for the Transfer of Technologies), EVCA, which is led by Englishman Richard Onians of Baring Brothers Hambrecht & Quist, now has 126 members, 59 of whom are associate members. The associate members are essentially represented by strategy consultants and auditing agencies who rather curiously pay a reduced fee (1,200 ECU's compared to 2,000 for members.) It should furthermore be noted that the only auditing agencies represented are Anglo-Saxon and that France has only one representative on the Board of EVCA (Ch. Cleiftie [illegible]). EVCA runs on its own budget (fees from members and on a subsidy from the Commission for punctual operations. The latest member of EVCA is the first Dutch venture capital group, the Noro group, which has capital of its own on the order of 750 million florins (1.9 billion French francs.)

Sofinnova Enters Secondary Stock Market

Paris ZERO UN INFORMATIQUE in French 20 Jan 86 p 8

[Article by PB: "Venture Capital in the Second Market"]

[Text] Created in 1982, Sofinnova is the oldest of the French venture capital companies (Footnote 2) (In fact, Sofinnova has been run since its

creation under the status of an innovation financial company (SFI), but, beginning this year, can opt for the status of venture capital company (SCR). In either case, investments benefit from the Sorafis guarantee (French Venture Capital Insurance Company), an organization held 34 percent by the state and the remainder by different financial organizations.) It has practically ensured a mission of public service in France by making institutions and industrialists discover the virtues of venture capital.

At the moment it is going to be introduced on the secondary market of the Paris Stock Market by the Nivard-Flornoycharge, exactly where does it stand in terms of its performance?

One first observation is paramount: The firm has earned a lot of money in the United States, because out of 30.8 million FF (30 percent of fixed assets) invested in 4 venture capital funds, the re-evaluated net value of these investments came to 127.5 million francs on 30 June 1985 (based on the dollar at 8.20 FF.) These four funds invest essentially in high tech companies likely to experience rapid growth in just a few years, then, if possible, resell their shares on the American over-the-counter market.

Today in Sofinnova's American portfolio, these names stand out: Broderbund Software (software publishing), Softsel (software wholesaler), Internet Systems (software to manage international banking transactions), Silicon Valley (equipment for the microelectronics industry) and Telco Systems (telecommunications materials.) Previously, the French fund had participated in financing Tandem and Genentech.

Another proof of its excellent performance in the United States: the appreciation of 4.2 million FF realized on French securities (estimate from the introduction charge on 31 Dec 1985) compared to the extremely respectable value of 80.3 million FF appreciation on foreign securities. The office estimates furthermore at 324.3 million FF Sofinnova's re-evaluated net situation, or 357 FF per share, one-half of which is composed of liquid assets.

However, the leaders do not intend to become a company investing 80 percent of its capital in the United States. For the time being, two-thirds of the capital is invested in Europe, compared to one-third across the Atlantic.

Let us note that interest has shifted from the computer, electronics and precision instrumentation sectors to biotechnology and agribusiness, the new "in" sector of venture capitalists. Moreover, the firm's financial capabilities enable it to take a position now in more mature affairs, such as Legris (industrial plumbing, registered on the second market.)

On 30 June 1985, the main shareholders of Sofinnova were the following: Credit National (20.50 percent), the state of Kuwait (9.70 percent), Paribas banking participation consortium (9.70 percent), Deposit Savings Bank (3.78 percent), Union of Studies and Investments (3.19 percent), UAP Paris Insurance Union (3.10 percent) and Telecommunications Auxiliary Company (3.02 percent).

On 20 January, nearly 110,000 shares, or about 12 percent of the capital, will be offered to the public at the price of 270 FF. Reasonably, the balance rate should stabilize at 310 FF after being rated below par 10 to 12 percent per share on the value of net assets. The introductory charge estimates the profit per share in 1986 at 25.4 FF, with the asking price building up 10.6 times this estimate.

Sofinnova's Main Holdings in the Computer Sector in France

Company	Activity	Participation(3)	Financing(4)
SMT-Goupil	professional microcomputers	10.34 percent	3.68 MFF
CMG	engineering and industrial management software packages	6 percent	3 MFF
Copernique	disk access accelerators	10.18 percent	2.65 MFF
Secmai	computer-aided design	0	1.92 MFF

(Footnote 3) (Before conversion of convertible obligations.)

(Footnote 4) (Shares and/or convertibles obligations and/or loans.)

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SCIENTIFIC AND INDUSTRIAL POLICY

INNOVATIONS OF 1985 VENTURE CAPITAL LAW IN FRANCE

Paris LA TRIBUNE DE L'ECONOMIE in French 16 Jan 86 p 15

[Article by Pierre de Pingon, tax consultant and associate of the civil consulting company Deprez, Degroux, Brugere & de Pingon: "The Venture Capital Law Offers Attractive Advantages"]

[Text] The law of 11 July 1985, consisting of various measures of an economic and financial nature, has introduced a major innovation into the French tax system: venture capital companies (SCR's).

These companies, which must have as their objective investing in french firms which are not quoted on the stock market, are liable for the tax on businesses and carry out an industrial or commercial activity, are exempted from the tax on businesses.

The dividends which come from their participation as well as the appreciation realized on the transfer of same are therefore not taxed.

A priori, this first measure is hardly original compared to the special system of parent companies and subsidiaries as it has existed in France since 1965.

What is truly singular about the new SCR system stems rather from the privileged tax system of their own shareholders. These shareholders, whether companies or individuals, can profit on the SCR's dividends from taxation at the reduced rate of 16 percent or 15 percent, or indeed from no taxes at all.

In the case of companies, these dividends are taxed at the rate of 15 percent if the company is subject to the tax on businesses, or at the rate of 16 percent if it is an individual enterprise subject to income taxes.

In the case of individuals, SCR dividends will be taxed at 16 percent and will be able to benefit from total exemption if the following three conditions are met:

--the shareholder and his family group must not hold more than 25 percent of the rights to the profits from companies whose securities belong to the SCR;

--the shareholder must keep his shares of the SCR for at least 5 years;

--the SCR's exempted dividends must be immediately reinvested in the SCR.

Thus we find sanctioned, within the French tax system, an exemption measure that seems sufficiently wide and attractive to constitute a real economic lever effect.

No doubt, legislators have placed several conditions on the application of this exceptional tax system:

--the SCR must not use more than 25 percent of the total amount of its capital on securities issued by any one company;

--the SCR cannot hold, directly or indirectly, more than 40 percent of the voting rights in the companies in which it is investing and for which the tax exemption is requested;

--finally, at least half of the securities giving the right to the special tax system must be subscribed to upon issuance.

These three limitations seem restrictive, but can be justified by the necessity of spreading out investments in order to dilute, insofar as is possible, investors' risks.

They can likewise be defended by the fact that the SCR's should take as their objective to provide aid in appropriate funds to the companies and not to take economic ccontrol of them.

Be that as it may, these limitations are liberally compensated by the option open to the SCR's to invest in all sectors of the economy, except for liberal and agricultural activities, and in most French companies except for those listed on the stock market.

Moreover, the SCR's are only required to invest in companies at the level at least 50 percent of their net financial activity.

So it is possible for them to balance these investments with other activities and other investments subject to the common law tax code.

It is even foreseen that the products of these other investments can be the object of the exceptional system within the limit of one-third of the so-called "exempted" portfolio (a portfolio represented by the securities whose dividends give the right to benefit from the SCR system.)

So the SCR's are not "risk" companies for their shareholders any more than other investment firms. all the more so since they are required to distribute each year to their shareholders at least 50 percent of their exempted profits.

Just one problem could arise in the hypothetical case in which the administration might check up on the SCR system for which a company might have opted and question it.

In such a case, this SCR, which would no longer be one, would no doubt have a great deal of difficulty facing up to the tax liability which it would incur after having distributed, under an illusory exemption system, the products of half of its stock portfolio.

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SCIENTIFIC AND INDUSTRIAL POLICY

FRENCH DAILIES REPORT 23 JAN 86 HIGH-LEVEL EUREKA MEETING

New Projects Presented

Paris LE MONDE in French 2-3 Feb 86 p 5

[Article by Philippe Lemaitre: "Fourteen New European Technological Cooperation Projects"]

[Text] Fourteen new technological cooperation projects among firms from countries participating in the Eureka program were recently presented at a high-level meeting held in London. These projects should be formally adopted during the next ministerial session, scheduled for May or June in the United Kingdom. Between now and then, countries which are not participants will be able to get further information about these matters and, if the case arises, announce that some of their companies wish to join.

The projects presented in London are very advanced at the conceptual level, but remain open regarding the number of possible participants. Thus the distinction is made, for each project, between the participating countries (at least two) and those who have shown an interest or have not yet made a definite decision. France co-presented 11 of the 14 projects and is showing interest in a twelfth. So each project can still be completed.

For this reason, even if the outline of the operation that the industrialists want to undertake is already clearly drawn, indications concerning the cost of the projects can only be approximate. All told it would be around 4 billion francs, to be raised over periods ranging between 3 and 6 years.

But the projected investments vary considerably from one project to the other. From 10 million francs for the most modest one--whose goal is automatic identification of the source of noises in cars and trucks (it was presented by Belgium and West Germany with possible contributions from the United Kingdom and Switzerland), to 750 million francs for the most costly one, the "East" project, whose goal is to move the production of software from the homemade stage to the industrial level. "East" was presented jointly by France, Denmark and Finland, but it is also of interest to Italy, the United Kingdom and Switzerland. The European Commission, which, under title of the "Esprit" program, is working on the development of software, indicated in London that it was hoping to participate in the project, and even to pilot it.

The commission is likewise interested in "Eurocim," a project to conceive and carry out flexible automated workshops to manufacture integrated circuit boards. It would cost 200 million francs. It was presented by France and Spain, with Italy to join in.

Another important project (around 700 million francs) foresees perfecting of third generation robots, which would be assigned to public security. The idea is to make available machines that can intervene more readily than man in case of natural disasters or against terrorist actions. These complex assistants of tomorrow's rescuers would be conceived by French and Spanish firms, but probably German and Swiss firms too.

The French and the English propose to develop integrated circuits, using as base material gallium arsenide, some properties of which are superior to those of silicon, which is normally used. The cost is estimated at 400 million francs.

Not Many Lasers

The "ES2" project (European Silicon Structures) foresees the creation of a new European enterprise which would manufacture specialized microcomputers. The United Kingdom, France, West Germany and Belgium have decided to participate in "ES2"; others will follow. The cost is estimated at 540 million francs.

A system meant to control security and possible breakdowns of industrial installations is being jointly presented by France and Norway. Its cost is figured at 200 million francs. The "Paradi" project seems closely akin to it. There too, it is a question of perfecting an automatic system of production control, requiring artificial intelligence. Its cost is also 200 million francs. The project is being presented by France and Belgium, with West Germany, Italy and Spain to join in. The Diane project, associating France and Spain and probably West Germany, concerns automatic control, by neutronography, of the most complex components manufactured out of new materials.

The French and the Belgians want to develop together new types of thyristors to be used in the motor units of railroads. This is a matter of electronic equipment which serves as a relay between the controls of the motor unit and the electronic motor. The cost would be on the order of 140 million francs. An important project (400 million francs), presented by Danish and Spanish firms, and in which the French are interested, focuses on developing medical diagnostical equipment requiring new detectors and artificial intelligence.

The development of the laser industry is relatively unrepresented in this series of projects. However, a project presented by France and Belgium, which Italy and Spain might join, proposes using powerful laser beams to detect and destroy dangerous substances in finished products or in waste materials. The cost is on the order of 61 million francs. And finally let us note a project conceived by Austria, Greece and Spain, whose goal is to develop new techniques for treating leather. The cost is 17 million francs.

The 14 projects take their place next to the 10 which were made public during the Hanover ministerial conference in November 1985. A new list of projects will be presented at the next high-level meeting in March.

Role, Structure of Secretariat

Paris LA TRIBUNE DE L'ECONOMIE in French 24 Jun 86 p 2

[Article: "Eureka: A Secretariat But No Headquarters Yet"; first paragraph is introduction by LA TRIBUNE DE L'ECONOMIE]

[Text] After 2 days of discussion, the members of the so-called "high-level" group, representing the 18 member countries of the Eureka program (plus the European Commission), defined the role and the structure of the organization's secretariat. Their conclusions will have to be ratified at the ministerial level, but that should only be a formality. The delegates reviewed some 20 new technological cooperation projects--about 10 of which were presented by France--but they put off selecting the secretariat's headquarters until a later date.

London--At the Hanover ministers conference last November, the 18 nations involved in Eureka agreed to provide the project with a secretariat that would be "flexible, small in scale and placed under the responsibility of the ministerial conference." On the basis of these recommendations, the delegates of the high-level group decided that the secretariat will include 6 officials: 3 for the 12 EEC countries, 2 for the 6 nations participating in Eureka but not members of the Community, and 1 for the Brussels Commission.

These six officials--civil servants or industrialists--will occupy their posts for a period of 2 or 3 years before yielding their place to candidates from other countries. Since the idea of a common fund (notably pushed by Norway and Turkey) was abandoned, the six officials will be paid by their own countries.

As for the role of the secretariat as it was defined in London, it is summed up in two words: information and liaison. The nucleus of an information network, the Eureka secretariat is to inform industrialists of projects under way and possibilities of cooperation.

The delegates came to an understanding on the necessity of ensuring total openness--an idea dear to small countries eager to prevent the formation of secret alliances among the "big ones": projects being prepared or under way must be brought to the attention of everyone.

It will also be up to the secretariat to explain to industrialists the procedures for working out and registering projects. On this topic, the high-level group came to an understanding, after debates that one of the participants called "very nit-picking," concerning a document which should be published during the next Eureka ministerial conference in London in June.

Finally, the secretariat will be obliged to ensure liaison between the presidency of Eureka, the high-level group and the ministerial conference, whose meetings it will arrange in collaboration with the presidency. Moreover, a seventh position could be created to this end to head the secretariat.

On the matter of the new organization's headquarters, the group, lacking a consensus, chose to put its decision off until later. Two European cities are competing for the privilege of hosting the new organization: Brussels and Strasburg. Out of some 10 delegations which expressed themselves on this issue on Wednesday, only 4 took a firm position: the French and the Germans for Strasburg, the Belgians and the Dutch in favor of Brussels. As for the Thatcher government, it aligns itself with the opinion of British industrialists, who also favor Brussels.

However, a majority seems to be taking shape in favor of the Belgian capital. Without officially declaring their candidacy, the Swiss let it be known that they were willing to welcome the secretariat if the two rival cities could not manage to settle the issue.

A decision should be made during the next meeting of the high-level group in March. Among Brussels supporters, there is fear that the French government's attitude will harden as legislative elections draw near.

Sixteen New Projects

Yesterday the high-level group approved 16 new technical cooperation projects which are being added to the 10 programs which were launched in Hanover last fall. These projects concern very different areas such as software, robotics, microcomputers and electronics. A number of firms will participate in it. Among them are France's Thomson, Matra, Aerospatiale and Rhone-Poulenc, Germany's Dornier and Porsche, England's GEC, Italy's Aeritalia and Spain's CASA.

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SCIENTIFIC AND INDUSTRIAL POLICY

BELGIAN, SWISS MINORITY ROLES IN EUREKA OUTLINED

Small Countries Disappointed

Paris ZERO UN INFORMATIQUE HEBDO in French 18 Nov 85 p 64

[Article: "EUREKA: Belgian Disappointment"; first paragraph is ZERO UN INFORMATIQUE HEBDO introduction]

[Text] In contrast to the big countries, not one single Belgian project was accepted. The last hope is for the creation of a permanent secretariat whose responsibility it will be to ensure the clarity of the projects.

Officially launched 6 months ago, EUREKA, the project for the development of European technologies, has now established its charter and given its label to 10 concrete projects. The ministerial conference at Hannover on 5 and 6 November, which involved 18 European countries, definitively sealed the European cooperation, but what kind of cooperation?

Three countries are rejoicing: 10 projects were accepted, 8 for French industry, 4 for German industry, and 3 for British industry. In all, 13 European countries of the European Commission will participate in the projects accepted. Four were left out of the game: Belgium, Luxembourg, Greece, and Ireland.

Compared to the big countries, the lot of small ones remains precarious. Benelux, Spain, Austria, and Switzerland have expressed their disappointment. Their claims came to naught in Hannover. EUREKA seems to have become the property of large nations and large industrial groups. The only protection would seem to be the creation of a permanent secretariat to ensure the coherence and clarity of projects and defend the interests of the smaller countries. To be sure, the idea has been accepted, but procedures have not yet been specified. Brussels or Strasbourg, the headquarters has yet to be chosen. Certain countries, including Belgium, would like to see the headquarters at the European Commission in Brussels; however, it seems that the odds are in favor of Strasbourg.

Belgium went to Hannover with 67 projects to present, but came back empty-handed. The disappointment was great, especially since the interest shown by Belgian companies on the eve of the meeting had been considerable. These projects touched six of the areas defined by EUREKA: Eurotrans, Euromat, Eurobio, Eurobot, Eurocom, and Euromatique.

Belgian projects in the data processing field were proposed by: Belgonucleaire (supercomputers), the Belgian Institute of Management (logical programming), Expert Software Systems (center for software engineering, development of a "Shell" expert system), Barco (video man-machine interface for expert systems and production management for the textile industry), ACEC [Electrical Construction Works of Charleroi] (management and monitoring of large industrial processes), SOBEMAP [Belgian Company for Economics and Applied Mathematics] (artificial intelligence, control center for networks, expert systems), IMEC [Interuniversity Microelectronics Center] (CAD systems, center for training, evaluation, and research into component reliability), BTMC [Bell Telephone Manufacturing Company] (CAD and test programs for development of gallium arsenide circuits) and Comsys (software for automated factories).

In the field of communications are BTMC (large digital commutator, broadband transmission, and parallel systems), Barco (storage of video images on optical disks and color displays), ACEC (broadband for ISDN [Integrated Services Digital Network] equipment) and Intersys/SDM/Gillam (multimedia network using cable distribution).

From the beginning, Belgium has put its stakes on the European Commission to prevent small countries from being pushed into a subcontractor role. The lack of dynamism and initiative shown by the European Commission was thus another disappointment for Belgium. Represented in Hannover by the European Commissioner K.H. Narjes, the European Commission contented itself with following the mainstream.

It is true that participation of Belgian companies in projects developed by other countries is still open; they have only to jump on the bandwagon which has just left Hannover.

Swiss Participation Assured

Paris ZERO UN INFORMATIQUE HEBDO in French 18 Nov 85 p 65

[Article by J.P.: "EUREKA: Switzerland's First Participation"; first paragraph is ZERO UN INFORMATIQUE HEBDO introduction]

[Text] Switzerland will contribute to the installation of the European research network.

One of the 10 projects selected in Hannover during the EUREKA meeting, in which numerous European countries participated, is the establishment of a "European research network," which will be the object of Switzerland's first participation in this effort to develop highly advanced technologies.

The priority given in Switzerland to data processing is not very surprising in light of recent statements by Dr Urs Hochstrasser, director of the Federal Office of Education and Science, who expressed a desire to "fill in the gaps" in this field.

The network project was proposed through the initiative of CICUS (Data Processing Commission of the Swiss University Conference), and of J. Harms in particular, president of its network group, who is looking for a successor to EARN (European Academic Research Network) which will cease to be made available by IBM in 1988.

To comply with scientists' wishes, this network must above all provide very high transmission speeds to enable fast acquisition of results at a distance without recourse to the inevitable magnetic tapes.

Other Projects

However, this first EUREKA development decision (whose financing must still be specified) should not cause us to forget that numerous other data processing projects have been proposed and appear in a list entitled "Extended List for the National Representatives EUREKA: Projects Under Consideration in Switzerland," available from the Federal Office of Education and Science.

It mentions, for instance, projects initiated by the Swiss Center for Electronics and Microtechnologies of Neuchatel, based on artificial intelligence concerned with integrated circuit verification and robotics.

The Zurich Federal Institute for Technology has proposed other developments concerning fields such as multiprocessor architecture, optical computers, robotics, microprocessors for engineering, etc.

For its part, the Polytechnic School of Lausanne has proposed studies on communication systems for office automation, multiprocessor systems, memories, supercomputer applications, artificial intelligence for development of new circuits, robotics, etc.

However, not only federal institutions want to participate in this drive toward high technology data processing: numerous private companies such as Faselec (Zurich), the Industrial Radioelectronic Company (Bern), Atek NC Systems (Brugg), Biocare (Basel), Landis & Gyr (Zug), Brown, Boveri & Co. (Baden), Hasler (Bern) and Contraves (Zurich) are also included in the above-mentioned list and hope to participate in EUREKA.

It will now be interesting to see how both the institutions and private companies will proceed to obtain funds. The EUREKA label is sure to become a very desired product, not only by computer scientists.

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SCIENTIFIC AND INDUSTRIAL POLICY

TURIN ROUNDTABLE VIEWS EUREKA, ESPRIT PROSPECTS

Turin MEDIA DUEMILA in Italian No 1, Jan 86 p 131

[Article by S.C.: "From Eureka to Esprit"]

[Text] Turin--Europe can and must start from Eureka and Esprit again. The Agency for Research Coordination--whose establishment is desirable--and the strategic program for information technologies research--launched about 3 years ago and which has already achieved meaningful success--are necessary in order to compete with the United States and Japan in the "2000 race." A realistic and thorough picture of the state of scientific research in Europe and an analysis of the conditions that allowed both giants of the West and the East to take off economically were outlined during a roundtable held in Turin at the Unione Industriale known as "Eureka and Esprit: Two Programs for Europe," with Michele Principle, president of STET [Telephone Finance Corporation]; Mario Muccini, (SELT research director; Domenico Corcione, lieutenant general of the northwest military area; and Francesco Tropea, a journalist.

"The old world," said General Corcione, "is doubt free about linking with the American SDI. There are numerous reasons for this: The 'Start Wars' system exposed Europe to a possible Soviet medium-range missile attack; it risks frustrating the balance of terror; it will weaken Europe's autonomous defense capability for a long time, countermeasures from the USSR would be aroused; and it will require a financial effort which may be out of Europe's reach.

Michele Principe examined the relationship between the development of the new technologies' research and the upsetting of the occupational picture, stating that "since the 1970's the United States and Japan annually create 3 million new jobs, while Europe experienced the opposite." The SDI "will feed both the research related to the military field and the civilian one." Europe, "which in the past decade erected the pillars of industrial development through innovative fields like biomedicine, informatics, microelectronics and telecommunications," cannot escape from the U.S. challenge, which appropriated $110 billion for research efforts.

Mario Muccini described the Esprit budget 30 months after its launching: "The program was born to allow Europe [in a period of 10 years] to reach

strategic equality with the United States, which together with Japan, controls over 90 percent of the world market and over 60 percent of the European market related to new technologies. Esprit's success is remarkable in giving an impulse to ambitious mutual research programs and is of great importance in deepening the exchange of know-how and assistance among the laboratories. The definition of common standards enables Europe to present itself with one voice before the table of negotiations with its competitors."

Francesco Tropea reviewed the Eureka events through the journalistic reports.

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SCIENTIFIC AND INDUSTRIAL POLICY

SWEDISH BUDGET PROPOSAL SHOWS DECREASE IN R&D FUNDS

Stockholm NY TEKNIK in Swedish 16 Jan 86 p 4

[Article by Jens Busch]

[Text] Efforts to promote technical development will continue to receive high priority. Stimulation of technical R&D is one of the cornerstones of the government's industrial policy.

So writes Minister of Industry Thage G. Peterson in the budget proposal.

But if one examines the figures in the proposed budget, one gets a different picture: the Ministry of Industry will be getting a good 1 billion kronor less to work with than it had in fiscal 1985-1986.

The cuts in the Ministry of Industry's budget are affecting the important headings of technical development (-350 million kronor), industry (-318 million), energy (-300 million), and regional development (-116 million).

According to the minister of industry, the cuts are due to lower spending, not to lower levels of aspiration.

The minister of industry writes that the reduction in the field of energy, for example, is explained by the fact that there were two nonrecurring amounts in 1985-1986: one for the Forsmark nuclear power plant and another for conversion of the energy system.

Not the Whole Truth

But that is not the whole truth. "Owing to the state's financial situation," the appropriation for energy research is being reduced by 100 million kronor--from 405 million to 305 million kronor.

Compared to the plans in the current 3-year energy research program, that means a drop of 50 million kronor for 1986-1987.

The reduced appropriation under the heading of technical development is explained by the fact that costs in connection with the Tele-X project are

dropping (actually, 100 million kronor in insurance premiums for the satellite are being postponed) and that the Fund for Industrial Development Work (the Industrial Fund) will not be getting any money this year. The reason is that the fund can continue at its present aspiration level with the money currently in that fund.

Below Inflation Rate

The Board for Technical Development (STU) is getting an appropriation increase of about 4.4 percent for technical R&D. That is below the 1985 inflation rate of 5.5 percent (according to the minister of finance).

Despite that, the minister of industry is recommending a further increase in the STU's efforts in the areas of engineering, information technology (electronics and data processing), and biotechnology, as well as no change in the high level of effort in technology related to materials, pulp and paper, wood, chemistry, and health and medical care.

This means that investments in nonpriority areas of technology are being cut, as is also pointed out in the budget proposal. Examples of the nonpriority areas that will be receiving less money are transportation technology, working environment, food technology, textiles and apparel, and environmental technology.

The STU's attitude is that it is unfortunate that many areas of technology are being put in the shade while only a few are being given priority:

"The need for a broad foundation of knowledge has increased in a large number of areas," says Bo Stenviken of the STU.

The Academy of Engineering Sciences (IVA) will see its appropriation upped by about 3 percent, compared to the 17 percent it was requesting in order to keep its aspiration level unchanged.

Research subsidies for technology-based small firms are also being reduced in real terms. The appropriation is being increased by about 4.3 percent to 21.7 million kronor.

But the appropriations for research and the training of researchers in the universities and technical institutes and the appropriation for research councils and institutions are rising by about 7 percent.

The appropriation for forestry research and environmental research is being increased by about 20 percent, as is the appropriation for environmental protection, which includes efforts to combat acidification.

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TECHNOLOGY TRANSFER

TRADE MINISTER EXPLAINS NEW EXPORT RULES

PM041041 Stockholm SVENSKA DAGBLADET in Swedish 28 Feb 86 p 3

[Article by Foreign Trade Minister Mats Hellstrom: "Legitimate Trade Will Not Be Hampered"]

[Text] In the fifties and sixties we had regulations covering what was then called trade in "militarily important goods." This trade was regulated by a special decree -- the export ban declaration of 1950. The measure embraced a number of strategic products -- including chemicals, minerals, instruments, and so on.

It was abolished in 1968 for the obvious reason that the rest of the world used embargoes so rarely that there was no reason for Sweden to maintain such a measure of its own.

However, as the tensions between the two superpowers increased during the seventies, foreign embargoes returned. It was the invasion of Afghanistan that triggered the tougher stance on the U.S. side. The Western countries that cooperate with the United States within the framework of the COCOM organization have also toughened their regulations correspondingly.

As a neutral country Sweden does not participate in the U.S. embargo policy. Nor did we do so in the fifties and sixties. It was rather the case that the system we had at the time was an autonomous Swedish ore based on the generally accepted principle in this context of a "courant normale" [preceding phrase in French] -- "traditional trade."

However, at the same time our economy is dependent on supplies to our high-technology industries from the United States. If we want our own high-technology industries to be in the forefront of developments and to be able to offer our competitors full competition, we have to ensure the supply of important components. It is of the utmost importance that our high-technology industries are not discriminated against in the supply field compared with our more important competitors.

For general trading policy reasons we totally dislike the limitations on the free flow of goods which an embargo policy represents. But since the Americans have every right to claim that they themselves have the last word on where their own high technology is to be used, we have to accept the rules that they lay down.

But it is extraordinarily important that these rules are applied in such a way that they do not lead to discrimination against our own high-technology industries -- compared either with the Americans' own industries or with our competitors in the COCOM countries.

An absolute majority of the Swedish importers of high-technology products from the United States enjoy great confidence in the United States. They have built up their own security systems which means that they have a good grasp of where the products imported from the United States go. These so-called bona fide Swedish companies' security systems compare very well with what the companies in the COCOM countries have.

It is not these companies that are the problem today. The so-called DATA-SAAB affair definitely belongs to history and is today no burden on either Sweden as a nation or the companies that were involved in the affair. The problem for Sweden is that less scrupulous companies have discovered that they can use Sweden as a transit country for the illegal shipment of high-technology and embargoed products. The so-called container affair was an example of this.

We came out of it having gained almost increased confidence in us from the United States. But there are now signs that similar attempts are being made against Sweden. People have also learned from the container affair that they have to be clean as far as currency and tax regulations are concerned. They are setting up neat little companies with the unspoken but actual aim of using Swedish territory as a transit area for embargoed technology. We have no proof to suggest that these attempts have succeeded to any appreciable extent. The strengthened resources of the customs service have obviously had a deterrent effect. But the signs are nevertheless clear that Sweden is the target of the attention of these less scrupulous persons and companies.

There is no reason for us to accept in the name of free trade or nonalignment such unhealthy deals taking place on Swedish territory. On the contrary, we assert that precisely because we are nonaligned we want to keep all such phenomena out of Swedish territory. For this reason it is a central objective for us to make sure that these illegal activities are kept out of Sweden.

The amendments to U.S. embargo legislation must also be taken into consideration in this context. If we do not adopt measures to keep these smuggling attempts out of Sweden this could "infect" the treatment of honest Swedish firms.

The new U.S. export legislation requires a country to adopt various sorts of protective measures if that country's industries are to be treated equally with competitors in other Western countries.

Yesterday the government decided that effective this June it will regulate the reexport of products for which export controls exist. The aim is to prevent Sweden from being used as transit country for trade that is illegal in other countries. An alternative would have been to stop these products at the border so that we would be able to totally avoid having them inside the country's borders.

Such regulations would however have led to extremely comprehensive checks -- and comprehensive checks, too, on the permitted import of technology to Sweden. Thus, to be practical, only when re-export from Sweden takes place should a ban go into effect. However, the meaning of and the intention behind the measures is to prevent less scrupulous people from using Swedish territory as a transit country for these products. The government's decision means that foreign products in the high-technology sector which

are subject to export restrictions in their country of manufacture may not be exported from Sweden unless permission from the manufacturing country can be produced. The regulations only cover foreign goods. Adapted products or components which form part of products manufactured in Sweden are not covered by the regulations. The intention is not to hamper legitimate trade by these regulations. On the contrary, the aim is to get at the illegal trade in which the regulations of other countries are circumvented.

We have confidence in the legitimate Swedish companies. They need not fear that their export chances will worsen. The regulations are being introduced precisely in order to ensure their supplies of high technology. And this also ensures their international competitiveness.

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TECHNOLOGY TRANSFER

PRESS COMMENTS ON NEW EXPORT REGULATIONS

DAGENS NYHETER Editorial

PM061601 Stockholm DAGENS NYHETER in Swedish 28 Feb 86 p 2

[Editorial: "An End to Technology Smuggling"]

[Text] The U.S. technology embargo against the Soviet Union and its allies has created serious problems for Sweden and other nonaligned states which are in favor of free trade. For Sweden these problems became acute when the majority of other countries introduced regulations to prevent the smuggling of technology through them. The government's decision announced Thursday [27 February] to introduce customs regulations with the aim of making it impossible for Sweden to be used as a transit country for the illegal trade in technology was therefore necessary.

In the future we will not need to resort to artificial tricks like the hastily written South Africa law to stop the notorious container affair. Goods which a certain country does not allow to be exported to certain other countries cannot now be exported to these other countries from Sweden. The fact that we are now complying in this way with another country's export regulations could be seen as dubious from the view point of neutrality. However, it would be even more dubious if we were to assist the importing country and allow smuggling via Sweden.

The new customs regulations that the government has decided, however, only solve one -- and perhaps the easiest -- of the problems with which the Reagan administration's embargo policy faces us. Our industries need a large number of high technology components which we can only get from the United States. In the foreseeable future neither an intensification of our own research and development nor imports from other countries -- these are most often also close allies of the United States -- can replace U.S. technology. This problem -- the export of Swedish products which contain U.S. high-technology components -- is not solved by the customs regulations.

One of the things that emerged from a series of reports in DAGENS NYHETER in January was how the U.S. Embassy in Stockholm maintains surveillance over Swedish importers of U.S. high technology. The Armed Forces Material Administration has also begun to act as a sort of voluntary surveillance and guarantee authority vis-a-vis the United States.

On the whole this system seems to work fairly well in practice. Sweden is not a country to which the United States wants to be unfair in respect to the transfer of technology. Legitimate Swedish companies are also anxious to manage their exports so that they do not become blacklisted as importers of U.S. high technology.

However, the matter has an important neutrality policy dimension. Without being members of the Western export control body, COCOM, which was set up in 1949, we have complied with its guidelines. Our nonalignment is subjected to increased strains when we are forced to accept foreign checks on sections of our trading policy -- as we are now doing as a result of the fact that the United States has stepped up its surveillance of what happens to high technology imported by Swedish companies.

Or as Ake Sparring concludes his little pamphlet "The U.S. Technology Embargo" (Current Questions in World Politics 1985:12): "Sovereignty is a question not only of form but also of content."

In order to come to grips with the problem there was discussion of more far-reaching export control legislation than that now decided. In the final analysis what is wanted here is of course a balance between various alternatives, all of which are more or less unsatisfactory from the viewpoint of neutrality.

We have chosen our nonalignment ourselves and we ourselves determine what it means. That is what is normally said in ceremonial contexts. In theory the only thing we cannot allow ourselves if we want to remain nonaligned is to join a military pact.

However, things are not really that simple in practice. But the limits of what we can allow ourselves as nonaligned are undefined. They are drawn partly by how we judge the rest of the world to view us, partly by whether we have the actual civilian and military resources to remain neutral in war -- the ultimate goal of nonalignment.

Neutrality in war requires not only "strong defenses given our circumstances," but also our ability to maintain a functioning civilian society at a reasonable level. By international standards not only our defense forces but also the whole of our society is technically highly advanced and dependent above all on U.S. technology.

A desirable side effect of the customs regulations that now have been decided would be to have U.S. surveillance activities on Swedish companies cease. It must be possible to treat even trade involving advanced technology as a matter of confidence between the U.S. exporting companies and the Swedish importers.

However, what is most important is that official Swedish circles have stopped pretending that the problem of trade in technology is not there. The customs regulations are perhaps a beginning.

SVENSKA DAGBLADET Editorial

PM041119 Stockholm SVENSKA DAGBLADET in Swedish 28 Feb 86 p 2

[Editorial: "'No' to Transit"]

[Text] The government has now decided that Sweden will regulate the trade in foreign -- read U.S. -- high technology. The announcement is by no means a surprise. In the past SVENSKA DAGBLADET reported that some sort of legislation was being prepared.

The government has taken the route of a decree which was simply read to the Riksdag by Foreign Trade Minister Mats Hellstrom. The measure is bound to have been discussed in advance with the opposition. Nevertheless, the method is somewhat debatable. A decision which affects not only vital Swedish trading interests but also has an indirect effect on foreign policy deserved more comprehensive treatment in the Riksdag.

In itself the decree can seem both reasonable and undramatic. It regulates the re-export from Sweden of computers, computer components, and electronic materials. Such foreign products may not be re-exported from Sweden in violation of the rules which apply in their countries of manufacture. The Swedish Government is commiting itself to ensuring that other countries' rules are followed in Sweden.

The decree will not cover products adapted here in Sweden or components that form part of Swedish products. Here the government is clearly counting on the Swedish companies concerned to follow the regulations of the country of manufacture. This is surely right. Several much publicized affairs caused major problems in the United States for leading Swedish export companies there, which are indeed eager to avoid a repetition.

At bottom the new decree is a result of U.S. efforts to prevent the use of U.S. technology in making the Soviet Union's rearmament easier. This policy is understandable in itself. It is obvious that the United States should not want its main rival to gain access to its technological breakthroughs. Nor is the United States the only country with restrictions in this respect. From a different point of departure Sweden, for example, is eager to maintain tight control over its arms exports.

But the technology which the United States is above all concerned with protecting does not primarily have to do with bullets and gunpowder, but with computers and electronics. These things have both civilian areas of application and are necessary for advanced weapons systems. The same circuit board could perhaps be used both in modern installations for civilian aircraft control and in missiles. The U.S. technology embargo against the Eastern bloc is therefore also directed against the bloc's very capacity to produce electronics. The VAX computers, about which so much was written about a year ago, could be used for the computer-controlled manufacture of microelectronics.

Thus, problems of delineation are difficult and even the new Swedish decree's distinctions between "pure" components and those which form part of Swedish-manufactured products are not entirely straightforward. In practice both types will be subjected to stringent restrictions. The decree clamps down on shady technology smugglers while the Swedish export industry must itself heed the U.S. demands.

Sweden needs U.S. technology. A manufacturing country ought to have the right within reasonable limits to set up rules so that its own products are not used against the manufacturer with hostile intent. From these points of departure the government decision is not unreasonable, and probably also necessary.

But it still feels a little strange for Swedish authorities to be guided by foreign laws and regulations in their activites.

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SWEDISH LAW TO REGULATE HIGH-TECH SALES, TRANSFER

Stockholm NY TEKNIK in Swedish 9 Jan 86 p 2

[Article by Tom von Sivers and Mikael Holmstrom]

[Text] The government is expected to propose more stringent control of technology exports from Sweden within the next few months.

The state will use lists of "sensitive" goods to control the flow of high technology. Although no law or enactment exists as yet, the authorities concerned have been alerted. The purpose is to halt the growing smuggling of technology through Sweden.

The authorities alerted include Customs and the Board of Commerce. If a system based on export licenses is adopted, the Board of Commerce may enter the picture as the authority responsible for issuing those licenses.

For Swedish firms, this means it will be a violation of Swedish law to sell high technology abroad without an approved and valid Swedish export license.

(Note that all this applies to civilian high technology and so-called double-use technology, not purely military materiel, for which we already have the War Materiel Act.)

Lists for Customs

Customs is responsible for controlling the border and will be able to use Swedish regulations to stop technology smugglers.

To be effective, Customs will have to have lists of sensitive high technology.

Exactly which technologies will be included on those lists is not yet clear.

At the Trade Department in the Ministry of Foreign Affairs, a team headed by Under Secretary of State Carl Johan Aberg has been studying various alternatives for state control over high-technology exports.

The government often claimed in the past that the existing controls were adequate.

Any further state regulation of the trade in technology was rejected: it was not considered necessary.

Firms Responsible

The government's approach was to shift all responsibility on to the firms. If they wanted technology, they must comply with the technology embargo placed on the Eastern bloc by the United States and its allies. It was a matter that concerned Swedish firms, not the government and its authorities.

The government also said that our existing laws and regulations--tax laws, the Goods Smuggling Act, and the War Materiel Act--were adequate for stopping technology smugglers.

But at a seminar held at the Institute of International Affairs in Stockholm on 17 October of last year, Customs revealed that the smuggling of sensitive technology to the Eastern bloc is on the rise.

"The traffic is continuing, and we see trends toward an increase. The more we dig into this, the more we find," said Sigvard Falkenland, head of the Customs Criminal Investigation Department (see NY TEKNIK, No 43, 1985). He added:

"Those engaged in this type of trade know that Sweden has no penalties."

Sweden Last

Sweden is currently the only highly industrialized country in West Europe with no state control over high-technology exports.

Another neutral country--Austria--tried as long as it could to manage without legislation.

But exactly 1 year ago, on 9 January 1985, an export control law took effect in that country.

It came about after the government in Vienna yielded to American pressure (see NY TEKNIK, No 43, 1985).

The fact that the Swedish Government is now investigating the possibility of passing legislation is due in large part to a smuggling incident that took place during the period from September to December 1985.

A West German request that Swedish authorities seize U.S. computer equipment was rejected by Sweden.

There was no legal means whatever of seizing the cargo.

That affair showed that if Sweden was going to live up to the government's objective of not becoming a transit country for the smuggling of high technology, our current laws and regulations would not be adequate.

U.S. Intervention

American authorities eventually intervened in the above-mentioned smuggling affair. The U.S. Embassy in Stockholm contacted the Swedish businessman acting as the middleman and succeeded in persuading him to send the computer equipment back to the FRG.

Its original destination had been the GDR.

Since 9 December 1985, the Swedish businessman has been blacklisted by the U.S. Department of Commerce.

The Americans are following developments in Sweden with the closest attention. Under Secretaries Stephen Bryen (Department of Defense) and Dale Tahtinen (Department of State) visited Sweden from 9 to 12 December 1985.

Both Stephen Bryen and Dale Tahtinen had previously explained the American viewpoint in NY TEKNIK: all countries should have strict export controls with the possibility of punishing those who violate the regulations (see NY TEKNIK, No 6, 1985).

During their visit to Sweden, the U.S. under secretaries were informed that the Swedish Government was studying the possibility of tightening up Swedish export controls in 1986.

"Untenable Situation"

Swedish industry has not been informed of the new plans because no proposal is ready as yet.

But here are a few reactions: "The Chamber of Commerce has long understood the untenable nature of the situation. All talk about self-control and 'arrangements' founders on the fact that there are always firms that do not consider themselves bound by gentlemen's agreements," says Tell Hermanson, head of the foreign department at the Chamber of Commerce.

Worried About Bureaucracy

He says that something must be done:

"This situation of not being able to go after technology smugglers with penalties but having to come up with some other charge (violation of the Smuggling Act, tax violations, and so on) cannot continue."

But Tell Hermanson is also worried about the form such a law would take and about the bureaucracy to which it might give rise:

"This applies especially to small firms that deal in high technology. But even though we at the Chamber of Commerce have our own group of experts, we have not been consulted as to how the system could be set up."

Tell Hermanson says: "Our attitude is that we do not want any kind of double system in which firms must apply to both Swedish and foreign authorities for an export permit."

Ingvar Petzall of the Federation of Swedish Industries takes a serious view of the fact that Swedish firms are participating in the smuggling of technology:

"But I would not like to say whether legislation is the right way to put a stop to it."

Difficult To Formulate

"It seems that it would be terribly difficult to come up with legal wording providing clear and unambiguous rules and allowing reliable application of the law.

"This involves questions of credibility and control as well as limitations on free trade.

"It also means administrative problems for the firms, and they are going to cost money," says Ingvar Petzall, but he points out:

"Provided that a sensible way to solve these problems can be found, we fully agree that legislation may be necessary."

As far as the government is concerned, it is a matter of finding a solution that will provide effective control without too much bureaucracy and one that can be combined with Swedish neutrality policy.

The question of a Swedish export law is very sensitive, and Under Secretary Carl Johan Aberg has so far declined to comment on the matter.

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TECHNOLOGY TRANSFER

FINLAND PLANS LARGEST COMPUTER, ELECTRONICS CENTER AT TURKU

Helsinki UUSI SUOMI in Finnish 23 Jan 86 p 8

[Article: Datacity to Be Completed in Five Years. Finland's Largest Center of Technology Being Built in Turku]

[Text] Finland's largest center of high technology, Datacity, comprising 36,000 square meters, is being built in Turku. The first part of the high-tech center of Turku's "silicon valley", costing 60 million markkas, will be completed next year, and the entire project, worth 200 million markkas, will be finished in 3-5 years. The promoter of the imposing project is Rakennustoimisto [Construction company] J. Lunden Oy, which has had the moral support of the Turku universities and colleges from the very beginning.

In addition to the City of Turku and the electronics industry of the region, the universities and colleges are members in the Fund of New Technology, assigned to create the prerequisites for introducing and developing high technology in Varsinais-Suomi [south-western Finland].

Already, 40 percent of Finland's electronics industry and about 70 percent of the country's communications industry are located in the economic region of Turku.

Instruction to Begin Next Year

Next year academic instruction in high technology will commence in Turku, when the university's first professor of high technology will be appointed. The chair has been endowed with private donations.

Each year, 500-1,000 jobs in the field of high technology are established in Turku.

According to Juhani Lunden, managing director, the purpose of Turku's Datacity is to function as the operational center of companies and corporations requiring high technology in their research, product development, production and marketing.

Marketing to Begin Next Year

"There is really a lot of interest. Even though marketing will not begin until next year, discussions have been conducted with dozens of companies," Lunden reported.

Among others, the City of Turku has inquired about the possibility to establish a development center for computer instruction in Datacity.

The construction of the first part of Datacity has begun. The center, designed by Architects B. Casagrande, will be located in the silicon valley, between the university and Wallac, near the Abo Akademi [Abo Academy] and the school of economics and business administration.

Cooperation Is of Primary Importance

Professor Timo Järvi, vice president of the Turku University, believes that the transfer of subjects associated with communications technology, now taught at the university, the Abo Akademi and the school of economics and business administration, to Datacity can be justified, among other things, in that it will quickly solve the problems of space.

"By combining the resources of poorly supported units, instruction and research can be improved," said Jarvi. He considers the close cooperation between the universities and colleges with the companies of Datacity to be of primary importance.

Juhani Leppa, assistant director, also emphasized the significance of the Fund as a channel between the schools and the economy, as well as a financing channel and union.

Above all, the purpose of the Fund is to create the prerequisites for high technology.

There is a total of some ten high-technology projects in Finland, about 300 in the world, and the number is constantly increasing.

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