



JPRS Report

Science & Technology

***Europe
Economic Competitiveness***

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Science & Technology

Europe

Economic Competitiveness

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S&T POLICY

EC: Five R&D Programs Adopted Under Third Framework Program

91WS0466G Brussels EUROTECH FORUM
JOURNAL in English Jul 91 pp 6-8

[Text] 74.19 Go-Ahead for Five R&D Programmes

The Council finally adopted five specific programmes under the Third Framework Programme for Community Research and Technological Development on 7 June. The Third Framework Programme, which has a budget of 5,700 million European currency units [ECU] for the years 1990 to 1995, is to be implemented through 15 specific programmes.

The five programmes adopted concern the following areas:

- communications technologies;
- development of telematics systems in areas of general interest;
- environment;
- marine sciences and technologies;
- life sciences and technologies for developing countries.

The first four of the adopted programmes are summarised to provide a brief update guide.

74.19.1 Communications Technologies (1991-1994)

This new R&D programme is designed to make a significant contribution to the introduction of integrated broadband communications (IBC), with the development of the integrated services digital network (ISDN) and the national introduction strategies which are to result in the setting-up of services at Community level by 1995.

As well as continuing development of the integrated broadband network and stepping up the research effort on optical communications and synchronous/asynchronous switching systems, this new programme will concentrate on the following priority areas:

- research and development on broadband communications;
- intelligence in broadband networks;
- flexible communications resource management;
- mobile and personal communications;
- image and data communications;
- integrated services technologies;
- information security technologies;
- advanced communications experiments;
- verification tools (research and development area common to all other priority areas).

This programme will be carried out by means of shared-cost research projects, concerted actions and accompanying measures (dissemination of results, training, etc.). The Community contribution will be **489 million ECUs**

for the years 1991-1994, from which 4.89 million will be drawn for the centralized dissemination and exploitation of results.

It is also planned to implement the programme by means of targeted projects of particular importance for strengthening the scientific and technological basis of European industry and improving its international competitiveness.

74.19.2 Development of Telematics Systems of General Interest (1991-1994)

This programme seeks to provide the conceptual, technological and prenormative basis for the gradual implementation of trans-European telematics service networks. These will contribute to the successful completion of the large internal market and at the same time improve the qualitative and quantitative performance of large public services which, at the Community level, have to face the new technological, social and economic challenges posed by European integration.

Seven broad areas have been selected as those best able to benefit both from progress in information and communications technologies and from the European dimension:

- **administrations** most affected by the implementation of the internal market (customs, social security, indirect taxation, frontier police, statistics);
- **transport services**, in order to improve their safety, environmental protection and performance aspects;
- **health care services**, in order to enable medical teams to take advantage of new observation and communications facilities of benefit to patients;
- **distance learning services**, to facilitate advanced training and the acquisition of occupational qualifications;
- **libraries**, in order to allow as many people as possible to have access to European knowledge;
- **linguistic research and engineering**, in order to reduce the constraints on information exchange due to language differences, but without diminishing the cultural wealth that they represent;
- **telematics systems in rural areas**. The identification of needs, area by area, and research on systems integration will lead into pilot applications which will make it possible to verify the technological feasibility and the suitability of services to meet user requirements. It will be up to the users, service providers, networks operators and equipment manufacturers to set up the full trans-European infrastructures and services outside the programme, on the basis of the experience thus gained.

The programme will be carried out by means of shared-cost research projects (Community participation 50%

maximum) and concerted actions. The financial allocation for the programme is **380 million ECU**s for 1991-1994, including 3.8 million ECUs for centralised dissemination and exploitation of results.

Provision has also been made for accompanying measures (dissemination of the results, training, etc.).

It is also planned to implement the programme by means of targeted projects of particular importance for strengthening the scientific and technological basis of European industry and improving its international competitiveness.

74.19.3 Environment (1991-1994)

This programme is divided into four parts:

a. Participation in the global change programme: Community contribution to international research activities on the global change of the planet ("greenhouse effect", oceanbiosphere-atmosphere interactions, depletion of the ozone layer, biogeochemical cycles, dynamics of ecosystems, etc.).

b. Technologies and engineering for the environment: development of equipment for the analysis, monitoring and surveillance of the environment (monitoring of air pollution and water quality), improvement of technologies available for environmental protection and rehabilitation (treatment of toxic wastes, protection and restoration of buildings and historic monuments, etc.).

c. Research on the social and economic aspects of environmental issues: incorporation of environmental parameters in economic methodology, cost/benefit analyses, development of environment quality indicators, environmental ethics, environmental impact of tourism, etc.

d. Technological and natural risks: Projects addressing vast transnational problems calling for an interdisciplinary approach, such as seismic and meteorological hazards, forest fires, technological hazards, desertification in the Mediterranean region, etc.

The financial allocation for the programme is **414 million ECU**s (150 million is earmarked for the part of the programme undertaken by the Joint Research Centre). 261 million ECUs will be allocated to programmes carried out by means of shared-cost research projects and concerted actions. Provision has also been made for accompanying measures (dissemination of results, training, etc.). From this 261 million ECUs, 2.6 million ECUs will go to finance centralized dissemination and exploitation of results.

74.19.4 Marine Science and Technology (1991-1994)

- Marine technologies: The projects will cover a fairly wide range of technologies for observation and intervention in the marine environment, such as automatic measuring systems, acoustic transmission, marine robotics, acoustic and optical imaging, etc.

- Support initiatives: Creation of a European network of information and data, drafting of standards, coordination of modelling, advanced training, new methods of mapping and Hydrographic surveying, etc.

The programme will be carried out by means of shared-cost research projects (maximum Community participation 50%) and concerted actions. Provision has also been made for accompanying measures (dissemination of results, training, etc.). The financial allocation for the programme is 104 million ECUs, of which 1.04 million will be used for centralised dissemination and exploitation of results.

Technology Dissemination in EC Criticized

91WS0467F Brussels EUROPE in English 27 Jun 91
pp 11-13

[Article: Disseminate and Utilise the Results of Research Programmes Has Been Insufficient and Ineffective Up Until Now]

Brussels, 26/06/1991 (AGENCE EUROPE) - The obligation imposed on the European Community by the EEC Treaty (Art. 130) to disseminate and utilise the results of its activities in the areas of research, technological development, and Community demonstration was the subject of a special report by the Court of Auditors. This report goes further than a simple audit and aims more generally to evaluate how this function was carried out by the Community. In other words, the court of Auditors has tried to answer the question of whether the EEC is managing, by disseminating this knowledge, utilising it, patents, etc., to make good use of the very significant Community investment in research (5.396 billion ECUs for the 1987-1991 framework programme).

Under the current conditions, the answer tends to be negative, for many reasons: - limited dynamism in the patent and publication services; - funding that is not proportionate to the need; - wide dispersion of activities making use of the results of research and the transfer of technology.

The Court (whose report was published in the Official Journal of the European Communities No. C/133 of 23 May 1991) notes that the financial package set aside to make use of the results of research represent only 0.7% of the funding for the 1987-1991 framework programme and that personnel resources are also very limited. The result is that only a very small part of the research leads to a concrete application. Areas such as health, nuclear energy, computers, telecommunications, agricultural and agro-industrial research, fisheries, and techniques to be used in development are practically untapped. Utilisation seems to focus on a small number of areas which are the only ones for which the available personnel has the necessary expertise, in particular the activities of the JRC, ECSC research, non-nuclear energy, raw materials, and recycling.

In addition, very few licenses are granted, and developments which bring a return are becoming increasing fewer: in 1988, for a return of 1 ECU, 204 ECUs were spent on implementation and 45,762 ECUs on research expenditures. This very inefficient situation is confirmed by the limited number of patents registered by the Community. In 1986, this number was eleven times less than that for all of the EEC countries together and 17 times less than that for the OECD countries. The main cause is the drop in the flow of patentable inventions from the Joint Research Centre (JRC).

The Court regrets cases like that for software to transmit data; it was felt to be a very worthwhile project, but its marketing was a total failure due to administrative delays (four years) related to the negotiation of a license contract. When the matter was finally settled, the system seemed too costly and had been surpassed technically by another software package.

Recommendations by the Court of Auditors To Improve the Situation

However, in its "Recommendations," the Court says that a small team with limited financial means is not necessarily condemned to being ineffective, but should adapt its strategy to its situation. Since it cannot plunge into setting up a network of large-scale operations, its role must be that of a catalyst, a body which uses established structures which have logistical strength and more adequate financial resources. This strategy must be developed with regard to Community services and structures by promoting better coordination of all the programmes and service which in some way foster innovation. It must also be developed with regard to structures - public services, enterprises, professional organisations - which pursue the same goal in the national framework. With regard to extra-Community structures, it will be as much a matter of calling on their assistance as of proposing collaboration to them. However, there should be no duplication of effort with the work of the Member States, or of enterprises. Whenever utilisation is directly possible at these levels, it should be given priority over administrative use, because for certain types of research, industry is the most effective user.

In any case, even if it is limited by the application of the sound principle of decentralisation, the scope of intervention for Community services in using the results of research will remain very broad and is based mainly on:

- the trans-national character of innovation: ensuring dissemination throughout Community territory of innovations developed in one Member State which would have a tendency to remain undiscovered there;
- the inter-sectorial character of innovation: in the Community programmes with significant industrial participation such as ESPRIT [European Strategic Program for Research and Development in Information Technologies] and RACE [Research and Development in Advanced Communications in Europe], the approach of utilisation currently in use is very sectorial, and

"focused" on a specific scientific area. However, real technological progress often presupposes the interaction of techniques which would appear to have no relation to each other. Therefore, it must be the role of a multi-disciplinary utilisation team to be the place of meeting and association for single projects using different techniques;

- the taking into account of social objectives - convergence and promotion of small and medium-sized enterprises: These objectives are not necessarily taken into account in a "per programme" approach to utilisation; this must be the task of a service with a global approach which gives specific attention to convergence, social development, the creation of jobs on a large territorial basis, and the systematic promotion of small and medium-sized enterprises. These are essential qualitative objectives which the Community must make reality.

Generally speaking, the Court feels that the activity of exploitation of the results of research, especially utilisation, must be conceived as a distinct research activity necessitating qualifications and a type of attitude which is not generally found in researchers. The characteristic of researchers is to propagate knowledge; the utiliser must be a sort of promoter. He is not a specialist; his specialty is to bring together all the specialists needed for the success of his project and to get them to collaborate. Utilisation constitutes the crossroads between industry and research; it belongs to neither side alone.

However, this position of principle must be viewed in light of three considerations:

- The logical purpose of research is the dissemination of results to the research services which can make full use of their financial potential in terms of publications. Within the research services, there should be an accompanying effort to use these results in a dynamic and efficient way.
- In the case of programmes in which the participants are mainly industrial (ESPRIT, for example), preference should be awarded to utilisation by industry. This approach has incontestable pedagogical value for entrepreneurs. When large enterprises have a tendency to retain information which is potentially quite applicable, independent utilisation remains necessary in order to get them to give up this attitude. It is also effective in tapping the dividends of the initial use, i.e., by-products which are neglected by industry (this is what is called "spin-off");
- While being separate, research and its use must remain closely intertwined. Research must give more attention to exploitation and utilisation in the very conception of its activities, to continuity between research and exploitation, particularly in the communication of all useful information to the services in charge of making use of the results of research. In return, the services in charge of exploitation and utilisation must be able to

turn to the research services and to directly obtain from them helpful collaboration, possibly remunerated.

European Commission Stresses That It Could Not Act Effectively Prior to Adopting the VALUE [EC program for the dissemination and utilization of research results in science and technology] Programme and That the Situation Is Different Now

In its responses to the comments from the Court of Auditors the European Commission made three basic preliminary points:

- 1) the VALUE programme on the dissemination and use of the results of Community research programmes was not approved until June 1989; as a result, the analysis done by the Court is, for the most part, based on the period prior to the programme's implementation;
- 2) the utilisation of research results is a long process: it is estimated that an average of 5 to 7 years go by (depending on the sector) between when results are obtained and when a product is put on the market (this may explain some errors in evaluation of potential markets);
- 3) the risk of failure is great when research is mainly upstream from the market, which is generally the case because the Community programmes are precompetitive in nature. The Commission services do not come into play until the competitive stage, and the success of a product on the market depends at least as much on the commercial strategy used as on the qualities of the product; however this strategy depends exclusively on the firm concerned.

This being said, the Commission generally goes along with the comments of the Court of Auditors with regard to a centralised dissemination and utilisation of research results but still feels that the exploitation of the results are mainly up to the enterprises. The Commission also responded to some individual comments by the Court:

- patents: According to the Commission the drop in the number of patented inventions is not due to a stagnation in inventive creativity within the JRC but to the reorientation of its activities decided by the Council and supported by the Parliament; the reorientation towards prenormative research and prior study for defining EEC rules, mainly in the area of security and the environment, naturally reduces the number of exploitable discoveries.
- productive files: The situation has changed since the entry into force of the VALUE programme; in 1990 about 50 utilisation files were opened, or an increase of 117% as compared to the figure cited by the Court for 1988.
- small returns: The rates practised by the Commission are not very high because the results of precompetitive

research necessitate considerable additional investment on the part of those who are granted the licence.

- dissemination and publication: The Court of Auditors did not take into account the huge body of scientific articles published directly by the laboratories taking part in the programmes. In addition, some initiatives could not be taken prior to the entry into force of the VALUE programme, which has made it possible to extend the utilisation programmes to BRITE [Basic Research in Industrial Technologies for Europe], to biotechnology, and so on. In 1990, the competent services published an announcement in the Official Journal for the first time concerning the utilisation of the results of specific programmes; about 60 responses were received.
- legal means and basis: Prior to the adoption of the Single Act, the Commission services had neither the financial means nor a solid legal basis for ensuring systematic follow-up for all of the programmes. Now the situation is different thanks to Article 130 Gc and to the VALUE programme.

The Commission's programme of publications for 1991 is found in annex.

EC Commission Approves Spanish R&D Projects

91WS0539B Brussels XIII MAGAZINE (News Review supplement) in English No 2, 1991 p 21

[Article: "Commission Approves Spanish Technology Programme"]

[Text] The Commission has cleared a Spanish technological action plan comprising seven state subsidy projects with a budget of 450 million ecus covering the period 1991-1993.

The programmes are aimed at funding research and development projects, improving workforce training and research infrastructure, protecting industrial property, and public awareness and information campaigns.

Special emphasis will be placed on the electronics and information technology sectors (Pein III plan), pharmaceuticals (Pharma plan), biotechnology, advanced chemistry and new materials (BQM plan) and basic and processing sectors (SBT plan). Subsidies can cover up to 25% of costs for applied research or development projects and up to 50% of costs for basic industrial research, demands for patents and the definition phases of national and international research.

A maximum of 70% of training costs can qualify for subsidies.

Europe: Five-Year EUREKA Results Called 'Mixed'

91WS0473B Paris L'USINE NOUVELLE in French
20 Jun 91 pp 42-43

[Article by Dominique Commiot: "EUREKA: A Disappointing Showing"; first paragraph is L'USINE NOUVELLE introduction]

[Text] Francois Mitterand is celebrating a rather glum birthday. The program, which is excellent in principle, shows it will take patience to build a technological Europe.

Five years after it was launched at France's initiative, the EUREKA technological cooperation program has not kept all its promises. Despite the program's some 520 projects involving 2,300 European companies and research organizations, and despite investments that will total 80 billion French francs [Fr] (30 to 40 percent state-financed) when the work in progress is complete, disappointment is starting to show.

It is expressed diplomatically in the audit Wisse Dekker, the former boss of Philips, and six other European industry figures were asked to make for EUREKA's fifth birthday. They admit that "EUREKA has helped boost the individual competitiveness of participating companies." But they hint that its effects in strengthening the positions of the Old World with respect to Japan and the United States are slow in coming. "We are hopeful that EUREKA will ultimately have a positive effect on Europe's competitiveness," the report concludes.

In fact, EUREKA programs (Jessi [Joint European Sub-micron Silicon Initiative], HDTV [high-definition television], Prometheus [Program for a European Traffic With Highest Efficiency and Unprecedented Safety]) to support the strategic electronics and automobile sectors still rarely produce concrete results, and even struggle to be implemented.

Moreover, too few small and medium industries hold leadership positions in EUREKA projects. And, according to different polls of European manufacturers, 50 percent of EUREKA developments would have occurred anyway, even if the program had not been created.

In a way, EUREKA is suffering from its virtues. Unlike EC-instigated technological cooperation—i.e., bid invitations drafted by Brussels bureaucrats on precompetitive research topics—EUREKA leaves the initiative to manufacturers. It is up to them to propose product or process developments designed to meet market needs. There is just one condition: Projects must be set up by at least two companies of different nationalities. After evaluation, EUREKA committees confer their label.

In La Haye yesterday, a hundred new projects brought the number of EUREKA developments to over 500. The label's notoriety is appreciated by small companies. But it does not necessarily imply financial support. Each

member country freely sets the amount of aid it will grant its participating companies, based on terms that vary widely from one country to another, and that are generally not divulged.

Manufacturer initiative and market-oriented developments are excellent principles. Agreement on this is so general that the European Commission is considering altering its cooperative research & development framework program along the same lines. But they explain a scattering of programs that the Dekker report deems too great. "The time has come to strengthen the quality of projects and start up new strategic programs," it stresses.

These structuring programs are proving especially difficult to set up. The big European groups, to whom the initiative falls, are having a tough time allying themselves with competitors. True, Prometheus unites all the European automakers and a total of 200 companies to develop a comprehensive system for improving the smooth flow and safety of traffic. Allocated Fr4 billion, the program is just now completing its definition stage after two years of work. Its slowness, which betrays the companies' mutual distrust, has prompted some, such as PSA (Peugeot Corp.), to conduct their own research on the side.

A more ambitious program is under study, which would attack the roots of the European auto industry's ailment: its insufficiently competitive way of organizing production. A working document has been making the rounds among European manufacturers for several months. France is definitely counting on giving it a push during its term as EUREKA president in 1992-1993. But in his La Haye speech President Mitterand could not, given EUREKA's "bottom-up" nature, too greatly anticipate an initiative that will supposedly be taken by manufacturers.

The same difficulties explain the snail's pace of Jessi, a Fr27-billion program to try to bring the European micro-electronic industry back up to snuff. "Until the necessary industrial restructuring is done—in particular a closer alignment of Siemens's and SGS-Thomson's activities—Jessi will not be off and running," says a high-ranking French official.

In the area of high-definition television, the EUREKA program helped prevent the Japanese standard from taking over everywhere in the world. But even though it has been allocated a healthy Fr5.2 billion, the program cannot do everything for the future of European consumer electronics. It deals only with the industrial aspect of high-definition television, and not with the content of programs or the organization of broadcasting on which the success of the European strategy largely depends.

On the other end of the scale, small companies are running into other types of snags. If only a third of EUREKA's participants are small and medium industries, it is because they struggle to make contact with potential partners from other countries, and lack financial support to design research programs.

France has already tackled these problems. Help in scouting out partners has been available at ANVAR (National Agency for the Upgrading of Research), which houses the French EUREKA secretariat, since January of 1990. It has enabled 60 small and medium industries to establish projects, and financial support for defining projects has been instituted.

For EUREKA's aid to programs initiated by small and medium industries is currently too often indecisive. Of the 30 projects involving French participation that are producing their first commercial results, eight are led by small companies. In Niort, Tecnal (staff of 120, sales of Fr120 million) collaborated with the top Spanish agro-food company, Campofrio, to design an automated plant able to produce up to 50,000 hams a day. It is the largest in Europe. But the EUREKA program was set up between an equipment manufacturer and its customer, who already knew each other and who would have carried through their project without EUREKA. (Nearly half of EUREKA programs involve only two companies). What is more, on a total investment of Fr50 million, Tecnal's government support consisted of nothing more than a Fr1.8-million reimbursable loan from ANVAR, for which the company would have been eligible without the EUREKA label.

In the view of the company's general director, Francois Gibert, "EUREKA primarily provided us with some name recognition, easier contacts, notably with consultants, and great self-confidence."

At Digipress, EUREKA developments also ended with a contract. This 48-person Caen firm with turnover of Fr28 million sells its very-long-lasting compact disks to the Washington Library of Congress for book archiving. And NASA is expected to follow. But here again, its president Jean Ledieu assures us that the company would have conducted its research without EUREKA. Digipress was already working with the Belgian glass-maker Glaverbel before it was awarded the program label, and the Ministry of Culture subsidies (Fr2.4 million out of a total of 6 million) would have been forthcoming anyway. "Perhaps with greater difficulty," admits Jean Ledieu. "But it is primarily the EUREKA label's notoriety even as far away as the United States that was the program's most significant contribution."

"EUREKA makes no difference when it comes to government funding; the companies could get aid through other channels," comments Henri Guillaume, president of ANVAR and a member of the group of European "high-level personalities" that mete out the EUREKA label. "But that is not the main thing," he continues. "European technological cooperation will only develop over a long period. You cannot transform a context of stiff competition in a few years. Without the accelerating effect of EUREKA, the tightening of technological ties would be much slower." In any case, participating companies argue in its favor. Eighty-nine percent of them say

they are satisfied with the program (78 percent of the small and medium industries) and prefer it by far to the EC framework.

But EUREKA's effectiveness in shoring up European competitiveness is disappointing, notably because too many programs do not reach a critical mass. France intends to give priority to tackling this inadequacy during its term as president of the program, starting in May, 1992.

Ministerial Conference Adopts 121 EUREKA Projects

91AN0496 Amsterdam COMPUTABLE in Dutch
28 Jun 91 p 9

[Article by COMPUTABLE correspondent: "EUREKA Adopts 121 New Projects: Focus Shifts to Quality Factors"]

[Text] The Hague—A total of 121 new projects were approved at the EUREKA conference in The Hague. Dutch companies and institutes are participating in 38 of these projects. Furthermore, Dutch companies have joined two ongoing EUREKA projects. This brings the number of EUREKA projects with Dutch participants up to 117. The total number of projects is now 470.

The EUREKA ministerial conference also agreed upon a number of adjustments. Pursuant to recommendations by an evaluation committee headed by former Philips top executive Prof. Wisse Dekker, more attention is to be given to the quality of projects. The selection and funding criteria for projects are to be straightened out. The National EUREKA Secretariats will be given more control without however sacrificing the bottom-up character of EUREKA. EUREKA was in danger of becoming a jungle of projects. The EUREKA Secretariats are to ensure that projects are not conflicting or running parallel to each other.

A very large project which involves the PTT [post, telegraph, and telephone] Research Center Netherlands, Philips France, SGS Thomson, and Siemens is called Video-Audio Digital Interactive System. This project seeks to develop standards for digital transmission of image and sound signals. Its goal is to define and determine a general ISO [International Standards Organization] standard for digital audiovisual information by the end of 1992. The companies have joined to counter the influence of Japan and the United States in the negotiations. The project may result in the further integration of telecommunications and radio and television networks, which will in turn give rise to new products and services based on this standard. The project will take one year and a half. The budget is fixed at nearly 50 million guilders.

Another interesting project in which Mommers Print Service and Digital Equipment Ireland are participating focuses on a feasibility study regarding the manufacture of large-scale high-performance printed wiring boards

(HPBs). The need for such HPBs has emerged as a result of increased switching speed and memory capacity requirements of present and future systems. Large HPBs seem to be a better solution than coupling small-size printed circuit boards because they require fewer interconnections. The HPBs currently being used in Europe are manufactured by U.S. or Japanese companies.

In addition, the Environment and Energy Division of the Central Organization for Applied Scientific Research (TNO) and Intergeos are the Dutch participants in a project set up to improve the reliability of computer models for representing measurement data obtained through geological research. This should lead to considerable savings in oil and gas exploration.

Ministerial Conference Evaluates EUREKA Program

91AN0487 Rijswijk POLYTECHNISCH WEEKBLAD
in Dutch 27 Jun 91 p 3

[Article: "Dekker: 'EUREKA Concept Is Good But Its Success Has Yet To Be Proved'"]

[Text] "Without a European industrial policy, major sectors of European industry will vanish by the year 2000." These were the ominous words of Prof. Dr. Wisse Dekker during the latest EUREKA conference in The Hague. Nevertheless, he keeps endorsing the initiative that led to the establishment of EUREKA five years ago, even though the program is still open to improvements in several areas.

A committee headed by Prof. Dr. Wisse Dekker evaluated five years of EUREKA activities and concluded that an international technology program like EUREKA is a good approach. However, Dekker and his team did not comment on individual projects. "The actual success of the projects will be proved once they are accepted in the market," says Dekker.

Dekker said that EUREKA's bottom-up approach is one of its strongest aspects; project proposals are put forward by the companies themselves. Accordingly, the main recommendation of the committee is that this approach be further strengthened, and that companies should be exonerated from as much red tape as possible. To this end, Dekker proposes the introduction of a kind of pre-EUREKA status. This would enable companies and institutes to begin work while application procedures are being finalized. Moreover, the committee would also like to introduce the right to deprive a project of its EUREKA status.

Besides project proposals from individual companies, Dekker believes that more attention should be focused on infrastructural and strategic projects in the areas of electronics and communications.

According to the committee, the role of small- and medium-sized companies should be reinforced. Irjo Toivola of Finland—last week Finland took over the

EUREKA presidency from the Netherlands—calculated that, excluding the agricultural sector, there are around 50 million [as published, probably 50,000] companies with fewer than 500 employees in Western Europe, and that a mere 400 of these are participating in EUREKA projects, as compared to a participation rate of approximately 10 percent for major companies. "I have a dream of 10,000 small- and medium-sized firms participating in EUREKA," said Toivola.

East Europe

Participants at the EUREKA ministerial conference consider EUREKA a success. The ministers of the 19 participating countries believe that the recommendations made by Dekker and his team should be adopted as a directive for future cooperation within EUREKA. The ministers also agreed to try to step up cooperation with countries in Central and East Europe. These countries should eventually be given the opportunity to become full members of EUREKA, but the criteria for their membership have yet to be determined. The main obstacle is the absence of an adequate industrial infrastructure in East Europe.

Belgian Participation in EUREKA Discussed

91AN0485 Groot-Bijgaarden DE STANDAARD
in Dutch 20 Jun 91 p 7

[Article by Pieter Van Dooren: "Belgium Once More Involved in EUREKA; Minister for Science Policy Hugo Schiltz in The Hague"]

[Excerpts] Brussels—Minister for Science Policy Hugo Schiltz was not embarrassed on his return from The Hague [venue of the EUREKA ministerial conference]. Belgium is participating in 15 new EUREKA [European research program] projects. This is five times more than last year, but still only half what the Netherlands does. Belgium is strongly represented in the project on high-definition television (HDTV) and, together with eight partners, in the important Joint European Submicron Silicon Initiative (JESSI), where the chips of the future are designed.

JESSI must provide Europe with an impetus, because in the area of chips we have fallen well behind. "Seven of the eight Belgian partners are Flemish," Schiltz could not refrain from saying "although as a federal minister I should not be rejoicing over that."

Of the 15 new projects in which Belgium is taking part, we are the initiators of two (a flutter test for aircraft and a portable electronic operation support). Twelve projects have Flemish participants and three have partners from Wallonia. [passage omitted]

JESSI is not a typical EUREKA project: It is a longer-term project than most; it involves many more partners; it consists of some 70 subprojects; and it has a sort of central project leadership. The EC itself is a participant in JESSI. The aim is to improve project integration, for

instance in the area of chips for HDTV. Therefore, the big countries and companies are attempting to make the whole business manageable by not allowing smaller participants a vote, unless they have more than a 5-percent stake in a project. Schiltz is determined to put a stop to this.

The JESSI partners have succeeded in barring the electronics company ICL (formerly British, but now 80 percent in Japanese hands) from three "sensitive" projects, replacing it with "real" European partners who can provide the same input. According to the EUREKA regulations, initiators of a project must supply information and give everyone a chance to participate, but they are not obliged to accept everyone. ICL is being allowed to participate in two other projects. The British minister—"a real Thatcherite" according to Schiltz—was not very happy about this, but he did not provoke a row.

The British are also being slightly awkward as far as HDTV is concerned, because they feel that ultimately the market should set the standard. Luxembourg is floundering because its existing satellites, based on the old standards, have not yet been written off. Europe, however, could become a world leader in HDTV, if it were able to agree on a standard quickly and to offer equipment and programs based on that standard to the outside world. Belgium is pleading very strongly that everyone reach an agreement. In their closing declaration, the 19 ministers have already issued recommendations to support HDTV.

In their "The Hague Declaration," the ministers also said that institutes and concerns from countries which are not EUREKA members (read East European countries) will have a greater chance to participate in projects.

Just as last year in Rome, Belgium emphasized that East European participation must not be allowed to lower the quality of EUREKA. Participation can only occur if at least two EUREKA countries are also involved in the project.

Schiltz also called for a better functioning of the central secretariat. There need not be any redundancies, but better streamlining of information exchanges could only be good for EUREKA. For instance, the database containing all projects and project proposals is not up-to-date and the coordinators from various countries who collect proposals and look for partners should work along the same procedures. [passage omitted]

France Telecommunications Industry Surveyed

Government Policy, Regulations

91WS0467A Maidenhead TELEFACTS in English
Jun 91 pp 3-9

[Article: "France: The Commercial and Regulatory Environment"]

[Text] Over the past ten years, the French telecommunications industry has distinguished itself in technological

advances and, more recently, through innovative approaches to regulatory practice.

Success in the development of the country's telecommunications infrastructure has been all the more remarkable given that in the early 1970s it was one of the least developed in the industrialized world. By the beginning of 1991, 75 percent of all France's subscriber equipment was based on electronic time-division technology and almost 80 percent of the toll network was digitized. The pace of technological change, which has been matched by a concomitant lowering of tariffs (mainly for international messages), rising productivity and quality of service, means that France is able to claim one of the most advanced telecommunications environments in Europe.

The agenda for change in the regulations governing French telecommunications had been set in the early 1980s. It was only towards the end of the decade, however, as the UK, and then Germany, drove further and faster towards a deregulated environment, that France began discussing deregulation.

Until 1990, the public telecommunications network in France was under the control of the Ministry of Posts, Telecommunications, and Space. The Ministry organized, planned and operated services itself, and authorized private companies to supply services in the established manner of traditional PTTs [post, telegraph, and telephone services]. France Telecom, the dominant supplier of services was part of the PTT.

Against this background, the government of Jacques Chirac had instituted a number of privatizations towards the end of the 1980s, most notably of Alcatel NV and Compagnie Generale des Constructions Telephoniques (CGCT), which intensified pressure on government to change its position on regulatory practice.

Although the equipment markets were, by this stage, fully liberalized, proposals for the broader liberalization and privatization of the network were postponed until after the 1988 parliamentary and presidential elections. In 1989, however, the Socialist government of Michel Rocard began to consider the proposals for liberalization propounded in the Prevot report, which Rocard had commissioned to guide debate about the future structure and activities of the PTT.

The Prevot report recommended the continued unity of the posts and telecommunications services under the Ministry of Posts and Telecommunications, while calling for:

- Increased autonomy of management;
- Separation of regulatory and operational activities;
- Clearer financial accountability.

Specific recommendations included:

- A proposal that France Telecom be changed from a civil service department to a public corporation;

- The suggestion that the Direction de la Reglementation Generale, a directorate of the PTT, was not sufficiently separated from the activities of France Telecom;
- A proposal for a general law and pluriannual contracts stating precisely the financial relationship between the state and the posts and telecommunications authorities.

The report argued that postal and telecommunications services should remain public services with their employees continuing to receive the full, though perhaps less formalized, rights of civil servants. Finally, the report suggested that telecommunications services in France continue to be provided through a mix of monopoly and competitive environments, though it remained unclear about where or how such a distinction should be made.

In the wake of the Prevot report, the French government embarked upon a reorganization of the PTT in 1990 and to a large extent acted upon nearly all of its proposals. By the end of that year, on the initiative of Paul Quiles, Minister for Posts, Telecommunications and Space, the French Parliament voted through two laws which had a dramatic impact on the future of telecommunications as a public service. The first law, voted through in July 1990, gave France Telecom the status of an autonomous operator under public corporate law, as the Prevot report recommended. France Telecom was formally separated from the French government and for the first time was made responsible for its own budget.

The second law, voted through in December 1990, laid the groundwork for a regulatory system in the communications sector. The law aimed at establishing an open market and represented a radical step forward for French operators.

One of the most notable features of the new legislation was that a very distinct difference was established between services such as the national telephone and telex service and public payphones, which continued under the aegis of France Telecom, and services such as terminal supply, mobile phone networks, and VANs [value-added networks], which were opened up to competition. The data transmission market, originally intended as a monopoly, was also to be opened up.

Despite this flurry of legislation, Rocard's Socialist government went on to be wary of the private sector; the French government has never demonstrated the same fervor for deregulation that has characterized British development over the past decade. As Jean Berry, spokesman for the Association Francaise des Utilisateurs du Telephone et des Telecommunications (AFFUTT), pointed out as the legislation was passed, the "law goes as far as the political and psychological context of France allows", meaning that a Socialist government would always be reluctant to move towards a totally free market. This caution has meant that competition is

limited by certain regulatory controls. Private companies hoping to operate cellular networks, for instance, have to comply with a set of "public service" obligations such as providing national coverage.

To counter the challenges posed by private operators in an increasingly open domestic market, France Telecom has intensified and expanded its international activities. Like many other operators, France Telecom has focused its attentions on developing partnerships with other international carriers with the aim of being able to offer multi-vendor "one-stop shopping arrangements". Europe's first "one-stop shopping" agreement was signed by France and Germany in 1989. Since then, agreements have been signed with the Belgian RTT, Telefonica in Spain, British Telecom International in the UK, PTT Telecom in the Netherlands, and Teleglobe Canada. The company expected to sign agreements in 1991 with Hong Kong, Ireland, Switzerland, US Sprint, IDB, and Worldcom. France Telecom is also a signatory of the European agreement on "one-stop shopping," which will provide a formal groundwork for US leased line customers to access the entire European market through a single point of contact.

France Telecom's international strategy continued apace in 1990. In the course of that year, a protocol of agreement was signed for the continuation of studies concerning the SEA-ME-WE 2 optical submarine cable linking Western Europe, the Middle East, the Indian subcontinent and South East Asia. This project is scheduled for completion in 1994.

Another protocol agreement was signed for the construction of the SAT 2 submarine fiber optic cable which will link South Africa to the Island of Madeira and the Canaries. It will then be connected to the EURAFRICA cable (linking France, Portugal, Morocco, and the Island of Madeira), to go into service by mid-1992. In July 1990, France Telecom became a member of the "Trans-Soviet-Line Development" consortium responsible for planning the Trans-Soviet optical cable project linking Western Europe, the Soviet Union, and Japan. In December 1990, the Eastern Mediterranean Optical Network EMOS-1, linking Sicily with Greece, Turkey and Israel was put into service.

France Telecom has also carried through a policy of making acquisitions abroad. In November 1990, the company (through its subsidiary France Cables et Radio) purchased 32.5 percent of Telecom Argentina, the new telephone operating company in the north of Argentina which was established in the wake of the acrimonious break up of the Argentine state monopoly ENTEL. In December 1990, the company chose a consortium made up of France Telecom, Southwestern Bell, and Grupo Carso to take control of Telmex, the national communications carrier.

The PTT Today

At the end of 1990, France Telecom reported a turnover of 103,000 million French Francs (FF), an improvement

of 8 percent on 1989's figure. The company accounted for this increase by pointing to the success of rapidly growing products such as fax, telematics, the telephone kiosk service, and toll-free numbers. At the same time, France Telecom reported a substantial growth in the use of data transmission services (up 14 percent) and mobile telephony (up 30 percent), both of which also contributed to the company's increased turnover.

France Telecom is structured at four main levels.

- The highest level, Central Administration, is headed by the Directorate General for Telecommunications. It defines and organizes overall policy.
- The second level consists of seven national directorates, three special service divisions, and 22 regional directorates, with each regional directorate implementing national objectives within its own area, and research centers (CNET, CCETT, SEPT).
- The third level has 57 operational directorates, five of which are responsible for the national networks within their areas; four for overseas territories; and 48 for management, operation, and maintenance of network services and customer relations. This level also includes two national schools and one institute, all of which operate as telecommunications education centers.
- The fourth level includes switching centers, line construction units, and engineering and commercial agencies.

Included in France Telecom's top level of organization is the Compagnie Generale des Communications (Cogecom), the holding company for all France Telecom's subsidiaries responsible for the development and operation of specialized communications services apart from mobile communications. In the course of 1990, Cogecom reinforced its financial structure within the France Telecom Group. Cogecom's capital was increased to FF 2,400 million in order to support the development of its subsidiaries, particularly abroad.

The following subsidiaries fall under Cogecom's umbrella:

- TRANSPAC operates the packet switching network. In 1990, this division announced a turnover of FF 3,600 million and a staff of 1,000.
- Telesystemes supplies data communications equipment and services in France. In the course of 1990, this division set up an Italian affiliate, Telesystemes Datamont, and acquired shares in the German firm IOP. In 1990, this division reported a turnover of FF 1,600 million with a staff of 2,870.
- France Cables et Radio (FCR) is responsible for new ISDN [integrated services digital network]-type services: Transfix, Transcom, and Transdyn. FCR has its own subsidiaries, including those responsible for value-added messaging services and promoting

French telematics products internationally. In the course of 1990, FCR acquired 32.5 percent in the capital of Nortel, operator for ENTel Argentina, and acquired 80 percent of Cylix Communications in the USA. FCR announced a 1990 turnover of FF 1,500 million and a staff of 970.

- Entreprise Generale des Telecommunications (EGT) supplies, installs, and maintains equipment such as Eurosignal, radio telephone receivers, telephone answering equipment, and facsimile terminals. In 1990, this division employed some 1,080 staff and reported a turnover of FF 1,000 million.
- Telecom Systemes Mobiles (TSM) is responsible for the cellular mobile telephone system. In the course of 1990, TSM bought a 10 percent share in the British company Phonepoint. In 1990, this division announced a turnover of FF 200 million and had a staff of 170.
- Telediffusion de France (TDF) is the television operator in which Cogecom has a 51 percent shareholding. In 1990, TDF reported a turnover of FF 3,600 million and a staff of 4,140.
- Other Cogecom subsidiaries had a staff of some 10,300 and accounted for a turnover of some FF 11,600.

By the end of 1990, France Telecom staff numbered 164,000. The organization had begun to shed staff in the late 1980s, but a renewed hiring policy at the end of 1989 meant that 4,000 employees were taken on in the course of 1990, of which 1,050 were in management positions. This brought the proportion of management level employees to 14 percent.

Research and Development

Approximately 4 percent of France Telecom's total turnover was devoted to research in the course of 1990. This includes some FF 2,000 million for research conducted by the Centre National d'Etudes des Telecommunications (CNET), and more than FF 2,000 million devoted to outside R&D contracts. CNET employs almost 4,000 people; in addition, 135 scientists from other administrations (primarily the CNRS), as well as 140 post-doctoral thesis candidates work in CNET laboratories. CNET devotes approximately 30 percent of its resources to basic research for telecommunications applications, 48 percent to network studies, and 22 percent for product lines (terminals, services, mobiles, etc.).

The Telephone Network

By 1991, the number of main telephone lines had increased by more than one million, bringing the total to over 28 million. The demand for new residential lines has started to diminish, whilst the business demand, driven primarily by the explosive growth of fax, has risen significantly (upwards of 650,000 lines in 1990).

The PSTN's rapid growth from a very modest base has given France a technical lead over other countries. By the end of 1990, 75 percent of all transit switches were digital, as was 93 percent of the local network. CCITT [International Telephone and Telegraph Consultative Committee] Common Channel Signalling System No. 7 was implemented on international transit switches by the end of 1989.

Automatic free calls for PSTN subscribers calling registered organizations (who pay for the calls) are provided by "Numero Vert" - Green Number - for national and international calls. At the beginning of 1991, this service had some 14,300 subscribers. Other services also showed a marked upward swing in the course of 1990, summarized below:

- Custom calling: 1,700,000 subscribers, an improvement of 41 percent over 1989;
- Itemized billing: 2,450,000 subscribers, an improvement of 36 percent over 1989;
- Direct inward dialling: over 12,000 business sites, a 50 percent increase over the 1989 figure. These installations cover more than 3 million telephone numbers;
- Card-operated public payphones: 72,000, an increase of 30 percent. 60 million telecards were sold in 1990, a remarkable increase of some 40 percent. By the beginning of 1991, telecards accounted for 67 percent of the total turnover brought in by public payphones. The newly introduced Pastel credit card was also in demand during the course of 1990 and had, by the beginning of 1991, some 810,000 subscribers.
- Dedicated lines: accounted for FF 5,700 million in gross income in 1990, an increase of 14 percent on 1989, and represented France Telecom's second most important product, after the telephone. By the beginning of 1991, there were 543,000 dedicated lines (380,000 local and 163,000 long distance).

International telephone traffic in 1990 reached 1,900 million minutes, a 13 percent increase on 1989's figure. Turnover achieved was approximately FF 9,600 million, up by 14 percent over the 1989 figure. Telephone traffic accounts for 86 percent of revenues from international operations which represent 10.8 percent of France Telecom's total turnover. The high volume of traffic is partly attributable to the fact that international calling rates from France are among the lowest in Europe.

France has a competitive market for private telecommunications equipment. Telephone handsets can be rented from France Telecom or purchased from approved suppliers. The PBX market is supplied entirely by the private sector. Alcatel and Jeumont-Schneider are the major PBX suppliers, with Matra-Ericsson Telecommunications also having a strong presence. GPT (now owned by GEC of the UK and Siemens of West Germany) established in 1990 a subsidiary in France (GP Telecommunications) to sell customer premises equipment.

Mobile Communications

Although the development of mobile communications in France was initially rather sluggish, particularly compared with its European neighbors, the end of the 1980s saw rapid growth in one of France's more competitive markets.

France Telecom describes itself as the main operator in this field, and in the face of increasingly ferocious competition, has had to innovate in both marketing and technological divisions in order to hold its ground. The company coordinates the different services marketed by the Group's operational entities under the central division Telecom Systemes Mobiles. These services include:

- Radiocom 2000
- Alphapage
- Eurosignal
- Operator

Radiocom 2000

Radiocom 2000 is a cellular radiotelephony system operating at 200MHz and 450MHz. This service had 230,000 subscribers by the beginning of 1991, a 40 percent increase on 1989's figure. Radiocom 2000 covers all the national territory and 97 percent of France's population. The high-density network, deployed in July 1990 in the Ile-de-France region, enabled the gradual resumption of subscriptions for nationwide service. In addition, two new regional services subscriptions are now commercialized: France North-East and Ile-de-France VHF.

Radiocom 2000 provides two types of service: car telephony, enabling calls to or from the public switched telephone network (PSTN) to be initiated or received in a vehicle; and corporate network type services, among a closed group of mobile users. This latter concept is made up of mobile terminals, with or without access to PSTN, and stationary terminals known as "bases."

Alphapage

Alphapage, the radio-paging system, opened in 1987, and was brought to the market by Telecom Systemes Mobiles. The system transmits messages in alphanumeric form in the following ways: text messages of up to 80 characters from a Minitel; messages of up to 15 digits from either a Minitel or a voice-frequency telephone; four sound or light signals triggered by telephone. By 1990, the service had attracted more than 60,000 subscribers and was available in 29 cities of more than 100,000 inhabitants - effectively more than half of the French population. Stockpage, Alphapage's E-mail system, memorizes the messages for 24 hours. These messages can be consulted on a Minitel.

Eurosignal

Eurosignal, a personal paging service, has continuous coverage of some 835,000 km through France, Switzerland, and Germany. The system operates a tone and light

signal and is conceived of as a precursor to European-wide mobile services. By 1990, it had a subscriber base of some 120,000.

Operator

Operator, a radiopaging service marketed through TDF, enables the carrier to receive audible signals or numerical codes at any point where the French radio station France Inter can be received. By the beginning of 1990, the number of subscribers had more than quadrupled from 4,000 to 18,000. The turnover was approximately 70 million francs, 40 percent generated by subscriptions and 60 percent by sales of receiver terminals. Also by 1990, voice E-mail, an E-mailbox service, and 24-hour operator assistance were in operation.

France Telecom has started programs aimed at developing future services. These include the following.

- GSM, the future pan-European digital cellular mobile system, is slated to replace Radiocom 2000. Defined by a European standard, GSM will enable travelling subscribers to converse with one another and to transmit data from, for example, a Minitel. Pilot networks were ordered from two industrial groups, Matra Communications associated with MET (Matra-Ericsson Telecommunications) and the consortium ECR 900 made up of various European affiliates of Alcatel NV, AEG and Nokia.
- Pointel, a new-second generation cordless communications system, enables a caller to place calls toward the PSTN via a cordless "callbox". A pilot network is planned for 1991.
- Euteltracs, Eutelsat's messaging and vehicle location system, is operated by France Telecom. The company has announced that it will be brought into service in mid-1991. The ground system is located at France Telecom's Rambouillet Centre des Telecommunications des Reseaux Exterieurs. Two antennae relay Euteltracs signals to and from two Eutelsat satellites. The ground station is linked to the control centers belonging to each operator wishing to offer the Euteltracs service. Euteltracs allows two-way alphanumeric communication with vehicles anywhere in Europe. Fleet operators are also able to monitor the position of their vehicles via computer displays at their control center.

Data Communications

In 1984, France upgraded its original Transmic ("mic" is the French acronym for pulse code modulation) digital leased-circuit service into separate services, providing full-duplex, synchronous transmission. The low-speed service provided transmission speeds of 2,400, 4,800, and 9,600 bps and was based on land links between access points in major towns. In 1986, Transcom, a new low-end service, opened to provide full-duplex, synchronous transmission at 64K bps. The medium- to high-speed service, called Transfix, provides transmission

rates of 48 bps to 1,024K bps, though an effective transmission rate of 2,048K bps can be reached by combining two 1,024K bps circuits. The Transfix service is based on a combination of land and satellite links via the Telecom 1A and 1C satellites. France Telecom supplies the modems for this service as part of the installation and prohibits connection of privately supplied modems. The third service in the "Trans" range is Transdyn, an ISDN-type service using leased circuits. This service offers point-to-point and point-to-multipoint links with a preprogrammable configuration. It provides transmission rates between 2,400 bps and 19K bps.

Transmission over the French PSTN is available at the following speeds:

- 50 to 300 bps full-duplex, asynchronous/synchronous;
- 600 bps and 1,200 bps half-duplex, asynchronous/synchronous;
- 1,200 bps full-duplex, synchronous;
- 1,200, 2,400, and 4,800 bps half-duplex, synchronous.

The PSTN also provides for international connections at 1,200 bps full-duplex and 4,800 bps half-duplex. Users can obtain modems for all speeds from approved suppliers.

Nonswitched data-transmission services use both analog and digital leased circuits. Telegraph grade, voiceband, and wideband analog circuits are available with full-duplex transmission rates of 50 bps to 72K bps. International leased circuits, via analog links providing rates of up to 72K bps, are available to all Western European countries. Leased circuits to Canada, Japan, and the USA provide analog rates of up to 9,600 bps via cable and digital rates of up to 56K bps via satellite links.

TRANSPAC

The French Packet-Switched Data Network (PSDN), TRANSPAC, introduced at the end of 1978, is operated as a Cogecom subsidiary. The service provides X.25 and asynchronous connections via a dedicated network of switches connected by high-speed links. TRANSPAC carries 2,700,000 million characters each month, 45 percent of which are for the Teletel service. It is the world's largest packet-switching network with, at the end of 1990, more than 82,000 direct accesses and 210 switches (see Table 1).

Other services using the TRANSPAC network include telex, teletex, and videotex (Teletel). Regular subscriber switches are gradually being replaced by advanced switches with SESA DPS 25 architecture. Transit switches, based on the multipurpose Alcatel X83 design, handle trunk traffic between subscriber switches.

There are two main types of access to TRANSPAC: direct connection and the PSTN. Both methods are full duplex, though access is also available via the telex network at 50 bps through half-duplex, asynchronous links. Direct access provides rates of 300 bps and 1,200

bps asynchronous and 2,400 bps to 48K bps synchronous. Access via the PSTN provides rates of 300 bps and 1,200 bps asynchronous, 1,200 bps and 75 bps for videotex, and 2,400 bps and 4,800 bps synchronous. Users with direct connections can access each other, or PSTN or telex connections. PSTN or telex users can access only direct connections. The "Noeud de Transit International - NTI" (International Transit Node) provides connections to many overseas countries. The unit price per kilobit was reduced from 7.3 centimes to 6.9 centimes in January 1990.

Table 1: TRANSPAC Accesses

Year	Number of Direct Accesses
1986	41,000
1987	51,000
1988	60,200
1989	70,000
1990	82,000

Text Services

Telex, enhanced with the Minitel and Telex Plus services, has continued to be a popular international communications tool. Minitel (use of a Minitel to send telex messages) attracted some 6,000 subscribers in 1990, and more than 10,000 subscribers were expected by the end of 1991. Telex Plus, a facility offered to any telex subscriber, enables messages to be sent simultaneously to multiple destinations.

Teletex, an international electronic mail service, permits the exchange of office documents among dedicated terminals and specially equipped personal computers. In 1990, the number of subscribers reached 7,000, with some 25,000 users. Terminals from approved suppliers can be connected via a dedicated line to the PSTN or PSDN networks.

By the beginning of 1990, France Telecom reported that some 12,377 information services were available on the Teletex network. They are divided roughly equally between general interest and professional services. On the other hand, professional consultations continued to increase in the course of 1990: professional traffic represented 52 percent of all videotex, versus 46 percent in 1989. The most extensively known service is the Electronic Directory which in 1990 received 40 million calls and was consulted for a total of 1.4 million hours per month. As an extension to this service, France Telecom introduced the first telematic E-mail service, known as Minicom. Initial results in 1990 reveal consultation rates on the same order as those for the Electronic Directory.

At the end of 1990, the number of Minitels exceeded 5.6 million, one million of which are on lease; this is equal to one in five subscribers. In 1990, the Minitel generated direct turnover of FF 2,100 million.

Fax services have continued to expand at an almost explosive rate. The number of fax terminals at the beginning of 1991 had reached 580,000. Traffic is about 15 pages sent per day per terminal on average.

Value-added services offer a broad range of information services to any terminal connected to the server. Well positioned among the E-mail services proposed by France Telecom, Atlas 400 is the standardized public support for value-added services and electronic data interchange (EDI). The three main applications for Atlas 400 are personal messages, multiple terminal distribution, and EDI. By the beginning of 1991, there were 3,700 mailboxes, including 220 private servers.

CNET's Research and Development Activities

Networks and Services.....54 per cent
Basic Telecommunications.....30 per cent
Network Management 16 per cent
Video Services

Videoconferencing services in France are offered through France Cables et Radio (FCR). By 1991, FCR was able to announce that it could provide videoconferencing services from 11 public studios in ten major cities - Bordeaux, Lille, Lyon, Marseilles, Metz, Nantes, Paris, Rennes, Rouen, and Toulouse. Ten mobile studios have also been operational since the beginning of 1985, while subscribers can build and operate their own private studios. Links are available to the USA, the UK, Germany, Italy, the Netherlands, and other countries. International videoconferencing usage underwent a sudden boom in the early part of 1991 as a result of restricted air travel in the wake of the Gulf war.

ISDN

The development of ISDN services in France has proved a considerable success.

The first ISDN project was undertaken as far back as 1986 in the Cotes du Nord and Rennes regions of Brittany. Part of this project involved developing a migration path toward a future broadband ISDN.

In 1987, France Telecom began providing Numeris, its full national ISDN service. The first interconnection trials began in 1989 and France Telecom began setting up accesses, connectors, and services in order to link up with other countries which had already developed their ISDN systems.

Primary access has been offered since October 1989, and allows the connection of 30 B channels at 64K bps and one D channel also at 64K bps. It is available along with the basic access which has been in place since 1987 (two B channels at 64K bps and one D channel at 16K bps). Owing to its high bit rate (2M bps), primary access meets the needs of large installations such as private switches (PABX), big computers, and servers, and applications which require more than six basic accesses. France

Telecom also extended its offer of Numeris terminals with a new range of telephone sets, adaptors, and switches.

By the beginning of 1990, basic and primary accesses were made available in the Paris area and the new towns of the Ile de France region, as well as in Lille, Lyons, and Marseille. By 1991, the service was available nationwide with some 500 basic accesses and 500 primary accesses.

At the same time, France Telecom has pursued a policy of forming partnerships for the development of Numeris. By 1990, 38 partnership agreements had been signed with customers, as well as nine cooperation agreements with computer manufacturers including: Bull, Electronic Data Systems, Apple, ICL, Telesystemes, Hewlett Packard, Nixdorf, and IBM.

The Future

Clearly, France Telecom's strategies, both domestic and international, have been very much defined by changes in the regulatory structure of the French telecommunications environment and the way in which powerful operators, like Alcatel and Matra, have been moving in predatory circles around France Telecom's central base.

The government formed by Edith Cresson in May 1991 is likely to introduce much more caution into industrial policy than did the government of Michel Rocard, which still only moved towards deregulatory measures under the weight of EC pressure. At the end of May 1991, Cresson announced the creation of a new "superministry" which would take responsibility for finance, industry, foreign trade, and telecommunications. France Telecom, which had been given financial autonomy only a few months earlier, has found itself once again under government control.

Nonetheless, the pace of change has been set and it seems inevitable that France's telecommunications sector, albeit grudgingly, will move towards a much freer environment. For France Telecom this has meant a huge push in internationalization, diversification, and research.

(Datapro Research Staff)

Infrastructure, Market Analyzed

91WS0467B Maidenhead TELEFACTS in English
Jun 91 pp 12-16

[Article: "French Market for Public Switching and PBX, KTS and Centrex"]

[Excerpts] [Passage omitted]

France: A Case Study

France recently completed a reorganization that split France Telecom (FT) from the government as a whole. FT is now a government-owned corporation, but does not rely on government funding. The lucrative French

market features one of the most advanced digital networks in the world. Technological innovation has flourished with government participation, but software services and network applications have not kept pace. FT runs the risk of losing its high-margin international accounts to carriers that offer integrated network services, including leased lines and facilities management. FT's competition will come from international players such as British Telecom, Cable & Wireless, and Digital Equipment Corporation.

Within France, in the public sector, Alcatel has a lock on the market with a 1990 market share of 92 percent. Despite economic uncertainty, FT added 2 million new lines last year. France's telecommunications infrastructure is very mature with a high percentage of digitization. Advanced network services hold the greatest potential for growth. French ISDN is making significant progress. Last year, ISDN interconnection with Germany, Belgium, the USA and Japan was accomplished.

In the private switching arena, France is one of the largest and most attractive markets in Europe - and it is also one of the most difficult to penetrate given Alcatel's dominance. France is the second largest PBX/KTS [private branch exchange/key telephone system] market in Western Europe. CPE [cellular phone equipment] demand is expected to grow moderately through 1993.

Public Switching

Position

- Market size, 1990: 9,903,000 DLLPIS
- Installed base: 28,003,000 MLIS
- Percent digital installed base: 69 percent

Market leaders, 1990

- Alcatel: 92 percent market share

Local Distributors

- Alcatel: Alcatel CIT (Subsidiary)
- Telic Alcatel (Subsidiary)

Growth Potential

- 11,601,000 DLLPIS 1991-1995

Market Assessment

Despite a global recession, the Persian Gulf crisis, and the maturity of the French network, FT added 2 million new lines last year.

During the past year, France, Germany, Japan, the USA, and the UK continued to lead in the race towards national ISDN deployment. In the USA, local exchange companies and long-distance carriers tariffed several new commercial offerings. France and Germany both continue to progress steadily in building a national ISDN network. They have also agreed to interconnect their national services to create the first integrated European service - a landmark in ISDN. Japan and Britain also

completed trials, but there is still considerable resistance to widespread ISDN deployment. [passage omitted]

In France, its ISDN offering, Numeris, continues to grow and it is expected to have more than 150,000 subscribers by 1992. E-10-based basic rate ISDN service was offered in Paris, Marseilles, Lyons, and Lille in 1989. Primary rate service went into commercial operation late in the year. In 1990, ISDN coverage expanded throughout the country with special emphasis on graphics and video applications. In the same period, FT achieved ISDN interconnection with Germany, Belgium, the USA, and Japan.

Domestically, the expansion of ISDN across France will result in steady demand for Alcatel E10 systems, which have been modified specifically for the network. Two years ago, FT introduced Ericsson's AXE systems into the network as a means of maintaining competition between two CO [communications operations] suppliers. In 1990, 16 percent of lines placed in service belonged to Ericsson.

New ISDN software releases expected to appear in France this year will support image applications and interconnection of PBXs [private branch exchange] with PRI.

Regulatory Issues/Policy Issues

The French parliament recently approved plans to deregulate certain telecommunications services, most notably CPE and value-added network services. The final outcome of these moves is still pending.

FT, meanwhile, is one of a handful of former PTTs moving beyond national borders. Despite its continued links to the French government, FT recently created a unit charged with seeking out overseas ventures. One targeted project would be a cellular network in Greece.

In the transmission market, France wants to lead Europe in the development of advanced telecommunications systems and services. Though loyal to domestic suppliers, FT seeks the most advanced technology available in order to maintain its leading position. For instance, FT is acquiring digital cross-connect systems from AT&T. Opportunities exist for suppliers touting advanced technologies that fit into France's domestic network and that FT can exploit in international markets. Nationalist concerns remain a top priority however.

Public Switching Outlook

France's telecommunications infrastructure is extremely mature with its current 69 percent digital installed base. Advanced network services including the "Colisee" VPN network, hold the greatest promise for potential growth. Despite a still sluggish economy, FT is counting on the advanced state of its system as a competitive strength. Furthermore, with E10 and AXE systems set side by side within the Numeris network, more advanced

service offerings will be another strength. For CO suppliers, however, the Alcatel-Ericsson hold on the market makes France a closed field.

The French PBX, KTS, and Centrex Market

Position

- Access lines, 1989: 26,305,000
- KTS shipments: 285,000
- PBX shipments: 1,177,000
- Centrex lines placed in service: 0
- Total: 1,462,000

Market Assessment

- The Finance Ministry of France has simplified procedures for foreign investment by lifting the country's remaining exchange controls. In addition, the French PTT has been subject to deregulatory measures.
- France is the second largest PBX/KTS market in Western Europe, accounting for about 20 percent of all lines sold.
- CPE demand is expected to grow moderately through 1993.
- Voice messaging products are in high demand, and vendors may enter the systems market by first providing related market products.
- Over the next few years, the CPE industry will continue to restructure, with small players dropping out and larger established players or large newcomers picking up the pieces.
- FT's aggressive promotion of ISDN will spur demand for ISDN PBX equipment. By 1993, France will purchase approximately 20 percent of all ISDN PBXs in Europe.
- Centrex service is available on a limited basis from FT and will most likely be incorporated into ISDN service offerings.

Regulatory Outlook/Policy Issues

- An EC member and policy leader, France is also the greatest champion of "sovereign rights" to protect domestic industry.
- France faces both local and international pressure to continue to liberalize its telecommunications policies.
- France's trade unions remain extremely resistant to innovation, deregulation, liberalization, and reform.

Distribution Opportunities

- A large, well-developed, and powerful network of independent and semi-independent distributors is the main sales channel in France.

- However, suppliers are developing direct sales in lieu of independent distributors in an attempt to decelerate price erosion in the French PBX market.
- FT's desire to increase share in the KTS market and break into the PBX market represents a new opportunity, particularly for suppliers with ISDN.

Outlook

Although the oil crisis has affected France's economic growth, its inflation rate still regularly dips well below the EC average. With its robust economy, France is one of the largest and most attractive markets in Europe, and one of the most difficult to penetrate. The reason: Alcatel—a global force in telecommunications.

Alcatel N.V. is emerging as a top global force in telecommunications for the 1990s. The company has the financial ability, the management experience, and the desire to continue to expand in telecommunications. By the middle of the decade, Alcatel, which bows to no one on its home turf, France, could become the world market leader in most public, and some private, network equipment sectors.

Since its foundation in 1987, by a merger of ITT's telecommunications companies and Alcatel's French-based telecommunications operations, Alcatel N.V., against all odds, has been an unqualified success.

The ITT European telecommunications empire that Alcatel bought was crumbling. Its flagship product, System 12 (S12), did not work properly and, bloated with excess workers, products, and manufacturing capacity, ITT was barely turning a profit. With break-neck speed, Alcatel turned the company around, successfully integrating the ITT companies with its French operations, trimming staff, rationalizing manufacturing and R&D, and fixing the flaws in S12.

Public network equipment sales increased faster than private network sales, and European sales mounted faster than international sales. Without a doubt, this was due to the success of S12 in Europe. It is now the most widely used digital switch in Europe. Europe's largest and most important PTT customers are satisfied with the switch's performance.

The success of S12 demonstrated the technical and marketing skills of Alcatel's managers. Not only were S12's problems fixed, but customers were convinced of its future viability and Alcatel's ability to manage two product lines in CO switching, S12 and the French E10. FT, the French PTT, is counting on E10 to build one of the most sophisticated public "intelligent networks" in the world. Technical co-evolution for intelligent networks, shared components, software, submodules, and supermodules will keep both switches competitive throughout their product lives.

With its acquisition of Telettra, Fiat's telecommunications transmission equipment subsidiary, Alcatel now rivals AT&T in size. The current Alcatel game plan is to

continue to build its European public and private network equipment business, and to expand operations in the Pacific region - NTT, the Japanese PTT and the richest telecommunications company in the world, is notably absent from Alcatel's major client list - without neglecting Eastern Europe, Latin America, the Middle East, and Africa. By the mid-1990s, Alcatel is likely to enter the US market on a large scale, both in public and private networks.

Because of its financial resources, and above all because of its proven ability to grow organically and through acquisition, Alcatel is among the most dangerous competitors in telecommunications today.

In 1990, Alcatel had 14.9 percent of the digital local lines placed in service (DLLPIS) worldwide, second only to Northern Telecom. Alcatel also led the world public switching vendors in Eastern Europe last year with a total market share of 74 percent of the digital local lines shipped to the region.

Alcatel benefits from the strategic location of its many subsidiaries. The governments of Italy, Spain, and Belgium have traditionally provided Alcatel customers with favorable financing. Alcatel Bell Telephone, the company's Belgian manufacturing division, arranged joint ventures for S12 switch production in China and Turkey with the help of Belgian government foreign aid. As a result, Alcatel has placed more than 1 million digital lines in service in each of these countries. Through Alcatel SEL, the company's German subsidiary, Alcatel became the first supplier to install a digital switch in the former German Democratic Republic. In addition, French government-financed joint ventures in Poland and the USSR were instrumental in making Alcatel the top supplier of digital switches in Eastern Europe.

Alcatel is positioned to become the number-one switch supplier within the next two years. The company is rapidly expanding its presence through joint ventures in Eastern Europe. If both China and the Soviet Union develop into major markets over the next four years, Alcatel could become the runaway leader in CO.

Alcatel positions itself to capture developing market customers by finding the best financing available. With its wide geographic spread of subsidiaries, Alcatel has more ways to tap into government funds to finance its customers. Through aggressive bidding, the company was able to steal business away from other suppliers in 1990, most notably from Ericsson in Australia and from AT&T in Taiwan.

Sales resulting from low-price leadership and explorations in cash-starved developing markets will not contribute much to Alcatel's profitability, at least over the short term. However, Alcatel sees huge potential for cost savings from integrating its two CO lines, the E10 and S12. While the company once considered the two lines as separate and competing with each other, it now markets both through the same export subsidiary. Although the

architectures of the S12 and E10 are radically different, Alcatel is developing common basic components to be used in both lines.

In the private sector, Alcatel is streamlining its CPE product line to eliminate overlapping product development and to provide easy migration and network development. It is attempting to cement a global market leadership position in inter-PBX signaling by announcing the Cornet system with Siemens and throwing into question the continued viability of the alternative DPNSS system.

Alcatel remains the second largest CPE supplier in the world, largely due to its dominance of the Western European PBX and KTS markets. In order to obtain the number one spot, Alcatel must either: (a) generate more sales worldwide than AT&T can draw in the USA, or (b) completely dominate an Eastern European market growing at a phenomenal rate. Although Alcatel is the unquestioned leader in Europe, it continues to face several challenges. These include rationalization of its many product lines, control of its decentralized organization, and improvement in operating efficiency. Alcatel must design an integrated product line.

(Northern Business Information Staff)

France: CNET Telecommunications Research Center Expands Mission

91WS0474B Paris L'USINE NOUVELLE in French
6 Jun 91 pp 74-75

[Article by Jean-Pierre Jolivet: "New Missions for CNET"; first paragraph is L'USINE NOUVELLE introduction]

[Text] Michel Feneyrol, director of the National Telecommunications Studies Center [CNET], will oversee changes at one of the biggest French research centers.

The National Telecommunications Center (CNET) is in the process of major changes. More and more, the France Telecom laboratory will be contributing to French research policy, not just in telecommunications, but also in the software, services, and semiconductor areas—a strategy that Michel Feneyrol, its new director, wants to give a resolutely European outlook as well.

CNET (whose annual budget exceeds 1.8 billion) was forced either to expand its mission or to see its funding dwindle. The result has been a veritable cultural revolution for its 4,200 employees (more than half of whom are researchers, distributed among seven main sites), who suddenly must adapt to the new telecommunications landscape. In the space of a few years, the environment has changed remarkably, what with deregulation, France Telecom's new status, and industrial upheavals. Gone are the days when CNET handed over to CGE [General Electricity Company] the first French E10 time-switching telephone exchange, considered a technological innovation. Since 1987, Alcatel, the leading French

telephone exchange maker, has become European by buying out ITT's telecommunications branch.

Michel Feneyrol is clear on the situation: "Developing hardware is now the responsibility of the manufacturers, with which we will have less and less contact. However, when it comes to major technological changes, CNET does have something to say." Development of the new OCB 283 exchange, soon to be installed at France Telecom, was financed by its manufacturer, Alcatel-CIT. CNET was only involved as France Telecom's expertise laboratory.

Pilot Network

However, it is playing a major role in the development of the asynchronous time-switching technology (ATM) [Asynchronous Transfer Mode], a forerunner of tomorrow's wideband integrated services digital networks. With this technology currently being standardized by CCITT [International Consultative Committee on Telephony and Telegraphy], CNET has just come in with Alcatel-CIT and TRT (Philip's French subsidiary) on the Brehat project for the purpose of preparing the specifications (detailing services offered, the network, and the hardware). These specifications should lead to the delivery of a pilot network in mid 1993.

While CNET may have decided to downplay hardware, it is touting itself as the major software laboratory. Its know-how now focuses on network architectures, software, and services. This is not surprising, given the importance of software in a modern switching system (over 70 percent of the cost of developing a telephone exchange). Similarly, it is software that will enable France Telecom to improve the operation of its network and, with it, its productivity. "Deregulation and the advent of competition have made it necessary for operators to develop their software and service capacities—all the more so since computer communications account for an increasingly greater share of the traffic," Michel Feneyrol said. France Telecom knows that its major international competitors are already off and running. Since the dismantlement of the AT&T monopoly in 1984, Bell Lab's head count has gone from 26,000 to 29,000 researchers. British Telecom has doubled its research staff, which is now at 4,000. And in 5 years of privatization, the number of researchers at Japan's NTT has gone from 3,000 to 7,000. Most of these new hires are in software.

Commercializing Its Technology

Given the extreme fragility of the French and European electronics sector, CNET has also been given the mission of providing manufacturer support in certain telecommunications-related fields. France Telecom has the money; CNET, the expertise. In semiconductors, for example, CNET has joined with SGS-Thomson on a Grenoble 92 program aimed at industrializing the 1-micron technology chip. In the field of display devices, CNET has established the Planecran consortium, which

is enabling Sagem to industrialize an innovative flat liquid crystal display technology.

CNET plans to amplify this strategy of working with manufacturers to commercialize its technology by subcontracting and by pursuing an active policy of seeking research contracts, particularly with small and mid-sized firms, both French and foreign. Almost 12 months of reflection led CNET management to orient its strategy toward the European context. "Gallop inflation in telecommunications research and development costs will force the Europeans to pool their resources. This is why Eurescom [Institute for Research and Strategic Studies in Telecommunications] was created," CNET's director said. The goal of the organization, which brings together telecommunications operators, equipment manufacturers, and service companies, is to conduct joint research aimed at harmonizing the development of networks and associated services, particularly with regard to computer data transmissions, in which telecommunications operators are obliged to take computer industry standards into account. Eventually, the organization sees itself as the major European telecommunications expertise laboratory, along the lines of the U.S. Bellcore.

In the meanwhile, CNET is focusing its efforts on making its activities fit in with France Telecom's new corporate logic—which is not the least of its challenges.

France: Industrial Policy Debates Discussed

91WS0425A Paris L'USINE NOUVELLE in French
27 Jun 91 pp 20-22

[Article by Gerard Dubois: "French Industrial Policy: The European Imperative"; first paragraph is L'USINE NOUVELLE introduction]

[Text] Edith Cresson's first decisions are expected this summer...

France's industrial policy has been taking its lumps lately. On the one hand, the European Commissioner for Competition has challenged the decision to give Thomson an injection of capital. On the other, a still-confidential Planning Ministry report has informed the prime minister that unless the electronics industry moves quickly to a Europe-wide footing, it will be dead in 10 years. Implicitly to blame in both instances is the excessively nationalistic interventionism of French authorities. Edith Cresson understands this; beginning this summer, she plans to imbue her high-technology policy with a European dimension, in assistance as well as initiatives. If she needed further convincing, the case of Locstar, the satellite tracking company, would provide an instructive example. Here we have France Telecom helping the company obtain frequencies and buying into its capital...while simultaneously teaming up with Euteltracs, its principal competitor! The authorities have been unable to make a clear-cut decision. Once again, such indecision is very costly.

It seems clear that Leon Brittan, the European Commissioner for Competition, jumped too quickly to the conclusion that France was backing off from its promise to give Thomson a capital injection of 1.8 billion French francs [Fr]. At all events, between Thomson one day and Bull the next, "border disputes" are on the increase, with Brussels claiming France's subsidies distort EEC competition. A position that Leon Brittan hopes to buttress this summer through adoption of a regulation requiring member countries to submit to Brussels any plans for this kind of assistance prior to implementation, thus curtailing further the leeway of the state in its role as shareholder.

To succeed, the commissioner for competition will have to show he is not singling out nationalized French groups as his target. Among other things, he will have to raise the issue of the disguised subsidies which governments provide to their nation's industries. Germany is one example: Bundespost [German Postal Service] and Bundesbahn [German Railways] pay immoderate prices to Siemens for telephone line and railroad equipment.

At the same time, France must factor the European industrial dimension into its own policy. Movement toward [European] cooperation agreements will only be feasible after France reorganizes the financial structure of its own champions. Therefore it needs to be given a certain minimal latitude, at least temporarily, with regard to subsidies. The choice is simple: These companies can remain European, or we can watch while they are "cannibalized" by Japanese groups like Honda and Fujitsu, as in the case of Rover and ICL.

The Thomson affair notwithstanding, it should not be assumed the French prime minister and Leon Brittan are on fundamentally opposed wavelengths. First of all, Edith Cresson lacks the budgetary resources to shower subsidies on all the nationalized companies. Even more importantly, she believes the state's contributions should be part of an industrial policy comprising precise objectives and firm commitments from the leaders of the industrial groups in question. In fact, staffers at Matignon say they favor the advance submission of aid proposals to Brussels. But they say the issue of a capital injection for Thomson will not be decided until completion of an "in-depth study presently under way." The same for Bull.

Emergency Strategy

In electronics, a sector where France had a trade deficit of nearly Fr18 billion last year, Cresson is determined to move quickly. In this area, where in the past as minister of European affairs she spoke disparagingly of Michel Rocard's failure to make decisions—"we know what has to be done, but we don't do it," she said before stepping down last fall—the prime minister herself is resolved to act. With her special adviser Abel Farnoux calling the shots, the entire electronics issue is currently being reexamined. Sources at Matignon say "the first decisions will come this summer," and the guiding principle will

be to play the European card for all it is worth. Because—and this is another constraint which industrial policy must take into account—the vast resources that must be mobilized preclude any strategy based on national markets and underscore the limitations of nationalized “spearheads.” The time has come to admit that if these latter are to play a leading role in the EEC, they must become team players.

It was learned on 27 June that an important new report has just landed on Cresson's desk to be added to the dossier. It says that the only possible industrial policy is a European policy. Prepared for the Planning Ministry's general commission by an industrial strategy group established in June 1990, this document, titled “An Emergency Strategy for Electronics,” begins with a grim recitation of the facts.

The chairman of the ad hoc group, Jacques Maillet, president of Inter technique, writes in a preamble that “while European industry as a whole may no longer be in disastrous condition, a new fact must be kept clearly in mind: The sectors where it was strong, indeed brilliant—telecommunications, industrial electronics, computer software and services—are now being threatened.” Of greatest concern is the growing importance of components, because without innovation in that sector “there is no innovation in electronics.” Over the last 15 years, European industry's share of the world semiconductor market has dropped from 20 to 10 percent. Of course, there is the JESSI [Joint European Silicon Semiconductor Initiative] program. But as the report points out, European enterprises may hope at best for \$170 million in aid from JESSI, while “between now and the program's termination in 1996, Japan's big three will be spending \$3 billion per year in research.” It concludes that “Japan today has such a large lead that the industry will have disappeared by the year 2000 unless a highly innovative emergency policy is implemented rapidly, resolutely, and on a Europe-wide scale.”

The report therefore recommends the launching “of major European federative programs” in space and military electronics, telecommunications (videophone technology) and data processing (a program analogous to JESSI is proposed). In the field of high-definition television [HDTV], the commission urges among other measures “strengthened cooperation between the European players,” beginning with Thomson and Philips, whose lack of “cohesion” is noted. But it is in the domain of chips that the study group urges Europe to pull out all the stops. Given the estimated “\$20-30 billion over 10 years” needed for them individually to reach the threshold of viability in components, the report suggests the only option for Siemens, Philips and SGS-Thomson is “European concentration, with major accords among European groups.”

The political authorities and the EEC need to “create favorable conditions for that concentration.” Moreover, European customers must be encouraged to buy semiconductors “made in Europe.” And the group was more

than willing to supply specific recommendations: “It is proposed that the purchase of European components be encouraged by means of a compensatory subsidy paid to suppliers.” According to the report, these compensatory payments, “on the order of 9 percent,” would amount to only “one-fifth the European compensation payments for vegetable oils.” While this proposal parallels Abel Farnoux's comment that “it would be better to give out subsidies at that level than to foundering ‘national champions,’” Matignon seems little disposed to go to Brussels to fight for such ideas. Especially since the same report also says “it is vital for Europe to consider establishing procedures that would create deterrence leverage in the GATT negotiations and guarantee reciprocity in the opening of markets,” particularly the Japanese market. In short, nothing less than establishment of a “Buy European Act in public procurement contracts.”

Under these conditions, it is easy to understand why the prime minister—caught between the Japanese outcry over her philosophy and Leon Brittan's insistence on strict observance of the rules for fair competition—should judge it prudent, for the moment anyway, not to put her own imprimatur on the authors' suggestions.

Germany: BMFT Freezes Research Funds Until 1994

*91WS0439A Duesseldorf VDI NACHRICHTEN
in German 21 Jun 91 p 11*

[Article by Peter Frey: “Just the Barebones Minimum Is Given Away Here”]

[Text] At least until 1994 the research establishments of the FRG will have to make do with those 2.3 billion German marks [DM] which are included in the 1991 BMFT [Federal Ministry for Research and Development] budget. Because of the additional locations for major research in Zeuthen (DESY), Berlin-Adlershof (DLR), Berlin-Buch (molecular medicine), Potsdam (geosciences) and in the Halle/Leipzig/Bitterfeld region (environmental research), cutbacks of up to 3,000 established positions can no longer be excluded over the next three years.

Crisis meetings were routine in the past weeks in nearly all 13 major western German research establishments. Everywhere there was just one subject on the agenda: Where can funds be saved? Only one thing is clear so far: It will affect everyone to the same degree. Furthermore, the scarce financial cover must also suffice for the new establishments in the former GDR.

AWI [Alfred Wegener Institute Foundation for Polar Research]:

The Alfred Wegener Institute for Polar and Ocean Research in Bremerhaven (360 employees) was hit by the ministerial belt-tightening in a booming phase. Just as it was selected as the central FRG institution for the Global Change environmental program, now the fear of a cutback in planned positions comes haunting. In view

of the BMFT approval for 40 new positions by 1993, AWI director Gotthilf Hempel took minister Riesenhuber at his word: "In the future we will not only coordinate Global Change, but also take on a new focus for our work with arctic research and the long-range programs of the former GDR." As an immediate precautionary measure, Hempel made sure the institute's own aircraft were safe. There will be no more major equipment in the analysis or computer areas in the next three years.

DESY [German Electron Synchrotron]:

Potential cutbacks of one to two percent (corresponding to not quite DM5 million) in the 1991 budget are classed as "not yet dramatic" at the German Electron Synchrotron foundation in Hamburg. Neither a hiring freeze nor cuts in training are presently an issue for the institute which counts 1,300 employees. Investments are to be reduced to the absolute necessary in the fields of material asset value maintenance and infrastructure. The topmost priority, according to press spokeswoman Petra Harms, is operation of Hera and Doris, research facilities which are used by more than 1,000 scientists annually.

DKFZ [German Cancer Research Center Foundation]:

The German Cancer Research Center (1,500 employees) reacts with "a financial braking maneuver" to the bad news from the BMFT. Dr. Reinhard Grunwald, spokesman for the business administration board: "We are in the process of slowing down in the personnel area." Vacant positions will not always be filled again, and for new staffing the procedure will be "circumspect." The Heidelberg researchers envision major difficulties in the near future in implementing new projects. The cooperation with clinics alone has lead to additional costs of approximately DM1 million. A newly established specialized field for tumor virology (200 employees) raised the expenditures considerably.

DLR [German Aerospace Research Institute]:

The German Aerospace Research Institute with its 4,400 employees will presumably be hit less hard than other institutions. The cutbacks in funding are balanced by additional tasks in the new Bundeslaender. Thus, the DLR senate will today decide about an additional location in Berlin-Adlershof. Even so, the Cologners will have to institute a hiring freeze as a result of the scarce funding. Says DLR spokesman Dr. Thomas Weyer: "This will delay the D2 project by a few months. It is unavoidable that it will cost millions."

GBF [Society for Biotechnological Research]:

At the Society for Biotechnological Research in Braunschweig one is "thinking" of reorganizing into a service establishment, which could then be more strongly oriented toward the needs of industry. However, it is not possible to avoid a hiring freeze. The fluctuation in the more than 300 non-permanent positions of the total 600 GBF employees will therefore necessarily lead to a

reduction of personnel. A dreadful prospect for administrative director Dr. Helmut Zeitraeger: "We are letting well-trained young people go into unemployment. A development which is cause for concern."

GKSS [GKSS Research Center]:

Increased caution in investments, restraint in new hiring, and vacant jobs have already been left open since the beginning of the year. That is at present the list of measures with which the GKSS Research Center in Geesthacht (850 employees, focal points for the research: environmental and materials research, underwater technology) intends to meet the Bonn challenges. But press spokesman Hans-Friedrich Christiansen has also hinted at readiness to slaughter "holy cows." This is most likely to affect the field of underwater technology.

GMD [Society for Mathematics and Data Processing]:

The Society for Mathematics and Data processing in Sankt Augustin near Bonn (1,400 employees) intends to trim the fat in its personnel. Small branches are to be dissolved, and about 100 jobs are to be saved over the next five years through retirement and early retirement regulations. In addition, the management of the research company is hoping for more third-party funding from the free economy in order to ease the DM160 million budget.

GSF [Society for Radiation and Environmental Research]:

Prof Joachim Klein, scientific managing director of the GSF research center for environment and health speaks of a "chaotic situation of contradictory tasks," of "apportioning the distress" and of "squandering valuable assets too soon." For 1991 one intends to utilize the personnel fluctuation in a stringent manner, and in future years the problem will only intensify. For 1992 alone Klein anticipates a deficit of several million DM in the institute's budget. Concrete decisions regarding the course of savings at Neuherberg are expected from a board of supervisors meeting on July 9.

GSI [Society for Heavy Ion Research]:

Hans Otto Schuff, business manager of the Society for Heavy Ion Research in Darmstadt (592 employees) hopes to be able to do without a reduction of jobs. The GSI has for years been a service establishment for German institutes of higher education and chronically overbooked for that same length of time. Since the DM116-million budget for 1992 will presumably be about DM9 million short, which can only be recouped in operating the facility, the waiting list for scientists in the future is likely to become even longer.

HMI [Hahn-Meitner-Institute]:

The business management of the Hahn-Meitner-Institute in Berlin (800 employees) is optimistic. The HMI managers have acquired crisis experience since the

dilemma of the BER II research reactor. As early as the end of 1990 they had to resort to the tool of halting operations for three months. The financial margin gained at that time, expanded duties in the new Bundeslaender, connected with the hope for additional budget funds, and positive signals from the BMFT ("they don't want to be too hard on us") make the need concrete savings decisions unnecessary, at least for the present.

IPP [Max Planck Institute for Plasma Physics]:

"We hold bad cards in the international competition right now." This is how Isabella Milch, press spokeswoman for the Max Planck Institute for Plasma Physics in Garching near Munich, comments on the diet regimen from Bonn. The IPP is not only forced to postpone the expansion of the heating for the Asdex Upgrade fusion experiment by a year or two, but in the future will be forced to effect major savings in power. At present, vacant positions are only filled after six months. Limitations in training are being discussed.

KFA [Juelich Nuclear Research Center]:

A cutback of about 250 jobs is impending today at the Juelich research center with 4,694 employees. Juelich is among "the hardest hit of the major research installations," according to a KFA spokesman. Anticipating more drastic measures, the board last week decided on a hiring freeze for all vacant positions in the technical and scientific area.

KfK [Karlsruhe Nuclear Research Center]:

The Nuclear Research Center in Karlsruhe (4,200 employees) sees itself forced to react with a whole range of measures. In addition to a limitation of the orders given to outside firms and increased solicitation of third-party funding, press spokesman Dr. Klaus Koerting does not even exclude the closing of institutes, at least when the respective directors step down. Furthermore, the return of individual institutes to the university domain is being contemplated.

First Pan-German Draft Research Budget Adopted

Increase Under 10 Percent

91MI0452A Bonn WISSENSCHAFT WIRTSCHAFT POLITIK in German 17 Jul 91 p 6

[Text] For the first time the Federal Ministry of Research and Technology [BMFT] budget features expenditures for institutional funding in the new federal laender. According to the government draft approved by the cabinet last week, the 1992 budget amounts to 9.252 billion German marks [DM]. This represents an increase of 9.7 percent on the current budget (1991) projection of DM8.432 billion.

Added to this are a further DM300 million out of the joint "Boost for the East" campaign for research in the new laender that the BMFT will grant for the university

renovation program and for commercial research establishments. Nevertheless, expenditure in the old laender on major research establishments, for example, will be frozen ("limited" as Riesenhuber puts it), while a total of more than DM1.2 billion will be available for research and development in the new laender next year. Of this, DM585 million are earmarked for setting up and developing new research institutes, which are mainly offshoots of former Academy of Sciences institutes approved by the Science Council and which will in the future be funded jointly by the Federal Government and laender.

Of these DM585 million, DM416 million make up the federal allocation to "Blue List" institutes and major research establishments in the east. In addition, the BMFT is making DM169 million available to the Fraunhofer Society and the Max Planck Society for the establishment of institutes, institute departments, or teams in the new laender.

When presenting his budget in Bonn last week, Research Minister Riesenhuber once again indicated that major research establishments would have to undergo a restructuring process. Although, according to Riesenhuber, overall expenditure for major research in the old laender was being "limited," this is merely a statistical statement. The research minister predicted considerable differentiation and a change in priorities and weighting within the DM2.3 billion budget.

"These times of austerity will be used for restructuring in major research," said Riesenhuber while illustrating his budget. The research minister was particularly critical of the drop in the portion of market-oriented research in the research establishments in the old laender since the eighties from around 60 percent to its present 40 percent. "In the future, we will also be looking more closely at what actually reaches the market," said Riesenhuber.

German Research Society Protests

91MI0452B Bonn WISSENSCHAFT WIRTSCHAFT POLITIK in German 17 Jul 91 p 3

[Text] Following the drop in the acceptance rate for project and funding applications to 40 percent by the middle of this year, German Research Association (DFG) President Hubert Markl has sounded the alarm: "The pain threshold has now been exceeded." More and more colleagues were failing to understand how their applications could be assessed as good, but could still not be funded, a view shared by the president-elect, Prof. Wolfgang Fruehwald. As many as 55.2 percent of all applications were approved by the normal procedure in 1990. Total funds for 4,806 research projects amounted to 557.5 million German marks [DM]; in the priority programs 1,616 projects were approved for a total of DM210 million, an acceptance rate of 63.7 percent. In 1990, the DFG had a DM1.210 billion research funding budget. All disciplines benefited from funding: 14.8 percent went to projects in the humanities and social

sciences, 25.1 percent to the natural sciences, 25.2 percent to the engineering sciences, and 34.9 percent to projects in biology and medicine. The DFG's newly-created grant scheme for graduate colleges will provide DM55.6 million for 56 colleges over a period of three years. With DM368 million in funding, the 170 special research programs claimed a considerable portion of the research funding. Payroll expenses account for something more than three-quarters of all the DFG's expenses.

Science Council Assesses Eastern German Research Facilities

91MI0467 Bonn WISSENSCHAFT WIRTSCHAFT POLITIK in German 24 Jul 91 p 3

[Text] Taking into consideration the evaluation of the Institute of Agricultural Sciences, the Science Council has completed its inventory, evaluation, and proposals for restructuring the university-related research establishments in the new laender. The Council recommends the retention of some 8,300 posts in university-related research establishments (including study, project, and research groups of the parent organizations). In addition, there are 1,700 posts for individual scientists and teams who are to contribute to the revitalization of research and teaching in the universities.

However, the experts advising the state and laender have recommended considerably fewer posts for major research establishments in the new laender than would have been expected given their population and research capacity. This is in contrast to the disproportionately large share allocated to the Fraunhofer institutes and especially the establishments on the Blue List, due principally to the strong support of these establishments for application-oriented and applied research and development.

In the united Germany, the Blue List will probably include some 75 to 80 establishments with more than 8,500 employees and thus achieve an importance whereby an adaptation involving the individual research establishments to meet the development of the research requirements cannot be dispensed with any more than the Max Planck Society, the Fraunhofer Society, or the major research establishments could be eliminated. Therefore the Research Council considers it urgent to devise a concept for the revision of the Blue List and thus especially to carry out an up-to-date evaluation and restructuring of the individual establishments.

With the implementation of the Science Council recommendations, Berlin will receive some 38 to 40 percent of the university-related research capacities in the new laender, Brandenburg approximately 16 to 18 percent, Mecklenburg-Vorpommern around 4 percent, Saxony 25 to 30 percent, Saxony-Anhalt 5 to 10 percent, and Thuringen just 5 percent.

It is the opinion of the Science Council that the reduced number of facilities to be located in Berlin in the future will favor consideration for the more structurally weak laender.

Eighty New Eastern German Research Facilities To Open

91MI0470 Duesseldorf HANDELSBLATT in German 19 Aug 91 p 4

[Text] Federal Minister of Research Heinz Riesenhuber announced that forty new research institutes, together with an equal number of new research groups, are to be set up during the next few months in the new federal laender.

The new establishments will deal with fields of research which either were not covered by the establishments in the former federal territory, or else were covered only to a limited extent. Riesenhuber cited the following examples:

- The Center for Molecular Medicine at Berlin-Buch will employ 475 people engaged in modern geomedical research and its clinical applications, in facilities not available until now in Germany.
- The Institute for Molecular Biotechnology at Jena will create some 180 jobs. The institute will pursue completely new approaches to biotechnology, with research fields including structural investigation, synthesis of biological macromolecules, and molecular recognition processes.
- The Environmental Research Center at Leipzig/Halle will be the focal point for environmental research in the new federal laender. Fifteen other institutes, research groups, and teams dealing with environmental research are also expected to be set up, including the institute for Baltic Sea Research at Warnemunde and the Institute for Freshwater Ecology and Fisheries at Berlin.
- The georesearch Center at Potsdam will employ 125 people researching processes in the earth's crust.

According to the figures given by Riesenhuber, the federal government is providing around 1.1 billion German marks for the reconstruction of research in the new federal laender. Some 12,000 of the 17,000 employees still working at the former Academy of Sciences of the GDR are to be given new jobs.

Riesenhuber described the support from the research establishments of the old federal states as remarkable. Numerous collaborative agreements have so far been reached, with over 400 scientists from eastern Germany already working for specific periods as visiting researchers at institutes in the old laender.

In addition, the Association of Institutes for Large-Scale Research has set up a specialist service to allocate personnel for temporary administrative support for the

new research establishments. Riesenhuber emphasized that this would assist the necessary process of coordinating research over Germany as a whole.

New German Laender Linked to Automated Research Network

91MI0468 Duesseldorf *HANDELSBLATT* in German
8 Aug 91 p 15

[Text] Since the middle of the year, research organizations in the new German laender have been connected to the data communications network WIN [Scientific Information Network]. This means that they have access to the international science network, over which they can exchange information and data worldwide.

WIN is operated by the DBT [German Federal Post Office and Telecommunications] by order of the DFN [German Research Network] organization as a data transmission network specifically for scientific research. At the end of April, 165 institutions were connected to WIN. Subscribers are able to exchange data worldwide. This is made possible by connection to the Pan-European science network IXI [International X.25 Interconnect] and to the Datex-P network of the DBP.

A significant advantage of WIN over the Datex-P data transmission service is that subscribers obtain the data transmission service at a flat rate, which is independent of the volume of data transmitted. This means that the institutions that are weaker financially can use the network unrestrictedly.

Currently, subscriber lines having transmission rates of 9.6 and 84 kbits/s are available in WIN. An extension to connections for 2 Mbit/s is proposed for the end of the year. In August 1990, the pilot project ERWIN [extension of WIN] was started with the aim of making connections to WIN and to the DFN communications services available, in order to extend the data communication network to the new laender. The project, which will operate until 31 January 1993, is receiving funding of more than 4 million German marks [DM] from the Federal Ministry of Research and Technology.

Because the communications network does not yet extend to the territory of the new laender, access from ERWIN to the WIN gateway in Berlin is made via two point-to-point circuits at 9.6 kbit/s. They connect the office of the DFN organization with the Institute of Information Science and Computer Technology in Berlin, as well as to the Institute of High Energy Physics in Zeuthen.

Via this project, the Federal Ministry of Research and Technology has granted a further DM11 million until the end of this year to fund the building up of the local information structure for data communications within the technical universities.

Stabilization of R&D in New German Laender Reported

91WS0479A Frankfurt/Main *FRANKFURTER ZEITUNG/BLICK DURCH DIE WIRTSCHAFT*
in German 6 Aug 91 p 8

[Article by Dr. Siegfried Schneider: "Market for R&D Begins To Appear in New German Laender: Expansion of Research Staff Subsidized for Over 300 Enterprises; A Ministry for Research and Technology Interim Balance"]

[Text] For a long time, the number of research and development (R&D) personnel in the new German laender was reduced. The first signs of a stabilization in eastern German R&D, including applications-oriented R&D, appeared in mid 1991. In contrast to the doomsday reports of the past 12 months, which warned that industrial R&D personnel were breaking away from industry, we are now seeing the first clear indications that enterprises and researchers in the new federal laender are "in step with one another."

Consequently, Dr. Heinz Riesenhuber, minister for research and technology, was able to cite positive figures in his recent semi-annual report on his ministry's Program for the Aid of Research and Development in the new Federal Laender, which is targeted at mid-sized enterprises. According to the interim balance, submitted in early July, in 1991 the program has been able to successfully aid more than 300 enterprises in developing and expanding their R&D staffs and in acquiring know-how concerning the awarding of research contracts.

The Program for Research and Development Contracts in particular has generated numerous inquiries. Through this program, the Ministry for Research and Technology provides a 50 percent grant to subsidize the awarding of R&D contracts to experienced third parties. Of the more than 300 applications that have been received, more than 210 have been approved. Only 49 had to be cancelled or denied. This means that as of the middle of July, the Ministry for Research and Technology had committed itself to providing 18.5 German marks [DM] in aid, nearly 80 percent of which will go towards the subsidizing of contracts awarded to the so-called research firms, as well as some engineering firms.

Other suppliers of R&D include universities as well as institutes of the former Academy of Science, which is undergoing reorganization. The ministry expects to receive approximately 600 applications for this grant during 1991. This means that, assuming an average duration of one year per aid request, the subsidies will provide employment for 1700 to 1800 researchers.

Third-party contracts alone cannot guarantee full employment of all eastern German industrially-oriented research personnel. According to estimates by the Trust Agency and the Ministry for Education and Science, research firms alone employ approximately 11,000 researchers. Consequently, in May, the Ministry for

Research and Technology initiated an additional aid program, West to East Research Contracts, which is intended to divert the demand for R&D resources from the old to the new German laender.

The Ministry for Research and Technology is offering a 40 percent subsidy to western German enterprises that award research contracts to eastern German research institutions such as technical universities, institutes of the former Academy of Science, and research firms. The ministry is hoping that this will prove an effective means of increasing the all-too-often low number of contracts awarded to the recently reestablished or reorganized research institutions in the new German laender.

At the same time, if small and mid-sized western German firms award contracts to eastern German research institutions, it will encourage these institutions to adopt a more market-oriented approach. Three and one half million German marks are available in 1991, DM12 million will be available in 1992, and approximately DM18 million will be available in 1993. It is estimated that this new program will cost in excess of DM50 million over the next few years. The Ministry for Research and Technology expects to receive approximately 1,000 applications for aid during the course of the program, which will end in December 1993.

The western German version of this program, begun in 1978, has now been discontinued. This will serve as a clear indication to western German small and mid-sized firms that they should increase their reliance on eastern German R&D institutions. Eastern German R&D institutions that successfully pursue western German research contracts within the framework of the West to East Research Contracts program can also take advantage of an additional sum of start-up money. This new program will be managed by branches of the Ministry for Research and Technology and of the Association of Industrial Research Organizations, located at 5-7 Leipzig St., O-1086, in Berlin. Application forms are available at this address.

The third measure targeted at mid-sized businesses, Aid for Research and Development Personnel Increases, has also proved to be an effective means of creating research positions. In this program, the Ministry for Research and Technology subsidizes the creation of additional research positions in small and mid-sized firms by promising to provide 60 percent of the researcher's gross salary in 1991 and 50 percent of his gross salary in 1992, ending 15 months after the individual is hired. As of mid July, approximately 180 firms had applied for this program, requesting aid in creating almost 500 new research positions.

Thus far, 140 of these requests have been approved and DM2.5 million paid out. Based on a 15-month period, this corresponds to a grant of approximately DM8 million, the majority of which will be payable in 1991. This indicates that many mid-sized eastern German firms, primarily mechanical engineering firms (40 percent of all

applicants), electronics firms (35 percent of all applicants), chemical firms (6 percent of all applicants), and textile, clothing, and leather firms (6 percent of all applicants) are already beginning to hire research personnel again in order to rapidly expand and modernize their product lines.

It is primarily the small factories of less than 20 workers that are reestablishing their research programs. The Ministry for Research and Technology is expecting an additional 400 to 500 applications during the second half of 1991, which will exhaust this fiscal year's DM22 million budget. Altogether, requests for approximately 2,000 new research positions are expected in 1991.

Given that the individual enterprises are bearing 40 percent to 50 percent, there is a strong market-economy incentive for them to bring developments to a successful conclusion. At the same time, the subsidies provided by the Ministry for Research and Technology are contributing to the market-economy inclination of existing R&D institutions, above all research firms, to restructure the R&D scene and create new positions for R&D personnel in small and mid-sized firms.

Germany: BMFT Shifts Funding Emphasis to New Laender

91MI0391 Bonn DIE WELT in German 14 Jun 91 p 23

[Article by Anne-Lydia Edingshaus: "Riesenhuber Wants To Economize on Major Research"]

[Text] Federal Research Minister Dr. Heinz Riesenhuber sees the shaping of research in the new, united Germany as one of research policy's major tasks over the next few years. However, the building of a modern research structure in the five new laender will largely be paid for out of the old laender's budget.

The research minister has become convinced that research in the former Federal Republic should be reviewed, just as has been done by the Science Council in the new laender. A moral obligation? At any rate, the same strict criteria are to be applied in the west as well with a view to scaling down research resources and giving them to the new laender.

Riesenhuber recently informed those responsible for research in the old laender of his plans: "The capabilities devoted to the existing project spectrum and its scope are to be reviewed. This will necessarily have an impact on many areas of research funding. The major research establishments will be particularly affected because of their large budgets." The long-term strategy will now be established for bringing the research funding structure fully into line with its future tasks.

Less Major Research, More Flexible Funding

This means that the proportion of funds allocated to institutional funding of major research establishments in

the research budget will be cut back (after the disproportionate increase in recent years) in favor of more flexible forms of support. Furthermore, against the background of the debate within the Science Council, a fresh review is to be made to identify major research's actual long-term priorities. The question also arises whether certain research topics would not be better pursued in other public research facilities or by industry. Lastly, the question whether building research establishments in the new laender will affect the existing major research facilities also arouses interest.

As regards medium-term financial planning, the research minister envisages that financing for the major research establishments in the old laender "will at least not be increased in the next few years." The budget for major research will probably be reduced by about 10 percent by 1994.

Riesenhuber had already drawn the attention of the education ministers to this need for cutbacks in mid-April. Then, at the end of May, he also informed the chairmen of the scientific organizations of his plans.

Since then a muted cry of protest has been heard, and it is growing louder and louder as more details of the planned cutbacks become known. By now it has become clear that economies in the basic financing of major research will also have repercussions on staffing. The BMFT [Federal Ministry of Research and Technology] suggests that more outside finance be sought, referring to the growth in EC programs. Riesenhuber admits that he is aware that the new situation will require considerable flexibility on the part of the boards and employees of the major research establishments.

This year, the BMFT already expects to give the new laender around 500 to 600 million German marks [DM] out of the total of DM3.4 billion, i.e., around 15 to 18 percent of total BMFT project funds. In the meantime it has become known that the institutional funding cutbacks will primarily affect the largest block of expenditure, namely the major research establishments, which, with some DM2.5 billion, account for around 30 percent of the BMFT's total budget.

The BMFT is working on the assumption that expenditures by the major research establishments will remain unchanged next year and then be reduced by 10 to 15 percent beginning in 1993. This will have an enormous impact on the three major research establishments based in North Rhine-Westphalia: the Juelich Research Center, the German Aerospace Research Institute in Cologne-Porz, and the Society for Mathematics and Data Processing in Bonn-St Augustin.

Between them, the major research establishments spend nearly DM870 million a year and have about 6,700 employees. It is expected that a 10-percent cut will mean the loss of 670 jobs and DM80 million in funds. On top of this will come cuts in project funding that it is still too early to forecast. The major research establishments are

currently looking at the consequences that the BMFT's financial cuts will have on their project planning.

Social Plans Already Under Consideration

News has already leaked out that consideration is being given to empowering the individual research establishments to adopt social plans requiring approval only by their supervisory boards and not by the providers of their grants. From one end of the country to the other, chief scientists are warning that cutbacks in federal funding must not lead to a dismantling of good research in the old laender so that the new ones can catch up with them. There is also widespread annoyance at the fact that the Research Ministry's budget for 1991 is being increased by only 7.2 percent, whereas the budget for Education and Science is rising by 47.1 percent, that of the Ministry of Economic Affairs by 110.1 percent, and Posts and Telecommunications by 69.7 percent.

The scientists affected feel that the MP's responsible for allocating budget funds and the Finance Ministry officials do not fully appreciate their plight. They are pleading for a proportionate rate of growth in the BMFT's budget too, and are suggesting an increase of 20 percent.

German Research Societies Move Into New Laender

New MPI in Halle

*91MI0420A Bonn TECHNOLOGIE NACHRICHTEN-MANAGEMENT INFORMATIONEN in German
13 Jun 91 pp 6-7*

[Text] The first Max Planck Institute in the new federal laender is situated in Halle and will study solid-state physics and electron microscopy. This was decided by the Max Planck Society (MPG) at its annual meeting on 6 June 1991. Seventeen MPG teams had already been founded at universities in the new federal laender. These teams are working on topics that cover a wide scientific spectrum, from pure physics, material sciences, radio astronomy, physiology, and molecular genetics to linguistics, history, and environmental law.

Further MPG institutes and teams are planned in the new laender. Topics and facilities without precedent in the old laender are being considered, for example, an institute of colloid and boundary layer research or an institute of plant biochemistry.

Even before German unification the Federal Government and the old laender had provided for an annual budget increase of 5 percent for both the MPG and the German Research Association over a period of five years, in order to afford the sciences an appropriate degree of freedom and certainty for planning purposes (grants from the Federal Government and old laender to the MPG in 1991 were in the region of DM1 billion). With unification, new tasks face the MPG. The Federal Government and the new laender have thus allocated some 30 million German marks to the MPG for 1991 for its initial establishment in the new laender. This figure will be further increased for 1992 and subsequent years.

Fraunhofer Institute in Dresden

91MI0420B Bonn *TECHNOLOGIE NACHRICHTEN-MANAGEMENT INFORMATIONEN* in German
13 Jun 91 p 8

[Text] The Fraunhofer Society (FhG) will take over the laser applications division of the Dresden Central Institute of Solid-State Physics and Materials Research (ZFW) and will run it as an institute in its own right. The FhG plans an initial workforce of 56 starting in 1992 for this new Fraunhofer Institute of Material Physics and Coating Technology. According to FhG plans, the institute will actually start operation on 1 July 1991; its formal inauguration is scheduled for 1 January 1992.

A new laser technology demonstration center, which will form part of this new Fraunhofer institute, was opened on 7 June. As early as 1990, the BMFT [Federal Ministry of Research and Technology] had provided two equipment investment grants totaling 1.35 million German marks [DM] in anticipation of the planned demonstration center, where they will make a considerable contribution to the propagation of laser technology in the Free State of Saxony. One of its major tasks will be to support small and medium-sized enterprises in the introduction of laser engineering as a key technology in such important applications as mechanical engineering, manufacturing engineering, medicine, etc.

The Science Council has also recommended the establishment of an institute of nonlinear optics and short-time spectroscopy in Berlin (East) to further laser research in the new laender. This institute is expected to be a "Blue List" establishment. It will be taken over from the Central Institute of Optics and Spectroscopy.

The Federal Government and the laender will jointly bear the responsibility and financing for these two institutes in Dresden and Berlin. Other, smaller, nonuniversity research centers or teams in Jena and Halle and laser research capacities in various universities would then complete the laser research scene in the new laender.

German unification made it possible to assist outstanding research teams through project funding under the BMFT "Laser Research and Laser Engineering" program. Overall, 25 projects spread among 14 different research centers in the new laender, with a budget of DM15.8 million, have been approved to date. Of these, the ZFW in Dresden has five projects and a subcontract from the Institute of Technical Physics at the German Aerospace Research Institute for a total of DM2.8 million

Germany Plans 80 New Institutes, Research Groups

91P60264 Frankfurt/Main *FRANKFURTER ZEITUNG/BLICK DURCH DIE WIRTSCHAFT* in German 19 Aug 91 p 10

[Text] In the new German states over the next few months, 40 new research entities and almost the same number of research groups will be established. This was

announced by Federal Research Minister Dr. Heinz Riesenhuber. Allegedly, the Federal government will support the restructuring of research in the former East sector with more than 1.1 billion deutsche marks. Prevailing circumstances call for 12,000 of the currently 17,000 employees of the former GDR Academy of Sciences to receive new positions, along with 2,000 collegiate-level scientists.

Riesenhuber appeared satisfied that the Science Council wound up its inspection of the former GDR Academy of Sciences and the School of Architecture a half year earlier than anticipated. Recommendations to the Academy of Agriculture are to be presented in September. The quality of research in the former East sector, particularly in the fields of earth and environmental sciences, mathematics, physics and chemistry is somewhat better than had been anticipated—often despite inferior equipment, being totally "walled off" from the West and being treated like children, politically. On the other hand, the judgment levied upon the former GDR's social sciences, which were frequently influenced ideologically, turned out to be far and away more negative. Against the backdrop of the discussion concerning STASI collaboration and a former spoils system, in response to queries, Riesenhuber stressed that in all newly established entities the management slots are "totally open." This means that even Western scientists could respond to the request for tenders. The minister typified the three future large-scale research centers for molecular medicine (Berlin-Buch), for earth sciences (Potsdam) and for environmental research (Leipzig/Halle) as outstanding new establishments.

According to Riesenhuber's statements, the new institute for molecular biotechnology at Jena is also significant. There, a totally new approach is to be pursued. This involves developments by Goettingen Nobel Prize winner Professor Manfred Eigen. The Max Planck and Fraunhofer institutes want to create up to 40 new research establishments and research groups. Riesenhuber appeared optimistic that, in three years, even in the new German states "there will be modern extra-university research which in a short time will no longer differ from the standard of the Western industrialized nations."

German Trust Agency Investment Plans Analyzed

91MI0456 Duesseldorf *HANDELSBLATT* in German
25 Jul 91 p 13

[Text] With the sale of the ten largest companies in June, the head office of the Trust Agency created about 8,500 jobs and investments estimated at 840 million German marks [DM]. According to Trust Agency statistics it had sold about 2,600 companies by the end of June, securing approximately 525,000 jobs and achieving confirmed investments of about DM65 billion, of which about half were in the energy sector.

Caution should be exercised in interpreting the Trust Agency's statistics however. These figures refer to management proposals. The Trust Agency management approved the sales of the companies and gave the green light for the signing of the sales contracts, but apart from one exception, all the agreements must still be notarized.

The same applies to the case of the Zuschlagsstoffe Haldensleben GmbH, which was rated number one on the June list. Haniel Baustoffwerke GmbH, part of the Haniel group, is to take over four gravel and four hard rock mines of the East German Zuschlagsstoffe company, along with the Frankfurt construction company Philip Holzmann. According to company statements, Haniel holds a majority 60-percent share of the joint company. The Wegener Basaltwerke company in Hannover, is taking over a hard rock mine and Huelskens, of Wesel, will take over two gravel mines to be separated from the former GDR company. According to a Haniel Baustoffwerke spokesman, discussions took place with the Trust Agency over long term investments of the order of DM170 million, although only DM70 million have been guaranteed under contract for the next three years. Haniel and Philip Holzmann intend to hire about 450 of the estimated 1,000 employees.

Delays in the transmission of data from local offices to the head office in Berlin have also been admitted by the Trust Agency in the takeover of Sebnitzer Elektrowerkzeuge GmbH by Robert Bosch Elektrowerkzeuge GmbH. The notarized contract document, according to information from the Bosch Group in Stuttgart, is dated January.

Bosch To Invest About DM570 Million by 1993

The Bosch press office estimates that its investments for the four companies taken over so far will amount to about DM570 million up to 1993. According to a spokesman, about DM67 million are planned in Sebnitz, while Trust Agency documents guaranteed DM50 million. The Stuttgart

firm employs about 4,800 people in the following Bosch companies: Fahrzeugelektrik Eisenach GmbH; NAL-Telecom GmbH, part of Telenorma GmbH in Leipzig; Sebnitzer Elektrowerkzeuge GmbH, part of ANT Nachrichtentechnik GmbH, a division of Robotron GmbH, and in Bosch's 132 branch offices. According to a management document obtained by HANDELSBLATT, Telenorma paid a purchase price of DM6.2 million, confirmed by legal notarization, for NAL Telecom, and guaranteed DM55 million in investments.

Most jobs, according to the Trust Agency document, will be guaranteed by the Roland Ernst group which is building a commercial site at Teltow near Berlin, on the site of the former headquarters of the Elektronische Bauelemente electronic components combine. The Heidelberg Society of Construction and Design is entitled to use the building of the successor to the combine, Elektronik-eb-GmbH. However, here also the notary's seal under the sales contract is missing.

One of the most interesting takeovers was made by the Stuttgart pharmaceutical wholesaler, Gehe AG, which purchased Jenapharm AG. Jenapharm, the only supplier of contraceptives in the former GDR, is one of the three major pharmaceutical companies in the new laender. The company currently employs about 1,700 people in four plants, of which 1,300 are to be taken over. The annual revenues amount to about DM200 million. Gehe is thus expanding its new pharmaceuticals manufacturing division. In contrast to Trust Agency statistics, the company intends, according to its own statements, to invest over DM80 million by 2003, mainly in rebuilding a pharmaceutical factory in the Jena area. By November 1990, Gehe had already taken over the six plants of Pharmed GmbH, the former state pharmaceutical wholesaler with 1,500 employees. In this division, investments of about DM100 million are planned. The purchase price for Pharmed, legally confirmed and notarized, is DM57.6 million, according to the Trust Agency document.

The 10 Largest Investors in June 1991

Businesses Sold	Purchaser	Confirmed Investments, in Millions of DM	Confirmed Jobs
Zuschlagsstoffe Haldensleben GmbH	Hermann Wegener Basaltwerke KG, Gerhard Huelskens & Co, Franz Haniel & Co GmbH, Philipp Holzmann AG	170	700
RFT-SEL Nachrichtenelektronik	Standard Elektrik Lorenz AG	125	2,300
Jenapharm GmbH	Gehe AG	95	1,400
Elektronik-eb-GmbH, Teltow	Roland Ernst Unternehmensgruppe	90	2,350
Mitteldeutsche Getraenke GmbH	Klingbeil-Gruppe GmbH & Co	90	400
Sodawerk Strassfurt GmbH	Lars Christensen Chemical	70	400
Schweriner Molkerei und Dauermilchwerk GmbH	Hansa-Meierei Luebeck	50	110
Sebnitzer Elektrowerkzeuge GmbH	Robert Bosch Elektrowerkzeuge GmbH	50	600
Mecklenburger Milchwerke Hagenow GmbH	Gervais Danone AG, Munich	50	180
Hotel Gohrischer Hof	General Trust Company, Ltd	50	90

Source: Trust Agency

German Research Association Establishes New Programs

91MI0442 Bonn *TECHNOLOGIE-NACHRICHTEN*
MANAGEMENT-INFORMATIONEN in German
28 Jun 91 pp 4-5

[Text] The German Research Association will establish three new special research programs in the natural sciences, engineering, and biosciences at German universities on 1 July.

The subject for study by physicists, electrical engineers, and high-frequency engineers in Munich is "Nanometer Components: Principles, Concepts, Implementations." Future microelectronics developments require intensive basic research on semiconductor physics and semiconductor electronics. The new research program will study the basic properties of ultra-high frequency components and implement concrete component designs. New crystal growth processes permit the deposition of extremely thin semiconductor layers on crystal substrates, achieving almost perfect interfaces. By perfecting the atoms, the physical properties can be influenced and customized, and these techniques can be used to create new properties in known semiconductor materials for use in a wide variety of applications. It is also possible to achieve targeted improvements in the optical properties of electronic components. Combining them with electrical effects, it is thus possible to open up applications such as fast optical switches and amplifiers, tunable [abstimmbare] light sources, and sensitive detectors. The research program consists of two areas: The principles-oriented area will use optical methods and tunnel spectroscopy to study the physical effects induced by structuring, whereas the applications-oriented area will study aspects of the development of new microwave components and analyze the noise and signal transmission characteristics of gallium arsenide millimeter wave components.

Geoscientists, chemists, and mathematicians at the University of Bonn intend to investigate "Interactions Between Continental Material Systems and Their Modeling." The research is to cover the interactions between fast atmospheric and hydrospheric (air and water) processes and slow lithospheric (rock strata) processes. Whereas large amounts of matter and energy are transported in the atmosphere and hydrosphere, the zones close to the surface of the lithosphere are almost immutable. However, there are specific material systems in the lower atmosphere, in the ground, in the unconsolidated zone, in the groundwater, and in the lower crust zones that act as bridges between these spheres. An investigation of these material systems will make it possible to formulate the boundary conditions that allow the adjacent material systems and their processes to communicate with one another. Specific mathematical modeling processes will be developed so that geoscientific data may be incorporated into the process descriptions, adjacent processes may be compared, and the extreme time scales and dimensions may be linked in perspective. This

comprehensive modeling project is designed to provide a view of the processes involved in the history of the earth in their entirety. The studies will be carried out in the Lower Rhine basin area and in the adjacent Rhine Slate Mountains.

"Molecular Mechanisms of Intracellular Transport Processes" are to be studied at Heidelberg. This raises a problem central to cytology-oriented molecular biology, i.e., the question of the transport processes that take place within cells when cellular organelles are generated and proteins are secreted. As these transport processes require that proteins be channeled through a membrane, "recognition" of the membrane by a protein must be guaranteed. For protein secretion, these are the endoplasmic reticulum (ER) membranes. Thereafter, the proteins, encapsulated in vesicles, migrate via the cisternae of the Golgi apparatus to the plasma membrane on the cell surface. The proteins, which are not released externally, must be sorted by this secretion process. In addition to the outward transport route, the cell can also absorb substances from the outside. A number of cellular organelles are also involved in this inward transport route. The special research program at Heidelberg is to investigate both the protein signals involved in these transport processes and the molecular mechanisms underlying the "sorting" of the proteins. Specially developed chemical probes will be used. In addition to scientists at the University of Heidelberg, researches from the Max Planck Institute of Medical Research, the European Molecular Biology Laboratory (EMBL) and the German Cancer Research Center will also be taking part in this new special research program.

Germany: Biotechnology Funding Program for Small Businesses Announced

91MI0419 Bonn *TECHNOLOGIE NACHRICHTEN*
MANAGEMENT INFORMATIONEN in German
13 Jun 91 p 2-3

[Excerpt] The Federal Ministry of Research and Technology [BMFT] has announced a new indirect-specific program to fund biotechnology in small and medium-sized enterprises so that this key technology can be applied as widely and effectively as possible for the development of new products and processes. The program has a budget of 100 million German marks [DM] over a period of five years commencing 1 July 1991. EC approval for the program is still pending.

A wide range of new biotechnology applications have evolved as a result of the swift advances of knowledge in this field. The indirect-specific program thus covers a wide range of topics. Financial aid will be provided for projects that aim to develop:

- new apparatus and equipment for use in biological research and production;
- safety and disposal processes relevant to biotechnology;
- new biological environment technologies;
- new enzymatic processes;

- products and intermediate products using new cell culture and molecular biology methods;
- new biotechnological processes and methods for plant breeding and biological plant protection;
- new biotechnological processes for diagnostics, quality enhancement, and disease resistance in livestock breeding;
- biotechnological processes for the use of raw materials of agricultural origin in the nonfood sector.

New biotechnological processes and methods also include genetic engineering.

The Battelle Institute in Frankfurt/Main has analyzed the effectiveness of the previous indirect-specific program, which ran from 1986 to 1989. The researchers ascertained that 220 firms had been funded through nonbureaucratic, swift channels, high launch and acceleration rates had been achieved, and only a limited parasite effect [Mitnahmeeffekt] could be detected. Although the first indirect-specific program had been open to biotechnology firms of all sizes, it had had the most beneficial effect on small and medium-sized industrial enterprises: More than 90 percent of the firms had an annual turnover of less than DM200 million.

In its report, the Battelle also established that more than 80 percent of the companies questioned had created new jobs. (In a random sample, 103 new posts for qualified employees had emerged in 22 of the companies interviewed.)

In 1990, two events in Bonn and Juelich demonstrated how extremely demanding projects in small and medium-sized companies were funded under the first indirect-specific funding program. The biotechnology firms that had received funding presented their results in a total of 57 reports. They included the development of genetic engineering-based methods for diagnosing various diseases (e.g., hepatitis) and modern biotechnological processes for studying pollutants in the environment and for analysis in food technology. In many cases the program was instrumental in establishing and extending contacts between small and medium-sized enterprises and universities.

The Battelle study drew the conclusion that the indirect-specific funding scheme had proved particularly well-suited to small and medium-sized enterprises. On the other hand, the effectiveness analysis showed that the three-year term of the first indirect-specific program had been too short. Biotechnological developments are not only time-consuming, they often also require a longer preparation time than other technologies. A new indirect-specific program with a five-year term is therefore now being launched.

The new indirect-specific funding scheme will bring into effect a further part of the Biotechnology 2000 program adopted in 1990. One of the aspects of this program consists in rendering basic research findings exploitable at an early stage for technological development purposes,

thus enhancing the competitiveness of the German economy, and small and medium-sized enterprises in particular.

Indirect-specific programs fund projects on suitable topics via a simplified procedure whereby in particular small and medium-sized enterprises from several branches of industry can be involved. Indirect-specific programs are designed to trigger a domino effect and foster private initiative.

Unaffiliated enterprises with an annual income of less than DM1 billion that are already engaged in biotechnology work or meet the basic qualifications for entry into this field are eligible to apply. The funding quota is 40 percent and the maximum grant is DM600,000.

An additional incentive will be granted for joint R&D projects involving at least two enterprises and at least one R&D institute. In this case the maximum grant is DM1 million per company. Thus financial recognition will be given to the high level of interdisciplinarity inherent in biotechnology, the often high investment costs, and the need to cooperate with external R&D establishments.

Former GDR Microelectronics Component Manufacturers in Trouble

91P60249 Paris *LE NOUVEL ECONOMISTE*
in French 26 Jul 91 p 25

[Article: "The Agony of East German Planned Production of Components: Empty Plants, Abandoned Laboratories—the Engineers are in the West"]

[Text] It was the pride of the former GDR and the defunct COMECON. With its 17,000 handpicked employees, its 1,200 researchers and its seven clean rooms, the microelectronics research center in Dresden and its two production units in Erfurt and Frankfurt/Oder were the object of the former communist regime's solicitude. The mission that had been entrusted to them: to free East Europe and the Soviet Union from any dependence in the strategic realm of electronic components—an ambition since forgotten. Nowadays, subsumed under the acronym ZMD [Center for Machine Documentation] by the Trust Agency (the entity responsible for East German privatization), only 1,200 people remain at the three sites. The laboratories are empty and, because of the entity that took over, the entire enterprise will very likely be shut down before the end of the year.

Ambition Did Not Survive the Breakup of the GDR

Yet, former president Erich Honecker had not skimped on salaries or investments earmarked for that 1 Mbit chip developed using a technique differing from that used in Western countries. At Frankfurt/Oder, 4,000 persons used to manufacture hybrid circuits. After setting up a pilot plant in Dresden itself, for outputting 1 million components annually, manufacture was decentralized and moved to Erfurt which received 4 billion

East German marks (around 15 billion francs). Seventy percent of the production was exported, especially to Poland, Czechoslovakia, and the USSR. The GDR was promoted as the supplier of components for all the COMECON countries.

But, ambition will not survive the breakup of the GDR. The chips that were coming out of Erfurt used to cost 140 East German marks. So as not to penalize the buyers, they were sold 40 East German marks net below the world price of between 12 and 16 marks.

But, these days, the combine is in agony. The quest for partners to refloat the enterprise has not been a fruitful one. One of the clean rooms is being used as a subprocessing facility by Siemens which manufactures semiconductors there. At the Dresden site, Germany's Fraunhofer Technical Center promised to develop four types of components for telecommunications and the medical sector. Two small companies, Fresenius (analyses) and Leybold (pumps), have leased some of the sites. On its own, an American firm would be willing to restart printed circuit production. Air Liquide has taken over the small-scale industrial gas facility with about ten persons.

Dutch Microelectronics Industry, Government Policy Analyzed

91WS0467E Zoetermeer SCIENCE POLICY IN THE NETHERLANDS in English Jun 91 pp 3-5

[Article by Roud Overdijk: "Specialise, Internationalise, or Run Aground"]

[Text] Philips's withdrawal from the Megabit project will have little impact on the demand for training and research in the field of microelectronics in the Netherlands. Nevertheless, the high-level research that industry needs should be carried out on an international scale, using modern production facilities that operate at European level. On the other hand, some very sophisticated small-scale research projects at the Dutch technical universities should be given room to move. This sums up the views of three British experts who presented their report to J.M.M. Ritzen, Minister of Education and Science, and J.E. Andriessen, Minister for Economic Affairs, on 14 January 1991.

Philips's decision to halt further efforts to develop the production of memory chips has sent shockwaves through the Netherlands. Both Philips and the Dutch government have poured huge sums of money into various projects - including the Siemens-Philips Megabit project—to develop high-standard memory chips. The WAX pilot plant for submicron technology in Eindhoven has been one of the main beneficiaries. The Eindhoven facility, together with other Dutch laboratories and research centres concerned with stable-substance physics and microelectronics, was to have assumed a major role in one of the Eureka projects, the Joint European Submicron Silicon Initiative (JESSI). In

the wake of Philips's reorganisation, however, this company will now be playing an entirely different part.

Whether training and research needs in the field of microelectronics will change accordingly is still a matter for speculation. Philips's presence has always served to stimulate university activities in this area. In the light of these facts, Ritzen and Andriessen commissioned a study to consider suitable strategies for microelectronic research policy in the 1990s. The study was conducted by B.W. Oakley of the British consultancy, Logics, together with I.M. Mackintosh and R.J. Morland of Mackintosh-Generics.

Top Level Research

The authors of the study take the view that microelectronics will continue to develop at its present pace. In order to face competition in the world market, governments, research agencies and the business sector will be forced to expand into large-scale production, possibly teaming up to form collaborative units, or to specialise in highly sophisticated research in specific market sectors. Given the exorbitant cost of expanding production, which, for the time being at least, seems likely to soar still further, the Netherlands has no option but to put more energy into collaborative efforts and greater specialisation. The researchers see no use at present for Eindhoven's pilot plant for SRAMs (a particular type of memory chip). It is a highly advanced facility which is expensive to operate, and is therefore unsuitable for the production of less sophisticated chips.

According to the report, the closure of WAX will not reduce the demand for graduates. As long as Europe has a viable semi-conductor industry, there will be abundant openings for well qualified people. Nevertheless, high quality research conducted not only by the business sector but also by outside agencies is crucial to ensure that the industry remains viable and competitive. Research should focus on innovative themes and problems which are at present just beyond the industry's reach. Efforts should be made to avoid duplicating work done elsewhere in Europe, and, wherever possible, projects should be carried out with industry and other organisations on an international basis. JESSI and ESPRIT [European Strategic Program for Research and Development in Information Technologies] could occupy a prominent position in this context. However, the report emphasises the importance of clearly defining their respective roles with regard to fundamental research and long-term projects.

Concorde

At the Logica offices in London, Oakley explains what he sees as JESSI's shortcomings. 'JESSI was devised by Siemens, Thomson in France, and Philips', he recalls. 'It was aimed at promoting the development of advanced memory chips and extending their range of applications. The business sector, eager to obtain government support, sought links with the Eureka programme. At this point,

however, they were asked what particular qualities they or the countries they represented had to offer. When JESSI was put before the Dutch and German parliaments, the overwhelming feeling was that other companies in the field of microelectronics were likewise entitled to receive support.' There was consequently a certain pressure to extend the programme and take new participants on board.

As we saw from the ESPRIT programme, the European Commission was also interested in microelectronics. According to Oakley, however, a Concorde-style project such as JESSI does not belong in the ESPRIT programme, and the Commission found it difficult to support it as a separate programme for only three companies. So pressure to widen the programme came from these quarters, too. Though it seemed useful, it made management more difficult, explains Oakley, and distracted attention from the principal goal. All told, he feels that the move was not a wise one.

JESSI was expanded and divided into four sub-programmes; technology (covering the original plan for JESSI), equipment and materials, applications and basic and long-term research. It was recognised as a Eureka programme in 1989. The problem with these programmes, however, is that approval does not automatically secure funding. The participants first have to apply for funds from the various tiers of government. Expanding JESSI made it all the more labyrinthine. It became a glory hole for a large number of research projects, without there being any clarity about available budgets. According to the researchers, this was reflected most conspicuously in the sub-programme for basic and long-term research.

Glory Hole

Oakley remarks that it is within the basic and long-term research component that most of JESSI's academic research is done. He points out that the three initiators of the sub-programme provide no more than ten percent of the funding. The remainder has to come from government, but no budget has been set aside for it as yet. 'Because of this, there has been absolutely no incentive to assess project proposals critically in relation to funding. Whatever turned up was incorporated into the sub-programme, which consequently evolved into little more than a glory hole. ESPRIT uses a peer review system to keep within the available budget. As a result, only one in three or one in five proposals are approved. This is not an unhealthy state of affairs in academic research. It means that only the very best proposals are carried out.'

The lack of such pressure, in Oakley's view, results in projects being taken on which have nothing to do with JESSI's original objective. By way of example he refers to proposals concerning 'devices' (sophisticated semiconductor structures) and neural networks. Neural networks, Oakley continues, are an interesting subject for academic research. They are also extremely promising.

But, he wonders, 'what the hell do they have to do with microelectronics? By the time neural networks find their way on to the market, it will probably be necessary to have special hardware. For the time being, however, we are mainly looking at theoretical studies, while networks are simply simulated with software.'

The report points out that several of JESSI's basic and long-term research projects definitely deserve government support. However, the authors advocate a funding arrangement under the third EC ESPRIT programme, for which funds should be available in 1992. This would prevent any overlap between JESSI and ESPRIT. Moreover, project proposals would be subject to a peer review system, which would improve quality. The government should bridge the gap until 1992, the report continues, as far as the activities of researchers in the Netherlands are concerned. Only NLG 18 million would then be needed for basic and long-term research, instead of the 96 million that the Foundation for Fundamental Research on Matter (FOM) and the Technical Science Agency (SWT) have applied for. This amount might even be cut further, given that more stringent selection procedures are needed, as mentioned above, and that not all basic and long-term research proposals from ESPRIT will be accepted.

Centres of Excellence

If basic and long-term research cannot be brought under the auspices of ESPRIT, and if the Dutch government should decide not to provide funding for it, government should nevertheless earmark special funds which could, for instance, take the form of innovative research programmes. In the course of their visits to universities, the authors of the report discovered a number of groups which have the potential to become centres of excellence on a European scale. Oakley was particularly impressed by the work on sensors and micromechanics being carried out in Twente and Delft. If the two groups could be combined, he says, they could form a centre of excellence. Delft already has one such centre, concerned with the design of analog chips, and this should be given backup. The work they do there is the best in Europe, if not in the world, he continues. Both fields could develop into centres of excellence in the European arena. The report also commends the work being done in Delft on device physics (all physics relating to semi-conductor structures), though it expresses concern at the insufficient numbers of researchers. The authors recommend reinforcement through the basic and long-term research component of JESSI, for example.

Process technology and computer aided design (for the design of chips), however, come in for considerably harsher criticism. Academic research in the field of process technology is only possible if it takes place on the frontiers of technological feasibility. This is not the case at the technical universities. DIMES in Delft is contemplating the development of a BICMOS [bipolar complementary metal oxide semiconductor] technology, which will work with structures of 0.8 micrometres. The report

sees little point in this, however, as the technology has been available in the industry since 1990. As far as computer aided design aids are concerned, the authors have reason to believe that much of the money universities invest in this area is wasted. 'Everyone on the design side of microelectronics has to have a complete set of software packages', Oakley remarks. 'Companies want well-designed, commercially-supportive software, and they invest large sums of money to get it. Academic software seldom meets these requirements. The ideas they contain may be excellent, but academics should not expect industry to buy their software. Academics should not think in terms of producing complete packages. There is no point, even if they are only developing software for their own use. The vast majority of students will move on to other jobs and will have to work with entirely different software. They would do better to confine themselves to developing ideas and methodologies.'

Production Facilities

Researchers, too, are highly critical of the production facilities for chips at the three technical universities. It is extremely expensive to operate and equip facilities for top level research. The report cites the Interuniversity Microelectronics Centre (IMEC) in Leuven as an example of a leading centre. It employs 420 people and absorbs NLG 70 million annually in investments. DIMES in Delft, by contrast, employs 36 people and costs NLG 15 million a year. 'Of course there are always people who don't have to work on the frontiers of technology', Oakley remarks. They could perfectly well work with DIMES if it were cheaper than Leuven, but that is unlikely to be the case. The scale of activities in Leuven means that production can go on non-stop. From the point of view of efficiency it is essential to keep production going, regardless of the quality of the people working there. As things are at present, DIMES is certainly doing a good job, but it operates on too small a scale for it ever to be efficient'.

The conclusions reached in the report are therefore quite hard-hitting: there should be no replacement investment in Dutch production facilities, and these facilities in their present form should ultimately be closed down. This does not mean that the capital will be lost. The premises that fall vacant, for instance, could be used for other, more specialised research. Furthermore, cooperation with the IMEC should be stepped up, and closer links should be forged with the ESPRIT project, EURO-CHIP, a joint venture which envisages the production of small series of chips for scientific and technical education and research in Europe. Finally, the three British researchers were critical of the general trend in research in the Netherlands, in which they detected a disequilibrium between component-focused and system-focused research. As Oakley remarks, 'microelectronics is only a small part of information technology. Most people in information technology have problems with their

software. The universities should therefore train far more people to understand software and systems, instead of components.'

CORPORATE ALLIANCES

Cap Sogeti, Daimler-Benz Form Computer Alliance

91WS0469A Paris L'USINE NOUVELLE in French
11 Jul 91 p 17

[Article by Patrick Levy: "A Colossal Ally for Cap Sogeti"; first paragraph is L'USINE NOUVELLE introduction]

[Text] Now backed by Europe's top manufacturing group, Cap Gemini Sogeti is confirming its desire to play one of the premier roles in international data-processing services.

A strategic agreement is expected to be signed in the coming weeks between Daimler-Benz, Europe's top industrial group, and Cap Gemini Sogeti, the top European software house. The former has sales of 290 billion French francs [Fr], while the latter employs 18,000 and does Fr9 billion worth of business. Daimler-Benz will spend Fr1.3 billion to acquire 34 percent of the capital of Sogeti Corp., the parent company of Cap Gemini Sogeti.

The acquisition is expected to be made through a simultaneous capital increase and stock buyout of certain minority shareholders such as CGIP [Cap Gemini Industry and Holding], Lazard, Clinvest, Suez, or directors. SKIP (Serge Kampf Industry and Holding), a holding company controlled by Serge Kampf, who founded the group 25 years ago, will maintain control of the whole concern (with 51 percent). The other shareholder is the CGIP. In exchange, certain activities of Debis, which is Daimler-Benz's computer subsidiary, will be merged with those of Cap Sogeti in Germany. Debis has sales of Fr3.5 billion, including Fr75 billion (sic) with its parent company. Furthermore, the two partners are going to work out a strategy to capture markets outside of Europe, essentially in the United States and Japan. But the Japanese firm Mitsubishi, an industrial partner of Daimler-Benz's, is not concerned by the agreement.

The first advantage of the alliance: "We are going to jump from third to first place in computer services in Germany," explains Michel Jalabert, the secretary general of Cap Gemini Sogeti. Debis will bring to Cap Gemini Sogeti considerable know-how in information networks, knowledge that will work in synergy with the French company's desire to diversify into new niches such as "facility management."

The latter, which consists of handling all or part of a company's data-processing services from the outside, is increasingly based on remote data-processing techniques. What is more, Debis is the number two German

firm (after SAP) in software packages and has a sizeable library of application programs (especially in manufacturing.) The Serge Kampf group's absence from this niche was, until now, one of its Achilles heels.

As important as it is, the new alliance does not rule out other agreements in the future with financial or industrial partners that could be American, British, or Japanese.

This desire to go international was announced by Serge Kampf as early as the end of 1989, when the SKIP holding company was created. His objective at that time was to raise the equivalent of Fr5 billion in new money without losing personal control of the group. After two capital infusions totaling Fr2.6 billion over the last few months, the company has carried out the plans to boost its financial resources that were announced less than two years ago. Moreover, the group still has a debt-carrying capacity estimated at over Fr5 billion.

Working Double Time

"If need be, and to make it easier for new partners to join us, we can still relinquish 14 percent of Sogeti Corp.'s capital, and 49 percent of SKIP's," says Michel Jalabert. To meet the challenge of giants such as EDS (a General Motors subsidiary), IBM, Computer Sciences, or Arthur Andersen, "Cap" must work twice as fast to make acquisitions, and new cash infusions will be welcome. Already last year, the group that originated in Grenoble successively took over the British firm Hoskyns, which is expected to become the cornerstone of its facility management strategy, then, in a move that strengthened its position in Europe's most promising market, SCS, the German subsidiary of Britain's SD-Scicon.

Its competitors have not rolled over and played dead in the meantime. Indeed, EDS, a subsidiary of General Motors that boasts 6 billion in sales and 64,000 employees, is on the verge of buying the same SD-Scicon company. For its part, IBM has invested the equivalent of 2.5 billion dollars in hundreds of software houses over the last few years. "Big Blue" makes no secret of its desire to eventually earn over half of its sales from services, a desire it shares with Digital Equipment. These are ambitious goals that are speeding the necessary redeployment of the industry.

"To meet the needs of companies that are moving into the international realm, it is no longer possible to stay home," reiterates Serge Kampf. Cap Sogeti, which is the fourth-largest software company in the world, is actually aiming for the very top position. To meet such a challenge, it needed the backing of a powerful partner. And that is what it is going to get.

Germany: AEG, DASA Establish Microelectronics Joint Venture

91MI0439 Duesseldorf *HANDELSBLATT* in German
17 Jul 91 p 1

[Text] The two Daimler firms, AEG AG in Frankfurt and German Aerospace [DASA] in Munich, have formed a microelectronics project company based in Stuttgart. The new firm is to work out a plan for restructuring both companies' microelectronics activities with the aim of forming a joint venture for microelectronics and motor vehicle equipment within the Daimler Group.

Electronics requirements of the various divisions of the company, currently standing at 6.5 million German marks [DM], are expected to rise faster than average in the next few years. By the end of 1992, the units concerned will be gradually separated out and subsequently integrated into the new microelectronics subsidiary. Four divisions are planned: components, microsystems, motor vehicle equipment, and special technology, each of which will operate on the market independently and be run as a profit center in its own right. In the medium term, the joint venture estimates that it will employ a workforce of about 20,000 and do about DM4 billion worth of business. Existing joint projects are to be stepped up and new ones arranged.

CORPORATE STRATEGIES

French Electronics Industry Competitiveness Weakens

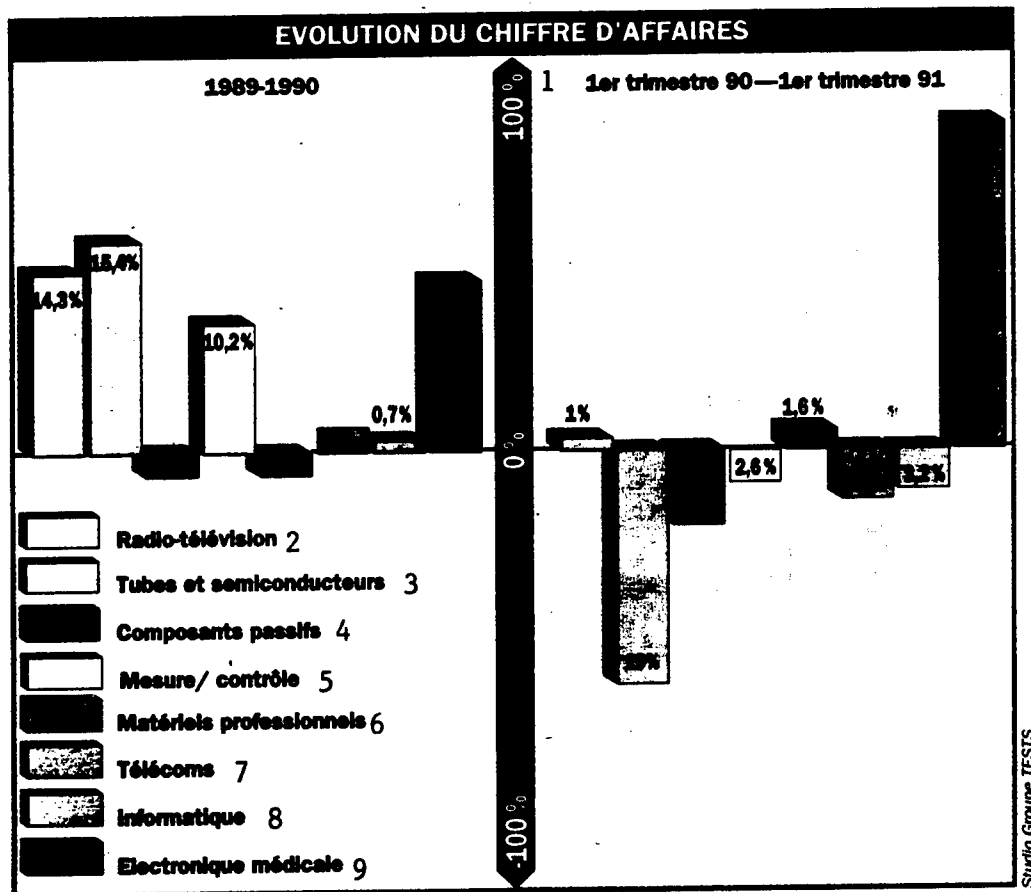
91AN0476 Paris *ELECTRONIQUE INTERNATIONALE*
HEBDO in French 13 Jun 91 pp 1, 6

[Article by Michel Heurteaux: "French Electronics: The Deficit Increases"]

[Text] No real surprises in 1990 in the trade figures of an electronics industry distinguished by the persistent weakness of its activity levels and a rising deficit in its trade balance. According to the figures of the French Association of Electronics Industries (GIEL), the growth rate only increased by 1.9 percent last year compared to 9.5 percent between 1988 and 1989. However, these figures, which, it should be remembered, cover the gross revenue of all manufacturers in France, both French and foreign, reveal very striking contrasts between one sector and another.

There are increases in the gross revenue of the consumer electronics sector (+14.3 percent) and the measurement and control (+10.2 percent) and radiology/medical (+13.5) branches. Also showing improvement are the figures for the electron tube (+9.7 percent) and semiconductor (+6.7 percent) industries. A slight decrease is shown by the passive components industry (-1.8 percent) and the professional equipment sector, which has experienced a drop in gross revenue for the first time (-1.8 percent); it should be remembered that in previous years, the growth rate was on average higher than +13 percent.

Figure 1. Evolution of Gross Revenue



French industry started the year rather badly. Its gross revenue dropped three points between the first quarter of 1991 and the first three months of 1990. Although the radiology/medical branch is experiencing a boom (+28 percent)[as published], several sectors are falling behind, mainly tubes and semiconductors (-19 percent), passive components (-6 percent) and telecommunications (-4 percent).

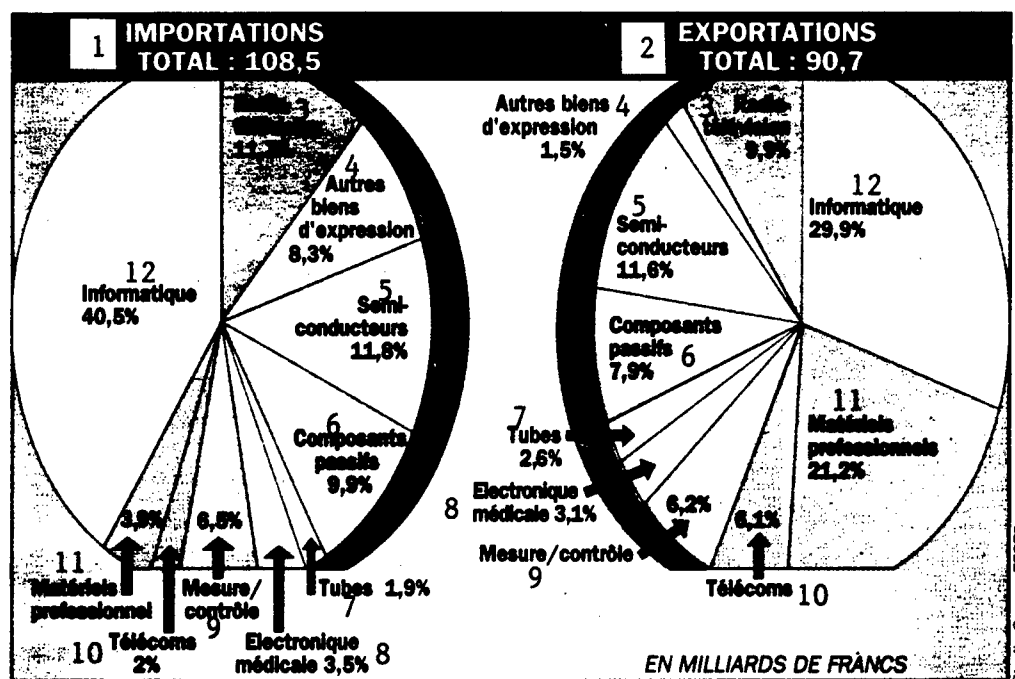
Key: 1. First quarter of 1990 - first quarter 1991—2. Radio and television—3. Tubes and semiconductors—4. Passive components (tab)—5. Control measurement equipment—6. Professional equipment—7. Telecommunications—8. Computing—9. Medical electronics.

This relative decline in the level of activity is also a sign that competitiveness remains weak overall, as shown by the persistent imbalance in our trade statistics. The GIEL figures show in particular a continuous erosion of the cover ratio for the whole of French industry, from 100 percent in 1987 to 84 percent last year. It is in the components sector that the situation is the most worrying, as according to GIEL the cover ratio has fallen from 101 percent in 1987 to 78 percent in 1990.

Sector-by-sector analysis emphasizes, not surprisingly, the continuous offensive maintained by foreign competition in consumer electronics, where our industry has lost yet more ground with a deficit of 11.4 French francs (Fr) billion. There is also a negative balance for the equipment sector, where the total amount of imports—Fr61.1 billion—is for the first time higher than the amount of export sales, which fell from Fr62 to Fr60 billion last year.

As far as trade figures are concerned, the GIEL statistics reveal a double development. While the trade balance with Japan continues to deteriorate, French industry is perceptibly improving its positions in Europe. With Japan, the deficit in 1990 will have reached Fr20.6 billion as against Fr19.8 billion in 1989, with French exports in the sector only representing 5 percent of imports. More than one-third of this negative balance comes from consumer electronics, closely followed by computers (Fr6 billion) and components (Fr2.4 billion).

In Europe, GIEL notes that the trend is toward a net "improvement in competitiveness," with a trade surplus up from Fr3.2 billion in 1989 to Fr5.8 billion in 1990. This reduction in deficit is particularly clear with respect to Germany, whereas it is stabilizing with respect to the United Kingdom.



The imbalance continues to grow between exports and imports. Overall, the imports are growing faster than exports; computing shows a considerable deficit. Professional equipment continues its export success, with slightly more than 21 percent of total sales abroad.

Key: 1. Total imports: Fr108.5 billion—2. Total exports: Fr90.7 billion—3. Radio and television—4. Other media goods—5. Semiconductors—6. Passive components—7. Tubes—8. Medical electronics—9. Control measurement equipment—10. Telecommunications—11. Professional equipment—12. Computing

Gross Revenue by Branch (in millions of French francs)

	1986	1990
Passive components	10,627	11,616
Semiconductors	6,520	8,690
Tubes	3,753	4,237
Consumer electronics	12,821	
Professional equipment	36,173	44,600
Telecommunications	23,735	24,500
Computing	66,275	80,018
Control measurement equipment	6,697	8,751
Medical electronics	2,223	2,651
Total	165,544	197,884

No great changes over four years in the respective weight of the branches. Computing, with a gross revenue of Fr80 billion in 1990, still holds the first place, far ahead of professional equipment and the telecommunications sector, which among the two of them achieved a gross revenue of Fr69.1 billion.

France: MATRA Agreements, Acquisitions Discussed

91WS0491K Chichester INTERNATIONAL TELECOMMUNICATIONS INTELLIGENCE in English 1 Jul 91 p 1

[Article: "Matra in Business-Like Mood in Europe: Forms Collaborative Agreement With AEG...."]

[Text] Matra Communications and the German company AEG have formed a collaborative agreement which will involve a transfer of ownership of some AEG companies in return for a stake in Matra Communications and joint-development of mobile communications equipment.

Terms of the deal were not disclosed but Matra Communications will acquire 100 per cent of AEG Radio-communications SA (ARC) in Madrid and 90 per cent of AEG Mobile Communications GmbH (AMC) based in Ulm and Berlin. The two companies ARC and AMC had 1990 sales of more than FF1,000 million from a workforce of 1,600 employees.

In return, AEG will take up to a 10 per cent holding in Matra Communications, with the possibility of increasing this stake to 21 per cent after three years or pulling out of the agreement altogether.

The agreement covers the business radio communications and cellular mobile market sectors, Matra said, and will not impinge on Matra's existing joint venture with Ericsson - MET - which manufactures switching equipment for PSTN [public switched telephone network] and cellular applications. Emphasis will be on the digital cellular handset and specialist business system markets.

The particular market the new agreement will attack is the GSM handset market. Matra is already part of a consortium with Telettra, Ericsson and Orbitel (a Racal Telecom/Ericsson joint venture) for the supply of GSM Infrastructure equipment. Matra was the lead-member of the consortium when it was selected by five European GSM operators to supply equipment (Vodafone, France Telecom, PTT Suisse, Telefonica and SIP). (Ericsson/Orbitel were also selected by P&TTele in Finland and Swedish Telecom to supply GSM infrastructure equipment.)

Matra previously had another joint-venture company in the radiocommunications handset area, Matra Nokia, which was responsible for the manufacture of the Matracom 2000 analogue cellular handset for use on France Telecom's Radiocom 2000 450MHz network and on the SFR cellular network.

Relations between Matra and Nokia are likely to have worsened last week when it was announced that Nokia had been selected by Microtel PCN to supply switching equipment for the latter's national network. Matra had been one of the original shareholders in Microtel and it is thought that Nokia's selection was the primary reason for Matra withdrawing its shareholding.

Negotiates with Bosch...

Matra Space and Defence is currently negotiating with Robert Bosch of Germany with a view to taking over control of, or working with, some of the space operations of Bosch subsidiary ANT Nachrichtentechnik. Matra is interested in increasing its presence in the European space business through co-operation with other European companies. Last year, the company formed Matra Marconi Space, a joint venture with GEC-Marconi.

...and Amper?

There have been rumours circulating the industry recently that Matra may be holding talks with Amper, the Spanish equipment manufacturer with whom Siemens instigated talks at the end of last year. The outcome of the talks with the German company are not known and spokesmen from Matra could not be contacted for comment on any of these issues by press time.

Siemens Interim Activity Report Summarized

91MI0454 Duesseldorf *HANDELSBLATT* in German
25 Jul 91 p 11

[Text] During the first three quarters of its 1990-1991 fiscal year, Siemens AG of Berlin and Munich, and its

consolidated domestic and foreign shareholders, continued on a growth curve. Management attributes this mainly to numerous major orders and, for the first time, to the inclusion of newly-purchased companies. As a result, orders rose appreciably by 20 percent to 61.3 billion German marks [DM] (versus DM51 billion in the previous year). The engine for this growth was domestic orders, which rose by 31 percent to DM27.2 billion (versus DM20.8 billion). The new companies accounted for about 8 percent of the increase in orders.

The profit position also showed improvement, although the increase was slower than the increase in revenues. These rose by 12 percent to DM51 billion (versus DM45.3 billion). After-tax profits rose by 7 percent to DM1.214 billion (versus DM1.136 billion). Last but not least, due to the 9 percent increase in the number of employees, to nearly 407,000, the personnel costs rose by 15 percent to DM22.9 billion. The increase of employees was primarily due to the new companies. In some areas which were particularly sensitive to trading conditions it was even found necessary to increase employee numbers and to introduce temporary part-time schedules.

The increase in domestic orders was also affected by DM2.4 billion in orders from the new eastern German laender. Participation in international businesses rose by 13 percent to DM34.1 billion (versus DM30.2 billion) so that overseas business still exceeded domestic business by a significant margin. Major orders were obtained in traffic systems engineering (39 percent increase), public communications networks (33 percent increase), and power generation/KWU (27 percent increase), which represents an above average rate of increase. However, general business showed a lesser expansion.

In spite of unfavorable trading conditions in its field, Siemens Nixdorf Information Systems (SNI) of Paderborn, integrated for the first time, showed a 4 percent increase of new orders to DM9 billion. However, in spite of a good third quarter, growth in revenues was not able to keep up with the increase in orders.

Siemens Publishes Mid-Year 1991 Results

91WS0539C Chichester *INTERNATIONAL
TELECOMMUNICATIONS INTELLIGENCE*
in English 5 Aug 91 pp 25-26

[Text] Siemens' business volume expanded strongly during the period October 1st, 1990 to June 30th, 1991, mainly as a result of numerous large orders and the inclusion of newly-acquired companies. New orders rose 20 per cent, with the major proportion of the growth being accounted for by German domestic business. In the most recent three months period, international orders also picked up. Newly consolidated companies accounted for eight per cent of the growth in orders. Worldwide sales increased 12 per cent and net income after taxes seven per cent.

Siemens (Siemens AG and its consolidated companies) booked new orders of 61.3 German marks [DM] (previous year: DM51.0) billion during the period, an increase of 20 per cent. Of this total, eight percentage points were due to newly consolidated companies, mainly Siemens Nixdorf Informationssysteme AG (SNI) and the activities acquired from Plessey. Growth in Germany was strong (31 per cent), due both to newly-acquired businesses and, above all, to orders from the new German states (DM2.4 billion).

Despite having a lower growth rate than in prior years, international business still expanded by 13 per cent on a year-to-year comparison, but 30 per cent during the last three months. Large-scale orders stimulated above-average growth for the Transportation (39 per cent), Public Communication Networks (33 per cent) and Power Engineering (27 per cent) Groups.

By contrast, business in standard products was weaker. Despite a depressed climate in the computer sector, Siemens Nixdorf Informationssysteme (SNI) recorded orders of DM9.0 billion, four per cent more than a year earlier.

Sales rose 12 per cent from DM45.3 to DM51.0 billion, with German and international operations contributing equal shares of this growth. Due to the traditionally long lead times in the systems business, the high level of new orders booked this year will only affect the sales volume over a longer period. Developments varied very strongly among the operating groups. While sales of Components and Automation Systems stagnated and Automotive Systems, Drives and Standard Products recorded only marginal growth rates, sales of the Transportation Systems, Industrial and Building Systems, and Public Communication Networks Groups increased by over 20 per cent each. At SNI, nine-month sales trailed behind new orders, despite satisfactory third quarter figures.

The number of employees at 30th June, 1991 was just under 407,000, or 9 per cent more than at 30th September, 1990. This growth resulted primarily from the inclusion of newly acquired companies. Other factors had only a marginal effect on employment levels. Reductions in the workforce and some short-time work was necessary in a few areas which were affected by recessionary trends. Personnel costs rose 15 per cent to DM22.9 billion.

Capital spending was down by one-third on the comparable year-to-year period, decreasing from DM5.3 billion to DM3.6 billion. This reduction was due exclusively to the lower amount spent on acquisitions. Capital expenditures on fixed assets rose slightly.

Net income after taxes increased seven per cent, from DM1,136 million to DM1,214 million.

Siemens AG - Interim Report for the period October 1st, 1990 to June 30th, 1991 (DM000m)

	1 Oct, 89 to 30 Jun, 90	1 Oct, 90 to 30 Jun, 81	% Change
New orders			
Domestic business	20.8	27.2	20
Overseas business	30.2	34.1	13
Total orders	51.0	61.3	20
Sales			
Domestic	20.2	22.8	12
Overseas	25.1	28.2	13
Total sales	45.3	51.0	12
Employees			
Domestic operations	230k	246k	7
International	143k	161k	13
Total	373k	407k	9
Employment costs	19.8	22.9	15
Capital expenditure	5.3	3.6	-33
Net income	1.136	1.214	7

Germany: Hoechst R&D, Organizational Strategies Outlined

91MI0446 Duesseldorf *HANDELSBLATT* in German
29 Jul 91 p 14

[Text] Professor Heinz Harnisch, member of the executive board of Hoechst AG in Frankfurt and the man responsible for the chemical group's research and development work, readily admits that: "Even an operation like Hoechst can't do everything." He certainly knows that it is not easy for his scientists to realize that they must narrow their sights and sometimes resign themselves to no longer going it alone in the areas of work remaining to them: "The 'not invented here' mind-set is still far from being defeated everywhere."

Defeated it must be, however, because the world of the researcher has been fundamentally transformed in a very short time. Gone are the days when they could work away in the laboratory at more or less any objective that struck their fancy—regardless of any corporate strategy—in order to delight the sales department as often as possible with finished products: "Nowadays, research strategy is a key component of corporate strategy, and we have to consider very early on whether a new field of work actually has a place in the overall corporation," says Harnisch, emphasizing the tauter integration.

Shorter Research Times and Risk Minimization

Corporate strategy, however, must also take account of the pressures of a world market in which even a corporate giant can no longer act in isolation. The race among competitors worldwide to bring out new products

seldom lasts just a few weeks, and the ever-increasing costs of the individual product (a new drug can devour a cool 400 million German marks [DM] before its launch) leaves little room for flops. "We have to shorten research times and minimize the risks," is thus the company's dilemma.

The new ends justify so many means that the chemistry researcher would never have dared consider before. Thus he has to work even with his direct competitors, particularly in the "precompetitive phase" of basic research. For example, Hoechst cooperated with Bayer on AIDS research and with Bayer and BASF [Baden Anilin and Soda Factory] on ultrathin plastic films. Even particularly knowledgeable customers are brought into the joint process. He states the properties needed in a product for his special application and receives preproducts for field trials to determine the direction that further development is to take.

Constant Increase in Overseas Share

This process also contributes to the internationalization of research: "The market leaders with whom we can undertake joint developments are no longer always based in Europe—so we have to go to them." Hoechst thus developed photoresists (special light-sensitive lacquers used to transfer micro-fine chip structures photo-mechanically to silicon) jointly with IBM. The research on resists was consequently transferred to the U.S. It was the same with the research on ferroelectric liquid crystals (for extremely flat, high-definition color picture screens). In this case, the basic work on the search for materials was certainly done, as previously, in Germany, although the formulation work followed the MITI [Japanese Ministry of International Trade and Industry] project to Japan.

Admittedly, decentralization and internationalization have other, more fundamental causes. Harnisch also sees them as part of a logical development: "First we globalized marketing; production then gradually followed in the sixties, and for about the last ten years research and development have been increasingly taking place abroad." In this way, the research and development strategists can trace both the formation of focal points on the worldwide research scene (e.g. molecular biology and genetic engineering in the U.S.) and the concentration of specific corporate product groups in specific areas of the world, not infrequently as a consequence of acquisitions such as the Celanese Corporation in the U.S.

The distribution of research expenditure in Hoechst illustrates this trend: of the DM507 million spent in 1970, all of 5 percent went on overseas work, whereas of last year's DM2.69 billion, (the 14,440 researchers had a budget of more than DM10 million per working day) 38 percent was spent outside Germany. "In the year 2000, equal status could be reached with a 50 percent overseas share," estimates Harnisch, because a "tri-regional

research concept" is increasingly taking shape at Hoechst, a tripod with European, American, and Japanese legs.

In the U.S., where development work focuses primarily on high-performance plastics and drugs for treating diseases of the central nervous system, DM420 million were spent on research in 1990; in Japan (where the focus is on electronics materials) the figure was DM51 million for the consolidated companies, rising to DM120 million when minority holdings are included). The Japanese difference indicates that research is more and more frequently tied into joint ventures, which significantly unify know-how.

"For a long time it has not been possible for the company to generate all knowledge itself," explains Harnisch. In spite of their size, resources are limited, and it is frequently faster and significantly cheaper to buy know-how. "This is why we need a licensing and acquisitions strategy, as well as the actual research strategy. And all three must be coordinated with one another."

Besides the new structure, the changes that have taken place in the competitive environment also render a different form of internal organization imperative. To save time, Harnisch's staff perform in parallel much of the work previously performed sequentially. From now on, teams of workers from all the sectors involved are formed. Doctors, chemical engineers, environment engineers, and of course, the marketing people all discuss the development process together. "The old division by function caused excessive frictional losses when a project was transferred from one department to the next," explains the research chief. "When there were bottlenecks in capacity, products often stood too long in the waiting line."

This parallel, interdisciplinary form of organization avoids such jams. And it makes for more efficient deployment of the researchers with predetermined schedules and rigid controls that were hardly imaginable a few years ago. Moreover, the latest devices, from the computer to the scanning electron microscope are used to increase accuracy and speed. The Hoechst people themselves have even developed an EDP program for on-screen molecule design that even makes suggestions about the synthesis in question.

Harnisch is fully aware of the risk of creativity falling by the wayside in such a tight technical and organizational straightjacket, and of opportunities being missed. As before, room for maneuver remains in central basic research, which admittedly accounts for only 7 percent of the research and development budget. A research reserve of DM100 to 120 million also brings flexibility and would permit entry into unforeseen major projects without prolonged investment planning. For, according to Harnisch's credo: "We must maintain a measure of freedom; chance has always been a valuable assistant."

Philips Seeks To Dominate Multimedia Market

91AN0488 Rijswijk POLYTECHNISCH WEEKBLAD
in Dutch 27 Jun 91 p 9

[Article by Rita Jager: "Philips Strives For Leading Position In Multimedia Market"]

[Text] Philips is working toward a comeback in the professional information and communication systems market. The Eindhoven-based concern is "seriously working on it," as vice president W.G. de Cock stated. A new range of (multimedia) PC's, notebooks, (image) telephones, and fax machines constitutes the onslaught. The ultimate objective is leadership in the multimedia market, an area where Philips is already one of the trendsetters.

Multimedia (i.e., where (data) communications, audio, and video overlap) is the spearhead technology of Philips Consumer Electronics. In this sector, which is expected to grow significantly, Philips anticipates major opportunities because it possesses the necessary technological expertise and, in the case of some technologies (e.g., interactive CD), it is even one of the trendsetters. This is one of the reasons why the company's management decided to transfer PC's from the loss-making Information Systems division to Consumer Electronics. Ongoing developments in multimedia technologies required the integration of computer and communications activities. "The press wrongfully concluded that Philips would pull out of the professional IT market," says De Cock, who denies these reports. PC's, which were the cause of considerable losses in the first quarter, are and will remain one of Philips' core activities. More emphasis will be put on notebook computers, multimedia PC's, and pen PC's. Prototypes of the latter will be ready by the end of the year.

Keyboard-Phobia

As far as the pen PC is concerned, Philips is lagging at least six months behind computer giant NCR, who launched this novelty last Monday in the United States as a world's first. The NCR product will be available in the Netherlands at the end of the year. Philips believes that the pen PC is an alternative for people suffering from "keyboard-phobia" because it allows users to write on the screen instead of using a keyboard. Multimedia PC's also represent an essential part of Philips' new market strategy. The first model is being introduced in the United States at the end of the year. Philips' ambition to become one of the top 10 market leaders—according to Dataquest figures, the concern is currently ranking 14th—will depend to a great extent on its performance in this market. At the moment, 40 percent of PC sales is realized in the United States. In 1991, this will probably increase to 50 percent. PC sales in the European market will drop from 50 to 40 percent.

Opportunism

Philips' information and communications activities have been brought together in the Personal Information Products (PIP) division. The main task of this division is to take advantage of opportunities presented by the new technologies used in multimedia and multipurpose products. This is not an easy assignment because the market "has not yet been delineated and there is a lot of opportunism," De Cock says. The PIP division (PC's, monitors, peripherals, consumer communications) has to grow by 10 to 20 percent per year. At the moment, Philips has a sales figure of approximately 750 million guilders in this market, consisting of 20 percent in hardware sales and 80 percent in services. According to director R. Hamersma of the Consumer Electronics division, it is important for a manufacturer to be able to supply a complete product range. He mentions products such as desktop, notebook, and interactive CD (CD-I), for which communications via networks and a high level of standardization are essential requirements.

Apparently, Philips has already made some progress in the area of CD-I standardization through its cooperation with Matsushita and Sony, which resulted in the establishment of the CD-I Consortium Japan last spring. In the fall, the CD-I system will be launched in Japan and the United States, and six months later in Europe. "We are the standard," says Hamersma confidently. Commodore's CDTV (Commodore Dynamic Total Vision) project does not stand much of a chance, according to him. With his "Commodore can have it its own way" comment, he more or less brushes aside the competitive challenge. At Commodore, marketing manager Henk Ras laughs off Hamersma's remarks. "It is a great story coming from someone who is not even in the market yet. Who knows what the standard will be? When Philips launches its CD-I, both systems will coexist temporarily. But ultimately, user preference will determine which system becomes the standard. Recently, Commodore quietly introduced CDTV into the Dutch market. The product has already been officially launched in the UK, Germany, and France, with Belgium and the Netherlands to follow suit in September. By now, 32 CDTV software packages (as diverse as games, language courses, and Shakespeare) are available.

EAST-WEST RELATIONS

Siemens, Ansaldo, FATA Join USSR in Energy Programs

91MI0451 Bonn TECHNOLOGIE-NACHRICHTEN
MANAGEMENT-INFORMATIONEN in German
18 Jul 91 pp 25-26

[Text] The energy production division (KWU) of Siemens AG has reached agreement with the Soviet Union on a long-term, comprehensive cooperation in conventional power station technology. The principal item is the "Interturbo" joint venture in Leningrad for the production of gas turbines using Siemens technology and

the further joint development of gas turbines. Another contract, which also involves the Italian partners Ansaldo-GIE, Milan, and FATA European Group, Turin, confirms the founding of the joint "Energoengineering" engineering company with headquarters in Moscow and offices in Kiev and Minsk. This joint venture will build modern heating power stations, with emphasis on environmentally-acceptable combined gas and steam turbines (GUD) in the USSR and possibly in Third World countries, will modernize and equip existing power stations with environmental protection technology, and will modernize gas production and gas transport installations. Energoengineering has already received provisional sales contracts for four GUD power stations to be built in Russia, the Ukraine, and Belorussia.

British-Hungarian Joint Venture Survives Videoton Dissolution

*91WS0523B Budapest COMPUTERWORLD/
SZAMITASTECHNIKA in Hungarian 1 Aug 91 p 1*

[Article by Z. M.: "Walton, Or the Hungarian Phoenix"]

[Text] While Videoton is melting like a snowman, dragging down its parts with it, including joint undertakings, it appears that Walton—formed, as one recalls, as a mixed enterprise by Videoton and the British Walters—succeeded at the last moment in cutting itself with a sudden masterly stroke from the body of the sick giant.

Only the name and the well known activity sphere—distribution of a wide variety of network products—remain, but everything behind the scenes is being transformed. The new owners of Walton—Albacomp and Compusack, one of the leading computer technology commercial houses of Germany—are bringing new, dynamic forces into the organization. The managing director of the reorganized corporation is Sandor Janovics.

Janos Minarovics, president of Albacomp, added the following to the report: The signing of the Walton contract also means that contrary to the earlier plans there will not be an independent Compusack Hungary or an Albacomp-Compusack mixed enterprise.

The fact that Walton has come to an agreement with its big rivals, the Albacomp-Compusack pair, will surely change the Hungarian LAN market, largely for the better.

EUROPE-ASIA RELATIONS

EC: Delors Urges Japan To Open Up Telecom Market

*91AN0495 Amsterdam COMPUTABLE in Dutch
21 Jun 91 p 25*

[Article by Nigel Tutt: "Delors Asks Japan To Open Up Market: Telecommunications Mentioned as Spearhead Sector"]

[Text] Tokyo—European Commission President Jacques Delors has asked the Japanese Government to open up the telecommunications and satellite markets—among others—to European competition.

During his recent visit, Delors discussed the issue with Japanese Prime Minister Toshiki Kaifu. He warned that it would not suffice merely to discuss the accessibility of European products and investments, but that the Japanese attitude, too, would have to change.

Delors' visit follows the publication of the balance of trade figures between Japan and the EC. For some time, the EC trade deficit seemed to be less dramatic, but now Japan is exporting considerably more to the EC than it is importing from the EC. Today, the main issue is technological and industrial dependence, according to Delors. "This is not reflected sufficiently in the current flow of trade."

Delors said it was "strange" that exports to Japan in the area of telecommunications—where European industry is considered to be extremely competitive—have stagnated and said it was primarily the Japanese system which was to blame. He expressed his dissatisfaction with the Japanese distribution system and the standoffishness of Japanese business concerns. "We also have to discuss these kinds of underlying issues which are related to the direct problems of competition."

Japan/EC: Basic Research Cooperation

Japan Plans Coordination Office

*91WS0441A Duesseldorf VDI NACHRICHTEN
in German 14 Jun 91 p 16*

[Article by Rainer Koehler: "East Goes West: Far Eastern Giant Wants to Make Up Ground in Research"; first paragraph is VDI NACHRICHTEN introduction]

[Text] Japan has considerable ground to make up in fields such as chemistry or aircraft construction. Today, when there are but a few who can still match Japan in the area of high technology, there is a growing demand for domestic scientific breakthroughs. To ensure these breakthroughs, Japan is entering into an increasing number of cooperative programs with foreign partners.

Japan is experimenting both in theory and in practice with several types of cooperative programs. On April 1, the beginning of fiscal year 1991, preliminary studies began for a "Center for Outstanding Achievements" (COE). Japan's federally funded basic research program is intended to help coordinate something that sounds a bit like Soviet competition propaganda. Although the final decision as to which fields the institute will focus on has yet to be made, there is no doubt that the funds allocated to it will be considerable. During the last fiscal year, the Japanese Ministry of International Trade and Industry (MITI) had at its disposal approximately 250 billion Japanese yen [Y] (3.1 billion German marks [DM]). Since 1988, the MITI budget has been increasing

rapidly. The budget for this fiscal year will be the highest ever, totalling more than Y263 billion (just under DM3.3 billion).

The MITI is currently sponsoring more than 50 projects. The research objectives of these projects range from superconducting materials to solar energy, encompassing all important fields now thought to have promising futures. Furthermore, something which does not come under the MITI umbrella can still be federally funded in other ways. In fiscal year 1991, the Ministry of Education alone had at its disposal an equivalent of more than DM10 billion. The Science and Technology Agency (STA), with a budget equal to DM2.9 billion, and the Defense Administration, with a budget equivalent to almost DM1.8 billion, are also powerful scientific partners. Altogether, the equivalent of nearly DM22 billion is presently being made available by the Japanese government for research purposes. That much money should certainly ensure at least some results.

Some major projects are already in the offing. Firms in the United States and Germany have been approached about cooperating with Japanese firms to develop a system for harnessing solar energy from space. A MITI spokesman even dreamed recently of a 5km-long, 10km-wide, and 500 meter-thick solar collector that in the year 2020 would send energy to the earth via microwaves. Other projects are also in the works.

In 1989, the race began for the development of aggregates for the new ultra-fast aircraft which, perhaps by the year 2030, will make the flight from Tokyo to New York at five times the speed of sound, reducing the flight time to three to five hours. Japan's leading economic newspaper "Nihon Keizai Shimbun" reports that this time the MITI "does not want to compete with foreign motor manufacturers such as United Technologies Corp., Rolls Royce Pic., or General Electric and thereby make enemies of them, but rather to collaborate with them on future-oriented projects."

It is obvious, however, that the economic bosses are not yet completely sold on the government's new approach to research. It is clear that Takaaki Yamada, vice president of Mitsubishi Heavy Industry, Ltd., one of the largest participants in the lucrative project, has something much different in mind. He told the "Japan Economic Journal" that his company's primary objective is to put the new aircraft motor on the market as early as 2005, much sooner than the MITI intends and most likely sooner than the foreign competition can manage.

There is even debate within the ranks of the government itself as to whether Japan might not be shooting itself in the foot by encouraging cooperation in basic research. The MITI Department of Mechanical Engineering and Informatics, which is responsible for negotiations with foreign governments on questions of trade and technology, is in favor of globalization. In contrast, the MITI Office of Industrial Science and Technology, which

manages the individual projects, is more concerned about the sluggish pace of international research projects than about international ire over Japan's limited contribution to global research.

Other problems have arisen concerning the choice of possible partners for the "Internationalization Program." The MITI is only interested in partners from the U.S. and the EC. Kenzo Inagaki, deputy director of the MITI International Mechanical Engineering section, explains "Currently, we are only accepting advanced countries, such as members of the Organization for Economic Cooperation and Development (OECD)." This is targeted primarily against the annoying competition by the four "Asian Tigers:" South Korea, Hong Kong, Singapore, and Taiwan.

However, it is not only interested parties from Asia that are blocked. Applicants from Canada, Australia, and some non-EC nations have been rejected as well. The official attitude raises the question as to why scientific cooperation must be established on a national level in the first place. In many respects it would be more practical for institutes from various countries to work together directly, as is customary.

Joint Optical Computer Research

91WS0441B Duesseldorf VDI NACHRICHTEN
in German 7 Jun 91 p 6

[Article by Rainer Koehler: "'Stowaway' on the International Research Express Changes Mind: Japan To Cooperate With Foreign Partners in Basic Technology Research"; first paragraph is VDI NACHRICHTEN introduction]

[Text] Until now, Japan has been a "stowaway" on the international research express. Now the Far Eastern industrial giant is promoting its basic research globalization program. For the Japanese Ministry for International Trade and Industry (MITI), the time has come to close the visible gaps in national research via international cooperation.

The army of officials in the MITI has always been very inventive when it comes to acquiring technologies and patents for Japanese concerns on favorable terms. Now the "master bureaucrats" in Tokyo's governmental quarter of Kasumigaseki have apparently come up with a new dodge for tapping foreign sources. The official phrase, "mutually beneficial international cooperation," sounds nice, but perhaps should not always be taken too literally. As controlling agency of state-funded basic research, the MITI is presently keeping a sharp eye out for powerful partners for programs in those fields in which the Japanese are not yet the world leaders.

The German chemical giant Baden Anilin and Soda Factory (BASF) is the first foreign firm to penetrate the "inner sanctum" of Japanese science: the state program for the "Research and Development of Basic Technologies for Future Industries." The ambitious title means

just that: 14 fields, ranging from bioelectronic equipment to synthetic metals, have been selected for the program on the basis of their theoretical or experimental potential. One of the primary areas of concentration for the nineties is research into "nonlinear photonic materials," a project in which BASF is also involved.

Experts agree that the computer generation of the year 2000 will be gated by optical means alone, with no electronic "brake." Laser circuits are 100 to 1000 times faster than electronic networks. Extremely fast gate times such as one picosecond or less are only achievable using materials with nonlinear optical properties. Under low illumination, these materials allow almost no light to pass through; under higher illumination they are far more transparent. If a suitable extremely conductive and laser-beam permeable material can be found, this interplay between opaque and transparent states can occur within a trillionth of a second.

The international race has long been underway, and, of course, Japanese firms are also searching feverishly for the "magic gate" that will ensure them a considerable lead in the computer market of the future. In the Tsukuba scientific center, this common objective has brought together a team capable of providing the stiffest competition outside of Technology Park. Concerns such as Hitachi, Matsushita, and Sumitomo are conducting joint research under the MITI organizational umbrella.

In addition to BASF, eight Japanese firms, five national research institutes, and universities in Tokyo and Nagoya are involved in the project. The project is well funded, with a budget of 20 billion Japanese yen (just under 225 million German marks). Research is initially being focused in three areas:

1. Microcrystalline-doped glass, on which four leading Japanese glass manufacturers are working;
2. Super-latticed materials, a specialty of the electronic concerns;
3. Organic materials, a specialty of BASF. Word from the laboratories has it that all the partners are praising the spirit of cooperation and readiness to freely exchange information.

Of course, more than a year after the beginning of the project, it is still impossible to say which of these fields holds the key to success; it may well lie in a combination of several materials. The two researchers sent from Ludwigshafen are of the opinion that polymers, which are characterized by an unusually high electrical conductivity comparable to metal, hold particular promise. A polyacetylene produced by BASF conducts electrical current as well as copper does. These successes in research have brought the German chemists to the attention of the Japanese MITI.

As a research partner of Japan, BASF is interested in, among other things, Nippon's world-leading optical and

electronic industries. Of course, free use of the state-of-the-art Tsukuba research laboratories is of tremendous appeal, but of equal importance to a firm operating in the international arena is the opportunity to get a good look at the research network of the Far East, which until now has generally been a closed book to foreigners.

Dr. Harald Koehl, president of BASF Japan Ltd., is confident that his company is doing the right thing, and that it will be able to benefit from the new internationalization program of Japanese basic research. Like other industrialists operating in Japan, Koehl was recently urged by the German minister for research and technology to "increase your ability to compete technologically" in Japan, and to "conduct research and development yourself rather than limiting yourself to manufacturing," as "that is the only way to attain an open market." The guest from Bonn even went so far as to say: "Don't lose heart, emphasize your strong points, and thereby neutralize the possible disadvantages of being foreigners."

Toshikazu Goto, Deputy Director of the Japanese Office for Industrial Science and Technology, who is responsible for global cooperation, has grave doubts as to whether this premise is valid where the Japanese economy is concerned. The fact is that until now, some major Japanese concerns have preferred to acquire scientific know-how by buying out their foreign competitors. It remains to be seen how willing these firms, some of which are internationally known, will be to abandon their habits and adopt the new MITI line.

First, however, there are logistical prerequisites that must be met before the new strategy can be launched. A MITI bill is in the works that would allow foreign firms taking part in international development projects sponsored by the Japanese government to acquire high-tech patents stemming from these projects free or at a relatively low cost. This, which sounds normal for a mutually beneficial cooperative program, and which is common practice in western Europe and the United States, is still new to the Far East.

Until now, local concerns have also been strongly urged to pay up, even if they contributed substantially to the research. The MITI has officially announced that the extreme restraint of important foreign partners is no longer incomprehensible, and it is putting its money where its mouth is.

Komatsu Chairman on Company's European Strategy

*91MI0469 Duesseldorf HANDELSBLATT in German
19 Aug 91 p 11*

[Article by Andreas Gandow: "An Insider in the European Market"]

[Text] Japan's leading manufacturer of construction machinery, Komatsu Ltd of Tokyo, is presently

increasing its involvement in the new fields of semiconductor and robot technology and in industrial engineering in order to develop into a "total engineering" company. According to a HANDELSBLATT interview with Komatsu President Tetsuya Katada, the company's plans for the EC, following its takeover of Hanomag AG, are to enter into cooperation with European manufacturers, to push hard to extend involvement in large-scale presses for the automobile industry, and to create in a short period of time a base for electronic components.

During fiscal year 1990-91 (ending 31 March 91) the company was able to consolidate its increase in revenues, which rose by 11.5 percent to 988.9 billion yen, or almost 12 billion German marks [DM], domestic sales rose by 12.8 percent to 688 billion yen, while overseas sales rose by 8.5 percent to 300.9 billion yen. Of these totals, 660.5 billion yen (+9.4 percent), or 67 percent, were accounted for by the construction machinery sector; 86.7 billion yen (+30.4 percent), or 9 percent, by industrial machinery (presses and robots); and 241.8 billion yen (+12 percent), or 24 percent, by the company's other new business activities, including silicon wafers, plastics, prefabricated components and software development. Profits rose over the same period by 14.6 percent to 31.3 billion yen (around DM375 million).

For the current 1991-92 fiscal year, the company expects an 8 percent increase in revenues to 1.030 trillion yen to yield corresponding post-tax profits of 33.5 billion yen. Katada's projections for the present fiscal year for both the domestic and overseas market take into account an anticipated worsening of the economic situation in the U.S., large parts of Europe and southeast Asia, shortages of overseas currency in the former eastern bloc, and the debt crisis facing developing countries, together with stagnating revenues in the construction machinery sector.

The impulse for the increase in revenues is expected to be provided by a further above-average expansion of the company's other business activities, which in the medium term will account for half the total revenues. Those sectors whose overseas revenues remain at less than 10 percent of the total, are to increase substantially their sales in the European market, Katada reports.

The company's European involvement, which expanded substantially during fiscal year 1990-91 by 25 percent to 100 billion yen (some DM1.2 billion) and is controlled by Komatsu Europe International SA set up at the end of 1989, falls into four production areas:

- Komatsu UK Ltd: an excavator factory operating in Great Britain since 1985, with production of 1,800 units per year. A European production share of "over 70 percent" by value has already been achieved. Katada reports that the present target, in accordance with undertakings given to the British government, is a level of 80 percent. Following the takeover of Hanomag, however, the planned annual production of 1,200 wheel loaders has been abandoned.

- In Italy, Komatsu has been cooperating with the construction machinery manufacturer FAI Spa since July 1988. In mid-1989, the company contracted to produce mini-excavators of Japanese manufacture for the European market, and Katada now reports a limited capital participation in FAI, to support cooperation in business activities; discussion on this matter with the Italian partner are still proceeding.
- The production base in Germany is Hanomag AG of Hanover, taken over on a majority shareholding basis (presently involving 64 percent of capital) in 1989; investment in modernization in the fields of production technology and data processing presently totals around DM50 million since, according to Katada, no new investment whatever had been undertaken during the five years before the takeover. He is now confident, however, of profits being achieved by Hanomag AG in the coming fiscal year. Katada says that, "We were convinced from the start that with suitable restructuring and with this investment program we could make Hanomag AG successful again. An additional aim, however, was to become insiders in the European market by means of this takeover. It would have been possible for us to proceed alone, but this is the better way for Japanese companies."
- In Norway, Komatsu has founded a joint venture with the state company Olivin AS for the production of trucks with articulated bogies. The Japanese company will hold a third of the capital of the joint venture, Moxy Truck AS, which will build the special truck with Komatsu's know-how and be responsible for worldwide distribution of the vehicles. The Norwegian company Brown Engineering has hitherto been the supplier for vehicles of this type.

Expansion of R&D Capacity To Include Germany

Future priorities, according to Katada, include the appointment of Europeans to management positions, the expansion of development capacity in Great Britain and Germany, the development of a European research center, the development of further collaborative ventures with European construction machinery manufacturers, and expansion in the other new sectors in which the company is active.

In his discussions with the European association for the sector, CECE (Committee for European Construction Equipment), says Katada, there was a general consensus that market development had been marked by stagnation in demand and overcapacity; therefore, all manufacturers were now engaged in "under the table" negotiations on cooperation opportunities.

Therefore, Komatsu does not see discussion centering on the creation of further capacity in the construction machinery sector, but rather on agreements on cooperation which would be beneficial to both sides. The European side includes numerous medium-sized manufacturers with a broad product range, Katada emphasizes,

for whom such collaboration could make good business sense; Komatsu is even prepared to postpone its own European development project for a wheel loader.

The massive participation by Korean construction machinery manufacturers at the last trade fair in Paris surprised even Katada, he admits. The three leading Korean manufacturers obviously have a strategy of making a significant impact on the European excavator market which could conceivably give cause for alarm among some European manufacturers.

This does not however, constitute a threat to his own company, as the experience of southeast Asian markets has already shown: Katada bases this belief both on the technical standard of the Korean exhibits, and also on the unfavorable pricing arising from lower production volumes.

As far as future involvement in the construction machinery market in central and eastern Europe is concerned, Katada stresses that even before the political upheavals there had already been contacts between the U.S. joint venture, Komatsu Dresser Co., and Hanomag AG with suppliers in Poland and Czechoslovakia. Visits to these companies, which were subsidiaries of tank factories, had revealed a "surprisingly modern standard of production technology."

It is now questionable whether these subsidiaries can remain competitive on cost; Komatsu, Katada states, has made "various investigations" with a view to involvement in this region. Developments in the respective markets are being closely monitored, but he does not expect any decision in the near future. Furthermore, the takeover of Hanomag AG in central Europe is proving to be very positive, as it could lead to the opening-up of markets in central and eastern Europe.

In addition to these activities in the construction machinery sector, Katada also reports a strengthening of sales of machines and systems for sheet metal working and for the plastics industry, together with an expansion of business in large-scale presses for the automobile industry, one of the company's traditional products supplied to all Japanese manufacturers as well as to three U.S. automobile manufacturers. For the first time, contracts have been concluded with Fiat, from whom orders are now awaited. Komatsu will also supply the European production centers of Nissan and Toyota with presses.

Wafer Production Imminent in Europe

The third area mentioned by Katada in which there will be future involvement in Europe is that of wafer production for the manufacture of memory chips, for which the group's Komatsu Electronic Metals Company is responsible. The company occupies a very strong competitive position internationally in silicon wafer production and, following the expansion of production by Japanese chip

manufacturers in Europe, it will set up its own production base in this region, which for long has not been adequately supplied on grounds of capacity: "before 1995," reports Katada.

Having achieved revenues of over 1 trillion yen in the current fiscal year, the medium-term aim of the entire company's strategy is to achieve revenues of 1.5 trillion yen by the mid-1990's, states Katada. This cannot however, be achieved with construction machinery as at present; the future priority is to integrate the present individual industrial machinery and robot construction units into systems and to market them together with software and engineering services. The second significant sector "in which we are all concentrating our forces, as it will develop into an important market," is the development of robots of all kinds for structural engineering, such as the installation of heavy wall panels and painting. Not only does the acute labor shortage give grounds to expect strong demand from traditional customers in the construction industry; but the company already possesses substantial expertise in this area, according to Katada. Revenues in the entire robotic sector are therefore expected to rise from 5.5 billion yen (some DM65 million, of which some DM12 million are accounted for by robots in the construction industry) to 10 billion yen in the present year and 25 billion yen by 1995.

Renault, Volvo Face Japanese Entry Into Truck Market

*91WS0472A Paris L'USINE NOUVELLE in French
13 Jun 91 p 26*

[Article by Alain-Gabriel Verdevoye: "Renault-Volvo: Japanese Are Sowing Discord..."; first paragraph is L'USINE NOUVELLE introduction]

[Text] ...This time, in the field of heavy trucks. And though Volvo may have allied with the Japanese to buy up Czechoslovak builders, Renault and RVI [Renault Industrial Vehicles] don't really appreciate it.

A partial, temporary accord, with no impact on the Renault-Volvo alliance. Top officials of the two automotive concerns have made no end of calming statements, in an effort to minimize the intrusion of Japan's Mitsubishi into the capital of Holland's Volvo Car BV last May. But the Japanese group is certainly sowing a great deal of discord between the French and Swedish partners. For Volvo now wants a new agreement with Mitsubishi, putting Renault in a quandary. "I have good reason to believe that a (second) accord between Renault, Volvo and Mitsubishi will soon be announced in some European country," said Jacques Calvet, president of PSA [Peugeot Corporation], worrying out loud before a group of journalists last weekend.

No Threesome

Renault, which has already swallowed the fact that Mitsubishi vehicles will be assembled on Volvo's Dutch

production lines starting in 1995, could end up becoming a privileged partner of the Japanese firm. In self-defense, Volvo is believed to be closing a deal on heavy trucks with the Japanese firm. A joint takeover of the Czechoslovak trucking industry would represent a first tangible step toward a triangular alliance. RVI officials, at all events, maintain they are not engaged in talks with the Japanese builder. So once again, Volvo may force the hand of its French ally.

An embarrassing situation for Raymond Levy, CEO of the state-owned enterprise, who met with Prime Minister Edith Cresson on Monday afternoon. The French Government does not find it easy to accept the idea that Renault—the only nationalized automotive manufacturer in Western Europe—should continue to lend its aid to the implantation of a Japanese group in Europe. Especially since Yohei Mimura, Mitsubishi's president, recently criticized Cresson's anti-Japanese position.

In any case, the Renault-Volvo alliance is going through a difficult period, even if Pehr Gyllenhammar, head of Volvo's board of directors, boasted to us last April of having made "the biggest investment in our history" with Renault. Volvo has much less to fear from the Japanese than Renault. "It is more productive to do everything we can to be competitive with the Japanese than it is to indulge in protectionism," Pehr Gyllenhammar said.

Volvo Enthusiastic

With its cars targeted at the high-end market and its trucks mostly in the heavy-tonnage category, the Goteborg firm is not really in competition with Japanese products, including those of Mitsubishi. Also, Volvo is already operating at home in a market open to Far East manufacturers. So it is scarcely worried about possible extra-European alliances. None of which is any help to Raymond Levy, the target of repeated attacks from his hot-headed competitor, the president of the PSA group, who speaks out openly against the Japanese. Jacques Calvet is also worried about the future of joint research programs with Renault: "I cannot allow the results of joint research to be exported without our agreement."

Renault seems to favor a bilateral accord with Volvo, at least for the short term. But the largely internationalized Scandinavian group seems to have bigger ambitions and envisages a broader alliance. Mitsubishi, which is seeking a European partner in the heavy truck sector and is also negotiating with Mercedes-Benz and Holland's Daf, could give Volvo not only a large investment capacity and solid technological know-how in medium-tonnage trucks, but also access to its marketing networks in the Far East. The Renault-Volvo duo could become a three-sided affair.

Japan's NTT Establishes German Subsidiary

*91WS0466C Chichester INTERNATIONAL
TELECOMMUNICATIONS INTELLIGENCE
in English 24 Jun 91 p 5*

[Article: "NTT Establishes German Subsidiary"]

[Text] By the end of this month, Nippon Telegraph and Telephone (NTT) of Japan hopes to have established a new subsidiary, NTT Deutschland GmbH, in Dusseldorf as part of its efforts to keep pace with the rapid changes in the telecommunications industry in Europe.

The new company, which will be owned by NTT Corporation (90 per cent); NTT Data Communications Systems Corporation (5 per cent), and NTT International Corporation (5 per cent), will be capitalised at DM1.15 million and headed by Mr Nobuyuki Sakuma.

NTT Deutschland's main functions will be to support new business developments and the operation of affiliated companies; supporting NTT's international procurement activities; and co-ordinating joint technical exchange activities and the exchange of information between NTT and European telecommunications agencies.

NTT Deutschland's address is: Immermannstrasse 13, 4000 Dusseldorf 1, Germany. Tel: 49 211 350087. Fax: 49 211 1649180.

Samsung Purchases Fifty Percent of Hungarian Electronics Firm

*91WS0508B Budapest FIGYELO in Hungarian
13 Jun 91 p 5*

[Article: "Samsung Buys Orion Shares"]

[Text] Samsung Electronics is purchasing the 50 percent of the shares of the Samsung Electronics Hungarian Company which were owned by the Orion Radio and Electric Enterprise. Thus the mixed enterprise, founded in 1989, will be owned entirely by the South Korean firm.

Last year the company, with 125 employees, achieved a turnover of 1.7 billion forints and the plan for this year is 2.5 billion forints. The capacity of the factory in Jaszfenyszaru, built at a cost of about 2 million dollars, is 100,000 TV sets per year, working a single shift. Last year they assembled 55,000 TV sets of which 31,000 were sold domestically and 24,000 in neighboring countries. This year the plan is for assembly of 80,000 sets.

Last year the firm, which also sells housekeeping and other electronic products, replaced the printed and packaging materials with domestic products and this year the cabinets and lines built into the sets will be Hungarian products as well. These two items together make up 15 percent of the parts and accessories needed for production. This year Samsung plans to increase the base

capital of the enterprise, which is 100 percent on Hungarian territory, and put the shares of the firm on the Budapest Stock Exchange.

Hungarian-Japanese Biotechnology Plant Begins Production

*91WS0508C Budapest FIGYELO in Hungarian
11 Jul 91 p 5*

[Article: "Lysine Factory Dedicated"]

[Text] The Agroferm Hungarian-Japanese Fermentation Industry Joint Stock Company has begun its work in

Bojar-Hollos, between Kaba and Nadudvar. The biotechnology plant was built with an investment of 50 million dollars, Vegyepszer Rt. [the Chemical Works Construction and Fitting Enterprise Company] was prime contractor, and it will produce 5,000 tonnes of lysine, an amino acid indispensable for animals which can be used as a food additive, per year. On the basis of projections 1,500 tonnes may be sold in our country this year, so they will export the larger part of the production. The Hungarian lysine factory uses the peak biotechnology and know-how of the Japanese Kyowa Hakko Kogyo Co. Ltd. The nearby Hajdusag Sugar Factory, in Kaba, will supply the sugar beet molasses which is the most important primary material for lysine manufacture.

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