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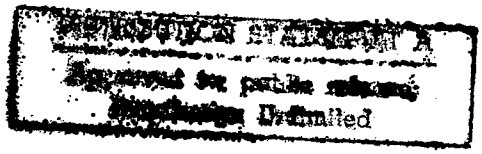

Science & Technology

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CONTENTS

EUROPE-ASIA RELATIONS

SCIENCE & TECHNOLOGY POLICY

Germany: Research Minister Expounds Position on Basic Research

MI3006102393 Bonn TECHNOLOGIE-NACHRICHTEN MANAGEMENT- INFORMATIONEN in German 28 May 93 pp 2-3

[Text] Discussion on what constitutes the appropriate scale of basic research has been taking place in Germany for a considerable time. There is no doubt that basic research, particularly that dedicated purely to understanding the world, enjoys high esteem in Germany. At the same time, it is becoming ever clearer that application-oriented basic research is increasingly becoming the norm. This is accompanied by an equally apparent trend towards a growing interdependence between industry and technology. Against the background of these factors, discussion on identifying higher and lower basic research priorities takes on a new dimension.

The essential cornerstones of BMFT [Federal Ministry of Research and Technology] basic research policy were defined by Wissmann as follows.

During the 1980s, Germany achieved high standards in terms of major facilities for supporting knowledge-oriented basic research (e.g., the HERA [hadron electron research accelerator] accelerator at DESY [German Electron Synchrotron] in Hamburg, modernization of the research reactor at the Hans Meitner Institute in Berlin, and the newly built heavy ion plant at the Heavy Ion Research Society (GSI) in Darmstadt). For the next few years, construction of BESSY [Berlin Electron Storage Ring for Synchrotron Radiation] II has been agreed, as has continued funding of FRM II. What is now important is to make intensive use of these facilities, as research results have to be measured against the hopes vested in the facilities. Universities and research establishments must work closely together here to achieve optimum results. While the BMFT is funding investment and operating costs for the facilities, the laender must in turn provide the necessary funding to enable university-based researchers to travel to and make scientific use of the facilities.

The BMFT sees its project funding for university researchers as pump-priming to develop capabilities in new fields with sufficient speed and international competitiveness. It will not, however, provide long-term funding for work performed at the universities, for which the laender are responsible.

The BMFT will not finance any new large-scale facilities for purely knowledge-oriented basic research over the next few years. Technology lines likely to achieve high technological and economic potential over the next 10 years depend on the requisite basic scientific knowledge being developed now. Studies show that the technical areas that achieved the greatest worldwide increase in patents during the eighties were more dependent than others on science: This correlation is systematically confirmed by a 1992 report commissioned by the BMFT (Hanolf Grupp, Ulrich Schmoch: "Technology's Reliance on Science, Overview of International Development and Analysis by Sector for Germany," Heidelberg, 1992). Finding solutions to urgent ecological problems, such as climate change, requires the acquisition of basic knowledge. Even at times of financial cutbacks, longer-term prospects opened up by investment in future-oriented technologies should not be forgotten. In Japan and the United States, the two major investors in research and development, there has been much debate on the importance and scale of state funding for basic research. Both countries' policies pledge them to a high level of funding for targeted basic research, and to supporting committed young scientists.

The BMFT has a special role in basic research. It aims to complement university research by opening a dialog with science on dynamic research fields at an early stage with a view to setting funding priorities. It will step up this work on funding targeted basic research over the next few years. A constant critical appraisal of the application potential inherent in the research results obtained must also become a routine aspect of research work.

There are shortcomings in Germany's exploitation of the excellent results of basic research, which needs to be based on close cooperation between industry and science, such as exists only in a few areas. One of these is chemistry, where there are well-established contacts between university faculties and companies, with industrial foundations and specialist associations ensuring a continuous exchange of ideas. This model needs to be extended to other areas.

The BMFT will initiate a package of measures intended to accelerate the application of scientific results. It will take steps to intensify strategic discussions between industry and science. The process of innovation in universities will be enhanced. In addition, small and medium-sized firms will be take on a particularly important role in the application of new technologies. The BMFT will therefore introduce a new measure supporting joint research.

The BMFT is currently spending around 40 percent of its budget on basic research, equivalent to a sum of 3.7 billion German marks [DM] in 1992. Over 50 percent of this sum was allocated to targeted basic research projects in 1992. However, the distinction that has to be made between different areas means that orientation in terms of an overall percentage will have no meaning in future. The decision on the future scale of basic research must be made, on the basis of the principles set out above, when the priorities for the specialized programs are discussed.

In view of increasing budgetary constraints, scientists and policymakers will have to make a greater effort than

ever to convince the layman, by reference to specific projects, of the purpose, benefits, and value of basic research.

Germany: Cabinet Passes Amended Law on Genetic Engineering

MI3006102993 Munich SUEDDEUTSCHE ZEITUNG in German 28 May 93 p 2

[Text] Genetic engineering research and production in Germany are to be made easier. After well over a year's discussion among experts, the Federal Cabinet passed an amendment to the 1990 Genetic Engineering Law to this effect on Thursday. The core of the bill is the shortened and simplified licensing procedure.

Speaking to the press in Bonn, Federal Research Minister Paul Krueger said that, compared with major competitors on the world markets, the previous Genetic Engineering Law had led to excessive bureaucracy and investment being transferred abroad. The CDU [Christian Democratic Union] politician called the amendment "an important signal for safeguarding Germany as a center of research." Both Krueger and Health Minister Horst Seehofer (CSU [Christian Social Union]) gave assurances that the high German safety standards for man and the environment would not be reduced, in spite of the simplified procedures. The bill will come into force on 1 January 1994.

According to the amendment, the licensing and notification lead-times for genetic engineering plants and work in the lowest safety categories, I and II, will be shortened. According to Krueger, 96 percent of all research work came into these two categories in 1992. The hearings procedure is to be dispensed with for genetic engineering plants used for commercial purposes in safety category I, which covers non-hazardous work. In safety category II, this procedure will be applied only for plants requiring licensing under the Federal Emission Prevention Law owing to the increased hazard they entail. In safety category I, licensing will be replaced by notification for certain plants and types of work. The amendment makes no change as regards public participation in licensing procedures for the release of genetically altered organisms, which is a highly disputed area. The bill does, however, allow the provisions governing it to be amended by directives.

Trade Minister Guenter Rexrodt (FDP [Free Democratic Party]) and Seehofer announced that they intended to press for a simplification of the EC guidelines on genetic engineering in Brussels. The health minister was, however, sceptical about their chances of success. The federal government regards genetic engineering as one of the key technologies of the future. According to forecasts, 2 million jobs will be created by this promising industry by the year 2000. Seehofer thinks that it is most likely to be medical applications that break down the public's mistrust of genetic engineering. As an example, he mentioned the blood clotting agent, Factor 8, which could be licensed in Germany before the end of 1993.

The Chemical Industry Association (VCI) welcomed the bill. Approval was also expressed by the SPD [Social-Democratic Party of Germany]. SPD research spokesman Wolf-Michael Catenhusen announced his own bill, however, which aims to simplify practical procedures without sacrificing safety.

Germany: Research Ministry Revises Space Research Strategy

MI2806131693 Bonn TECHNOLOGIE-NACHRICHTEN MANAGEMENT-INFORMATIONEN in German 28 May 93 p 2

[Text) Federal Research Minister Matthias Wissmann presented his strategy for realigning German and European space policy to the ministry's economic committee on his final day at work in this office. On 12 May, the minister repeated that only those projects that could be justified in plausible terms would be continued. The tightness of budgets, not only in Germany but also among her European partners and in the United States, meant that prestige projects could no longer be justified.

Wissmann stated that the APM laboratory module, the German contribution to the Freedom space station project being developed jointly by ESA and the United States, was more than controversial from the cost/usage ratio point of view: Even the scientists were now refusing to answer for its high costs. The Federal Republic was not alone in facing major problems in the future in financing its ESA contribution. ESA itself was working on the assumption that there would be an annual 5-percent real increase in contributions over the next few years. According to Wissmann, however, there was no prospect of German agreement to this: Savings were urgently required. The federal government had therefore "aggressively" supported the U.S. Government's new attempt to reduce the appropriation for the Freedom project from $15.1 billion to $7.1 billion for 1994 through 1998. Future projects would have to have a more global bias, and include Russia and Japan. The intention was to involve Russia's research capacity, part of the purpose being to prevent its being poached and bought by dubious parties. According to Wissmann, it would be "enormous progress" if the Freedom project and the Russian Mir-2 project could be integrated. Space flight would in future need to be considered more with a view to rational practical applications, such as earth observation, and climatic and environmental research.

For all the considerable economic benefits that would accrue for both sides from cooperation with Russia, problems would arise from opening up western markets to Russian space technology: State Secretary Dr. Goehner of the Federal Trade Ministry [BMWi] pointed

out that, though Russia could provide a cheaper alternative in its Proton launcher rocket, the market for highly-developed Western launcher rockets, of which there was currently a glut, could be severely damaged by a pricing policy divorced from market economy behavior patterns. Though the billions spent on developing the European Ariane launcher rocket had brought it a substantial 60-percent market share of commercial launches, primarily of communications satellites, the market itself was a small one, amounting to only 15 to 17 launches a year. Goehner affirmed Germany's willingness, along with her European partners, to ease Russia's access to the market, though this would have to be in a well-ordered manner. The BMWi is therefore engaged in political negotiations over the volume of supplies from Russia, so as to avoid any drastic inroads into German industrial capacity, with the loss of jobs that this would bring.

EC ESPRIT Program Focuses on Small Companies

MI1207103193 Turin MEDIA DUEMILA in Italian May 93 pp 70-71

[Article by Marco Casagni of ENEA [Agency for New Technologies, Energy, and the Environment]: "EC 'Special Action Project' for Microelectronics"]

[Text] Small- and medium-sized companies often constitute the perfect setting for improving or adapting technologies deriving from research activities, for defining requirements, determining new technological or market opportunities, and putting the finishing touch to new products or processes. However, a survey carried out within the EC among small and medium-sized companies working in the electronics sector (a sample group of about 25,000 companies) has revealed that access to specialist and advanced know-how is particularly limited:

—36 percent do not even have the basic information on microelectronic technologies;

—22 percent have the basic information but have never tested the microelectronics applications;

—28 percent have the basic information and have carried out tests but require technical assistance to manufacture their products;

—10 percent satisfy all the above conditions but either ignore or are unable to apply advanced technologies;

—finally, only 4 percent can be considered self-sufficient in the microelectronics field.

The above typifies Italy's situation and it is within this very context that a "special project" has been implemented by the EC Commission. The project is funded within the framework of the ESPRIT [European Strategic Program for Research and Development in Information Technologies], is promoted by the Ministry of University and Scientific and Technological Research (MURST) and, whenever possible, aims at removing the obstacles mentioned above by encouraging the adoption of microelectronic technologies within Italy's small- and medium-sized companies through a program of information, awareness, training, optimization of results, and technological and financial support.

The path to be followed for ensuring greater technological capability among small and medium-sized industries is the one which leads to more effective interaction between the academic and public research world on the one hand and the production world on the other by funding joint development projects. The first "special project" known as I-SMILE, which began in March 1992 and was managed by Tecnopolis-Csata in Bari, is now coming to an end. It pursued the above-mentioned goals by funding the activities of 10 small and medium-sized companies and 10 universities throughout Italy (Turin, Pavia, Genova, Bologna, Rome, L'Aquila, Bari, Catania and Palermo). These collaborated in the development of CMOS [complementary metal-oxide semiconductor] integrated circuits for a variety of applications.

In fact, microelectronic design no longer falls exclusively within the scope of integrated circuit manufacturers. For some time now, advanced technologies and highly sophisticated automatic design systems (CAD [computer-aided design]) have been available to users for the design of specialized circuits, which is why they are known as application specific integrated circuits (ASIC's).

Users develop specialized chip technologies to meet the demands of markets that can be both extremely wide-randing and diversified thereby ensuring a good financial return for the high process and CAD system costs. The second "special action project" for microelectronics in Italy has just started and will have an overall budget of ECU4 million. MURST has entrusted its management to ENEA [Agency for New Technologies, Energy, and Environment] which will receive three quarters of the funds while Tecnopolis-Csata will receive the remaining quarter. The goal of the "project" is to boost the development and dissemination of the most advanced microelectronic technologies (EPROM-EEPROM [erasable programmable read-only memory-electrically-erasable programmable read-only memory] non-volatile memories, smart power, smart sensors, BICMOS [bipolar complementary metal-oxide semiconductor], GaAs [gallium arsenide]) among small and medium-sized companies and to promote the setting up/consolidation of structures for the design and testing of integrated circuits. In fact, in addition to the information, awareness, and training activities briefly discussed further on, the "project" provides for:

—technological and financial support (50 percent) for a maximum of 15 innovative projects (known as Demonstrators) put forward by companies together with universities or other research centers;

—technological and financial support (50 percent) for setting up various specialist microelectronic centers (known as CCM's) capable of providing small and meidum-sized companies with highly qualified services in the microelectronics sector. The CCM's must be managed in an entrepreneurial way and be self-supporting upon completion of the set up phase.

Companies have been invited to take part in the project (information and awareness activities) through notices advertised in the most widely distributed newspapers, specialist magazines as well as magazines of general interest (such as the one that has kindly agreed to publish this article) and through the channels of manufacturers' associations. The notice for the selection of Demonstrators and setting up of CCM's was published in the SOLE-24 ORE of 27 February 1993 and presented together with a "Guide for Applicants" during an Information Day which took place on 4 March 1993 at the offices of Genova Ricerche [Genoa Research Consortium].

The "project" also provides for the creation of a number of "schools" (training activities) for both management and technical personnel of companies for which they are intended.

Both the EC Commission and the coordinators of the "special project," ENEA and Csata, are confident of a high level of participation in the very interest of small and medium-sized industries (and hopefully the whole country). This represents an opportunity for small and medium-sized industries to break away from the cultural and scientific isolation to which they are objectively being exposed and of reestablishing technological competitiveness with their market which, although local, is increasingly subject to international competition.

Role of ENEA

The "special project" is managed within the framework of the innovation dissemination activities that ENEA carries out through a specific organization. ENEA is not new to these projects since it acts on behalf of the EC as the National Focal Point for the IMPACT (Information Market Program for the Promotion and Introduction of Common Technologies) program, and as the Relay Center for the VALUE (EC program for the dissemination and utilization of research results in science and technology) program, etc., even though the terms may vary from case to case. All these activities aim at boosting or supporting innovation in companiess while at the same time facilitating access to EC funds.

Although ENEA has all the characteristics of a research center to which it assigns most of its resources, it distinguishes itself by its transfer structures which act as a link between the internal development of technologies/processes/materials/etc. and their application to production processes. This function also makes use of decentralized structures (the so-called technological outlets) to promote direct contact with companies.

Status of Environment R&D in New Laender Reported

MI1207092093 Bonn BMFT JOURNAL in German May 93 p 2

[Text] In addition to its current wide-ranging funding measures amounting to some 265 million German marks [DM], the BMFT [Federal Ministry of Research and Development] in 1992 made available a further DM93.5 million in special funding from the "Upturn East" solidarity program to build and maintain efficient research and development capacities in the industry of the new laender. These special funds alone helped to finance around 1,200 jobs in eastern Germany's industrial research and development in 1992.

The BMFT used these additional resources to support R&D projects at private limited liability research companies, offshoots of the former Academy of Sciences now working for industry, and manufacturing companies in the new laender that carry out their own research and development. The private limited liability research companies in particular, which received around DM42.5 million, found this support very helpful during their restructuring process, when it also had a desirable side-effect: Most of the research companies assisted have now been successfully privatized. The Academy offshoots, which will be converted into industrial research institutes in line with Science Council recommendations, also welcomed the "Upturn East" project funding. For example, sustained support was given for setting up the Hans Knoell Institute of Natural Substance Research in Jena, which was created out of the former Central Institute of Molecular Biology and Experimental Therapy (ZIMET). The Academy offshoots received around DM20 million of the special funds administered by the BMFT.

Manufacturing firms received DM30.5 million in funding for projects under the "Upturn East" solidarity program. Support was given both to new or recently founded small and medium-sized firms and to companies still owned by the Trust Agency.

It is worth noting that a large part of the special funds—more than 50 percent in all—was granted for environmental technology and biotechnology. Environmental technology is increasingly becoming a new line of business in eastern Germany.

Ambassador to EC on Relevance of European R&D

BR2906101693 Brussels XIII MAGAZINE in French May 93 pp 22-24

[Interview with Manfred Scheich, Austrian ambassador to the EC, by Margaretha Kopeinig; date and place not given: "Austria and the EC"]

[Text]

[Kopeinig] Following Switzerland's "No" to the European Economic Area (EEA), the EEA Treaty has to be adjusted. What are the main problems and when do you think the EEA will enter into force?

[Scheich] Switzerland's withdrawal, following the negative outcome of the referendum on the EEA on 6 December 1992, has indeed created the need to adjust the EEA Treaty. In this case, technical corrections are required. From a political point of view, the question revolved around the Swiss contribution to the Cohesion Fund which would be refunded to the poor EC countries (Spain, Portugal, Ireland, and Greece). True, the overall subsidy figures amounting to ECU500 million and the credits granted amounting to ECU1.5 billion have not changed. However, the share borne by the EFTA [European Free Trade Association] countries within the framework of this Cohesion Fund have fallen from 3 to 2 percent. For the EFTA countries, this means savings which largely make up for the initial increase in various amounts. It has also been decided that the agricultural package (i.e., the bilateral agricultural agreements between various EFTA countries and the EC, and the concessions granted by the EFTA countries to the member countries of the Cohesion Fund within the framework of the EEA negotiations in 1992) will take effect on 15 April 1993. For Austria, this will be beneficial in certain respects. These agreements have enabled several objectives to be achieved: the EEA, which is of vital importance to the Austrian economy, will soon be a reality. The date envisaged is 1 July 1993.

Austria has always viewed the EEA as a very important transitional phase from an economic point of view. However, the ultimate aim can only be EC membership, if we want to mold Europe's future together.

[Kopeinig] Within the EEA, and particularly within the context of European negotiations aimed at Austrian membership, how much importance is placed on technological research and development?

[Scheich] A great deal. Research and development are of vital importance for the innovative strength and productivity of industry. The Austrian economy knows it will be better able to resist the pressures of international competition if it makes increased efforts in the field of research and development.

Technological research and development are the most important policy fields in the context of the EEA agreement. Within this context, collaboration between Austria and the EC is actively promoted. The EEA enables Austria to participate in the EC's Third Framework Program aimed at technological research and development.

True, membership of the EEA provides unrestricted access to the EC's research programs as well as a say in the relevant decisions, but real decisions can only be made if Austria becomes a member of the EC. Only Austrian membership in the EC will put the country in a position of equality with regard to other countries and allow it to take part in all decisions relating to EC activities in the field of technological research and development. As a result, the EEA is only a transitional phase, even in the field of technological research and development.

The gradual and continual integration of Austria into the EC's research and technology community arouses certain thoughts. You begin to realize that cooperation in research goes a long way toward strengthening competitiveness. This is evident, and not only at national level. However, in the Maastricht Treaty and in its decisions relating to research and industrial policy, this idea has not been reflected in the policy of the EC. That is why Austria hopes that its membership of the EC's technological and research community will help it increase its research activities within the national economy. It is a question of achieving a balance between state and private financing in the research sector. Austria's membership in the EC, as well as its participation in European research and technology policy will help increase the importance of research in the eyes of the EC. The very knowledge that transnational collaboration in research matters also enables companies which take a less active role in the research field, as well as small- and medium-sized enterprises, to take part in expensive research projects is the basis of Austria's participation in European research and technology associations. Access to the results of these research activities is of vital importance to the Austrian economy, but also to many small- and medium-sized enterprises.

[Kopeinig] What experience has Austria gained so far as a result of the EC's research programs, both in this sector and in terms of planning and program management?

[Scheich] Austria can pride itself on its broad experience in European cooperation in the field of research and development. Back in 1971, Austria was one of founding members of the group which initiated the "European Cooperation in the Field of Scientific and Technical Research" (COST) program. For Vienna, that meant that Austrian organizations were taking part in EC technological research and development programs within the framework of COST. In the mid-1980's, it took part in the EURAM [European Advanced Materials] program as well as in the first framework program for technological research and development. Austria is also one of the founding members of the EUREKA [European Research Coordination] initiative, launched in 1985. In 1987, the conclusion of a framework bilateral agreement between the EC and Austria on collaboration in the sector of science and research formed an additional element for future cooperation.

Since then, firms, universities, and research institutes in Austria have increasingly lent their support to various projects within the framework of EC programs. While the participation of Austrian organizations and companies in the first and second Framework Programs was restricted to some 50 projects, this figure has almost been doubled in the Third Framework Program (1990-1994).

However, and I would stress this point, this transitional phase in anticipation of the completion of the EEA and Austria's permanent EC membership is not altogether satisfactory. In fact, it means that Austrian representatives are only allowed to participate as observers at meetings of the committees responsible for the various programs. During this preparatory period, that is a good thing. In fact, even if an observer is not supposed to take part in the debates, his participation in various meetings does facilitate an exchange of information. Five years ago, Austrian representatives were, for the first time, invited to take part in CREST [Scientific and Technical Research Committee] meetings; since then they have been invited on an irregular basis. This development may be considered as preparation for Austria's gradual integration into the planning and management of various programs. The next stage in this process is to invite Austrian representatives to take part in the IRDAC [Industrial Research and Development Advisory Committee] and ESPRIT [European Strategic Program for Research and Development in Information Technologies] committee meetings. In this way, Austria is being extremely well prepared in terms of the planning and program management.

[Kopeinig] What possibilities do you envisage for Austria in the Fourth Framework Research Program and what do you believe are its main themes?

[Scheich] The current preparatory work for the Fourth Framework Research Program is of special significance for Austria, given that we can hope to be a member of the EC when it takes effect. The main themes of the Fourth Framework Program are already taking shape: information and telecommunications technology and their multiple applications. We feel particularly closely involved in materials research, which is one of Austria's strong points, and in environmental protection—a field on which we have always taken a clear stand. Nor must we overlook the sector of new energy sources. We are also particularly interested in the development of data communications systems, especially in the networking of public administrations, with a view to achieving a more efficient, more closely adjusted Single Market, while of course bearing in mind Austria's future membership of the EC.

[Kopeinig] In the field of telecommunications, is Austria well prepared for its EC membership, for example, in terms of market liberalization and the organization of telecommunications?

[Scheich] The Austrian Post Office has been a member of the CEPT (European Conference of Postal and Telecommunications Administrations) since 1959 and is now a member of the European Telecommunication Standards Institute (ETSI).

An analysis of the efficiency of Austrian structures in terms of telecommunications demonstrates that many of the objectives laid down in the EC's Green Paper on the development of the Single Market in the telecommunications sector have already been met in Austria. In addition, Austria takes a positive attitude to the demands posed by the lifting of restrictions and competition in the telecommunications sector.

In order to make progress in unifying the telecommunications network, Austria has signed the Memorandums of Understanding (MOU) aimed at introducing ISDN [integrated-services digital network], the pan-European digital mobile telephone system (GSM), and the ERMES [European Radio Message System] personal and pan-European communications system. It has also submitted both research projects and concrete pilot projects for ISDN and GSM. Austria is also taking part in the METRAN project (Managed European Transmission Network).

Similarly, the Austrian Post Office sees no problem with the activities aimed at creating open access to the telecommunications network (ONP [Open Network Provision]). In Austria, the value-added services which are the subject of future European directives on competition and the ONP have been liberalized for a long time. Based on leased services and public telecommunications networks, a large number of private services are on offer.

The equipment market has been liberalized for several years. At the beginning of 1992, 150 firms offered a total of 328 different types of approved telephone. Competition is just as fierce in the field of cordless telephones and fax machines. There is also much competition in the market for add-on telephone sets. The Post Office's share of the market is around 25 percent.

Whether we look at the organization of the Post Office as a public telecommunications service or the liberalization of the market, the Austrian telecommunications sector is all ready for EC membership.

[Kopeinig] Do you think it is realistic to suppose that Austria will be a member of the EC by 1 January 1995?

[Scheich] In July 1989, in other words before the Berlin Wall came down and before the major strategic changes in East-West relations, both in Europe and the world at large, Austria had already applied for EC membership. Negotiations started on 1 February 1993. Above all, the aim of these negotiations is to achieve Austrian membership by 1995. Of course, we have to be realistic and to remember that we will have to face 12 to 14 months of negotiation. It is therefore our duty—as well as that of the European Commission and of the member states—to direct our efforts in this direction. There will certainly be no lack of commitment on our part.

French Government Funds Microelectronics Projects

MI1507141993 Eschborn NACHRICHTEN FUER AUSSENHANDEL in German 7 Jun 93 p 6

[Text] France is helping its companies to introduce the latest electronics and microcircuitry. The use of customized integrated circuits (ASICS [application specific integrated circuits]) in small and medium-sized firms will be promoted through the Angers College of Electronics.

In cooperation with the ministries of Research and Defense, the Industry Ministry has launched an 80-million French franc [Fr] program to promote the spread of microcircuitry.

In the past, small and medium-sized firms did not use ASICS in their products because of the high failure risk. Although the use of these electronic chips is considered crucial for the competitiveness of many products, it was previously confined predominantly to large firms with the finance and personnel required to develop customized chips in-house.

Smaller firms, on the other hand, were and still are forced to have them developed to their specification outside and to commit themselves to buying ASICS in large quantities.

But often enough the first attempt fails because the purchasing firm does not give precise enough details of the chip's specific task.

This is where the Western College of Electronics (ESEO) in Angers comes in, not only offering firms special training but also making available instruments for computer-aided design and skilled personnel. The ASIC thus designed is then made by the firm ES2 at preferential prices.

Initial experience shows that this arrangement can cut the cost of making an ASIC from around Fr500,000 to about Fr60,000.

State support granted under the JESSICA (French version of Joint European Submicron Silicon Initiative) and PUCE [Products using Electronic Components] programs can further reduce the costs for the firms involved to around Fr20,000 per ASIC.

This year, ESEO would like to undertake development programs with about 10 small firms, starting with staff training in July and ending with chip production in September.

Four processes are on offer, from the development of a simple programmable logic module to the design of a customized ASIC for serial production.

France also attaches great importance to microcircuitry. Potential applications are seen, for example, in car manufacturing (e.g., microsensors and actuators—control elements—for antiskid systems, air bags, etc.), mechanical engineering and instrument manufacture (micromotors), domestic appliances (intelligent sensors), medicine (micromanipulators, micropumps), the food industry, and environmental engineering (sensors). The French state is giving some Fr80 million in funding to make microcircuitry applications and the requisite production technologies accessible to the country's firms as quickly as possible and to translate the findings and experience gained in research laboratories into salable products and processes.

The work of the CNRS [National Scientific Research Center] Systems Automation and Analysis Laboratory (LAAS) in Toulouse is at the center of these efforts. Together with the specialist firms Actia and Cita, LAAS, which has already developed micromotors and wear-free electrostatic control elements, recently founded the MCCT organization.

Its purpose is to assist small and medium-sized firms in the development, manufacture and application of microcircuitry products.

France has a second center for microcircuitry in the Clock and Watch Industry Technical Center, CETEHOR, in Besancon. This organization has already developed a piezoelectric motor 5 mm in diameter and 1.5 mm tall to the production stage. This micromotor will be used not only in clock and watchmaking, but also to make microrobots, clinical instruments, and the like.

Views on German Machine Tool Industry's Technology, Competitiveness

93WS0493B Frankfurt/Main FRANKFURTER ALLGEMEINE in German 26 May 93 p 15

["Very Good Grade in Technological Competitiveness"]

[Text] him. FRANKFURT, 25 May 93—The Ifo Institute for Economic Research in Munich considers the position of the German machine tool industry in international technology competitiveness to be very good, better, in fact, than of German industry in general. In this competition German mechanics is the strong point. However, in a symposium of the Association of German Machinery Manufacturers [VDMA] in Frankfurt, Karl Heinrich Oppenlaender, the president of the Ifo, said that "for fields important in the future, like new materials or control technology, German machinery manufacturers can only be rated good (not very good) when compared with Japan and the United States." An important competitive advantage for the German machine tool industry when compared with Japan is, in Oppenlaender's opinion, "the availability of qualified engineers. And this advantage, he insists, will exist "for the foreseeable future." The Ifo president attributed this German advantage to the more limited training opportunities for Japanese engineers and scientists at their universities and to the lower social status of engineers in Japan.

Contradicting the overwhelming opinion of the VDMA, Hans-Guenther Vieweger of the Ifo Institute maintains

that the German machine tool industry has had structural problems for a long time. Problems in areas like "just-in-time" production and in production depth, he says, have been known for some time but have never really been resolved. These problems manifest themselves in productivity gaps, as compared with Japanese competitors. Vieweger went on to say that "the productivity differential between major Japanese and German machinery manufacturers is between 50 percent and 150 percent, when measured in terms of value creation per year and work force." The main reasons for this, he continued, are the 30 percent longer work time observed in Japan and the dual Japanese economic system, in which the major machine tool companies are supplied with preliminary products produced cheaply and delivered at really bargain costs.

In the opinion of Jan Kleinewefers, president of the VDMA, a lessening of the production depth in the German machine tool industry is seldom accomplished without other problems and is seldom linked to the magnitude of cost advantage that it is in Japan. In Japan the labor costs of the suppliers is only about half that of the large buyers. Berthold Leibinger, Kleinewefer's immediate predecessor as VDMA president, again advised the German machine tool companies to simplify their products to meet market demand, to streamline structures by reducing personnel, and to cooperate with each other more than before and to produce more abroad. In this way, Dirk Frese, director of VDMA's foreign department, "the strategic plan will not exhaust itself solely in the defense of internal European markets." The high-priority strategic mission is to strengthen our presence in Asia.

With regard to the economic state of the German machine tool industry, Kleinewefers said that it would have to be considered a success if the 1993 production drop only reached the 6 percent drop of 1992. However, the VDMA president said: "We cannot even count on that." The fall-off in domestic contracts has not yet bottomed out. "The only revival to be seen is in Asia, particularly China," Kleinewefers concluded.

German Expert Views Research Problems, Coordination, Future

93WS0545A Duesseldorf HANDELSBLATT in German 16 Jun 93 p 8

[Article by Rainer Nahrendorf: "Technology: Siemens R&D Chief Danielmeyer: Decide Where We Want to Lead: Better Locational Conditions Can Avert Danger of Second-Class Status"]

[Text] Munich—If locational conditions in Germany for technology and industry are not actually improved and structured more competitively right now, Germany is threatened by a slide into second-class status. This was the view expressed by Prof. Dr. Hans Guenter Danielmeyer, a member of the board of directors and head of the Central Department for Research and Development of Siemens AG, in an interview with HANDELSBLATT.

However, Danielmeyer said that he is confident that a slip into technological and industrial second-class status can be avoided. He noted that politicians, who have talked for years about the need to improve locational conditions, have now apparently resolved to take action. Danielmeyer welcomed the fact that Federal Chancellor Helmut Kohl is emphatically promoting the improvement of Germany's competitiveness as a location for business.

Germany is a country that achieved its prosperity through technology, and it will lose it without technology, Danielmeyer warned. However, not only Germany, but also all of Europe has fallen behind Japan in terms of the quality of locations for technology and industry, he said.

Germany's weaknesses as a technology site include general locational conditions, such as the shortest labor and machine running times, the longest study times, and the most restrictive legal regulations, from environmental protection to regulations in the work place, he said.

R&D Support Averts Later Subsidies

It is primarily these negative locational factors, Danielmeyer said, that force German companies to move an increasing number of jobs abroad.

He said that a site comparison that he conducted showed that Germany does better with all locational factors that amount to stabilization of the status quo. In keeping with this, Germany is the world master in subsidies for long-existing sectors such as steel, coal, shipyards, and agriculture.

In contrast, with all factors that promote change in Germany is relatively bad off, he said. This relates to labor costs, working hour flexibility, mobility, and so on. Danielmeyer says: "It is time that we improve locational factors that promote change. R&D support is the opposite of subsidies. Indeed, it averts later subsidies."

In addition, the Germans should have tightened their belts much earlier, Danielmeyer thinks. The Japanese are definitely doing so during the current crisis, he said, and for that reason they will also emerge from the crisis in a stronger position.

Problems Predominantly Structural

The current German problems are only partially related to business cycles, Danielmeyer said; they are predominantly structural in nature. On the road to a service-oriented society, many companies have practically forgotten how to competitively bring promising products onto the global market in adequate quantities, he said. And this is a trend that must be reversed.

Danielmeyer drew a distinction between a science-oriented state research site and a technology-oriented

industrial development site. The bridge between these two things has been missing for 20 years, he said. However, the bridge must be built so that discoveries from basic research can be converted more quickly into applied research and innovative new products. Both sides face a challenge, he said: State research must set its goals with applications in mind, while industry must delve further into the fundamentals with its research.

Danielmeyer says: "We do not need a MITI [Ministry of International Trade & Industry]. But we do need better dialogue, like the one successfully pursued by the Japanese." This dialogue must take place on four levels:

- The first level is in infrastructure. Here, Germany is well-equipped. There is scarcely any other country that spends so much of its gross social product on basic research as Germany does.
- The second level comprises the key components for the products and systems of tomorrow. This relates to production engineering. In this field of R&D, the Germans have fallen short in recent years. Danielmeyer: "We must think about what key components we in Europe want to competitively produce for the world over the next five to 10 years."
- The third level is that of systems and applications. The state must think about where it pays off to develop pilot projects that bring innovate technology onto the market and make it possible to effectively utilize the state's procurement potential.
- The highest level is that of vision. Here too, the Japanese have outstripped the Germans and Europeans.

With global technology, a global market, and global competition, the European vision cannot be fundamentally different from that of Japan, Danielmeyer said. However, the formulation of this vision cannot be left up to Japan alone. Danielmeyer says: "Eventually we must also decide where we want to lead." If these decisions are not made, he said, the Germans and Europeans will lead nowhere. Thus, it is a matter of setting goals and committing to achieving them.

Better Balance in Research Policy

Just as better balance and coordination of research policy within Germany is necessary, it is also essential within Europe, Danielmeyer said. The EC is certainly ready and willing for this. Because it is aware of the importance of this dialogue, industry wants to strengthen the role of the federal minister for research and technology, he said.

Danielmeyer appraised technological competitiveness within the Japan-United States-Europe triad as follows:

The Americans are especially strong in converting new technologies to new markets, as demonstrated earlier by optical electronics and currently in genetic engineering.

The Germans are strong in perfecting technologies that have long been successful. Examples can be found in the automotive and chemicals industries. One by one, however, companies in Germany and Europe have abandoned the development of promising peripheral and terminal equipment. Germans and Europeans should have no problem developing intelligent video screens, for example. There are also deficiencies with regard to Japan and the United States in the use of computer chips.

The Japanese are successful in bringing new, promising technological products and key components onto the market in high-quality form and in large quantities. They lead in production engineering.

The Japanese economy clearly does not spend any more or less money on research and development than German industry does, Danielmeyer said. Siemens is quite comparable to Japanese companies in terms of R&D investment. R&D costs in the Japanese and European automotive industries are also comparable. There is a difference, however, in the strategic use of R&D investments in Japan and Europe. Danielmeyer: "In Japan they say, 'We use our hands before we stop thinking.' Often we stop thinking and then realize that our hands cannot really do anything with our ideas." The strategic question, he said, must be this: "How do we arrive at a successful customer application and a successful market?"

As an example of a product with good future prospects, Danielmeyer cited the mobile PC telephone. This mobile PC telephone, with a video screen built in, must be so small that it fits into a vest pocket. Since work on developing a digital mobile phone network has already begun in Europe, it stands a good chance of becoming the world market leader in mobile PC telephones, he said. However, the opportunity must be seized in time. Another opportunity lies in the field of energy-saving and low-noise high-speed trains to relieve road and air traffic. Siemens is certainly a market leader in transportation technology, in automotive electronics and in networks for communications technology, he said. In medical technology, Siemens shares market leadership with General Electric. There are actually very few fields of electrical engineering and electronics where Siemens is not among the leading firms, Danielmeyer said.

Cooperation with IBM and Toshiba

According to Danielmeyer, Siemens is also making every effort to maintain its leading role in technology and marketing. It was one of the first companies to gain a clear picture of its core competences. This is one of the reasons that it is considered one of the thriftiest and most effective companies in terms of resource utilization, he said.

Siemens entered into its cooperative arrangement with IBM and Toshiba in order to solve problems in microelectronics, Danielmeyer said. This was the first three-sided cooperative arrangement in the triad. This example will become the accepted model where spending on R&D in added valuation exceeds one-third of sales.

In that case, such cooperative arrangements are absolutely essential, he said. In conjunction with IBM, the 16-megabit chip is currently under production in Frankfurt, the development of the 64-megabit chip is almost completed, and work has begun on developing the 256-megabit chip together with Toshiba and IBM.

The development costs for a new generation of megabit chips increases exponentially, Danielmeyer said. Each new generation costs about twice as much as the one before it. With the 16- and 64-megabit chip, this amount was in the billions. Such enormous investments pay off on the one hand only through cooperation, and on the other hand only because they are already linked to the next generation of chips. It is always necessary to bridge three generations in research and development and in production engineering, because the cost of a single generation is too high.

Siemens entered into the cooperative arrangement with Toshiba and IBM in order to be one of the world's leading company's in chip technology as well. "And we will achieve that," Danielmeyer says.

Share of World Trade in R&D-Intensive Goods (1991)

Country	Percentage
Japan	20
Germany	18
United States	18
France	8
Great Britain	8
Italy	5
Others	23

Source: Federal Ministry for Research & Technology

In 1991, Germany suffered a clear decline of 0.9 percentage points in its share of world trade in R&D-intensive goods, compared to the previous year. According to a definition by the Fraunhofer Institute for System Engineering and Innovation Research, R&D-intensive goods comprise advanced technologies with an R&D cost of at least 8.5 percent of sales as well as premium technologies with an R&D cost of between 3.5 and 8.5 percent of sales.

French Research Minister on S&T Policy

93WS0554A Paris AFP SCIENCES in French 19 May 93 pp 1, 2

[Text] Paris—Mr. Francois Fillon indicated 14 May that research and higher education remain among the government's top concerns, despite the 392 million French franc [Fr] cutback in his ministry's budget as part of the recovery plan. The government withdrew Fr109 million from higher education and Fr288 million from research.

In his first press conference since he joined the Ministry of Higher Education and Research, Mr. Fillon stressed his plans to revamp some priorities and give [research] organizations and universities freedom to manage themselves. He insisted on the need to restore a space policy to France, to undertake ambitious programs in the fields of nuclear science, biotechnologies, AIDS, and genetics, and to pursue France's involvement in joint European research endeavors without overlooking Russia and eastern European countries.

Moreover, Mr. Fillon disclosed the fact that he will travel to Moscow this summer to pave the way for expanded Franco-Russian collaboration. In the meantime, he will try to convince France's European partners to authorize Russia's membership in the EUREKA program.

"Our country must regain an ambitious, long-range space policy," declared the minister. "France no longer has one. Since France leads Europe's space policy, Europe no longer has one either." "Collaboration with Russia is a means," said Mr. Fillon, "but cannot be an end." That is why "We must redefine a 15- or 20-year space policy with our European neighbors. Today we are all investing money in manned flights, but without really knowing where we are headed" given the uncertainties surrounding the Freedom station and the future of Russia's program.

"If France is to remain highly involved in European research, it must continue to collaborate bilaterally with other countries, notably eastern European countries and Russia. The sizable infrastructures of the latter must not allowed to decay for fear researchers will leave the country to work for the highest bidder."

Mr. Fillon considers nuclear science an area where research must continue and where France, which tops the field in expertise on the downstream end of the fuel cycle, must maintain its position. Regarding the Superphenix supergenerator, the minister described the report of his predecessor Hubert Curien as "excellent," and said he would defend the facility and make proposals in the fall.

Higher Education

"I do not believe in big national reforms," said Mr. Fillon. "Establishments of higher education are extremely diverse in terms of size, history, and geographical location. The only answer to the problems of universities is autonomy and experimentation within limits strictly defined by the state."

The minister said he favored the bill exempting universities from legal requirements that prevent them from experimenting with different ways of operating. But, he said, "Diplomas must continue to be recognized nationally." "I will not accept—and the prime minister agrees with me—a regionalization of higher education or a secondary role for undergraduate education," asserted Mr. Fillon. In so doing, the minister distanced himself from the university reform plan presented by Mr.

Charles Millon. "The autonomy of educational establishments will not be bought at the price of local community control. Let universities bring me their plans for experimentation, and the ministry will decide and evaluate them."

Mr. Fillon called the Universities 2000 development plan floated by Mssrs. Lionel Jospin and Jack Lang a "stroke of genius and a bluff." "The state did not honor its commitments over the last two years, especially in 1993, for which there is a shortfall of Fr600 million (28 percent of the money promised)."

Chart Information: 1993 Annual Tax Act

The following lists the payment allocations and money commited to each area.

Higher Education

1. Universities - Operation: Fr40 million;

2. Central administration: Fr24 million;

3. Research (DRED): Fr40 million; Fr83 million

4. Total: Fr104 million; Fr83 million

Research

1. Research establishments: Fr227 million; Fr470 million

2. Research allocations: Fr32 million;

3. Administration: Fr29 million;

4. Total: Fr288 million; Fr470 million

5. CNES (National Center for Scientific Research: 0; Fr226 million

6. FRT (Research & Technology Fund): 0; Fr97 million

German Experts Discuss Research Policy Problems

93WS0597A Stuttgart BILD DER WISSENSCHAFT in German Jul 93 pp 42-45

[Article by Michael Zick: "Stepchild Science"]

[Text] *Have we as a people lost all interest in research? There are cracks in the structure; problems are being poorly handled; there appears to be no fixed policy. Science, research, and education appear to be stagnating in Germany. There is not enough money; there is a feeling of decay; a lack of support on the part of society and the government. The people are reacting sluggishly; the politicians appear to have lost all interest. Everyone is united in one thing, namely, science needs help.*

Prof. Gisbert zu Putlitz, the chairman of the Baden Wuerttemberg State Research Council, said that he wanted to send a signal and then proceeded to resign from his post because of the state government's disinterest in research.

To be sure, Chancellor Helmut Kohl gave the signal for a major outcry a few days later by recalling Matthias Wissmann, the minister for research and technology, after only 105 days in office on the grounds that he was needed elsewhere. He was replaced by Paul Krueger.

Edelbert Richter and Christian Wipperfuerth, members of the SPD and the European Parliament, described a German "science catastrophe" analogous to the educational catastrophe of the 1960s. The handwriting has been on the wall for some time now:

- The budget of the Federal Ministry for Research and Technology [BMFT] has been continuously reduced since 1980; last year alone, the BMFT has 8.4 percent less real money available than it did in 1982.
- In the last four years, the German economy as a whole reduced personnel in the various departments for research and development by almost 6 percent.

Is Germany on the way to the minor leagues with respect to science and education?

The chancellor's move, aside from all other interpretations, at least lay bare the frayed nerves of a seemingly chaotic segment of society. Talk about the BMFT as a Party-political shunting yard, the first stepping stone for ministerial interns, the quarry for money cut-backs, etc. has been rampant. It has almost always been that way, except for Riesenhuber's 10 years. But in times of short money, the weapons used in battle become cruder. The change of ministers is very controversial:

- Prof. Hans F. Zacher, president of the Max Planck Society [MPG], said: "The abrupt change in Bonn has complicated science policy."
- Prof. Manfred Fricke, former president of the Technical University of Berlin, commented: "Given the already directionless research policy, this disastrous act sounds a totally wrong fanfare and has an absolute negative effect."
- Prof. Wolfgang Fruehwald, present of the German Research Society [DFG], stated: "This abrupt change can engender doubt in the reliability of the policy regarding those sectors, to which Germany owes its economic and scientific position in the world."
- Prof. Meinhard Miegel, director of the Institute for Economics and Society [IWG], remarked: "The change shows disregard for future policy. It was a purely Party-political maneuver and demonstrates the loose relationship the present government has with science and research."

That Germany, as an export-dependent nation with few raw materials to rely on for future security, must invest in science, research, and education is clearly understood by responsible people in politics, science, and the industrial sector.

An apparently peripheral example of the discrepancy between talk and reality follows: Prof. Gerhard Neuweiler, the new president of the Science Council, warned that a profoundly changed society needs many "scientifically trained professionals." To protect and nurture science, the Academic Committee is asking the government to allot 2.3 billion German marks [DM] for the 23rd preliminary plan for university construction in 1994 as an "indispensable requirement." The results are already in on this "litmus test of the status of scientific education." The federal government will allot at most DM1.6 billion.

In a statement made in January 1991. Chancellor Kohl said: "The quality of the Federal Republic as an attractive site for businesses and investors is molded by the good reputation of our research and science...It must remain so."

Only one question remains. How is that to be done? Time is running out and research is suffering. In a memorandum released last February, the Federal Association of German Industry warned against "the danger of the erosion of the research infrastructure."

Among such signs of erosion are: the great inequalities between science and education in the old and in the new federal states; the diverging financial views of the government and the universities; the still unresolved overload of 1.3 million students and only 900,000 university openings; the unspeakable fight over priorities between basic and applied research; the duration and practicability of a university education; BMFT monies for major industrial projects; and the dovetailing of university research and industry.

To confuse the situation even more, the representatives of the most diverse forces, all with different goals, are also romping about the battlefield because there are offices responsible for science, education, and culture from the lowest communal level, to State authorities, right up to the federal agencies. But there too it is not just one involved institution, but rather—at the highest level—it is, for example, the federal minister for research and technology and the federal minister for education and science. And differences of opinion exist between those two ministries. But being a federal office, the federal ministry of finance and the federal ministry for economics are also players with money and power. The debate over the introduction of a 13th school year, which recently flared up, is a grotesque example of the apparent popularity of this topic. The discussion was picked up by the finance ministers of the various states, not by the ministers of education.

The acute complexities, which call out for priority crisis management, are instead being further complicated by the uncertainty as to strategic goals. Prof. Hans-Uwe Erichsen, president of the University Rector Conference [HRK], told BILD DER WISSENSCHAFT: "It becomes difficult when a ministry responsible for future structuring lacks continuity and predictability."

Exaggerating somewhat, another scientist said that you do not even know where to file an application for research support. There is no program anymore. "All of BMFT is in turmoil again," Fricke of the Berlin Technical University chimed in, "we are presently living in a vacuum. There appears to be no new plan."

But while the ex-president was demanding initiatives and guidelines for research from the government, Meinhard Miegel expressed his fear: "The risks involved in ministerial directives is very great." He sees the scientific community itself responsible for the situation, but admits at the same time: "Apparently, the scientific community can no longer cope with the tasks."

That again—in the overwhelming opinion of the researchers and managers we questioned—reflects the general worsening climate for science and research in Germany, both at the political as well as the societal level:

- DFG president Fruehwald sees clear signals: "Growing skepticism with regard to basic research, anxieties, and occasionally even outright aggressions."
- Prof. Quadbeck-Seeger, director of BASF research, observed: "Taken together, the excessive regulations, the long approval waiting times, salaries, working times, and a general skepticism with regard to technical progress provide a bad climate for innovative thinking."
- MPG president Hans F. Zacker stated: "Whenever risks are apparent, research is negated—at almost any price, even at the price that absolutely necessary solutions to human and societal problems cannot be found."
- Dr. Manfred Popp, chairman of the board of the Karlsruhe Nuclear Research Center, commented: "Apparently, for large sectors of our population, science and technology is increasingly being viewed as a two-edged sword and no longer as the most important element in ensuring the future security of an industrial country."
- Prof. Hans Guenter Danielmeyer, member of the board of Siemens AG, noted: "In the public sector, distancing criticism and debates about possible risk factors predominate, where healthy inquisitiveness and a sound evaluation of chances are called for."
- Prof. Joachim Treusch, chairman of the board of the Juelich Research Center, sees two trends: "The concern that the research community is unable itself to weigh the risks and possible benefits involved in its own work has led society to a hasty, and ill-considered fear of risk-taking...the immediate concern about prosperity results in research focussing too much on its technological applications and the rapid conversion into marketable products."
- Prof. Peter Starlinger of Cologne University's Institute for Genetics and a member of this publication's advisory council, observed: "The discussions about environmental concerns and risk-taking, which of course are important, unfortunately have resulted in science and research being viewed primarily as the

producers of pollutants and unnecessary risks. In the medium-term, I consider this to be very dangerous."

Prof. Ernst-Ulrich von Weizsaecker, president of the Institute for Climate, Environment, and Energy in Wuppertal and also a member of our advisory board, has arrived at an entirely different evaluation, but one that merits attention. He explains: "The political climate has developed rapidly and positively for science, research, and technology since 1960... It was inevitable that now the saturation point has been reached and manifestations of dissatisfaction should appear. Generally speaking, a certain sobering up has developed after many years of optimistic promises made by science. To interpret these sobering up and saturation signs as a general worsening of the climate would not reflect historical truth." He continued: "Science should have an enlightening effect. Often enlightenment is difficult for the establishment. To that extent, good science has always had a difficult time of it."

But of course it is bad times for established university research as well. After years of lively discussions about university status and facilities, the university as a research center has now been examined and some negative findings reported. HRK president Erichsen comments: "Research threatens to become a stepchild." Miegel, a critic of the universities, asserts: "A general slackness prevails in university research; it would be a mistake to believe that everything is just fine." The situation is also dangerous because of the interlinking that Manfred Fricke contemptuously points out: "Anyone can give university lectures by reading from books. But, regrettably, good university teaching keeps itself current solely from university research."

True, university research has undeniable financial problems. The universities have in the meantime also come to accept the reality that they themselves must first deal with campus structural obstacles before they go to the German chancellor's academic summit in the fall. There, the united university teachers want to ask for an additional DM9 billion (DM6 billion for the old federal states, and DM3 billion for the new states).

They hope to establish the basis for a structural reform of the universities. Resources are to be better utilized; the watering can principle hitherto used by the universities to shower support on all manner of research is to be eliminated; specific projects are to be supported; and financial support to be provided only on a limited time basis. West German universities will also face evaluation.

Commenting on this, Erichsen said: "You cannot master a crisis simply with money. Sound ideas must enjoy the top priority. But, of course, you cannot rescue the universities without money either."

It remains to be seen whether or not he will be successful with his financial grants. Despite all the lovely words, one thing remains true. The results of the neglect of science and education will only show up years later. Therefore the matter must be handled gently and cautiously.

This is also true in politics and industry. Just look at the present situation.

However, with regard to the last mentioned, technical university president Fricke claims to see a hopeful change. Two examples lead him to believe that the business world has recognized the value of anticyclical research support and of investing in university science as a way of gaining future security.

The technical man Fricke, who considers himself to be a business director, sees science and industry as natural allies. And when the two partners are strong and creative in times of crisis, "we can ourselves determine and shape the new science policy."

Education Is Not Going Anywhere at the Present Time

Highlights from our questionnaire on the value of science and research:

Klaus Pinkau, Max Planck Institute for Plasma Physics: "The casual neglect of scientific activity is losing vital opportunities for the future."

Adolf Josef Schwab, ABB Research Center: ""Research policy should not ignore the needs of the economy."

Max Surbe, president of the Fraunhofer Society: "What is needed is a more issue-oriented and less feelings-oriented policy that does not dodge the discussion and consideration of complex interrelations."

Manfred Fricke, Berlin Technical University: "The BMFT has, to a large extent, disappeared as the important supporter of university research."

Hans-Juergen Quadbeck-Seeger, BASF research board: "The strengthening of science, research, and technology is insurance for the future. Too little has been done in recent years in that regard. It is high time to act."

Manfred Popp, chairman of the board of the Karlsruhe Nuclear Research Center: "Our society is living in a paradoxical situation. It must live in a world of technology that it really distrusts."

Peter Starlinger, Cologne Institute of Genetics: "There is a lack of awareness that a price will have to be paid for the neglect of research and that that price is too high for our society."

Walter Kroell, chairman of the DLR [German Aerospace Research Institute]: "A research policy that intends and wants to be viable has to be established for a longer time frame and it must be adhered to."

Hans-Uwe Erichsen, president of the University Rector Conference: "Basic research is the humus without which applied research would wither away."

Hans F. Zacker, president of the Max Planck Society: "The effectiveness of researchers depends on the structures, the resources, and the freedom their research is assigned. Today, research is threatened in all three categories."

Wolfgang Fruehwald, president of the German Research Society: "The morale of German science, which was engendered by its lead in many advanced field, threatens to be lost."

Hans-Guenter Danielmeyer, member of the board of Siemens AG: "Industry supports a strengthening of the role of BMFT because the taking of precautionary measures in R&D is more effective for the future than would be remedial subsidies after the damage is done."

European Transsonic Wind Tunnel Inaugurated in Cologne

MI1207092393 Bonn DIE WELT in German 12 Jun 93 p 7

[Article by Wolfgang Engelhardt: "Aerodynamic Tests at Ultra- Low Temperatures"]

[Text] After taking about five years to build, the European Transsonic Wind Tunnel was opened on 8 June in Cologne right next door to the German Aerospace Research Institute. The low-temperature wind tunnel, built jointly by Germany, France, Britain, and the Netherlands, will simulate the flight behavior of new commercial aircraft more realistically than previously possible. The wind tunnels already in existence in Europe are capable of testing the flight behavior of large commercial and military aircraft only inadequately or, at best, only in some areas. This often leads to costly modifications to aircraft shapes after the prototype's initial flight.

Building the new wind tunnel cost 562 million German marks [DM], to which Germany contributed 38 percent, France and Britain 28 percent each, and the Netherlands 6 percent. It will now be operated, mainly on a commercial basis, by European Transsonic Windtunnel GmbH, and be available to paying companies or institutes from any country. About 5,000 aircraft measurement programs per annum will be run in the new wind tunnel, with three test runs per day. The annual revenue target of about DM35 million would cover running costs.

In the view of the operators, the real winner in this major technology project will be the European aircraft industry, and the Airbus Consortium in particular. To remain competitive, future commercial aircraft will have to operate even faster, further, higher, and more safely, quietly, and economically. To fulfill these requirements, engineers need precise measured values right at the planning stage of a new aircraft model to tell them how it will behave aerodynamically.

Operating temperatures of -180° C, which are achieved by injecting liquid nitrogen into the wind flow, make it possible to simulate the actual flow conditions of even small aircraft models realistically. All flight altitudes, aerodynamic conditions, and speeds from Mach 0.15 to 1.3, i.e., into the ultrasonic range, can be simulated in a 2.4 x 2.4 m measurement field in the new low-temperature wind tunnel.

This makes it possible to simulate realistically in the wind tunnel, for the first time in Europe, the entire speed range of modern commercial aircraft from takeoff, through fast cruising, to landing, which entails pressure fluctuations from 1.25 to 4.5 bar and temperatures ranging from -180° to +40° C.

The new European Transsonic Wind Tunnel has a closed aerodynamic cycle with a large propeller compressor, the propulsion system which consumes 50 million W of electrical power. The wind tunnel is 62 m long and 11.5 m wide, but is surrounded by a much larger complex of buildings.

CORPORATE ALLIANCES

French Minister of Industry Favors Breakup of CEA Industrie-SGS Thomson Alliance

93WS0515A Paris LE MONDE in French 13 May 93 p 26

[Article by Caroline Monnot: "The Minister Favors New Chief Shareholders for SGS-Thomson"; first paragraph is LE MONDE introduction]

[Text] When Gerard Longuet outlined his plans to the press on Tuesday, 11 May, he questioned the role of CEA-Industrie, the holding company for the industrial stock of the Atomic Energy Commisson (CEA), in shoring up the electronics industry.

Is the CEA-I issue, which has generated its share of worry, statements, and scares recently, really such a burning one? The general consensus of observers questioned barely a week ago on the holding's future was that it was hot, but not that hot. The fact that Cogema recently formed closer ties with Total—in other words that it is gradually freeing itself from the oversight of CEA-I, of which it is the largest stockholding—prompted a rebuke (see LE MONDE, 29 April).

But Gerard Longuet hurried things along a bit more during his press conference in Paris on Tuesday, 11 May. Citing SGS-Thomson as one of the issues urgently needing attention, the minister of industry did not beat around the bush. The teaming of the Franco-Italian chipmaker with CEA-I, he said, is not meant to be "a long-term partnership."

Alcatel Concerned

Moreover, what Mr. Longuet had to say was mild compared to the final written version of his speech. "Components are a national priority that we must consolidate with the help of all industry players," the document reads. Nonetheless, "That does not mean we

should put together ridiculous industrial combinations such as the electronics and nuclear industry blend artificially decided upon by the previous government." And, concluded the minister, "I will never allow the cross-pauperization of those two industries."

If it did nothing else, Mr. Longuet's "outburst" on SGS-Thomson dumbfounded those who heard it. Was it a whim? There had been no plans to discuss the topic at the press conference that was initially scheduled for 3 May. That the matter should have become urgent in the space of a week is amazing. "We had more or less resigned ourselves about nuclear power, but components!" was the flabbergasted response at CEA-I, a CEA-I struck dumb by the news and which, uncertain of anything any more, has refrained from any [official] reaction.

For Mr. Longuet specifically mentioned a user from the telecommunications world to replace CEA-I. Reasonably enough, all eyes have turned to Alcatel, the top customer of the Franco-Italian firm. But Alcatel's CEO Pierre Suard has always refused—at least publicly—to acquire any stake in ST. As far as Mr. Suard is concerned, Alcatel's support of the chipmaker through its long-term supplier contracts is worth all the capital commitments in the world. An industry-ministry specialist now thinks that better days for the microelectronics firm "could be an opportunity for more stable financing."

More stable? Allowing the nuclear industry to finance electronics is an old idea that was dusted off by Jean-Claude Hirel, CEA-Industrie's current CEO, at the end of an assignment given him in the summer of 1991 by prime minister Edith Cresson. It was meant precisely to insure that SGS-Thomson, a firm operating in an extremely capital-hungry industry, would be guaranteed a regular source of cash over the long term. That was the logic—beyond the less than obvious industrial synergies—of the Thomson-CEA Industrie merger.

Named to the head of CEA-I in September, 1992, Jean-Claude Hirel has since repeatedly announced his intention of forming a real group, of transforming the holding company into a manufacturing firm "with a staff of 45,000 and sales comparable to those of the biggest French groups, such as Aerospatiale." A group—in other words, a coherent unit that will create synergies between the nuclear power (with shares in Cogema, Framatome), biomedical (via Oris and more recently Sopha Medical), computer services (through CISI), and components industries (SGS-Thomson). The group would have a real top management corps, autonomy, and tighter control over subsidiaries, whose CEOs would be reduced de facto to the rank of division director.

This was a little tough for Jean Syrota, Cogema's CEO, to swallow. Mr. Syrota fought tooth and nail against the Thomson-CEA-I plan, and has been demanding his emancipation for years. Skirting him was not easy. Thomson's CEO, Mr. Gomez, learned that the hard way when he tried to negotiate CEA-I's takeover of his consumer electronics division. Mr. Syrota, who took over the Mines administration late last year, has strengthened his position. In an ironic twist, the Cogema CEO, who was not officially a candidate, won out after a battle between two candidates who included CEA Industrie's general director and Mr. Hirel's right-hand man, Jean-Francois Saglio.

The first to resist, Mr. Syrota was followed by another baron whose motives were more unexpected: Jean-Claude Leny, Framatome's CEO. This ferocious adversary of Alcatel Alsthom surprised everyone a few months ago by announcing that he favored rebalancing his shareholder group in favor of Alcatel Alsthom—in other words, at CEA-Industrie's expense. His request was addressed to the new majority through the press, and was highly significant for CEA-I, which is threatened with a breakup.

New Leadership

There are many observers today who imagine a subtle "deal" in the works. One scenario has Alcatel agreeing to replace CEA-I—which would return to being an empty shell, a portfolio company—as the "industrial pilot" of a reinvigorated SGS-Thomson. In exchange, the government could magnanimously reconsider its majority stake in Framatome, thus satisfying the long-standing demands of Pierre Suard and the much more recent strategic convictions of Mr. Leny.

Deal or no deal, by encouraging a minority-shareholding Total to invest in Cogema, the government has protected its treasury from being siphoned by CEA-Industrie to support the electronics industry. "We are not about to dig into reserves to dismantle the Hague," the industry minister has forcefully reiterated.

Without this manna, does CEA-I have any hope of developing SGS-Thomson, which operates in an extremely capital-hungry industry, alone? Mr. Longuet's teams apparently do not think so. If they are right, CEA-I may be tempted to turn to its principal shareholder, the CEA, and by extension the state. The prospect probably gives Bercy the shivers. Like any good politician, Mr. Longuet has more than once deplored his recession-limited budget leeway, as well as "off-budget" commitments he discovered on his arrival. The obligations are owed to the National Center for Scientific Research (CNES) and...the Atomic Energy Commission. Under the circumstances, a private industry player—a new primary shareholder for SGS-Thomson—would be most welcome. In any event, it would sound the death knell for a components-subsidy policy, without spelling it out in so many words.

So CEA-I is good and dead as an industrial group. It never existed anyway except on paper. But does that mean it should be made into something like Cogecom, a pure portfolio company that controls the stock holdings of France Telecom? Mr. Longuet's outburst would seem to indicate so. But there is another question behind that of CEA-I's future, namely who will lead the nuclear

power industry. Such leadership seems increasingly fated to slip away from the CEA. Will it revert to Electricity of France? Should it be shared with Alcatel-Alsthom? The answer is beyond the scope of the minister of industry alone. Logically, we can expect to see the matter refered to Matignon and Elysee.

Germany: Merger Between Deckel, Maho Machine Tool Companies Assessed

93WS0537A Duesseldorf HANDELSBLATT in German 14 Jun 93 p 11

[Article by Karlheinz Voss: "Machine Tools: Gildemeister Will Probably Join Bavarian Dual Alliance: Drive Toward Larger Entities"]

[Text] Duesseldorf—The merger of two machine tool manufacturers, Friedrich Deckel AG, Munich, and Maho AG, Pfronten, is taking shape. The Federal Cartels Office will probably not erect any obstacles to the reorganization merger. Bowing to necessity, the one-time archrivals—both are first and foremost manufacturers of milling machines—must create a viable working relationship. Both are worn-out; there is no winner. Moreover, the merger is very expensive, particularly in terms of production restructuring. The new company, which will come into being on 1 October, has practically no time to revalue its consumed resources. There are no seams in the struggle for survival.

The catastrophic market collapse for machine tools (incoming orders in 1992: -24 percent; in the first quarter of 1993: -47 percent) was exacerbated at both companies by internal problems. The business figures provide a rather good indication of how alarming the depletion of assets is. For the past three years ending on 30 June 1993, Maho will have incurred losses of approximately 220 million German marks [DM].

Assuming Role of Global Player

Sales in the current fiscal year will probably end up at a similar level. In 1990, it was still around DM714 million. Deckel shrank from DM636 million to DM290 million and will probably end up with approximately DM200 million for 1993. Losses to date since 1990 are around DM130 million. Accordingly, the two companies together have a sales level of DM420 million. That is not even 60 percent of what Maho alone achieved in its best days.

Unlike the many specialists in the machine tools sector, Deckel and Maho are among the so-called volume manufacturers, and thus the producers of standard line machines. One of the essential preconditions for holding ground against the Japanese, who are practically the only significant remaining competition, is assuming the role of a global player.

Size alone is certainly no guarantee of survival. But a certain "critical mass" is necessary for a worldwide presence, whereby even Maho, with more than DM700 million in sales, was regarded as too small. The most important Japanese competitors have sales in the billions. The joint sales volume of Deckel and Maho are hardly adequate to eradicate the shortcomings on the world market. Such shortcomings include:

- The volume manufacturers are too strongly focused on the domestic market. Thus, the four biggest producers (besides Deckel and Maho, Gildemeister AG, Bielefeld, and Traub AG, Reichenbach) achieved during the best year, 1990, a sales share of only 4 percent in the United States and less than 1 percent in Japan, while accounting for 58 percent in Germany and 29 percent in the rest of Europe.
- The international presence of German manufacturers is supported too little by their own branches and production facilities. This is in contrast to the Japanese, who operate nine plants in the United States alone as so-called transplants, with six each in Europe and Southeast Asia.
- Manufacturers here often lack the will to systematically capture the resources of the world market. In part to achieve one of the important other goals of maintaining competitiveness in the machine tools industry—the reduction of costs by approximately 25 percent—a certain order of magnitude could certainly be advantageous.

There are some indications that the dual alliance will be expanded. With Gildemeister, the leading German lathe manufacturer, the billion-mark threshold would be in sight in the event of a market upswing. This could also fulfill the wish of many customers, that the Germans should give up the limitation to generally only one single processing technology. Japanese manufacturers have three or four technologies, with sales of approximately DM200 million from each.

Gildemeister and Deckel already sell their machines through a joint marketing company, and other joint projects present themselves. Observers looking to the future could see an indication of Gildemeister's inclusion in the southern German alliance in the fact that all three companies will be sharing a stand at the EMO [Machine Tool Exhibition], the most important machine tool trade fair in the world, this fall in Hannover. A further indication of a larger alliance is the fact that Gildemeister—whose sales shrank from DM716 million in 1990 to DM476 million in 1992—can no longer cope with its losses in the current year on its own and wants to reorganize with a cut in capital (see report below and article on page 1 [not reproduced]). The other two partners have already effected this measure.

The restructuring of this sector is of interest not only to creditor banks, stockholders, boards of directors, and especially employees, who must all make sacrifices. It is true that the direct significance to the national economy is minor. Even in the best of times, the machine tool industry accounts for only approximately 0.5 percent of the gross social product. Nevertheless, it occupies a key position in the technology chain. In the long run, a loss of

position by the sector weakens the strong German position in the machine-building and automobile industry application sectors.

Advances in the machine tool industry first benefit domestic industry with a time lag of up to two years. After Japanese industry progressively conquered the entire chain of technology in electronics, the major machine tool manufacturers in Germany want to avoid a comparable development in metal processing.

CORPORATE STRATEGIES

France: Military, Civilian Aircraft Industry Production Drops

BR2105143893 Paris ELECTRONIQUE INTERNATIONAL HEBDO in French 6 May 93 p 14

[Unattributed article: "French Aircraft Industry Production Figures Down by 7 Percent in 1992"]

[Text] The French aircraft industry is not expecting any real pickup before 1995; Taiwan's Mirage aircraft order will have no impact on the industry before then.

Henri Martre, president of GIFAS [Organization of French Aircraft and Space Industries], sees no hope of recovery for the French aircraft industry before 1995. Results for 1992 show a slackening of business: Sales in the industry are down to 101.4 billion French francs [Fr], a 4-percent drop in constant francs as compared with 1991 (1.5 percent in current francs). Exports increased by 4 percent while sales in France slumped by 6 percent. In fact, the actual decline in activity is greater since production has dropped by 7 percent—a difference explained by the fact that the industry considerably reduced its stocks in 1992. The slump is being felt less strongly in the areas of aircraft and missiles (56 percent of the sector's sales volume) and equipment (23.3 percent of overall sales), whereas for engines (20.7 percent of overall sales), the drop is close to 20 percent. For 1993, a 7-percent drop in business for the whole sector is expected. The distribution between civilian and military activities remained stable in 1992 (respectively 53 and 47 percent of overall sales). However, exports of military equipment jumped by 24.4 percent, while those of civilian equipment were down 4.1 percent due to the difficulties in the airline industry.

Orders Up 21.6 Percent in 1992

Orders placed in 1992 jumped 21.6 percent to Fr112.1 billion, including Fr57 billion for exports. This is the result of the boom in orders for military equipment exports (up 211.3 percent) due to Taiwan's order of 60 Mirage aircraft and their missile complement.

As for employment, the decline in business that hit the French aerospace industry in 1992 led to a decrease in the number of jobs in the sector: Some 7,000 jobs were eliminated in 1992, bringing the total number of persons employed in the sector down to 111,600. This downward trend should continue in 1993 along the lines of this year's expected fall in business.

Even if companies that are union members implement partial work/unemployment schedules to limit lay-offs in 1993, the industry's labor force is expected to ultimately stabilize around 102,000 to 103,000 people.

French Electronics Industry 1992 Turnover Down

93WS0514B Paris L'USINE NOUVELLE in French 20 May 93 p 46

[Text] With a nearly 4-percent drop in turnover to 187.5 billion French francs in 1992, French electronics manufacturers are hurting. The result has been staff cutbacks that totaled over 11,000 in one year. The only industry sectors spared so far are telecommunications (+3 percent) and semiconductors (+14 percent). Stagnating consumption has kept market saturation stable at 83 percent. France has a 130-percent trade surplus with the EC, and a trade deficit with Japan (4.3 percent), the Dragons (26 percent), and even the United States (24 percent).

Austrian SME's Called Upon To Spend More on Research

MI3006101493 Eschborn NACHRICHTEN FUER AUSSENHANDEL in German 25 May 93 p 2

[Text] It is anticipated that 33.7 billion Austrian schillings will be spent on research and experimental development (R&D) in Austria in 1993, 7.5 percent more than last year. This expenditure corresponds to 1.57 percent of the gross domestic product (GDP); although it grew faster than the GDP in previous years, it is relatively lower than that of neighboring Switzerland, for example, according to a report by the Austrian Central Statistics Office.

Of the total expenditure, 39.3 percent will be provided by the government, 5.8 percent by the federal laender, and 0.6 percent by other public bodies, for a total of 45.7 percent. Industry will provide 51.2 percent, and 3.1 percent will come from other sources. The change in the structure of research funding in Austria that has been noticeable since 1988 has thus been consolidated. Industry's contribution to research funding is now over the 50-percent mark, that of the public sector being well below.

The level of R&D work in Austrian companies is, however, below average for the European industrial nations; as a rule, this applies mainly to small and medium-sized enterprises. Large domestic companies that account for only 23 percent of the overall output value raise 80 percent of all R&D expenditure.

According to surveys carried out by the Industrial Federation in Vienna, an average of 5 percent of corporate turnover is allocated to R&D; the quota for intensive technology users is as much as 15 percent. On average, about 3 percent of all employees in industry are engaged

in R&D activities; only in high-tech companies is this figure likely to be as high as 10 percent.

Moreover, surveys have shown that the technology-oriented R&D capability available in Austria is not enormous. It comprises nearly 16,000 full-time employees, of whom about 13,000 are employed in industry and trade, 700 in universities, and about 2,400 in 30 sector-oriented institutes and three non-university, technology-oriented major research facilities (the Seibersdorf Research Center, the Joanneum Research Association in Graz, and the Arsenal Federal Testing and Research Institute in Vienna).

SGS-Thomson Sets Up Pilot Chip Factory Near Grenoble

MI1507145693 Eschborn NACHRICHTEN FUER AUSSENHANDEL in German 11 Jun 93 p 6

[Text] The state-owned Franco-Italian semiconductor group SGS-Thomson has produced the first 20-cm diameter silicon wafers in its Crolles development center near Grenoble. The center, which was built jointly with France Telecom at a cost of 200 million French francs [Fr] and where researchers from Philips are now also working, has now installed its first pilot plant producing 2,000 of these wafers a month. The capacity of the plant, which produces prototypes for the main partners Philips, Alcatel, and Thomson, will be expanded in 1994 to 4,000 units a month.

SGS-Thomson is endeavoring to change from laboratory-scale to industrial-scale production as soon as possible, the target being in the region of 18,000 20-cm wafers a month. It will cost $400 to 500 million to implement this project. According to press reports, SGS Thomson deputy chairman Piero Martinotti said that the company could only raise this sum with the aid of its banks. This would appear to indicate that the project to expand Crolles into a European center producing advanced CMOS [complementary metal-oxide semiconductor] chips, announced only a year ago, has been abandoned.

Indeed, the latest news seems to suggest that SGS-Thomson could be in a position to make an investment on this scale by itself. It is well known that following the French government, the Italian government has also approved plans to increase the company's capital by about $1 billion. What is more important, however, is that the company, which for years reported only losses, was able to balance its operating books in 1991 and even its overall accounts in 1992, in spite of debts of about Fr9 billion.

The company announced a 28.1-percent sales increase, a 91.2-percent increase in bookings, and a profit of about $24 million in the first quarter of 1993, evidently succeeding in consolidating its strong position in nonvolatile EPROM's [erasable programmable read-only memories] and the promising flash EPROM.

The Crolles center was founded with a view to developing large 0.5-micron silicon wafers for CMOS and 0.7-micron technology wafers for BiCMOS [bipolar CMOS] by the end of 1993. From 1994 onwards, Crolles will also develop CMOS with a 0.3 micron, and BiCMOS with a 0.5-micron, conductor width up to the production stage.

Philips To Cut Back 1,550 Jobs in Germany

MI2007100193 Bonn DIE WELT in German 18 Jun 93 p 14

[Text] The Dutch electronics group Philips NV has announced massive job cuts in Germany. Philips's German subsidiary Philips Communications Industries AG (PKI), Nuernberg, will lose about 1,250 jobs in the wake of a large-scale reorganization. Another 300 jobs will, in Philips's words, be "hived off" in the service sector. Philips headquarters in Eindhoven says the purpose of restructuring PKI is "to improve international competitiveness."

It is planned to create, as from 1 July, a group-wide Personal Communication Business Unit, which will concentrate on the telecommunications markets. Philips telecom business range from fax machines, minitel, and mobile radio to terminals. Philips Grundig Radio (PGF) GmbH, Nuernberg, is also affected by the restructuring and will in future be part of the new Philips Telecom Business Unit.

There is no connection between the recent reorganization and the recently announced sale of Philips's cable business to the Dutch NKF Holding, part of the Finnish Nokia group, Philips stresses.

Germany: Industry "Cannot Afford Role of Ecological Pioneer"

MI1507141593 Bonn DIE WELT in German 22 Jun 93 p 11

[Text] Opposition to ever-stricter environmental regulations is growing in German industry. At the annual conference of the Ecological Economic Research Association in Berlin, the German Industry and Trade Association (DIHT) expressed its view that German companies "could not afford to act as the Federal Republic's ecological pioneers on a long-term basis."

In addition, the Central Association of German Craft Trades (ZDH) yesterday called for a market economy-oriented environment policy that, in the words of ZDH General Secretary Hanns-Eberhard Schleyer, would be fair to medium-sized firms and "aimed not only at freeing the environment from pollution, in itself a desirable goal, but equally at enabling industry, and especially small and medium-sized craft-based firms, to achieve it."

DIHT environment spokesman Armin Rockholz told DIE WELT that, though there could be no going back on environmental protection, it was just as important to

avoid "excessive burdens" and too many regulations: "We must set priorities, and can no longer meet all the demands of environment policy." German industry had no need to hide its light under a bushel, he said, as regarded its environmental investment: The $10.5 billion it invested in environmental protection in 1991 was more than the combined total for Denmark, France, Great Britain, Japan, and the Netherlands.

Rockholz went on to say that the ongoing cost of environmental protection is two to three times higher than the initial investments: If this burden continues, German industry's international competitiveness will be jeopardized. Rockholz quoted the fifth amendment to the waste law to illustrate his view that environmental protection threatened to turn into an "ecological self-blockade." The regulations were so complicated that they just could not be implemented. Environmental protection needed to be reorganized and all existing and planned environment projects critically reviewed in terms of cost and effectiveness. For example, effluent purification requirements in western Germany were being set ever higher; yet four times as much could be achieved for the same cost in the new laender.

After the hearing before the Environment Committee, the Christian Democrat parliamentary party yesterday renewed its commitment to the amendment on effluents.

EAST-WEST RELATIONS

European Firms Work on Ukraine's Satellite Telecom Project

MI3006101693 Eschborn NACHRICHTEN FUER AUSSENHANDEL in German 24 May 93 p 3

[Text] There is a big demand for satellite-supported communication services in the Ukraine, stated V. Shmarov, deputy-director of the Ukrainian Space Agency, speaking at a telecommunications exhibition and conference organized in Kiev by the American company NeoCom (Miami). According to Shmarov, there is a demand for both stationary and mobile communication services and satellite-supported television and radio broadcasting. A rise in demand will be triggered simply by the reorganization and expansion of the Ukraine's own national administration (e.g., Foreign Ministry, embassies, customs authorities, and others).

The Ukraine already has some fixed and mobile satellite communication infrastructure. The satellite station Azimuth in Lvov, for example, handles international telephone traffic, although it has only 100 channels at its disposal. According to Shmarov, a number of stations were installed on ships belonging to the merchant shipping fleet. There is access to the Immarsat system via the central station in Odessa. The Russian satellite Horizon is used to broadcast the Ostankino and Rossiya television channels. Until now, the Ukraine has no satellite-supported radio or television broadcasting facilities of its own.

The Ukraine's production capability for satellite-supported communication systems was well developed, said Shmarov. The major companies in this field included Musson (Sebastopol: producer of mobile satellite receiver stations of the iceberg type), the Yushnoe engineering bureau (Dnepropetrovsk), Chartron (Charkov), Saturn, Oktava (both in Kiev), and the Kiev Radio Works. The opportunity to use this capability for production-sharing with foreign partners should be taken. At present, it was virtually impossible to import Western technology.

Work is currently under way on a complex national program to develop satellite communications, which will be completed by the summer. Consultancy services are being provided by experts from Great Britain and France (Matra Marconi Space). When work on the program has been completed, a decision will also be made about participation in Russian projects in this field.

One of the most important domestic projects, from the Ukraine's point of view, that are already being pursued on a commercial basis jointly with Russian companies is the Ariadne project. The intention is to install 22 to 25 low earth-orbit satellites for communication services on an orbit 1,640 km above earth. According to optimistic estimates by the Yushnoe Engineering Bureau, work could begin in 1996.

In view of the small number of satellites required, the Ariadne project will be cheaper than the planned Gonez (Russia), Iridium (United States), or Globalstar (France) systems. In addition to Yushnoe, the project will be led for the Ukraine by the Yushmash production association, and for Russia by the Moscow Institute Radiosvyas, among others. The project's sponsors will include the Italian company Italtechna.

Siemens To Supply Computer Systems for CIS Police

MI3006101393 Eschborn NACHRICHTEN FUER AUSSENHANDEL in German 25 May 93 p 1

[Text] Siemens Nixdorf is to supply computer systems for Russia's police, the Russian Ministry of the Interior in Moscow has announced. The federal government will grant Russia a preferential loan to implement the project. The loan must be repaid within 10 years. The ministry also stated that Siemens Nixdorf was also negotiating similar contracts with the governments of the Ukraine, Kazakhstan, and Kyrgyzstan. The ultimate aim could be a police computer network covering the whole of the CIS.

ESA, Ukraine To Consider Collaboration

93WS0527B Paris AFP SCIENCES in French 27 May 93 p 9

[Unattributed article: "First Contacts Between ESA [European Space Agency] and Ukraine in Satellite Communications Sector"]

[Text] Paris—The ESA availed itself of its participation in the NeoCom-93 telecommunications show/conference, which was held in Kiev on 11-13 May, to make initial contacts. Actually, according to an ESA communique, Ukraine offers interesting possibilities for satellite communications, and perhaps also for joint activities and projects.

The ESA director of telecommunication programs, Mr. Rene Collette, representing the agency, met with the general director of the Ukrainian Space Agency, Mr. Gorbouline. This initial contact will be followed by the visit of an ESA delegation, whose mission it will be to examine in detail the question of information exchange and the possibilities of joint projects in fields such as earth observation and telecommunications.

Mr. Collette appeared particularly interested by Ukraine's considerable experience of space technology.

French, Russian Science Academies Sign Agreement

93WS0554B Paris AFP SCIENCES in French 19 May 93 p 3

[Text] Paris—French and Russian Academies of Science will henceforth work together "closely" according to an agreement signed 3 May by their presidents Jacques Friedel and Yuri Ossipov.

The agreement calls for regular exchanges of high-level scientists chosen for their ability to advance Franco-Russian research programs, as well as joint sponsoring of scientific symposia. The symposia will bring together researchers from both countries on well-defined topics. Moreover, the two academies hope to be instrumental in spurring new collaborative research projects.

The accord also mentions the Academies' "identical views" on the problems of "free circulation of ideas and people and the inadmissability of any discrimination against scientific personnel on the basis of race or politics."

EUROPE-ASIA RELATIONS

Hitachi, Trinity College Develop Artificial Eye

93WS0554D Paris AFP SCIENCES in French 19 May 93 pp 9, 10

[Text] Dublin—An artificial vision system that can recognize shapes and volumes in a way analogous to the human eye has just been developed by a research team from Hitachi's European laboratory and Dublin Trinity College, the Japanese group announced.

The researchers used opto-electronic techniques coupled with computers and neural networks to develop the Dublin Eye. According to its inventors, the Eye is the first device to combine the two techniques to create a sort of electronic-chip-based brain.

The system designed by the teams of Professors J. Hegarty of Trinity College's Physics Department and Paul Horan of the Dublin Hitachi Laboratory (DHL) teaches robots to recognize objects much more rapidly than current electronic-vision systems do. The system can, for instance, distinguish between two models regardless of their position or movements.

The researchers say the system is based on using photon, rather than electron, transmission computers, for that is the only way to sufficiently speed up the analysis of moving shapes and objects. The use of this type of equipment in factories, where there are many robots and where automated vehicles get around through electronic vision, is considered one of the most obvious applications of the new system.

But the Eye would also improve speed of execution in many other fields, notably massively parallel computers (a series of small computers operating simultaneously), boosting it to the speed of light. The Dublin researchers also claim the invention could be applied in man-machine interfaces, which it would humanize by enabling machines to recognize facial expressions.

The development of this system in just three years is the most dazzling achievement of the collaboration between DHL and Trinity College's Physics Department. The study, which was launched in 1988, aimed to explore systems that might lead to a new generation of computers able to function like human brains and to replace conventional computers in the 21st century.

Japanese-German R&D in Neural Computing Outlined

MI1507142193 Leinfelden-Echterdingen COMPUTER ZEITUNG in German 3 Jun 93 p 15

[Article by Friedhelm Weidelich: "Building Bridges and Setting Standards"]

[Text] "In view of our different cultures, we do not want to copy Japan blindly, but we would do well to understand Japan and its successful methods." This phrase, a favorite with former Research Minister Matthias Wissmann characterizes joint German-Japanese information technology research, which began 10 years ago.

Although the German Ministry of Research and the Japanese Ministry of International Trade and Industry (MITI) are unequal partners, the MITI does intend to increase exports. Nevertheless, the joint work carried out by the universities and research institutes of both countries seems to be bearing fruit in basic research.

Verbmobil is the name of a BMFT [Federal Ministry of Research and Technology] project that will build a bridge between the German and Japanese languages. The German Artificial Intelligence Research Center in Saarbruecken is developing a mobile translation device that uses English as the language of dialog. As a non-written,

and hence incomplete, language has to be understood and translated, the problems are legion.

Two Unequal Partners

The first research goal of the project, which is scheduled to last eight to 10 years, is to master simple discussions such as two business partners arranging an appointment, or ordering goods from a mail order firm. In Japan, too, the ATR Interpreting Telecommunications Research Laboratories in Kyoto have set the translation of spontaneous language as their target. The Saarbruecken researchers are working with them on data collection, speech recognition, and linguistics.

The exchange of neurocomputing scientists between Germany and Japan has been in progress since 1990. The universities of Osaka and Tokyo and the Ruhr university in Bochum have obtained the first results in mathematical-geographical research fields, and developed a usable face recognition system and optical modules for robots. The results will be published shortly.

Professor von Seelen of the Ruhr University, Daimler, and Siemens, who are aiming for a joint German-Japanese project to develop an autonomous mobile robot system, have set themselves major tasks. Binding standards, an adaptive system and the modular principle will enhance quality by leaps and bounds in robotics. The researchers see applications in control tasks and in active intervention in manufacture and coordination processes. The German and Japanese partners will each form a consortium in which industry will dominate and be supported by research institutes.

At this point, other projects seem to be more urgently required to get rid of the confusion in the software field. The EUREKA Software Factory (ESF) was an early supporter of integrated programs and applications: In spite of the software companies, 70 percent of software is still developed and refined by the users, as complexity and networking increase. Consequently, the ESF looked for opportunities to bring together organizational, information, and communication technology and exploit the resulting know-how.

Herbert Weber from the Fraunhofer Institute of Software and Systems Engineering considers that only engineering methods can give software development new impetus. The use of standardized components and platforms, and adaptable semifinished products, simpler production processes, and the reuse of previously developed program components will facilitate the further industrial development of highly complex software structures. Weber regards the development of a market for standardized components and semifinished products as very difficult, so he would welcome collaboration with the Japanese. The idea of a "software factory" goes far beyond the CASE [computer-aided software engineering] strategy of many producers. Weber's philosophy is: "Quality and economy in software development depend not only on the developers' level of training and working methods but also on the development team's correct ordering of the working process and its coordinated use of tools and methods." If components producers, software factory, and CASE users work together, their individual strengths will be used to the best advantage.

United Against Software Confusion

The core of an ESF reference model that can be used to restructure industrial software production and other computer-aided interpersonal processes will form the basis of further research. A circle of users will help to spread the ESF gospel. Weber expects an important boost to come from joint German-Japanese work that will extend the existing contacts with NEC, NTT, and the University of Kyoto to new partners in Japan.

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