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SCIENCE & TECHNOLOGY POLICY

Wissmann Sees 'Critical' Condition of Research in Eastern Germany

93P60204 Duesseldorf *HANDELSBLATT* in German
8 Apr 93 p 4

[Text] The reorientation of science in eastern Germany is still proceeding at an uneven pace. While it is almost complete in the non-university research institutes which Bonn supports, the situation of industrial research is "critical," according to a statement by Minister of Research Wissmann in Bonn.

The number of those employed in industrial laboratories, about 87,000 persons in late 1989, dropped to an estimated 24,000 at the end of 1992. At present, the new laender provide only about 2.5 percent of the German exports which are based on intensive research; he said.

According to Wissmann, promotion of industrial research in the East has special importance. During the negotiations on the supplementary budget, it was possible to obtain the prerequisites for unblocking a total of DM200 million for 1993 and 1994. Moreover, DM330 million in federal funds are foreseen for a package of special subsidy measures in this year.

According to Wissmann, what is now needed is to break through the "encrusted structures" in eastern German university research. The Federal Ministry for Science and Technology (BMFT) will support this process by promoting pilot projects for "colleges of innovation" at universities. This means that scientists from different fields will work together for a certain period at interdisciplinary institutes. In the area of non-university research, there are about 100 new institutes and research centers with about 7,200 jobs; these institutes are mostly operational, he said.

German Expert on Research Goals, Policy, International Cooperation

93WS0297A Duesseldorf *HANDELSBLATT* in German
2 Mar 93 p 16

[Text]

Today's Research is Tomorrow's Sales

Forschungszentrum Juelich GmbH (KFA): Interview with Chairman of the Board Prof. Dr. Joachim Treusch

The advantage of German research lies in its diversity. Universities, national laboratories, Max Planck and Fraunhofer Societies as well as industry complement each other rationally and cooperate in many areas, emphasizes Prof. Dr. Joachim Treusch, chairman of the board of Forschungszentrum Juelich GmbH (KFA) [Research Center Juelich], Juelich, in an interview with the *HANDELSBLATT*. The structure, exceptional in comparison to other nations, must be preserved. After all, "today's research is tomorrow's and the day after

tomorrow's sales," something which must be taken into consideration in view of the empty public coffers which necessitate economizing. Treusch does not view the German research landscape as a model for other countries. Research, like the educational system, is based on tradition; it is more strongly centralist in France or other countries, while in Germany it is federalist. Each system has its advantages, with the German one having proven itself in the Federal Republic.

Universities and the Max Planck Society (MPG) predominantly carry out long-term basic research, "from which something can occasionally emerge very rapidly." Industry, supported by the Fraunhofer Society (FhG), works on application-oriented research with short-term time frames of under five years. For large-scale research, which lies in the middle as far as time is concerned, it is necessary for the "basic research institutes to collaborate more with the universities, and the application-oriented institutes more with industry." Opportunity lies in the mixture.

Collaboration among researchers is therefore especially important to Treusch. This is true not only nationally, but internationally as well. For this reason the KFA has decided not to cut the international visiting scientist program, although the financial position is tight in Juelich, too. About 400 international guests come to Juelich every year. Of this group, the number of scientists from Eastern Europe is increasing the most.

Treusch also does not plan any cutbacks in the "doctoral program." The KFA employs 38 C-4 professors, with all institute directors teaching as full professors at a university in North Rhine-Westphalia: "This 'Juelich model' is a special feature of the KFA and does not exist in this form at any other national laboratory. And that integrates us naturally into all the surrounding faculties." Another 70 or so employees are qualified as university lecturers. The high number of staff members with teaching qualification makes it possible for us to supervise about 400 doctoral students.

For Treusch, on the one hand, this is part of cooperating with the universities, while on the other hand it is the fulfillment of the educational mission which he sees for the KFA. Juelich performs another, often painful, part of its educational role as a supplier of candidates for university professorships: "Seventy professorships have been filled from the Institute for Solid State Research alone since its founding 20 years ago."

More Than 400 Doctoral Students are Supervised in Juelich

The close connection to the universities has its advantages. "Contrary to preconceptions," says Treusch, "it makes cooperation with industry easier rather than more difficult." In this way, many joint projects were opened up, from which, in turn, all three sides profit.

In this regard, the KFA chief refers to the special attraction which, in his opinion, Juelich has. In contrast

to the MPG, FhG, and universities, but also unlike most of the other 16 German national laboratories, the KFA's work is largely interdisciplinary. "Because the world is becoming more complex, it is increasingly important to look beyond the end of one's own nose." After conclusion of the KFA's first big contract for developing the high temperature reactor to the point of industrial readiness, Juelich was reorganized and set up along interdisciplinary lines.

This process was simplified by the fact that, from the beginning, the KFA "was not a monolithic center of nuclear research, but even in the early years (1966) kept up with neighboring areas of research—from nuclear medicine to chemistry to materials research and solid state research."

Research is Based Increasingly on the Division of Labor

Research, as Treusch predicts, will be "based increasingly on the division of labor, just as industry itself. If an enterprise reduces its vertical range of manufacturing, it needs subcontractors. That also applies for research, which must rely more heavily on interdisciplinarity and division of labor. Not only in cooperation with universities and industry, but in the Juelich Research Center itself, the coexistence and cooperation of engineers, physicists, chemists, physicians, biologists, computer specialists and other scientists stimulate creativity and efficiency of the work."

At present, the only real difficulties Treusch sees for this work involve financing problems caused by the empty public coffers. Reductions or cutbacks in basic financing, which amounts to almost 90 percent of the 580 million German mark [DM] budget "available for cost coverage," are not the biggest burden. "The financial restrictions are hard, but the pace at which the restrictions come is more difficult. And this is what we suffer from at the moment."

Sheer size is not necessary for the survival of the KFA. "We could do just as well with a few less people," says Treusch. It's just that, because of the public service law, time is required to adjust.

Japan Now Relies Heavily on Basic Research

Independent of KFA interests, Treusch also warns against reducing basic research. Germany and its economic success are very much dependent on it. A basic researcher, for Treusch, "is one who investigates without having someone stand next to him and say what should come from it and who should earn the money with it." The results are predominantly long-term, but not therefore less important. Japan, for example, now relies heavily on basic research, "and we must watch that we don't gamble away our next millennium in order to get through the last decade of this millennium somewhat more economically."

Part of basic research as it is conducted at the KFA is transferred directly to industry. "We naturally have a lot

of patents, several hundred, and at present about 100 new ones are granted per year," contributing to the almost DM80 million "profits and other earnings" of the research center.

The rapid transfer of research to industrial products and processes is not, however, "the immediate objective." More important is "the transfer of science to business and industry, familiarization with existing results, which are often useful for tomorrow. That can only happen if science opens up to the business sector and, naturally, if the business sector listens. And we do a lot for this. Far be it from me to say that enough has been done here already, but the Juelich Technology Center, recently opened right next door to the KFA, is another important step in the right direction."

The long-term nature of basic research naturally makes it difficult to monitor success. Treusch, however, is convinced that this monitoring functions at the KFA, as well as in German research as a whole. "Scientists judge scientists. I believe this is the only method possible," he emphasizes. A state commissioner is hardly in a position to evaluate scientific work.

In the KFA, success is monitored not only by various committees, through which the funds are allocated, but also by scientific advisory councils with international representation "which monitor reports of results, listen to lectures, talk with the people, and go into the laboratories. That is a very intensive way to monitor success. Whoever comes off badly can tell—even faster than by financing—by the impact on his good reputation. And that is rather deadly."

EC Should Support Research Where It is European

In the international allocation of funds, "the special bureaucracy which is practiced in Brussels" is a cause for concern for the KFA chairman. For one thing, overall planning is a process in which the Federal Republic is certainly not involved to a sufficient degree and which often goes in directions "which are not our own. Other nations are more clever there." For another thing, the process of evaluating applications is still very obscure. To Treusch, the process also seems "very slow and extraordinarily document-intensive," while the approval rate, on the contrary, is "very low."

In general Treusch assumes "the EC should support research where it is really European, which is to say secondarily." Along with large-scale installations like CERN, these include exchange of scientists and international cooperation in strategic high-tech programs. In no case, however, should an attempt be made "to Europeanize basic research on the spot. If all of basic research received European financing and its organization and monitoring were handed over to a commission with parity representation, then it would be dead." By this he doesn't mean that researchers should not cooperate with each other. Quite the contrary, but "on a completely different level." For example within the context of scientist exchange programs, as is done in the KFA.

Treusch does not believe the time is right for a "European science city" in the style of Japan's Tsukuba. But he believes the KFA is a promising beginning: interdisciplinary cooperation on the spot, international cooperation in major projects, for example fusion research or particle physics. Treusch's dream: "A European KFA with the goal of interdisciplinary and interlingual cooperation in research and applications."

France, Canada Sign Earth-Observation Agreement

93WS0337A Paris AFP SCIENCES in French
11 Mar 93 pp 10-11

[Text] Paris—National Center for Space Studies (CNES) director Jean-Daniel Levi and the president of the Canadian Space Agency (CSA) Roland Dore have just signed an agreement protocol in Montreal to work together in Canada's RADARSAT-III earth observation program. The CNES announced the agreement in a communique on 5 March.

The signing of the protocol, the communique stresses, "gives concrete form to the two agencies' shared views of the future of operational earth observation programs, and how those programs can solve environmental problems on a planetary scale."

The CSA is chief contractor for the RADARSAT program, whose primary aim is to monitor the environment and manage the planet's resources. The RADARSAT-1 satellite is scheduled for launch in 1995. With an expected life span of five years, the satellite will be able to take pictures of the earth under all kinds of weather conditions using its synthetic aperture radar. Users the world over will have access to its data. A second RADARSAT-II satellite, the communique continues, will be proposed in Canada's long-term space plan.

On the French side, the CNES has developed satellites that use high-resolution optical techniques—Spot 1 and Spot 2—and that were launched in February, 1986, and January, 1990, respectively. Spot 3 will be put into orbit next September. Spot 4 will be ready in 1995, while a more powerful Spot 5 is under study.

The RADARSAT-III satellite project is expected to commence early in the next century and to benefit from the experience gained by France and Canada. There are plans to implement a remote-sensing program, whose data would be marketed by Radarsat International (Canada) and Spot Image (France), concludes the CNES.

FRG: 'Blue List' Institutes Seek to Join Forces

93WS0362B Frankfurt/Main FRANKFURTER
ALLGEMEINE in German 24 Mar 93 p 14

[Article by Silvia Schattenfroh: "Blue as New Color of Research: More and More Institutes Falling Out of Old Organizational Plan"]

[Text] Berlin, Mar—The new Laender are at risk of losing the things that they have only just achieved in the field of research. As a result of German unification, numerous research institutes were established there that belong to the so-called "Blue List," and are thus jointly financed by the federal government and the Laender. The name comes from the color of the paper on which, in 1977, the federal and Laender governments listed out-of-the-ordinary scientific institutions: The Blue List institutes belong neither to the Max-Planck-Gesellschaft (which is devoted to basic research) nor to the Fraunhofer-Gesellschaft (which is engaged in research for industrial applications); they also do not fit in with the college projects of the German Research Association or so-called (state-oriented) major research. Although before unification attention was given to keeping this list of otherwise unclassifiable exceptions as small as possible; since the revolution it has grown from 48 to more than 80 institutes—with a doubling of personnel.

Thus, the Blue List institutes have become too big to continue eking out a niche existence; indeed, they are developing into a serious competitor for state grants. With more than 9,000 employees and a financial volume of 1.3 billion German marks [DM] a year, they are now among the main recipients of state support for science, and in order of magnitude are comparable to both the Max-Planck-Gesellschaft and the German Research Association.

This trend was not intended. Instead, the unification treaty specified that the well over 13,000 researchers deemed qualified after evaluation by the Scientific Council would be incorporated into the "proven" western German scientific structures. The swelling of the "Blue List" is a consequence of the rather hesitant acceptance of eastern researchers into the installations of the major economic organizations. Ultimately the Scientific Council and the executors of the unification treaty had little choice but to keep a significant number of eastern German researcher groups afloat by establishing new "Blue List" institutions. This was because the three major research facilities in the East (the West has 13) were naturally limited in terms of the number of people whom they could absorb. And although the Fraunhofer-Gesellschaft was very much involved in setting up new institutes in the East, the Max-Planck-Gesellschaft remained cautious, especially with regard to integrating outside humanities institutions.

The least inclination to integrate scientists was demonstrated by the people from whom one had expected the greatest willingness, the eastern German colleges, from which research had been largely excluded under SED [Socialist Unity Party of Germany] rule. They were and still are so occupied with restructuring themselves and the need to make rigorous cuts in their own personnel surplus that 2,000 researchers to be transferred to the universities are still waiting for integration today, and will probably have to be "provisionally financed" by the federal government for years to come.

The growth of the "Blue List" is a thorn in the side of the Max-Planck-Gesellschaft in particular. Its president, Zacher, demands that the "Blue List" be eliminated in the East as soon as possible and that support of research at the colleges be accelerated. Under no circumstances are the Laender willing to go along with this, however, because this would mean giving up the certain 50 percent share of the federal government in financing the institutes. Shifting science from the "Blue List" to the colleges would saddle the host land in question with the total costs, if one discounts the (uncertain) procurement of funding from the German Research Association.

Berlin will definitely resist such trends. Since 1 January 1992, eight "Blue List" institutes in the eastern part of that city have merged into a "research group." In this way, these institutions of very diverse size and scientific focus have gained an administrative service that they never could have acquired on their own. Because besides the classic administrative duties, the group has taken over service functions ranging from legal counseling on property, labor, and patent law to public relations to the organizing of scientific conferences. Originally set up by the Land of Berlin and the federal government as a corporation for reasons of thrift, the "group," which frees researchers from bureaucratic functions and thus indirectly benefits research, is now attracting institutes in western Berlin that existed even before reunification. Especially since one voice that speaks currently for 800 and in the future for more than 1,000 employees is heard more clearly than the agent of a single institute.

Precisely because it is successful, the major research organizations regard the Berlin group model with suspicion. Is the nucleus of a powerful federation of all of Germany's "Blue List" institutes being formed here? Actually, they are a collection of heterogeneous institutes of various sizes with a financial volume of between DM3 million and DM50 million a year. Thus far, this "general store" lacks a common profile. At most, the list's institutes are connected by the principle of equal financing by the federal government and the respective land.

However, the institutes do have one shortcoming in common: The "moment of finiteness" is missing. Has anyone ever heard of an institute, once founded, subsequently being closed down? This immortality probably has less to do with the regional pride of the host Laender than with the inadequate evaluation of the quality and efficiency of "Blue List" institutes.

In the meantime, the "Blue List" itself is sensing its shortcomings in internal identity and external effectiveness. In order to bring about closer cooperation, a loose "Association of Blue List Research Institutions" was founded back in 1990, to which around two-thirds of all institutes belonged by the beginning of 1993. It maintains a business office in Dortmund, but thus far has developed no external influence.

Thus, once again, a certain amount of hope is being vested in the Scientific Council, which has set up a

"Working Group on Blue List Reorganization," which is supposed to provide a legally binding structural plan for the List. One hearing has already been held in Frankfurt. But not that much progress is being made. A new organizational form must be decided on, and the question is whether any organizational form will not confer an independent existence on the "Blue List" in the long run and impede the medium-term dissolution or transfer of individual institutes.

Should the organization be based on scientific disciplines, such as the social and natural sciences? Or would differentiation based on goals be more appropriate, for example according to applied or basic research? Should the division be regional, or perhaps Laender-oriented, whereby the Berlin "research group" could serve as a model? The most important decision will probably relate to the structure of the umbrella organization. Do we want a purely administrative office, or should there be a central board with control functions over content? Could a "committee" handle the eagerly desired criteria for quality evaluation despite the diversity of the institutes and, more importantly, impose them? Finally, how can the interests of the 16 involved Bundeslaender and 10 ministries be coordinated? The working group is supposed to have completed its work, intended to give the institutes on the "Blue List" something like a corporate identity, by summer.

German High-Precision Technology Industry Reviewed, Compared to Competition

*93WS0363B Duesseldorf VDI NACHRICHTEN
in German 19 Feb 93 p 20*

[Article by Peter Schmitt : "High-Precision Manufacturing Technology"]

[Text] VDI-N, Aachen, 19 Feb 1993—Microstructure technology procedures enable the manufacture of extremely tiny components, for example, motors having an armature diameter of a mere 50 μm . "Micromachines" that supposedly will wind their way through the circulatory system of the human body are under development in Japan. Currently, under laboratory conditions, the limits of manufacturing capabilities verge on the dimension of an atom. The technology underpinning these developments is ultra-precision. For the tinier the products, the more precise have to be the machinery and equipment manufacturing and manipulating them.

There presently exist state-of-the-art machinery which, on the basis of its resolution, is capable of snipping a human hair into more than 50,000 slices, and measuring systems that render surface atoms visible.

Among the mass-produced items of everyday life, e.g., in video recorders, CD players, printers or copy machines, are high-precision optical and precision engineering components that are manufactured in very large batches.

To enable the production of such components, machinery parts are under development at the Fraunhofer Institute of Manufacturing Technology in Aachen. For advances in R&D often depend directly on attainable accuracy of measurement. Examples of this are mirrors for X-ray telescopes or specially shaped laser lenses and mirrors. The concept of a nanometer (nm), designating a thousandth of a micrometer, $1 \text{ nm} = 10^{-9} \text{ m}$, is commonly employed by the experts to describe the precisions and surface areas of this technology.

Currently, machinery having nanometer resolution in the U.S., Great Britain, the Netherlands, Japan and the FRG, is capable of attaining approximations of several nanometers in the case of nonferrous materials. Getting to this point, however, was a long haul. Just as soon as the capability existed for positioning with nanometer precision a host of influencing factors cropped up, systematically undercutting the precisions.

Ultra-precision technology began in the U.S. in the sixties when the endeavor was made, using single-crystal diamond tools, to manufacture reflective surfaces having very highly precise shapes on converted gauging machinery. The huge success of the endeavor led to a rapid development of that technology.

Under the direction of Prof. P.A. Mc Keown in Great Britain, the Cranfield Institute of Technology devotes itself to this high-precision technology. With the Cranfield Unit for Precision Engineering [CUPE] he established a research laboratory that focuses exclusively on the development of ultra-precision technology.

The Japanese are also busy: the Science and Technology Agency [STA] and the Ministry of International Trade and Industry [MITI] have sponsored nano-technology in Japan since 1985 under the Yoshida Nano-Mechanism Project and under the Advanced Material Processing and Machining Technology [AMMTRA] Project that ran until 1993.

In the early eighties in the FRG, Prof. Manfred Weck, at the Fraunhofer Institute of Manufacturing Technology [IPT] in Aachen, began exploring these high-precision machines. With his 20-member team he is currently developing and exploring ultra-precision machinery and its components. The Ultra-Precision Technology Research Group, numbering more than 25 enterprises, was founded in Aachen to focus the activities in this sector.

According to Prof. Weck it is now a question of transferring to industrial manufacturing technology the precisions currently obtained in the laboratories. There is a

recognized trend in this connection for high-precision processing of hardened steel materials to assume increasing importance.

Manfred Weck is certain that, "We are currently capable of reducing any given machine component to the threshold precision of the measurement technology that is employed. For example, using a hydrostatic bearing wheel and disk drive, we are able to position precisely to the final digit, that is, 10 nm. In so doing the drive itself presumably still has large reserves for approaching positions to within several Angstroms over paths of several hundred millimeters. According to IPT investigations, the drive has a 20 nm position instability, determined on the basis of Association of German Engineers [VDI]/German Society for Research on Quality [DGQ] 3441 and possesses no width of backlash."

Another example is a high-precision turntable that makes it possible to approach more than 36,000,000 individual points of a circle. Once again in this case the shaft encoder that is used determines the limit.

Notwithstanding the development of some machine components with nanometer precisions, total machine precision is still far from being able to attain such extreme values. At the tool's work site lever arms or disadvantageous alignments of the machinery axes multiply imprecisions several times over. Technological influences also reduce manufacturing precisions to a considerable degree. Machine tool-work piece interactions, process heat, cutting property, and cutting forces have a large impact on the obtainable manufacturing result. This is why Prof. Wilfried Koenig is focusing on cutting technology at the IPT. It is also why Prof. Thilo Pfeifer is developing the required measurement technology at the same institute.

Even the Federal Ministry for Research and Technology is focusing on the promotion of high-precision manufacturing technologies. For instance, it is making resources available for a combined project in which high-precision steel cutting is further developed with a geometrically defined cutting edge. The aim is to replace grinding with lathing in specific sectors. The goal of the development is to obtain precisions ranging from ISA tolerance [IT] 3 to IT 5.

Prof. Weck claims that high-precision technology has to be systematically developed for the manufacture of future products. Application of this technology would yield new technological alternatives, e.g., in targeted materials manufacturing, in the future. "Combining micro-engineering, micro-optics, and micro-electronics will create alternatives for the manufacture of very inexpensive mass-production items." Examples of this are supposed to be presented at the upcoming "Conference on Ultraprecision in Manufacturing Engineering" in Aachen in May 1994.

Current Processing Technology

Process	Precision
Milling	10 μ m
Lathing	
Drilling	
CO ₂ laser processing	
Precision lathing	1 μ m
Precision milling	
Grinding	
Photolithography	
Electron beam processing	
YAG laser processing	
Glass grinding	0.1 μ m
Precision lapping	
Chemical vapor deposition [CVD]	
UV photolithography	
Diamond lathing	
Diamond milling	
Elastic Emission Machining	0.01 μ m
Mechanical-chemical lapping	
Reactive lapping	
Physical vapor deposition [PVD]	
Electron beam processing	
Non-contact lapping	0.001 μ m
Ion beam processing	- 1 nm
Ion implantation	
Substance synthesis processes (Molecular beam processing)	< 0.001 μ m Sub
Manipulation of the atom by means of a raster tunnel microscope	nanometer

(Source: Taniguchi)

[Photo caption]

Using a diamond cutting point, extremely minute particles are sheared off of this concave-shaped copper part. High-nanometer precisions are obtained. By the year 2000 maximum attainable manufacturing machine-tool precision should drop to a few nanometers (1 nm = 10⁻⁹m). James Watt, 250 years ago, had to be content with the thickness of a shilling coin as the standard measure of manufacturing precision.

German Political Leaders Discuss Federal Support for Basic Research

93WS0363C Duesseldorf VDI NACHRICHTEN
in German 19 Feb 93 p 16

[Article by Thomas A. Friedrich: "Prospects and Risks of New Technologies"]

[Text] VDI-N, Bonn, 19 Feb 1993—Is 40 percent of the Federal Research Ministry's budget too much for basic research? Do we require more intensely applications-oriented and industry-friendly research from federal funds? Last week in Bonn the experts' seminar of the CDU/CSU parliamentary party organized by CDU

research expert, Christian Lenzer, discussed the controversial topic of the "Private Sector's Role in Germany as a Hub for Research and Technology."

Germany as a technology hub is at risk since there is no longer a consensus of will. "The risks of new technologies are exaggerated," lamented Hans-Juergen Warnecke of the Fraunhofer Institute for Manufacturing Technology and Automation. Siemens executive Hans Guenter Danielmeyer likewise noted a research hub and technology hub divergence: "There exists an academically determined research hub and a private sector determined technology hub." The overdeveloped research landscape needs a common strategy. The goal should be to incorporate into academia the applied research from industry and to draw up priorities for the next decade.

Bernd Neumann, non-cabinet minister in the Federal Ministry for Research and Technology [BMFT], counters this with: "Industrially focusing the broadly-oriented research of the Large Research Institutes [GFE] seems too all encompassing." The GFE's research activities should not be centrally oriented towards the private sector's increasingly accelerated product cycles, warned Joachim Treusch of the Juelich research center, and thus avoid arriving shortly thereafter at the situation in which Japan now finds itself for having engaged in too little basic research in the past. (tab) According to Neumann, BMFT-sponsored research at present is clearly aimed overwhelmingly at applications-oriented basic research, such as biotechnology, laser research, high-temperature superconductivity, information technology and environmental sciences. Currently this type of basic research constitutes nearly 22 percent of BMFT sponsorship. Altogether, the government and the private sector in Germany spend approximately 18 percent of total R&D outlays on basic research, reflecting an annual volume of DM13 to 15 billion.

Nearly 40 percent, or DM3.8 billion, of the BMFT budget is expended on basic research. According to BMFT data, in prior years nearly 15 percent of that was allocated to the basic financing of the Max Planck Society, about 55 percent to applications-oriented basic research and approximately 30 percent on major equipment.

In the FRG, the private sector finances approximately two thirds of total expenditures on R&D. There are indications, however, from academic statistics that large companies in the FRG are reining in long-term investment in basic research. According to Neumann: "That would be fatal for the future." It would adversely impact the bases for optimum translation of research results into applications.

Not only the government but the private sector, too, has to accord priority to research. Daimler Benz AG research director, Hartmut Weule, confirmed that the private sector primarily pours research funds into guaranteeing today's business. Only about DM5 billion are spent each year on developing tomorrow's technologies.

Industry has to increase its R&D outlays on activities insuring the future. Research and technology are not simply a matter of financing. Rather, it mostly amounts

to the government creating the basic conditions for attaining a rapid implementation of the guiding principles. Hence, in Weule's own words, the task confronting the Federal Research Ministry would be to moderate the dialog between academia and the private sector.

On behalf of the Chemical Industries Association [VCI], Dr. Hauke Fuerstenwerth complained of the "constriction of innovative energies because of the overwhelming flood of government laws and regulations."

Prof. Walter Kroell, chairman of the Large Research Institutes' Study Group [AGF], warned of the danger of misusing the BMFT budget as a quarry for plugging the gaps in the federal budget. "We need not less, but more, support for research in the future."

France: S&T Expertise at CNRS Detailed

93WS0373A Paris LE MONDE in French 24 Mar 93
p 36

[Article by Pascale Kremer: "The CNRS Awards"; first paragraph is LE MONDE subhead]

[Text] The Cesars and the Molières have been joined by the Crystals, for researchers.

They will never win the Nobel prize. At CNRS [National Center for Scientific Research], engineers and technicians work in the shadow of the great researchers. Yet the laboratories could not operate without them.

CNRS's top researchers have long received recognition. Some 50 gold, silver, and bronze medals have been awarded every year since 1954. The same cannot be said of the technicians and engineers, whose research support work was until recently never really acknowledged.

For this reason, in 1992, it was decided to award Crystals each year to the most deserving technicians and engineers. "It is a wonderful way of recognizing those of us who are often somewhat forgotten, even if our work is in the spotlight for only a few days," says Jean-Paul Gendner, one of 1992's 17 happy laureates. As the electronics and data processing manager of CNRS's ecological and physiological energetics laboratory in Strasbourg, he recently developed an automatic weighing and identifying device for penguins. Thanks to that, researchers can now obtain useful numerical data untainted by the presence of humans.

Reopening Communication Channels

In addition to the Crystals, there are also retirement medals, which will soon be joined by a CNRS award for good team work. This proliferation of honorific distinctions springs from the determination of the new human resources office (established in 1990 for the purpose of modernizing personnel management at this public institution) to reopen the channels of communication between researchers and research support staff in the laboratories. "There is a big cleavage between laboratory

heads and ITAs (engineers, technicians, and administrative workers). As a result, the ITAs, whose abilities are underutilized, are discouraged from trying," says Christian Pralon, the human resources director. "The laboratories' management culture absolutely has to change."

Other initiatives target the same goal. Laboratory directors are encouraged to hold annual performance reviews with all of their staff and to design laboratory projects to motivate their team around a better defined objective. "The laboratories are full of family quarrels. Communication, which is the principal advantage of the laboratory structure, suffers," according to Christian Pralon. "But, unfortunately, you cannot decree a change in mentality." To date, only 30 laboratory projects have emerged, and a scant 400 lab directors (out of 1,300) have conducted annual performance reviews. "At first, many directors were unenthusiastic, thinking that a good scientist is always a good lab director. Now, however, the term 'management' is no longer criticized."

"Occupational Observatory"

Raising skill levels is another hobby horse of the human resources office. Three-quarters of the 27,000 people employed by CNRS throughout France (11,000 researchers, 8,000 engineers, and 8,000 technical and administrative workers) are Level A civil servants. Seven or eight years ago, only 70 percent fell into this category. "This is a strong trend. In the future, we will be recruiting fewer basic technicians and more high-level technicians and engineers; fewer design engineers and more research engineers." Some low-skill positions (cabinet maker, mason, carpenter, etc.) or positions requiring too much infrastructure (maker of high precision instruments) are being eliminated in favor of subcontracting.

Each post eliminated means a worker in need of retraining. For the past three years, the human resources office has been assisted in its forward employment planning by an "occupational observatory." Researchers, technicians, engineers, and administrative personnel of recognized ability have been noting the developments they see in the field. These include, for example, very profound changes in the occupation of librarian (with the use of data banks), secretary (with office automation and microcomputers), and even engineer. "Today, we recruit engineers less for their very narrow specialization than for their ability to coordinate multiple subcontractors, manage a budget, and lead their team. Scientific skills now need to be accompanied by organizational and management skills," the human resources director says. This is why the method of recruiting engineers was recently changed. The anonymous civil service exam has been replaced by a review of the candidate's qualifications and an in-depth interview in order to provide a more accurate picture of his or her personal qualities. Lastly, new occupations are emerging, such as dual specialization engineers (industrial chemist/biologist, for example).

Passing on Knowledge

Of even greater concern to the human resources office than changing skills requirements is the aging of CNRS's work force. The average age of researchers and technicians, the majority of whom were hired during the 1960-1970 recruitment boom, is now 45. For engineers, it is 48. This means that CNRS will have to replace a large portion of its personnel in the next 10 years. It will be necessary to recruit 350 researchers and 400 engineers, technicians, and administrative workers a year. Already in 1992, CNRS brought 216 new ITAs on board.

"This requires us to think about ways of passing on knowledge. The research support occupations are uncommon occupations that combine extensive initial training with a long period of adapting that training within the organization," Mr. Pralon says. In-house training, which, despite having quadrupled in the past five years, currently totals only 2 percent of payroll (44 million French francs in 1992), will have to increase considerably if the strong skills of the current staff are not to be lost. "Those nearing retirement will act as tutors for the young engineers and technicians. Technicians will train in laboratories other than their own in order to acquire complementary know-how." The only curb on such exchanges is that researchers are often very reluctant to see their technicians leave for six months.

France: Industrial Research Support, Direction Discussed

93WS0373B Paris LE MONDE in French 24 Mar 93
p 21

[Article by Jean-Francois Augereau: "The Republic's Fair-Haired Child"; first paragraph is LE MONDE sub-head]

[Text] Since 1981, except during cohabitation, research has enjoyed governmental largess. However, the current economic climate weighs heavy on the future.

When, in July 1984, then-Prime Minister Fabius asked Hubert Curien to take the fate of research in hand, the scientific community was still smarting from savings measures "indiscriminately" applied by the offices of the minister for the economy, finance and budget, Jacques Delors. Not that researchers had suffered during the first three years of socialism—much to the contrary. From his first days in the Elysee, President Mitterand made research a priority. In doing so, he continued the "belated" effort undertaken by Raymond Barre at the end of Valery Giscard d'Estaing's seven-year term.

Why this presidential passion? Because, according to President Mitterand, "if France wants to succeed, research must become the 'Republic's fair-haired child.' The expression made me smile. But I liked it for its simplicity." The first Socialist minister for research and technology, Jean-Pierre Chevenement, would bear this phrase in mind and would organize "historic" days to

reconcile the scientific community with the country: its politicians, its manufacturers, and its general public.

Those being times of magnificence, research funding was increased by around 17.8 percent. The objectives were so ambitious they could not be met. Indeed, after having enjoyed, with the ascension of the left, magnificent budgets and a rather generous hiring policy, in 1984 the "Republic's fair-haired child" felt the weight of austerity and, looming in the distance, the specter of the infamous yo-yo policy from which it had so badly suffered in the 1970s.

Thus the inclusion of Hubert Curien, "a man of civil society," in the Fabius government made researchers hopeful. Mr. Curien knew about research. A crystallographer by training, by the time he received his portfolio, this "calm and stubborn" native of the Vosges had held all the important posts in scientific research and, in particular, in 1973, that of representative for scientific and technological research, an administrative office equivalent at the time to that of a secretary of state or a minister for research.

Buoyed by this past and by the respect acquired then in research, political, and industrial circles, Mr. Curien would attempt to put research back on track. He made slow headway initially, obtaining, for his first budget in 1985, an increase of 5.4 percent in constant francs,¹ which, when compared to the size of the 1984 budget after Mr. Delors's cuts, represented an increase of more than 10 percent.

This bright period was soon over. The advent of a rightist government in 1986 dashed all hopes. Funding for civil research was cut by 4 percent. Funding for CNRS [National Center for Scientific Research], which just barely escaped dismantlement, declined by 3 percent between 1986 and 1988.

After this painful interlude, the Rocard government was in an excellent position to "correct this trend." Named deputy minister for research in May, 1988, and full minister a month later, Mr. Curien achieved a bit of a coup by obtaining "significant budgetary facilities" designed to give him "the means to implement a coherent research policy." Eight hundred thirty million French francs [Fr] were released, and 150 research and engineering posts were immediately created.

With this governmental recognition of research as a priority and with the advantages acquired under the Maurois and Fabius governments, the minister for research and technology thus regained the budgetary clout his predecessors under the Chirac government had lost. Witness the most recent budgets: up 7.9 percent in 1989; 7.1 percent in 1990; and 7.3 percent in 1991 prior to Mr. Rocard's cuts in March, 1991, which bring the increase down to less than 5 percent.

France is limiting its ambitions. While the idea of research as a priority has prevailed, even in a climate of austerity, expenditures for research and development in

1990 fell far short of the magic figure of 3 percent of GDP [gross domestic product] recommended by Mr. Raymond Barre in his day.

France is topping out at 2.42 percent despite the "top priority" status accorded to research (4.7 percent) in 1992. Still, it has come a long way from behind, when one thinks that, in 1981, domestic spending on research and development represented only 1.97 percent. This comparison is a better measure of the distance covered, which has allowed us to pass Great Britain, even if our "competitors" in this strange race are prancing along in the lead with 2.86 percent of GDP for the United States, 2.83 percent for Germany, and 2.72 percent for Japan. This trend is confirmed by the "Midterm Report on the 10th Plan," which once again stresses our chronic weakness with respect to Japan and Germany: industrial research.

Encouraging Industrial Research

This is the Achilles heel of the state-owned enterprises, the disease endemic to France. The causes? According to Mr. Claude Jablon, scientific director of ELF Aquitaine, "the link between public research and the competitive world broke during the post-war 'Glorious Thirty.' Outside the big programs, the academic world and the industrial world each had enough to do on its own not to feel very compelled by the other's problems."¹

At the same time, the so-called "intermediate technologies" have been neglected. The infamous big programs have focused public research on "high technology" problems (high performance materials, integrated electronics). "Less prestigious technologies pose problems that are just as compelling," Claude Jablon says, "and their consequences for our country are decisive, while the support provided by public research is not in keeping with their economic importance."

"Today," he says, "it would seem fundamental to ask what should be done to foster the link between public research and industry in the technological 'Mittelstand,' where Germany excels." For three years, Mr. Curien and his counterpart at the Ministry of Industry tried to

correct this situation by favoring this sector in their budgets, so much so that, between 1988 and 1990, funding for industrial research and development grew at twice the rate (14 percent) of the research budget.

Research incentives for industry were strengthened. The research tax credit increased by 30 percent in 1990; in 1992, it reached Fr4 billion. Support for in-house training for researchers also expanded, as did actions promoting innovation in small and mid-sized businesses. As a result, over 9,000 companies now claim to do research and development, compared to 1,300 in 1983.

Is this enough? One of the people close to Mr. Chirac, Alain Pompidou, does not think so. In his view (LE MONDE, 17 March), the development of industrial research is hurt by the inability of public institutions to organize the use of their discoveries efficiently, the absence of available venture capital, and the lack of real tax incentives.

Not surprisingly, Mr. Curien does not share this opinion. Although he acknowledges that efforts in this area are "still insufficient," he says that "this in itself is no reason to inveigh against industry. We need for the processes of innovation to be more natural and, while avoiding too much mimicry, to establish a true European industry, not a Japanese industry." With Japan forging ahead and President Bill Clinton of the United States defining his policy on research and industry, this orientation is in the right direction.

However, the new team that emerges from the second round of the legislative elections on 28 March will face a difficult task. As Mr. Alain Pompidou says, in view of "the inherited economic situation," it will be necessary to make do "for the immediate future with a constant budget before there can be any appreciable new increases."

Footnote

1. September 1992 report of the Higher Council for Research and Technology (CSRT).

Civil Research and Development Budget

	Budget (Billion Francs)	Growth Rate in Current Francs	Growth Rate in Constant Francs	Posts Created
1987	38.4	-8.8%	-11.5%	-374
1988	39.3	2.3%	-0.3	-178
1989	42.4	7.9%	4.1%	918
1990	45.4	7.1%	3.6%	750
1991	48.7	7.3%	4%	650
1992	51	4.7% *	1.9% *	600
1993	53.7	5.3%	2.4%	470 Average
1988-1993		6.4%	3.2%	

* Does not reflect cuts made in 1991.

Germany: System of 'Blue List' Institutes Criticized

93WS0379B Frankfurt/Main FRANKFURTER
ALLGEMEINE in German 27 Mar 93 p 29

[Article by Reimar Luest, president of the Alexander von Humboldt Foundation: "Blue Lists; a Temporary Stage of Research Support Threatens To Become a Permanent Institution"]

[Text] In the former GDR, the core of research was housed in the institutes of the then Academy of Sciences. Research played only a minor role in higher education. After unification, it was undisputed, both on the political side and in the field of science, that the Academy of Sciences should not continue to exist and, therefore, could also not be the basis of the research. It was emphatically explained by all sides that research had to be returned to the institutions of higher education.

Since in many cases this did not appear feasible, for organizational and primarily financial reasons, a transitional solution was sought. The saving grace seemed to be an institution which had largely been unknown to the public so far: the Blue List. But what was intended as a temporary measure is now the Blue List. What was intended as attempts are now being made to market the Blue List as a new research policy concept, to the detriment of higher education.

After the end of World War II, the support and thus the funding of scientific and cultural institutions was exclusively up to the Laender. For certain institutions of supraregional interest, the Laender agreed on joint financing, based on the so-called Koenigstein Agreement. After formation of the Federal Republic of Germany, the federal government gradually took over a certain portion of the funding for these institutions, among them the Max Planck Society and the German Research Association. An amendment to the constitution in 1968 finally provided for an assured legal basis.

In parallel, there were still a few supraregional institutions, such as museums, which were initially financed by the Laender to which they belonged. The federal government shared in their funding because of their supraregional importance. Since the end of the 1950s, in the framework of a recommendation, the Science Council has each year proposed the share of funding to be anticipated for each individual institution. In the foreground have been museums, scientific institutions and institutions, for which a "general government science policy interest" is claimed.

This annual list of institutes proposed for funding by the Science Council was ultimately called the Blue List, because of the color of the paper on which it was published. In the final list, each federal Land tried to secure for itself a corresponding share of federal funding. For reasons of proportionality, institutions were also accepted for which neither supraregional importance nor

general government scientific interest were actually evident. These institutions remained on the Blue List—to some extent for non-impairment of vested rights, although they should long since have been changed into institutions of higher education or were ripe for closing.

Until the German unification one could still tolerate this practice, but now the situation has radically changed. Since unification the number of institutions supported by the Blue List has grown by about 80 percent, and the funding volume has more than doubled. The overwhelming number of newly included research institutions came from the GDR Academy of Sciences. Although it had been declared that research belongs back with higher education, in many cases the schools were not in a position at first to integrate these old Academy institutes, above all the larger ones. As a transitional solution the Science Council recommended that they be included in the Blue List so as to make it possible for the federal government to share in their funding. For the majority of institutions there was no evidence of either supraregional importance nor any overall governmental-scientific policy interest, in accordance with the Blue List criteria. If this were claimed in earnest, the majority of all research institutions at the universities would have to be financed through the Blue List.

Everyone is quite aware that transferring these institutes to higher education requires time. If this remains the declared goal, the corresponding transition regulations must now be initiated. But so far no one seems to have hit upon the idea.

Using the argument that the Blue List has turned out to be a "flexible instrument of science policy," it is being redefined as one of the five supporting pillars of government science funding in the FRG. For that reason as well it was no coincidence that the Blue List Working Group was formed right after unification in December 1990. Meanwhile, one is thinking about giving it a structure, based on the example of the Max Planck Society and the Fraunhofer Society with their corresponding departments, which confirms it as a "supporting pillar." In so doing there is complete misunderstanding of the organizational structure of these two organizations. They are characterized by an executive with acting capacity, who is also able to implement measures internally, and they have a senate, equipped with decision-making authority, which has all the required powers.

None of that will be possible for an institution such as the Blue List. The general meetings and executive boards of such a working group would not have any executive power and could not obtain any. The board of trustees envisioned will instead have a caretaking and thus a preservational character. The Blue List institutes would be decisively controlled by politics and the administration; this ensures that proportionality will be a decisive criterion for the existence of the Blue List. Anyone who believes that the Science Council itself would also be able to maintain a controlling function, would overburden it.

To establish the Blue List as the fifth supporting pillar of government science funding would be fatal. Nothing would be gained for the quality of research; the only result will be that the quantity remains the same. Such a course must be urgently discouraged. The goal remains to reinforce the most important pillar of research in Germany, and that is the institutions of higher education.

JESSI Chairman Presents Optimistic Interim Report

MI3004132193 Munich SUEDEUTSCHE ZEITUNG
in German 30 Mar 93 p 28

[Text] Halfway into the European JESSI [Joint European Submicron Silicon Initiative] project, the partners in this initiative have "some remarkable results" to show for their efforts, as reported at the CeBIT fair in Hannover. According to Heinz Hagmeister, the core of the program with which Europe intends to close the gap on Japan in microelectronics is mastery of mass production technology. According to the new chairman of JESSI, who has been in office since the beginning of March, the project had stabilized, and even, in some cases improved the position of certain European enterprises on the world market. This improvement applied to certain types of chips, for example. Once again, Europe was now producing its own automatic exposure devices for chip structures, it had the necessary facilities for cleanrooms, and an improved supply of ultrapure materials for semiconductor production.

As far as process technology was concerned, JESSI was currently working on chip structures of 0.35 microns (1 micron = 0.001 millimeter). This size roughly corresponds to the structures required for the 64-megabit memory.

JESSI is also supporting some European innovations that have a chance of succeeding on the world market—the mobile radio standard GSM [special mobile group], broadband ISDN [integrated services digital network] technology, the ATM [asynchronous transfer mode] telecommunications transmission process, and the future digital audio broadcasting (DAB). A number of JESSI partners are engaged in developing the chips required for these projects. In order to speed up the design of such integrated circuits, a computer-aided design program has also been developed under JESSI and is now being sold commercially by several companies.

There are currently 150 companies, institutes, and universities from 14 countries taking part in 62 individual projects under the JESSI program. Funding of 750 million German marks [DM] has been earmarked for 1993, half of which will be provided by the project partners and half by the national governments and the European Community.

BASF Official on Legal Obstacles to Research

93WS0380A Stuttgart BILD DER WISSENSCHAFT
in German Apr 93 pp 90-91

[Article by Wolfgang Hess: "Knowledge Means Prosperity"]

[Text] The director of research at BASF asks that the consequences of current laws on research be reviewed. Professor Quadbeck-Seeger argues that German laws are impeding the development of science. He proposes that research be treated separately within the legal framework.

bild der wissenschaft: Quite recently the Association of the Chemical Industry initiated an expensive publicity campaign, called "Pro Genetic Engineering." Professor Quadbeck-Seeger, to whom are you addressing this campaign?

Quadbeck-Seeger: It is a desperate attempt to change the mood in the country. In the 10 years that genetic engineering has been recognized as a relevant economic factor, we find that it still meets with disapproval in Germany. The genetic engineering law passed in 1990 was a direct result of this disapproval. The politicians bowed to public opinion and accordingly passed a very rigid law. The result of all this is that we here in Germany find ourselves at a distinct disadvantage vis-a-vis foreign competitors.

bild der wissenschaft: What disadvantage do you have in mind?

Quadbeck-Seeger: Not only has research been made difficult, but Germany has, for some time now, been eliminated as a country where such production is even carried out. Even those needing medical treatment suffer the consequences. Who can be absolutely certain that one day even therapies involving genetic engineering techniques will not also be thwarted? Patients, whose condition might well be alleviated by such medicines, would then have to be treated outside Germany, which of course will add considerable cost to their care. Financially deprived individuals would be unable to afford gene-based therapy. Our country would then find itself with a split class-based medical system—one for the rich and one for the poor.

bild der wissenschaft: Don't you think that the chemical industry whines and complains about laws and regulations more than do the other branches of industry? It is not just the genetic engineering law that sticks in its craw. It is also the laws controlling the use of chemicals, the Federal Pollution Control Law, and the laws governing the quality of drinking water.

Quadbeck-Seeger: There can be absolutely no doubt that we take the environmental protection laws seriously. What troubles us is that Germany seems obliged to take the vanguard role in these activities. In certain areas this can cause considerable harm. To be compelled to follow such regulations in all fields means that essentially

different operating conditions prevail here in Germany than in other countries. Just take a look at the new waste control regulation...

bild der wissenschaft: ...according to which waste, if not reduced or avoided, then has to be recycled. This seems completely justifiable.

Quadbeck-Seeger: That is unquestionably correct. But there are phases in research, for example, when we produce products that are experimentally tested by the customer. Such products cannot be recycled because their composition changes constantly as they are improved. It is simply impossible to develop recycling techniques in such cases. Previously, such products would simply be incinerated after use. But since the passage of the waste control law, incineration is no longer permitted. It is regrettable that precisely those developments of particular interest for researchers are not taken into account in the laws. For that reason, we are seeking a review of the consequences of the law...

bild der wissenschaft: ...and thereby postpone the passage of a necessary law until never-never day.

Quadbeck-Seeger: Not at all. Research simply has to be handled separately in the legislative process.

bild der wissenschaft: What, where, or who do you consider to be your enemies?

Quadbeck-Seeger: We have been concerned with that problem since we were confronted with the general criticism of progress. That goes back into the 1960s when it was suddenly realized that all the hopes that so many had placed in progress were not going to be fulfilled. On the contrary, a reaction developed that no one had anticipated. A general criticism of progress is a phenomenon that currently haunts our society. We find it in all spheres and, although differently expressed, in all parties.

bild der wissenschaft: Why don't you simply accept that and live with it?

Quadbeck-Seeger: We have to keep in mind the role progress and knowledge play in our country. We are a heavily populated country with very few mineral resources. Our native soil provides us coal, potassium, and potatoes. That's it. In these days such resources wouldn't carry us very far. What we need are brains, creativity, and know-how. Francis Bacon's old formula "knowledge is power" is no longer relevant in our case. Today, knowledge means prosperity. Our citizens have to understand that. Of course progress built on the basis of newly gained knowledge must also be amenable to future needs. But we shouldn't be filled with anxiety in approaching these problems and in no case should we become hysterical. People should not underestimate the ability of science to exercise self-control. True, scientists discovered the ozone hole. But it is also scientists who are continually refining the detection limits of ecologically relevant substances.

bild der wissenschaft: Can you give us a recent example of a single promising product, whose further development you stopped, because you found that it could not be recycled after use?

Quadbeck-Seeger: We have something like an anticipatory awareness. Today, no product will be developed any longer if it presents great difficulties either when it is introduced or when disposed of. This consideration is taken into account in the earliest research stage.

bild der wissenschaft: That illustrates beautifully that early compliance with new laws can also provide business opportunities. It is apparent that in the course of time almost all industrial countries adapt to strict handicaps and then the companies that have adapted to the new conditions quickly march forward.

Quadbeck-Seeger: Yes, but the trouble is that we in Germany are demanding to be in the forefront in all fields. Personally, even that would not bother me if the demand had at least some economic justification. The best example is the assumption that genetic engineering is dangerous, although that is not explicitly stated. But you can easily read between the lines. When one approaches the formulation of a law with this attitude, it is only logical that the content of the law will reflect that attitude. There is a difference as to whether I have complete trust in scientific knowledge and technology or whether I say that the new technology proffers man potentials that he fails to take advantage of.

bild der wissenschaft: The same discussion is underway in the United States.

Quadbeck-Seeger: But the discussion is conducted differently there, less thoroughly and not by all layers in society. It is usually discussed among intellectuals. There is little to be learned about the question in the print or visual media.

bild der wissenschaft: What do you hope to see in the discussions to simplify the genetic engineering law?

Quadbeck-Seeger: Just your selection of words irritates me. It is not a matter of simplification, but the lifting of restrictions. When researchers are working with harmless microorganisms like yeast or intestinal bacteria, there is no danger involved, even if a strange gene were somehow smuggled in. Hundreds of thousands of experiments have proven that. Whenever or wherever someone is working with dangerous pathogens or products, the existing stipulations should remain in force. But in cases where there is no risk at all, the restrictions should be lifted.

bild der wissenschaft: Can you give specific instances in which we have suffered economic disadvantages vis-a-vis the international competition because the lawmakers have tied our hands?

Quadbeck-Seeger: This handicap is only just becoming visible. One example, is the production of insulin at Hoechst. We have not yet reached the point with our

tumor necrosis factor (TNF) that we can go into production. We have what we need for clinical experiments. But we are uncertain as to whether we can go into long-term uninterrupted production. Just how differently genetic engineering is viewed in the United States may be inferred from the fact that the governor of Massachusetts was present at the laying of the foundation stone of our laboratory there. You would have to wait a long time to see the minister president of any German Federal State do that here.

bild der wissenschaft: When you transfer research capabilities to other countries, it is not just because the laws are more favorable. You can only secure a market such as the United States offers today when both research capabilities and production facilities are built up there.

Quadbeck-Seeger: Of course there are a variety of reasons...

bild der wissenschaft: ...but you are only informing the public about the one reason.

Quadbeck-Seeger: That's not true. When we announced that we were going to establish a gene research laboratory in the United States, we gave three reasons. First, the U.S. pharmaceutical market represents almost one-third of the total world market. Second, the intellectual atmosphere for scientific medical research was very attractive on the U.S. east coast. And, as the third argument, we named the legal uncertainties in Germany.

bild der wissenschaft: What prevents you from cutting back sharply on your research capability in Germany and just build your laboratories in countries where you see an inviting atmosphere and a promising future?

Quadbeck-Seeger: We don't want to throw out the baby with the bath water. Germany is still an outstanding site for research. We want to keep it that way.

Hans-Juergen Quadbeck-Seeger began his career at BASF 26 years ago. He has been the director of research at BASF, the third largest chemical company in the world, since 1990. Quadbeck-Seeger, a graduate chemist, was appointed an honorary professor at Heidelberg University in 1985.

UK: New Materials Research Lab

93WS0385D Paris AFP SCIENCES in French
18 Mar 93 p 17

[Article: "Creation in Great Britain of New Laboratory for Research on Surfaces and Interfaces"]

[Text] London—The British Scientific and Engineering Research Council (SERC) and the Imperial Chemical Industries (ICI) group have just decided to create a new laboratory for research on surfaces, transforms and interfaces, "RUSTI" (Research Unit in Surfaces, Transforms, and Interfaces), to work on vital problems in the field of materials, SERC has announced.

The laboratory, which will be launched in April at SERC's Daresbury facility, should facilitate closer cooperation between basic and applied researchers, with the aim of developing new lines of research, technologies, and processes in the domain of new materials, thus helping British firms maintain their leading position in a high-technology economic sector.

ICI is going to transfer to the new laboratory not only ultramodern equipment—including the only high-resolution SCIENTA X-ray spectrometer in service in Great Britain—but also the former director of its materials research center, Professor David Clark, while SERC will furnish ion beam equipment and facilitate collaboration with the synchrotron source.

The director of the joint laboratory will be Professor Hywel Price, current director of the Daresbury nuclear laboratory, assisted by Professor Clark as scientific adviser. RUSTI will operate on funds provided by its two founders.

Reforms in EC Research Policy Seen as Needed

93WS0403A Munich SUEDEUTSCHE ZEITUNG
in German 1 Apr 93 p 38

[Article by Jeanne Rubner: "Research Strategy for Europe"]

[Text] Not too long ago, Antonio Ruberti of Italy, the new European Commissioner for Research, hired three "sages." They are supposed to advise him in connection with the fourth basic program specifying European support for research between 1994 and 1998. In contrast to the five experts for the second basic program, most of whom came from industry, Ruberti's advisers are exclusively from academia. This could be construed as a signal that Brussels intends fewer subsidies for industry in the future, the subject of frequent criticism in past years, and instead will support increased research.

European Community [EC] countries annually lay out ECU100 billion (one ECU is approximately DM2) for research. Of that amount, 2.5 percent comes out of EC funds—a rather small proportion compared to the U.S. and Japan, as Germany's European representative, Rolf Linkohr, has critically remarked. On the whole, according to Linkohr, the EC level reflects the same development as in the individual states: in times of economic recession too little is done for research. Having 4 percent of the budget, that department is also the stepchild of the EC support program. By comparison, 50 percent of the EC's billions flow into agriculture and the fishing industry. In December, 1992, at the European summit in Edinburgh the decision was also made to cut research outlays benefiting the regional fund, that is, support for structurally shaky regions.

Under the fourth basic program ECU8-11 billion will be available. The tenor of the new European research guidelines still remains uncertain. In any event, the bewildering multiplicity of programs—ESPRIT for information technology, RACE for communications technology,

BRITE/EURAM for new materials and manufacturing technology, to name only a few—is supposed to be reduced and combined. Ruberti recently emphasized that activities are too spread out and there have to be more focal points. He mentioned as examples, climate research, decoding the human genome, epidemiological studies on AIDS and cancer and earth observation.

Up until now the European Commission has often been viewed as a milch cow by industry and research. That will have to change now. "We have to tackle problems in a more general fashion and plot strategies, for instance, for safety surrounding nuclear energy and ultimate waste disposal," in the words of Herbert Allgeier, director of the EC Research Directorate's energy department, "and not always just asking where there is money available in Brussels."

The following topics and others are currently being discussed in Brussels: debureaucratization of the applications, allocation of resources no longer through headquarters in Brussels but through an independent organization (a sort of "European research community"), fewer disguised subsidies for industry, improved research coordination in Europe where scientists in fact frequently know what their colleagues overseas are working on but are hardly aware of the projects of their immediate neighbors. The debacle of the European standard for high-definition television [HDTV]—pushed by business and financed with EC funding—that no longer has any chance now vis-a-vis the more advanced digital systems from the U.S. and the Far East, nevertheless indicates that a change of course is necessary in Brussels.

European Commission Proposes ECU3.5 Billion for Five-Year High-Performance Computing Network Project

93WS0409B London *INTERFACE EUROPE*
in English Mar 93 pp 3-4

[Text] The U.S. Senate has approved the allocation of \$1 billion to set up a national network of supercomputers linking research institutes and businesses. Is the Commission considering a similar network in Europe?

This was the substance of a recent question in the European Parliament (OJ C 65 of 8.3.93).

In its reply the Commission gave details of the U.S. Federal Programme "High Performance Computing and the National Research and Education Network," which was launched in 1991 with the aim of strengthening the U.S.'s dominant position in the two complementary strategic sectors of high-performance computers and rapid networks.

The budget for the programme, which is due to run until 1996, is much larger than suggested in the Parliamentary question—\$2.9 billion. These funds are to be shared by four lines of action: high-performance computers (25 p.c.); advanced software (41 p.c.); the rapid network (14

p.c.); and basic research and training (20 p.c.). According to the Commission, the network is only part of a much bigger coordinated project.

The Rubbia Report

By way of a response to the U.S. effort, the Commission set up a Working Party on high-performance computing chaired by Professor Rubbia. The Working Party has issued a report recommending the launching of a large-scale European project—the proposed budget is ECU3.5 billion over five years.

The report says that advanced computing techniques and high-capacity communications are essential for the industrial competitiveness of European businesses and for scientific progress over at least the next decade. Three main categories mentioned are:

- Systems engineering and scientific computing which are directly dependent on progress in modelling and simulation to optimise the design and production of new products;
- The management of increasingly diverse knowledge and information which is essential as an aid to decision-making;
- Improvement of the cost/performance ratio for a whole series of embedded systems which are incorporated in complex, highly advanced systems such as medical and industrial imaging and robots.

For the Fourth R&D Framework Programme (FP4) the Commission is proposing a "core thematic area" entitled "High-performance computing and networking" (HPCN), the aim of which is to enable a broad category of users to benefit from the new prospects offered by this approach. At the same time, the development of HPCN is being pursued under current EC R&D programmes, mainly ESPRIT and RACE.

What Is HPCN?

On this subject, we have obtained a copy of an interesting Commission paper explaining what HPCN is and outlining its potential.

The key to HPCN is the use of groups of computer processors so that work is tackled not sequentially but in parallel. "Parallel computing provides much higher performance by harnessing the power of several (tens, hundreds or thousands) individual low cost standard processors and by getting each one of them to contribute to the solution at hand at the same time, in parallel".

By the year 2000, the most powerful of these systems will outperform single-processor "supercomputers" by a factor of 100 at comparable price, while smaller configurations of parallel computers will match the performance of today's most powerful supercomputer at a cost of ECU100,000 by contrast to a typical cost of ECU10 million today.

"The drastically improved ratio of performance to price of HPCN makes it feasible to embed high performance computing systems within other products, e.g. cars. In an application which is a good showcase for the power of parallelism, Daimler-Benz uses a small parallel computer system developed by the German company Parsytec in a DB230T station wagon. This car can drive on a normal road in a normal traffic situation without intervention of the driver. Only a year ago, this experiment required a large bus to house a conventional computer."

In order to exploit the application potential of HPCN, high speed broadband networking is indispensable for many applications such as images.

HPCN technology has been successfully applied in the field of science and engineering in such areas as computational fluid dynamics, structural mechanics, material science and computational chemistry. It has also been used to solve design problems using simulation techniques. Military applications include target recognition, visual navigation, command and control systems and training simulation.

In the financial sector, HPCN systems are being used to facilitate asset pricing, portfolio optimisation and risk management.

According to the Commission paper, Europe has a reasonably hopeful starting position in the field of HPCN. European companies such as Meiko, Parsys, Parsytec and Telmat successfully market parallel computing machines. In 1992 Meiko sold two large systems to Israel, as well as delivering a high performance simulation system to Toyota Motor Corporation in Japan. Meiko has also supplied a substantial system to the U.S. Cray Research Corporation for eventual use in a U.S. nuclear facility.

Some 50 European software houses are active in HPCN.

The paper concludes by pointing out that the Maastricht Treaty (Art. 130n) provides that "...The Community may set up joint undertakings or any other structure necessary for the efficient execution of Community research, technological development and demonstration programmes." An integrated approach under this provision might be organised, the paper suggests in a way that could bring together and orient the necessary public and private actors in HPCN in such a way that Europe could match the U.S. efforts.

ESPRIT Program To Focus on High-Performance Computing and Networking

93WS0412F Edam SUPERCOMPUTER EUROPEAN WATCH in English Feb 93 pp 2-3

[Text] The work under the ESPRIT programme in the domain "High performance computing and its applications" aims to expand the application potential of High Performance Computing and Networking (HPCN); to

demonstrate the cost-effective transfer of applications currently running on conventional systems to HPCN environments; to act on new applications which will foster the mastery of new functionalities and levels of performance, and to develop next generation HPCN technologies and systems, especially those which improve the processes of application transfer or development, and are easy to use. The application focus is on improving industrial and commercial productivity.

Objectives for HPCN applications are two-fold. First, to demonstrate within a two-year timescale the successful migration of the 10 or 15 most relevant existing codes onto advanced parallel computing environments, and, second, to develop and demonstrate within two to five years new applications that could not be solved cost-effectively without HPCN and which have an impact on industrial and commercial productivity.

To meet these objectives the ESPRIT Directorate has selected the following R&D tasks:

- migration of existing codes;
- new HPCN applications which reduce the time to market and cost;
- new applications which improve through HPCN information management;
- new embedded systems applications of HPCN which are of particular economic relevance.

Objectives for basic HPCN tools and technologies are to:

- improve and consolidate the environment in which software and applications for HPCN systems are developed;
- provide generic software which eases the use of a wide range of applications;
- continue to stimulate the development of next generation HPCN hardware and software in accordance with user requirements.

Here the R&D tasks are:

- development of methodology, associated software tools and supporting standards;
- provision of distributed programming environments, operating systems and networking software, compliant with emerging standards;
- development of widely applicable models of virtual shared memory systems;
- development of visualisation interfaces;
- development of user oriented software to embed within complex simulation and design packages;
- the development of next generation hardware and software includes advanced computational models, inter-connection systems and algorithms for better exploitation of parallel systems.

ESPRIT 3 Program on Large-Scale Parallel Computing Presented

93WS0412G Edam SUPERCOMPUTER EUROPEAN WATCH in English Feb 93 pp 11-12

[Text] PPPE (Portable Parallel Programming Environment) is a new ECU12 million ESPRIT 3 program, now underway, which brings together an experienced team of European users, SMEs and large companies in a cooperative R&D project to deliver a fully integrated set of parallel programming software tools. This programming environment will be exploited on a wide variety of massively parallel computer platforms and will greatly simplify the development of large-scale scientific and engineering applications in the future.

The target markets for PPPE software are the scientific and engineering communities which currently employ supercomputers for numerical simulations. The early adoption and support of this environment by computer vendors involved in the project will accelerate broad market acceptance and widespread use of the new software development and runtime environment.

The PPPE project is based on the results of the highly successful ESPRIT 2 GENESIS project.

PPPE contains three threads. The runtime system is composed of an explicit message passing system, a High Performance Fortran runtime system and an event monitoring system. These portable components will initially run on supercomputer systems from Meiko, IBM and Intel. The second thread, the cross development toolset, is composed of a High Performance Fortran (HPF) transformation system, an HPF symbolic debugger, real-time and post mortem performance analysers and low level debuggers. These portable tools will initially run on Sun SPARC and IBM RS/6000 compatible hardware. The portability layer is the third thread, composed of the existing PCTE (Emeraude) and PARMACS (GMD/Pallas) software; the project has made a binding commitment to publish all software component interfaces to encourage adherence and adoption.

As the demands of high-performance computer-users cause an increasing requirement for open systems versus proprietary systems, there is a clear need for new products which will ease applications development and operational use of interconnected high-performance computer systems.

A major aim for the PPPE software is to give applications developers a consistent programming environment across many high-performance and parallel computers such that these machines become attractive commercial targets for applications software developers. The provision of a rich and coherent programming environment will reduce the technical and style barriers in the development and operation of software for this class of computer.

Germany: German Social Democrats Wish to Cut Back Fusion Research

MI2204135593 Munich SUEDEDEUTSCHE ZEITUNG in German 8-9 April 93 p 38

[Interview with Wolf-Michael Catenhusen, SPD (German Social Democratic Party), Chairman of the Bundestag Research Committee, by SUEDEDEUTSCHE ZEITUNG; place not specified: "Less Fusion Research?"]

[Text]

SUEDEDEUTSCHE ZEITUNG: After 30 years of fusion research, which have seen the goal of a fusion reactor become ever more remote, the SPD wants to put the brake on. You do not wish the European fusion experiment, ITER (International Thermonuclear Experimental Reactor), intended to test whether the "taming of the hydrogen bomb" is physically and technically possible, to be built in Germany. Why not?

Catenhusen: The SPD's research policy specialists are agreed on the need to set new priorities in the light of ever scarcer resources. Given a technology that will not be able to make a significant contribution to power supplies for at least 50 years, if at all, strategies for rational power consumption and power saving must have priority. The country that hosts ITER will have to contribute 1.8 billion German marks [DM] to the project. Germany cannot afford this.

SUEDEDEUTSCHE ZEITUNG: What is ITER likely to cost?

Catenhusen: Current estimates suggest around DM23 billion for design, construction, and operating costs, though this sum would presumably be provided jointly by Europe, Japan, and the United States.

SUEDEDEUTSCHE ZEITUNG: How do you, as an opposition party, intend to get your way?

Catenhusen: Building so large an experimental fusion plant would require a separate Nuclear Fusion Reactor Law, which would have to be approved by the Bundersrat. This could only happen given a broad political consensus.

SUEDEDEUTSCHE ZEITUNG: Is it beyond legal dispute that ITER cannot be licensed under the existing Nuclear Law?

Catenhusen: The experts say so.

SUEDEDEUTSCHE ZEITUNG: Is the SPD opposed to building ITER in general? Is it opposed not only to having the reactor in Germany, but to having it at all?

Catenhusen: The SPD is not fundamentally opposed to nuclear fusion research. It does, however, wish to set a new schedule for the development. The decision on the ITER project is being made in negotiations involving Europe, Japan, the United States, and Russia. What we

are in a position to influence is whether Germany should bid to be the host, with the extra costs involved.

SUEDDEUTSCHE ZEITUNG: If this fusion reactor were to be built in France, Germany would still incur considerable costs. How much?

Catenhusen: The Federal Republic would have to contribute around DM250 million to the construction costs if it were located in Europe.

SUEDDEUTSCHE ZEITUNG: Would you consider that wise?

Catenhusen: If such a decision is taken at world level, German fusion research will naturally have to take part in this major project. But then we should have to talk about the scale of the involvement.

SUEDDEUTSCHE ZEITUNG: The SPD parliamentary group has produced a paper, in which its research policy experts oppose increasing resources for fusion research over the next few years and call for a reappraisal of the present scale of German fusion research. What does this mean?

Catenhusen: We're asking whether there should really be three different centers in Germany all engaged in fusion research.

SUEDDEUTSCHE ZEITUNG: This is the case in Juelich, Karlsruhe, and even more so in Garching.

Catenhusen: We're considering whether it should not be concentrated in two research establishments. What we are talking about is the future of Juelich. We also need to give thought to whether, in addition to the Tokamak development on which the ITER is based, it still makes sense, in terms of research policy, to continue pursuing an alternative fusion reactor line, the Stellerator.

SUEDDEUTSCHE ZEITUNG: This is the line being pursued in Garching.

Catenhusen: There is, in any case, no future for the Garching line as a major German project. Thus, the question is whether Europe can afford an additional reactor system; and this is another matter that I think we need to decide quickly.

SUEDDEUTSCHE ZEITUNG: What are you advocating?

Catenhusen: I have an open mind on this. The Europeans should give it careful thought, particularly in case Europe bids for the ITER: Would there be any money left for the Stellerator? The Stellerator is technologically a very interesting project, but we do need to ask whether it can still be funded.

SUEDDEUTSCHE ZEITUNG: If we can't afford it, does this mean there is no future for the Max Planck Institute at Garching?

Catenhusen: This question needs to be asked when the decision on ITER is made. I'm assuming that, in view of the fourth EC framework program and the related continuing development of the Euratom (European Atomic Community) programs, a decision will be made next year on whether Euratom sees any point in taking the Stellerator idea any further. I don't believe that Europe can afford twin-track fusion research.

Germany: German Research Minister Calls for Investment in Industry

*MI2204134693 Bonn WISSENSCHAFT
WIRTSCHAFT POLITIK in German 24 Mar 93 p 2*

[Text] Industry's R&D expenditure is growing at a much slower rate than the gross national product (GNP). Federal Research Minister Matthias Wissmann has warned that industry's share in the funding of national research expenditure, which had risen constantly since 1981, has fallen continuously since 1989 from 62.3 percent to 59 percent in 1991 and 58.4 percent in 1992.

In comparison, Japanese companies are now backing new ideas and new products even more intensively, just when international competition is becoming fiercer. Japanese industry increased its share of research budget funding from 69 percent in 1987 to 72 percent in 1989 and 73 percent in 1987 to 72 percent in 1989 and 73 percent in 1990. Even today, Japanese companies are investing heavily in research and development, despite a perceptible business recession. Consequently, "we need to reverse the trend in Germany," urged the new federal research minister in his first policy statement last week in Bonn.

His answer was: "Innovation strategies for the future," which had to be based on a market-oriented understanding of research and technology policy, which made a clear distinction between state and entrepreneurial responsibility.

The starting points for future-oriented innovation strategies lie in the following main areas: increasing technological competitiveness, measures geared to the public interest that will determine the shape of the future (environment, health, energy and traffic), and modernizing the research infrastructure.

Dialog Among Science, Industry, and Government

Discussion among science, industry, and the government on the research tasks to be addressed is of crucial importance as regards innovation strategies. The BMFT (Federal Ministry of Research and Technology), acting as a moderator, will therefore intensify the dialog with science and research at three levels:

- The Research Minister will convene a "Research and Technology Strategy Working Party" with six high-ranking representatives from industry and six from science, which will meet regularly under his chairmanship.

- At the second level, a series of specialist conferences will be held on selected topics in order to develop future innovation strategies with science and industry.
- Thirdly, industry and science will undertake studies of potential, as the Central Federation of the Electronic Engineering and Electronics Industry and the German Mechanical Engineering Association are currently doing in the field of information technology, as a contribution to the strategic talks with industry and science.

Increasing Technological Competitiveness

The BMFT is seeking to strengthen the technological competitiveness of German industry, which is so important for the future of Germany's trading position, on five levels:

- examining the framework conditions laid down by the government with regard to their effects on research and technology;
- strengthening the position of the new federal laender as a center for research and technology;
- accelerating the conversion of the results of basic research into marketable products;
- consistently supporting the research and development efforts of small and medium-sized enterprises;
- aligning national R&D efforts with the needs of a uniting Europe.

Promoting Small and Medium-Sized Enterprises

Funding for small and medium-sized enterprises is to be increased. With funds of nearly 600 million German marks [DM] annually, the funding structure will be simplified. Another aim is to strengthen and develop Europe as a center of research and technology, Wissmann emphasized. As his budget will generally remain limited, the watchwords are "no new major basic research projects, no new major national space projects, and no fifth space program."

EC Approves Major Policy Lines of Fourth Framework Program

BR2304125593 Groot-Bijgaarden DE STANDAARD in Dutch 23 Apr 93 p 15

[Article signed CB: "EC Earmarks 500 Billion Belgian Francs for Research Over Next Five Years"]

[Text] Strasbourg—The European Commission approved this week the major policy lines of the Fourth Framework Program for Research and Technological Development for the period 1994-1998. During this period, the EC will spend ECU13.1 billion (roughly 500 billion Belgian francs [Bfr]) on research projects.

The main lines to be followed in implementing the Framework Program involve the promotion of cooperation between the member states, the enhancement of

European competitiveness by selecting projects in strategic sectors, and the improved integration of research expenditures and the EC's regional and social expenditures. The Council of Ministers will deal with the Framework Program next week.

When he presented the Framework Program yesterday, EC Research Commissioner Antonio Ruberti said that European research policy was currently suffering from the fact that the member states were frittering away the funds allocated to them and that the budget for research was too small. In 1991, for instance, the United States and Japan, respectively, allocated 2.8 and 3 percent of their gross national product to research and development, as opposed to just 2 percent in the European Community.

Although the scope of the fourth Framework Program can hardly be compared with previous programs due to differences regarding its contents, Ruberti nevertheless stated that EC funds for research have continued to rise over the past few years.

Only 4 percent of total R&D expenditures by the 12 member states goes toward joint projects. Apart from a few specific areas, such as nuclear fusion, Ruberti claims that there is far too little coordination of research efforts in Europe. Because of this, money is allocated rather nonselectively to anything and everything. Ruberti wants to focus on strategic sectors such as telecommunications, energy, and biotechnology, while projects that are leading nowhere should be abandoned. However, he is not in favor of the idea conceived by his predecessor, Commissioner Pandolfi, to let companies propose their own projects. This approach is one that Ruberti wants to leave to EUREKA, the pan-European project aimed primarily at promoting market-oriented applications.

Ruberti either could not or did not wish to say which programs would be dropped if there was more stringent selection: "By definition, a Framework Program only lays down the main lines. The details must be filled in later." However, he did focus attention on new funds for research in the transport and traffic sector and for socioeconomic research into education, training, and social integration.

Another problem with EC policy on research, apart from the frittering away of funds, is the poor dissemination of knowledge. There are still too many national "research islands." Ruberti therefore wants a better integration of the EC's research and structural policies, for example by encouraging the passing on of knowledge to less developed regions.

EC To Stop COMETT Technology Training Program

BR2304091193 Rijswijk POLYTECHNISCH WEEKBLAD in Dutch 2 Apr 93 p 5

[Unattributed article: "Overwhelming Demand for Overseas Traineeships"]

[Text] Brussels—The European COMETT (Community Education in Technology and Training) exchange program is not suffering from lack of success, but rather from lack of money.

The new European commissioner for research, Antonio Ruberti, has already announced a full-scale evaluation of the COMETT program. COMETT began operating in 1987 and concentrates specifically on technology. Among other things, the program gives students the opportunity to receive practical training in foreign companies.

Brussels had earmarked 650 million Dutch guilders for the 1987-1994 period. This amount is quite insufficient for carrying out future plans. Only one-quarter of the applications for placement grants can be awarded. Last year, fewer than 7,000 students were able to go abroad within the scope of COMETT, while there were 27,000 requests for grants.

The program's biggest bonus, according to Ruberti, is that it has stimulated cooperation between industry and technical faculties in the field of training and education. COMETT now supports a network of over 200 such cooperative projects, organized on a regional or sectoral basis. Ruberti wants COMETT to increase these projects, for they offer the opportunity for the demands of industry and the offers of technical faculties to be geared toward one another.

Ruberti, who has been working with the Commission since the beginning of this year, appears to place more emphasis on training and education than his predecessor. The exchange of students and researchers is, according to Ruberti, the fastest way to disseminate R&D results. And, says the Italian, it is the best way to even out differences between the leading and less developed regions in Europe. "COMETT proves to be useful in this respect," stated Ruberti.

Netherlands: Officials Discuss Technology Competitiveness

BR2104090393 The Hague RESEARCH PLUS RESULTS in Dutch Mar 93 pp 4-8

[Jos van den Broek: "We Must Move Up To Higher-Value Market Segments"]

[Excerpts] If we want to be able to compete internationally, we must move into technologically more sophisticated market segments, and not just slash costs and pride ourselves on our geographical location.

This is the view of Mr. Noe van Hulst, acting director of the General Technology Policy Department at the Ministry for Economic Affairs. First, however, we will have to sacrifice a few sacred cows, according to Dr. Cees le Pair, director of the Technical Sciences Foundation [STW].

"How can Netherlands industry compete effectively?" asks Dr. Noe van Hulst. "In any case, not on the basis of lower costs alone. No matter how you look at it, with our social security system and high welfare level, we are incurring relatively high wage costs. Even in comparison with southern or eastern Europe, let alone the developing countries."

"So, we need to adopt a different approach," he feels. "The Netherlands needs better quality, product differentiation, more intelligent products, timely delivery, and good logistics." However, he believes that none of this is possible unless our industries are at the technological leading edge. Van Hulst (36) is acting director of the General Technology Policy Department at the Ministry of Economic Affairs. [passage omitted]

"Technological innovation has become a critical success factor for business, far more so than 10 or 20 years ago," he continues. "This applies both to industry and large parts of the services sector, like telecommunications, banking, and transport. After all, the services sector is equally exposed to foreign competition, and certainly with Europe's open borders after 1992. So, our services sector will be able to compete successfully only if it too has the most advanced communications and information processing technologies."

Higher-Value Segments

The Central Planning Bureau has completed a long-term study of the Netherlands economy. According to Van Hulst, the study provides a clear message, no matter what scenario you take as your starting point. If we want to be able to compete internationally, we must enter the technologically more sophisticated market segments, not just slash costs and pride ourselves on our geographical location. His position is supported by various relevant studies. In the past, Van Hulst has researched industrial sectors in the Netherlands which have been performing well over the long term. Chemicals, oil refining, and the food industry are sectors in the Netherlands with high export levels and good long-term performance. Also, they often make greater investments in new technologies than their competitors in other OECD countries. However, they constitute an unsteady base. The innovative industrial apparatus is not diverse enough. "We are good in a few areas, but the Netherlands' achievements are not very significant in those areas," stated an alarmed NRC *HANDELSBLAD* on 3 February.

"I understand perfectly that it is difficult to invest and spend money," says Van Hulst, "especially when it only bears fruit years later. Just think of the long development periods in the chemicals industry. It takes DSM [Dutch State Mines] 10 years to introduce a new fiber onto the market. First, that is difficult in terms of business economics, because you have to be able to anticipate your strategy. Second, continually earmarking resources for this is a strain. Often you have to make even greater efforts, looking ahead to your market position in five or 10 years' time."

Industrial Facility

As for financing, Van Hulst refers to another problem: In the Netherlands, links between banking and industry are far looser than they are in, say, Germany, France, or Japan. For example, the Deutsche Bank has large shareholdings in Mercedes Benz. That is one of the reasons for the "Industrial Facility" [fund] about which Minister Andriessen informed Parliament on 21 January this year. It is difficult even for the large companies to find funds for new product ranges. R&D costs are increasing constantly. The aim of the fund is to provide large amounts of venture capital to large- and medium-sized Netherlands companies. Eligible firms represent the core of a cluster of high-value activities in technology, employment, the knowledge infrastructure and suppliers.

In principle, 660 million guilders have been made available for the industrial facility fund. The Ministry of Economic Affairs, banks, and insurance companies will each contribute 200 million guilders. The pension funds have promised in principle to make an equivalent contribution. And finally the NIB has promised to add 10 cents for every guilder invested. So, an amount of 880 million guilders seems feasible. The intention is to use the facility fund's money in accordance with market conditions and thus prevent unfair competition. The financing will be awarded on a temporary basis, with a maximum of 50 million guilders per company.

NRC HANDELSBLAD disparaged Andriessen's industrial fund in an editorial: "The Netherlands is sitting on private capital of 600 billion guilders, held by pension funds and insurers, which is being invested in government loans. Every year 150 billion guilders is pumped into the social security system." In the same newspaper, Mr. Tommel, a parliamentarian of the D66 [Democrats 66] Party, said: "Industrial policy in the Netherlands is dealing in peanuts." STW Director Cees le Pair put it even more gloomily: "In the draft governmental agreement of Lubbers and Kok, the words 'Technology Policy' did not appear even once!"

Stock Exchange

Van Hulst believes that one obstacle to investment is the extreme sensitivity of Netherlands industry to the mood of the stock exchange. "It is very difficult for companies to explain to the stock exchange and investors that they must lay aside large sums to develop the new generation of products which will appear on the market in five or 10 years. How can you explain to your financiers that you have to make such large, risky investments? There is a huge span between the short and the long term. Moreover, not only do electronic products nowadays have a long development period, but their life cycle is becoming increasingly short. You have to win back the investment in an even shorter time. Certainly during recessions it is difficult to continue to believe in a better future."

"I recently read in BUSINESS WEEK that U.S. companies slash their R&D during recessions," Van Hulst says.

"Japanese companies, however, only trim their R&D expenses. Once again you can see the difference: The Americans use a short-term approach of quarter-to-quarter profits. They tend to cut back hard. By doing so they endanger their long-term position. The Japanese have to cut back too; they snip away bits here and there, but keep the core activities going.

"My concern is that Netherlands business be able to follow the second route rather than the first, and keep major investments going reasonably well. Of course some choices have to be made, including trimming where necessary. General Secretary Geelhoed said recently that 'a strong economy keeps investing even in slumps. It emerges from a recession stronger rather than weaker. When the tide turns again, it should be in the starting blocks, ready to make the best of any opportunities.'"

"I must admit," Van Hulst continues, "that we do have some worries on this score. R&D investments in the Netherlands have not developed favorably for years." STW Director Le Pair shares this opinion: "We are starting to fall behind countries like Switzerland, France, Germany, Sweden, the United States, and Japan. Or even Korea. The percentage of GNP spent on research and development is increasing there, whereas in the Netherlands it is still decreasing." Le Pair feels no qualms about speaking his mind. "Something has to be done about this at the macroeconomic level. That means cutting back on social security and rent subsidies in order to free up money for what I call investing in the future," he insists.

No Budgetary Impact

Van Hulst says that the government is trying to improve the climate for technological innovation in various ways. "There are various programs to stimulate corporate R&D," he says. "We are developing a broad range of new activities to boost technical and vocational training and to make the culture in the Netherlands more technically oriented. We also are trying to steer more students to the technical fields; currently, enrollment figures for technical universities are plummeting."

"It is very easy to change that," Le Pair says. He claims that young people do not believe in government advertisements along the lines of "Girls, get into technology!" Le Pair explains his solution: "Just tell those children: 'If you study a technical subject, you will receive a grant of 10,500 guilders instead of 10,000 guilders. And if you study an arts or humanities subject, you will receive 9,800 guilders.' Then you will not have done anything socially unacceptable, because those people will continue to eat and drink just as well. The difference is not that big, but it does make clear what society regards as useful."

"Whether that would succeed is another matter. What he has to say is: 'That is my policy, my choice!' What he says now in the Science Budget is: 'Better policies need to be introduced, but by somebody else, if you please!'"

When asked about Le Pair's solution of differentiated grants, Van Hulst said that there is 'no single' solution to this question. "My idea is that you need to launch an offensive on a broad front," he says. "Many parties have a role to play in this game. In the Netherlands we have to realize that if nobody masters these subjects in the future, then it will pose a serious threat to technological innovation. Otherwise, no incentives whatsoever will have any impact."

Sacred Cows

The big cutbacks mean that, in the coming years, Minister Andriessen cannot increase expenditures for technology incentives. Nevertheless, Andriessen wants to continue the main thrust of his policies, like encouraging links between technical and vocational education and business. "If the Netherlands government does not invest enough in training good scientists and does not pay enough attention to a good educational infrastructure," warns STW program officer Nico Boots, "then, you will see companies being forced to go outside the Netherlands to obtain that knowledge. We are so fortunate to have the research centers of five multinationals in the Netherlands, but you still can see a trend of shedding businesses and others moving abroad."

"Companies have important work to do here, too," retorts Van Hulst. "They have to offer good career and salary prospects to people with a technical education. You hear different reports about this. Short-term staff reductions are necessary at companies like Philips and DAF. However, in the medium to long term, they will still need people educated in technical fields." "I agree that all players, including the government, must be ready to put some of its sacred cows up for discussion," he says. One of them is the equal treatment of subjects, grants, and salaries. STW Director Le Pair would rather sacrifice these sacred cows with his own hands. He is in favor of abolishing the introductory sociology courses in some places. The technical universities must grow differentially. "These all are measures that will not affect the budget one way or the other," says Le Pair in his brash manner. "The minister cannot complain that I am simply shouting 'More money, more money!,' though of course I want that, too, because if we want to follow European trends, the STW must have more money as well."

"That is all well and good," replies Van Hulst. "But these measures are meaningful only as part of a greater whole. Too often in the Netherlands we tend to say: If only the government would do this or that."

"There is a whole battle to be fought for a better educational infrastructure in particular," he says. How can we adapt our educational system better to the needs of industry? How can we make our research infrastructure in the universities, TNO [Netherlands Institute of Applied Technology] and elsewhere better adapted to the needs of industry? Geelhoed put it this way: "All interested parties should work together on this one, whether they are involved actively or passively."

Windbags

The research schools (high-technology R&D institutes affiliated with universities) are an example of an initiative for a better educational infrastructure. An extra boost has been given to universities in fields relevant to industry's need for innovation, in order to raise education and research to a higher level. Examples include catalysis, process technology, and data communications.

Le Pair is not enthusiastic about the research schools, to put it mildly. "Windbags," he says irreverently. "People you would never want to give money to just have to hold out their hand. And the good people waste their time with all that nonsense."

Van Hulst sees things differently. "In the Netherlands we start shouting that something is not going to work before it has even gotten off the ground. First, let us look at how revolutionary these research schools are in the Netherlands situation. This sort of process takes time, but the process is valuable in itself. I find that reaction completely premature."

"You steer research a little closer to the needs of industry and then you have to wait and see what comes of it. I sincerely hope that Cees Le Pair will be proven wrong on this one. I note with pleasure that, in various fields, companies have been successfully persuaded to think about ways of pooling research and increasing its industrial relevance. That is what we will need in the end—schools, universities, research institutes, and industry functioning more like a network, complementing each other rather than operating in relative isolation."

"That is what Andriessen has said repeatedly," Van Hulst concludes. "In the long term this is the way to keep good businesses in the Netherlands and to create an attractive investment climate to attract technologically high-value activities."

Technological Strengths and Weaknesses (based on patents indicator)

	UK	Germany	France	Netherlands	US	Japan
Agricultural technology, food, beverages	(0)	(-)	(0)	(++)	(-)	(—)
Data storage	(—)	(—)	(—)	(++)	(-)	(++)
Telecommunications	(0)	(0)	(++)	(+)	(0)	(0)
Image transfer	(+)	(-)	(-)	(++)	(0)	(++)
Electrical engineering	(-)	(+)	(+)	(++)	(0)	(0)

Technological Strengths and Weaknesses (based on patents indicator) (Continued)

	UK	Germany	France	Netherlands	US	Japan
Process technology	(0)	(0)	(-)	(+)	(0)	(-)
Polymer chemistry	(—)	(+)	(-)	(+)	(+)	(+)
Lasers	(++)	(-)	(—)	(+)	(0)	(++)
Organical chemistry and petrochemistry	(+)	(+)	(-)	(0)	(+)	(0)
Anorganical chemistry, etc.	(+)	(+)	(+)	(0)	(0)	(-)
Optical equipment	(+)	(-)	(—)	(+)	(0)	(++)
Data processing	(-)	(—)	(-)	(-)	(++)	(+)
Electronics	(-)	(-)	(-)	(-)	(++)	(++)
Polymer applications	(0)	(+)	(-)	(-)	(0)	(+)
Engines, turbines	(-)	(+)	(0)	(-)	(-)	(0)
Mechanical technologies	(+)	(+)	(+)	(-)	(—)	(—)
Materials processing	(-)	(+)	(0)	(—)	(-)	(-)
Transport, traffic	(+)	(+)	(+)	(—)	(—)	(-)
Biogenetics, pharmaceuticals	(0)	(-)	(-)	(—)	(+)	(0)
Biomedical technology	(-)	(-)	(—)	(—)	(+)	(—)

(++) = very high activity; (+) = high activity; (0) = average activity; (-) = low activity; (—) very low activity.

EC Funding for Joint Electronics Projects With Japan

BR1404114293 Rijswijk POLYTECHNISCH
WEEKBLAD in Dutch 2 Apr 93 p 5

[Unattributed article: "EC Pumps Millions Into Cooperation With Japanese"]

[Text] Brussels—Over the next two years, the EC is to allocate 7 million guilders to cooperation projects with Japan in the electronics sector. The money can be used for various projects, but Brussels wants to concentrate mainly on participation by small- and medium-sized enterprises. EC Commissioner Martin Bangemann [industrial affairs] says that the potential for cooperation always has been overshadowed by trade conflicts between the EC and Japan. The electronics program should serve as an example to other sectors.

EC Commission Proposes Europe-Wide Computer Network

93MI0456 Bonn DIE WELT in German 17 Mar 93
p 17

[Text] An ambitious program for creating a computer network of public authorities has been proposed by the EC Commission to the EC governments to help ensure the smooth running of the single market and enable EC citizens to take full advantage of its "four freedoms" (goods, services, people, and capital).

The EC authorities are prepared to provide 360 million German marks [DM] for this project out of their own resources within five years. If the Council agrees, there would also be subsidies of DM320 million for programs

to improve the exchange of statistics and for specific areas of interstate cooperation (for example, on taxes and plant and animal protection).

The Commission's initiative is also in line with the EC's objective of boosting economic growth. Brussels is hoping that the development of the computer networks will not only boost the right kind of investment in public authority modernization but also have a positive effect on European research.

The majority of the costs must be borne by the member states themselves. According to initial estimates, creating these networks will cost just under DM30 billion.

Measures To Promote Eastern German Research Reviewed

"Upturn for the East" Program

93MI0464A Bonn TECHNOLOGIE-NACHRICHTEN
MANAGEMENT-INFORMATIONEN in German
27 Feb 93 p 2

[Text] Special funding totaling 93.5 million German marks [DM] was provided in 1992 from the "Upturn for the East" program for building up and maintaining a productive R&D capability in companies based in the new laender. According to the BMFT [Federal Ministry of Research and Technology], this special funding alone was sufficient to help finance around 1,200 jobs in industry-oriented R&D in eastern Germany.

These additional funds were used by the BMFT to support R&D projects in research companies, businesses

hived off from the former Academy of Sciences, and manufacturing companies in the new laender undertaking their own R&D.

The allocation of the BMFT's DM93.5 million funding among the new laender shows Saxony to have benefited the most, with a share of approximately DM27.7 million. Next came Saxony-Anhalt, which received around DM19.9 million, then Berlin with about DM17.7 million, followed by Thuringia with around DM16.1 million. DM7.3 million was approved for projects at industry-oriented R&D establishments in Mecklenburg-Western Pomerania, while Brandenburg received around DM4.3 million of the BMFT's "Upturn for the East" funding.

The funding was allocated in close consultation with the Federal Trade Ministry, which also provided an additional DM106.5 million from the joint program for this area.

The research companies, which received around DM42.5 million, were particularly active in using these additional funds, seeing them as valuable support for restructuring. A secondary effect of this funding has been that the majority of research companies supported have now been successfully privatized: For example, a large brewery diversifying into biotechnology has been taken over by a leading company from the original federal laender. The "Upturn for the East" project funding has also been welcomed by the units hived off from the Academy of Sciences, which are to be transformed into industry-oriented R&D establishments, as recommended by the Science Council. For example, continuing support has been provided to develop the Hans Knoll Institute of Natural Substance Research in Jena, formed from the former Central Institute of Molecular Biology and Experimental Therapy (ZIMET). Such former Academy of Sciences units are receiving around DM20 million of the BMFT's special funding.

Manufacturing companies received around DM30.5 million in funding under the Upturn program, which benefited from not only new and recently-established firms, mainly small and medium-sized enterprises, but also companies still under Trust Agency ownership.

A breakdown of special funding according to funding program topics shows environment technology and biotechnology as major beneficiaries. Environment technology received around DM28 million, and biotechnology about DM25 million, so these two areas account for over 50 percent of the special funds handled by the BMFT. Environment technology's high share of the funding is indicative of the new laenders' great need for innovative solutions to their existing environmental problems; it shows too that the new laender have highly qualified experts working in this area. In addition, a large proportion of research companies are seeking to diversify into environment technology, for which they received around 25 percent of the Upturn funding.

Special funding allocated to environment technology was used for projects on effluent treatment, prevention, and recycling, and effluent and drinking water processing. In addition, R&D projects on the reclamation of highly contaminated industrial sites, such as the BUNA/LEUNA chemicals plant, were financed.

The BMFT has provided around DM330 million for industry-oriented R&D in the new laender during 1993, and they will also receive DM50 million under the "Development Aid for the East" program. Thus, about 25 percent of the BMFT's project funding for 1993 is likely to benefit industry in the new laender.

Greater Industrial Capital Needed

93MI0464B Bonn *TECHNOLOGIE-NACHRICHTEN*
MANAGEMENT-INFORMATIONEN in German
27 Feb 93 pp 4-5

[Text] Eastern German companies are frequently finding themselves prevented from taking up research, development and innovation funding programs by the inadequacy of their own financial resources. There are consequently good reasons for seeing whether and how medium-scale holding companies can be used to increase enterprises' own resources. This was one of the conclusions reached at the Federal-Laender Research and Technology Committee meeting held at the Federal Trade Ministry on 16-17 February 1993.

The committee members stressed the basic importance of an innovation-led growth process in the new laender, and were clearly of the opinion that greater account needed to be taken of the requirements of innovation, both in the joint project on the "improvement of the regional economic structure," and in the use of EC Structural Fund subsidies (as in other EC member states).

Different laenders' experience with programs for funding the employment of "innovation assistants" in small enterprises had been predominantly positive in terms of take-up and conversion into permanent jobs. Employing scientifically trained personnel gives small enterprises easier access to new technical and industrial knowledge.

The committee also discussed the need and scope for introducing quality assurance systems, taking as an example the pilot experiment in Schleswig-Holstein financed by the Federal Trade Ministry. Small and medium-sized enterprises in particular are being forced by the pressure of international competition, the arrival of the Single European Market, and the reorganization of production process to make greater efforts in this area, and they consequently need qualified advice. The development of shared industrial research in the new laender was welcomed; a greater say for eastern German firms in research associations was nevertheless called for, as was an increase in the number of researchers from the new laender sitting on panels of experts. The agenda also included:

- Current research and technology policy issues at federal and land levels;
- Problems arising from reduced federal financing of major research institutes, experience with the North German Inventors' Center; and
- The development of regional patent information centers in the original and new federal laender.

German Ministry Announces Superconductivity Funding Program

93MI0465 Bonn *TECHNOLOGIE-NACHRICHTEN*
MANAGEMENT-INFORMATIONEN in German
27 Feb 93 pp 7-9

[BMFT Announcement of Funding for Joint Projects Under the Superconductivity and Low-Temperature Technology Funding Program, 12 February 1993]

[Text] 1. Under the Federal Ministry of Research and Technology (BMFT) Superconductivity and Low-Temperature Technology Funding Program, funding of joint projects in the following areas is planned:

- Cryoelectronics and high-frequency engineering with high-temperature superconductors (HTSC);
- High-current applications of high-temperature superconductors

Funding is available for innovative, predominantly basic, research undertaken by research institutes, and for application-oriented industrial joint projects featuring work-sharing between companies and research institutes addressing basic problems common to different firms. Such research work must be marked by a high technical/scientific risk factor, particular complexity, high overall cost, and a multidisciplinary approach.

Funding is also available for research where the importance of the subject and the cost require solutions involving partners from other European countries (e.g., EUREKA [European Research Coordination Agency] projects).

Where appropriate, support will also be available for partial studies concerned with R&D aspects of technical regulations, norms, and standards undertaken for the purpose of devising draft international standards.

2. Work on developing superconducting cryoelectronic and high-frequency components will be funded provided:

2.1 The purpose of the work is to produce a working model, a prototype, or a demonstration model.

2.2 At the system level, clear progress over existing systems with superconducting or non-superconducting components is discernable.

In this connection, research will be carried out in the following sub-areas:

- New types of circuits based on optimized HTSC Josephson contacts;
- High-frequency HTSC applications for mobile phones, tele- and data communications, metrology, and other areas;
- HTSC SQUID [superconducting quantum interference device] applications for materials testing, process control, medical diagnostics, and other applications;
- New HTSC cryocomponents;
- Projects on metallic superconductors presenting novel and innovative characteristics, and having a pilot function for HTSC.

In parallel to the system solutions being sought, appropriate cooling technology is also to be developed.

2.3 In individual cases, system studies evaluating potential HTSC applications will be funded.

3. Development work on wire- and strip-type HTSC conductors or solid HTSC materials will also be funded.

3.1 As regards HTSC properties, the emphasis will be on pursuing the following subsidiary objectives:

- Improving current density values for short conductor samples [Leiter-Kurzproben] and solid materials;
- Controlling grain size and improving intercrystalline properties;
- Producing greater lengths of conductor material with high current densities in technically relevant magnetic fields;
- Developing technical conductor designs for HTSC;
- Studying the alternating current behavior of HTSC conductors;
- Optimizing technically relevant production processes, taking account of economic aspects.

The overall aim of this work is to devise and develop fully functioning laboratory models that can be used to acquire initial experience of designing future electromagnetic systems using HTSC.

3.2 In individual cases, system studies evaluating potential HTSC applications will also be funded.

4. The funding arrangements are primarily designed to support industrial joint research projects. Joint projects will be jointly prepared, applied for, and carried out by the firms, research institutes, or universities. The individual contribution to be made by each partner in the project must be evident from the application. Sub-projects should be grouped together according to the broad topic involved, and an agreed project schedule and finance plan should be submitted. A coordinator is to be designated for each joint project.

5. BMFT funding for joint projects is dependent on available budgetary resources. For joint industrial basic research projects, there is a funding ceiling equivalent to 50 percent of the gross costs of the project.

For projects involving small and medium-sized enterprises (SMEs) and the new laender, a bonus of 10 percentage points may be granted, which may, subject to EC Commission approval, be increased to a maximum bonus of 15 percentage points.

The relevant BMFT operating principles apply. There is no legal right to funding.

When setting up joint projects, special consideration will be given to proposals regarding where specific plans for cooperation between companies and scientific institutes already exist (e.g., the Fraunhofer Society, the Max Planck Society, universities).

Funding decisions will take account of funding already being received and of research projects planned in other research areas, in order to avoid uneconomic parallel funding. Proposals for implementing the above research projects should initially be submitted in outline, specifying the subproject's topic, its aims, a work and time schedule, the resources required, and the joint partners involved. Proposals should be sent to the Project Manager, from whom further information and application forms for funding for joint projects on superconductivity are available: VDI Technology Center Physical Technologies P.O. Box 10 11 39 D-W-4000 Duesseldorf 1 Tel. 02 11/62 14-401.

New German Research Minister's Policy Approved

93MI0471 Munich SUEDEUTSCHE ZEITUNG
in German 19 Mar 93 p 28

[Article by Thomas Froehlich: "Whirlwind in Research Policy; Wissmann's Aims Are Correct, But Achieving Them Is Another Matter"]

[Text] Following almost two months of feeling his way into his new job as research minister, Matthias Wissmann has this week revealed himself as a research and technology policy whirlwind: With his typical dynamism, he seems intent on impersonating not just one, but a whole army of new brooms.

Industry should welcome this. At a time when even Germany's competitiveness as a technological base is being questioned, Wissmann, for many years Bundestag economic affairs spokesman for the Christian Democratic Union, seems the right man for the job. Wissmann plans to link research policy more directly to the needs of industry, and to foster cooperation between industry and science, facilitating the faster conversion of basic research results into marketable products.

In the Public Interest

Wissmann's new priorities make sense, provided he does not see R&D policy as entirely subordinate to economic policy, but also accepts the need for basic research performed for the "sole" purpose of acquiring knowledge or applications. A coherent environmental research

program, and a health research program concentrating on AIDS, cancer, and cardiovascular diseases, make far more sense than spending billions on space programs of questionable worth, or yet another major basic research project.

Wissmann is right to place the emphasis on such matters, as they are in the public interest. He is also right in his attitude to the call, supported by industry and the SPD [German Social Democratic Party], for tax breaks for investment in research and technology. In providing funding for medium-sized enterprises, however, the minister must be careful not to bend over backwards to pull industry's cart for it: For example, it is very doubtful whether state funding for companies' quality assurance can be justified.

Wissmann certainly needs to be clear about three factors that have lately passed almost completely unnoticed in the research policy whirlwind. The new research minister has only a short time at his disposal: He will not be able to uproot any trees before the Bundestag elections at the end of 1994. The dialog between the state, industry, and science, which Wissmann plans to institutionalize with his "R&D Strategy Panel," specialist conferences, and studies, can be no more than a start. Given the complexity and long-term nature of the topics, neither Wissmann nor anyone else should expect rapid results.

No less important than the time factor is the financial one. First of all, a large part of the research budget—at least 9.5 billion German marks [DM] next year—earmarked for international, and particularly space policy commitments, and hence offers no scope for reallocation. In addition, it cannot be overlooked that clearing up sites contaminated by nuclear waste could cost billions from the research budget. The dismantling of the Karlsruhe reprocessing plant is just one example of the problems facing the research minister.

Yet, even if the scope for restructuring the research budget were greater, R&D's strategic importance for Germany requires real growth rates, and not the 1.5-percent annual increase planned in the current medium-term budget. This must also apply at times when resources are scarce. For this reason, the "minister for the future" will be judged on whether he succeeds in stopping the plundering of his budget by the finance policymakers.

Improving Acceptance

Finally, Wissmann needs to give thought to how the acceptance level of technology among the German public can be improved. As long as satellite dishes, CD players, and microwave ovens are regarded as everyday items, while a new coal-fired power station, a garbage reprocessing plant, and genetic engineering are indiscriminately lumped together as works of the devil, even a new research policy can have only limited success.

Scientific Research Prospects in Saxony Reviewed 93MI0435 Bonn DIE WELT (Welt Report Supplement) in German 9 Mar 93 p WR7

[Article by Michael Simm: "The Free State Intends To Take First Prize in Research—Numerous New Institutes and Universities Will Grace the German Scientific Scene"]

[Text] Great intellects such as Alexander von Humboldt, Johann Wolfgang von Goethe, and Wilhelm Leibniz brought honor to the universities of Saxony long before the word "communism" had been coined. Later, in GDR times, quantity rather than quality was the criterion: With its 70 technical and engineering colleges, the Free State of Saxony bore the main burden of academic training in the workers' and peasants' state. A new start is now being made with the four universities of Dresden, Leipzig, Chemnitz, and Freiberg and five technical colleges, the long-term aim being to excel once again not only in teaching, but in research as well. Over half of the 2,132 professorial chairs have been permanently filled, and about 13,500 employees are currently working in higher education in Saxony.

A new emphasis will be laid on nonuniversity facilities. A "Leipzig-Halle Environment Research Center" has been funded to the tune of 45 million German marks [DM] over the last year and is using the superabundance of practical examples available for study on its doorstep to develop reclamation techniques for contaminated soils. The 335 employees of this federally financed national research institute will also address other environmental problems faced by highly polluted conurbations, such as which pollutants are discharged by industry and how they are transported in the soil, water, and air. The Institute of Tropospheric Research and Atmospheric Physics in Leipzig is also working on air pollution.

The Max Planck Society, Germany's best-known research organization and most successful hothouse for Nobel prizewinners, is actively involved in Saxony. Three teams in Dresden and Leipzig totaling 40 employees are being funded over five years to work closely with Max Planck institutes in the original federal laender.

Dr. Helmut Eschrig heads a team at the Technical University of Dresden working on the "theory of complex and correlated electron systems." The physicist's mathematical equations will contribute to a better understanding of, among other things, the way superconductors work. These promising substances conduct electricity without frictional losses at very low temperatures.

Crack propagation is of relevance to mankind in general, as we know from the latest debate regarding safety at German nuclear power stations, if nothing else. The "mechanics of heterogeneous solids" team at Dresden University aims to acquire a better understanding of the rules that govern the formation of such cracks, so as to

contribute to the development of new materials. Their know-how is also sought-after, however, in the rare cases where crack formation is actually desired, for instance in the exploitation of geothermal energy, where cold water is pumped into warm rock. The deeper and more ramified the cracks, the more geothermal energy can be obtained.

The application-oriented Fraunhofer Society has established three research facilities in Chemnitz and Dresden. Production process automation is the topic in Chemnitz, where the aim is not only to raise economic efficiency but to achieve an employee-friendly working environment as well.

The Fraunhofer Institute of Ceramics Technologies and Sintered Materials (IKTS) in Dresden is working on the production of high-performance ceramics, while a second facility in Dresden, the FEP is working on combatting the mounting waste dumps with electron-beam and plasma technology. Biologically degradable foils will be widely used in the future, but are often not yet able to prevent foods from drying out or spoiling.

The minutely thin silicon dioxide films that the FEP is vapor-depositing onto meter-wide foil are expected to combine biological degradability with improved barrier properties. If the project is successful, the conventional compound foils consisting of up to seven plastics could well soon be a thing of the past.

CORPORATE ALLIANCES

German Machine Tool Companies Discuss Cooperative Ventures

93WS0364A Duesseldorf VDI NACHRICHTEN
in German 19 Feb 93 p 7

[Article by Juergen Salz: "Machine Tool Producers: An Industrial Branch Dovetails"]

[Text] VDI-N, Duesseldorf, 19 Mar 93—*The hard-pressed machine tool industry is attempting to weather the storm through painful capital cuts and cooperative ventures. But the prospects remain bad for 1993. Many companies will have to endure this drought period for some time yet.*

Just a few years ago, the then minister president of Baden Wuerttemberg, Lothar Spaeth, in a flier published by the Association of German Machine Tool Plants (VDW) could still say: "This branch of industry is run by unknowns, but by totally successful unknowns."

Unfortunately, the times have changed radically since that statement was made. The VDW expects a drop in production of more than 10 percent in the western German machine tool industry in 1993. The association makes the dire forecast that of about 98,000 employees in the industry at the close of 1991, only a few more than 80,000 will still be employed by the end of 1993. The VDW goes further in asserting that even the volume of

new orders, which had dropped a real 23 percent in 1992 as compared with 1991, will continue to fall off in 1993.

The machine tool industry, more than other machinery manufacturing enterprises, is deeply engulfed in the present crisis. Moreover, the machine tool sector is considered a key industry. Hardly a single production process exists, in which a machine tool does not appear somewhere in the process. For this reason, many technical people refer to the industry affectionately as "the mother of all machines." And while most other industries are dominated by larger companies, it is the small and medium-size companies in the machine tool industry that supply the world market with technically first-rate "made in Germany" milling, drilling, finishing and lathe machines. Only a few companies can show more than a half billion German marks [DM] turnover per year. The German companies are being eclipsed by the competition of the Japanese rising sun. The largest producers in Japan have turnovers of between DM1 billion and DM2 billion.

But even in the land of the rising sun, business is not good. The 10 leading Japanese machine tool producers expect a turndown of between 8 percent and 36 percent for the current 1992-93 business year. Seven companies anticipate losses, while the remaining three expect a drop in profits. The reasons for this crisis are the same in Germany as in Japan. The important branches of industry that use machine tools, primarily the automobile industry, have their own problems and therefore have held back on their orders.

But this provides little consolation for the German producers. While smaller specialized suppliers can still successfully fill a market need, the larger mass producers of machinery products suffer most by the crisis. Maho, a company in Pfronten, reckons its loss in the 1991-92 business year, which ends on 30 June, will be one-third of normal turnover—a loss of DM157 million. According to board chairman Bodo Viets, not even a balanced book can be expected before the 1993-94 business years. The situation is the same at Deckel. Board chairman Peter-Juergen Kreher expects a loss of DM75 million in 1992, with a turnover of about DM290 million (in the preceding year it was DM434 million). This year, it is expected that the turnover will fall further to DM250 million, while the losses will amount to between DM10-15 million. Kreher does not expect to see a profit before 1994. Competitors like Gildemeister, Traub, and Hermle also see figures in the red for 1992. One of the few larger companies, which has finished the current business year without losses, is Trumpf GmbH & Co. of Ditzingen, near Stuttgart. The company, run by former VDMA president Berthold Leibinger, showed a profit before taxes of DM6.7 million with a turnover of DM678 million.

The companies suffering losses hope to overcome the crisis through cooperative ventures, concentration on nuclear fields, and hard capital cuts. If, at last year's meeting in December, the Deckel AG stockholders had

not approved the issuance of new stock and a capital depreciation, the company would have had to declare insolvency. A few days later the stockholders of competitor Maho also approved similar capital measures.

So far the Gildemeister Company in Bielefeld has not had to take any capital measures, but it is eager to trim itself down. The majority stockholders of Witzig & Frank Turmatic GmbH, the special machine manufacturing company in Offenburg which belongs to Gildemeister, were selling off at various banks. Grundig AG of Fuerth has taken over 51 percent of Gildemeister Automation GmbH, which produces control systems. Meanwhile, a manager from their own concern has bought up the company's large machine program. But the companies are mostly relying on cooperative ventures. Deckel and Gildemeister established a joint distribution company on 1 January; it is expected that both companies' fixed distribution costs could be reduced by DM10 million by the joint venture. Talks are still being held on the possibility of further joint efforts as, for example, cooperative purchasing or a joint production facility outside of Germany. Maho and Traub are also undertaking joint distribution as well as joint R&D; it is expected that several millions could be saved through these measures. Both companies are keeping the door open for additional partners. The joint ventures of Deckel and Gildemeister, on the one hand, and Maho and Traub, on the other, will certainly not be the last such measures taken in the industry. "A lot is going to happen in the next two or three years," Bodo Viets, the head of Maho, believes.

It is even possible that the former arch rivals Maho and Deckel will come together. "Animosities were high on both sides," recalls Roland Friedrich, a partner at the Dr. Wieselhuber & Partner consulting firm, which has been advising Maho for years. Necessity is now welding them together. At the last major meeting of his company, Bodo Viets, chairman of the board at Maho, admitted that "more than talks are underway." Deckel boss Peter-Juergen Kreher and majority stockholder Walter Eder were also at the meeting. The interests of both companies are broadening. Addressing the production facilities of his company in the expensive area south of Munich, Deckel-majority stockholder Walter Eder, a construction machinery entrepreneur in Mainburg in Bavaria, foresees "a substantially more economical use of company property," and is considering "several possibilities as, for example, the use of other companies' existing production facilities" instead of the expensive Munich site. This remark might well refer to the Maho plant in Kempten, which desperately needs orders. Maho chairman of the board, Bodo Viets, is also interested "in arriving at a more rational utilization of our capacities through various measures within a larger association." Both companies have a lot in common. Both produce chiefly milling machines, and are located in Bavaria. The Deutsche Bank and the Bayerische Vereinsbank pull the strings behind the scene for Maho and for Deckel. Another thing both companies have in common is that in

the recent past both successfully reduced the influence of the families that founded the companies. Maho, which was formerly owned by the Babel family, now belongs to the banks. In the case of the Munich competition, majority stockholder Walter Eder, not the Deckel family, has held the controlling stock in the company for the past two years. It is quite possible that Maho and Deckel will become the germ cells of the first large German machine tool company. Maho could bring in Traub and Deckel could bring Gildemeister under the same roof. Other companies might want to join. "Why not," Maho boss Viets responded, when he was asked about such speculation.

Whatever solution is ultimately found, there is little doubt that most machine tool producers will have to help each other. The support of a major company does not seem probable. To be sure, Thyssen has a serious interest in integrating a machine tool manufacturing capability, but even that Ruhr company does not see itself as the reformer of the entire machine tool industry. It is also possible that one or another of the ailing companies will fall under the influence of the Rothenberg group in Frankfurt. That conglomerate has been gathering up stock in machine tool companies for years.

German Aerospace Takes Over Dresden Aircraft Factory

93MI0472 Munich SUEDEDEUTSCHE ZEITUNG
in German 22 Mar 93 p 26

[Text] The Trust Agency board has announced in Berlin that Dresden Aircraft Works GmbH (FWD) is to be sold to German Aerospace Airbus GmbH (DA), safeguarding 700 jobs and procuring investments of 71 million German marks [DM]. DA is also reportedly intending to invest in additional Airbus family components. The Trust Agency will share liability for commercial risk and launch costs until the end of 1995. As it has not proved possible to implement the original plans, which primarily envisaged Interflug GmbH aircraft and Boeing jet maintenance, parts of the Airbus program have had to be transferred to the Dresden factory to safeguard its future. FWD was part of the former Dresden Special Engineering combine, and the hub of the former GDR's aviation industry. The factory developed and built a civil airliner during the fifties, but since the sixties the factory mainly serviced Warsaw Pact military aircraft. In 1990, its workforce numbered 2,100.

CORPORATE STRATEGIES

France: Minitel Industry Grows in 1992

93WS0324B Paris AFP SCIENCES in French 4 Mar 93
p 14

[Article: "Telematics: Results Continued Booming in 1992"]

[Text] Paris—Telematics continued prospering in France, posting double-digit growth in 1992, despite a morose economic context, according to a France Telecom telematics activity report released on 2 March.

Teletel's (the minitel industry's) revenue rose 10 percent to 5.8 billion French francs [Fr] last year, and that of Audiotel (voice telematics, numbers 3664 to 3570) skyrocketed, up 25 percent to Fr1.28 billion. Some 6.2 million minitel terminals have been installed (+4.8 percent over 1991). The 20,000-services marker has been passed (+18 percent). Traffic volume totaled 110 million hours (+4.8 percent) for over 1 billion calls.

The electronic directory (number 11) is still the best-seller among the Teletel services, with traffic volume totaling 23 million hours (+3.7 percent) and 760 million calls, surpassing, now, that of telephone calls on number 12 for information.

As if to convey signs of the crisis by way of telematics, minitel users are forsaking the amusement services for those providing practical information. The number of users expressing satisfaction with the cost of minitel is also less. The year 1993 will be the year of development of telepayment via minitel, either by using a code to authorize the necessary withdrawal from the subscriber's bank account for payment of a bill, or by using directly a credit card reader connected to the minitel.

But 1994 is expected to bring the innovations. France Telecom will offer a new line of minitels, featuring new esthetics, high speed, and minitel telepayment service. High speed minitel, which is currently being tested, will multiply the present speed of transmission by a factor of eight. Communication via these high-speed terminals is expected to cost some 20 percent more for the first level, there being three speed levels, depending on uses. Minitel photo service is also expected to be inaugurated next year.

Cooperation, Possible Mergers in Ailing German Machine Tool Industry

93WS0332A Duesseldorf HANDELSBLATT in German
12-13 Mar 93 p 21

[Article by Karlheinz Voss: "Coming Together Dictated"]

[Text]

Machine Tool Industry/The Branch is Suffering From an Horrendous Weakness in Demand—Deckel and Maho as Possible Merger Targets

The situation in the German machine tool industry is hopeless. Orders are not coming in, losses mount ever higher. The most recent interim reports of the large, in a German branch comparison, standard machine manufacturers Maho AG of Pfronten (milling machines) and Gildemeister AG of Bielefeld (lathes) do not point to an improvement but rather even worse times.

Indeed, the machine tool industry is now stuck in a worldwide recession not seen since the post-war period. Scarcely one producer can pull himself out of the undertow. All leading manufacturers are suffering a massive drop in demand resulting in a comprehensive reduction in capacity. In Germany, the machine tool manufacturers had to cope with a drop in orders of 21 percent last year in spite of the leading technical position. Domestically, the drop reached 30 percent and, for foreign orders, it was 12 percent. Orders had already dropped by about 22 percent for 1991. In the case of lathes, orders last year dropped by 26 percent, including a drop in domestic orders by 37 percent. Basically, orders have dropped by almost one-half compared to those of previous years.

Now, a merger of the currently weakest companies of the large volume manufacturers is at hand. After the "strategic alliance" between Traub AG of Reichenbach (lathes) and Maho fell through and Traub instead became allied with the Maschinenfabrik Berthold Hermle AG of Gosheim (milling machines) to cooperate in sales, all signs indicate that Maho and Deckel AG of Munich (milling machines) will be coming together.

Comprehensive discussions between the principal Deckel stockholder, the construction machine manufacturer Walter Eder, and the various creditor banks—in the case of Maho, the Deutsche Bank has the final say—have been going on for some time. Before Maho is seriously considered as a partner or becomes ready for a take-over, a solution must be found regarding the gigantic mountain of debt. Rumors in the branch hold that the Deutsche Bank alone has debt claims of about one-half of a billion German marks [DM] on the company that was once a showpiece of the German machine tool building industry.

After slashing capital, giving up areas of activity, closing factories and downsizing in all areas, the main problem by far for Maho remains the oversized factory at Kempten. The previous Maho head, Werner Babel, designed this factory in its final expansion stage for a production capacity of DM1.5 billion. This would be about two-thirds of the capacity worldwide for milling machines. At this time, the capacity is about DM1 billion and, at that, is only using one-third of its capacity. Even the auditors provided the annual financial statement for 1991-92 (30 June) with the qualification that the investment at Kempten could not be conclusively appraised.

The numbers show the downsizing process that the company from Allgau underwent: Revenues reached their high point in 1989-90 (30 June) at DM714 million. Instead of the originally announced DM800 million for 1990-91, only DM641 million remained. In the last fiscal year, this shrank to DM442 million. At the same time, revenues of the stock company still reached DM324 million. In the first half of the current fiscal year, these have dropped by an additional 25 percent to DM140 million.

The loss reached DM159 million in the past year for the stock company. In the current year, the loss will be about DM45 million. However, there was no concealing the fact that the deficit could be even higher. Additional inroads in the market were not considered in this estimate. These inroads, however, are indeed expected. Besides, additional risks from unforeseen developments at subsidiaries are possible. Such risks could make additional write-offs necessary. Whether additional capital reconstruction measures would be necessary because of this is an open question.

The fact that the banks must think of something special in the face of this desolate situation appears obvious. This is despite all the efforts of the management to make Maho acceptable to Eder. In this respect, the creditors will have to make sacrifices. In any case, Eder has already dispensed with debt claims on Deckel. The Munich company is anything but healthy. Deckel had become a case for reorganization already by the end of the eighties. New activities outside the accustomed production program failed. Mismanagement of the family company added to this.

Revenues of the company were still DM638 million in 1990. They shrank by more than DM434 million to DM290 million in the past year. For 1993, only DM250 million are expected. In 1991, the Deckel family had to pull out of the operations side of the business under pressure from the banks, and Eder became the majority stockholder. A slashing of capital also was necessary for Deckel because of the horrendous losses in the past year. Here, there are also location problems. The Munich site is, in Eder's opinion, "not optimal" and "too expensive." Insiders estimate that the real estate, well-situated in the south of Munich, is worth "one quarter of a billion marks." Today, Maho and Deckel would both have more than enough space in Kempten.

Gildemeister was also drawn into the pact. The company has a joint venture with Deckel in the form of a joint sales company. This company could continue in existence even with a merged Deckel-Maho group. Whether links above and beyond this are intended is still an open question.

The lathe manufacturer from Bielefeld has downsized greatly in the meantime. Revenues dropped from DM716 million in 1990 to only DM476 million last year. The result was in the red by DM70-80 million. In the current year, no "drastic change in the earnings and profits" is in view. The current market situation for machine tools and for lathes in particular clearly has all the signs of a fight for survival with ruinous price wars. There is barely a doubt that joint ventures alone without a recovery of the structures can hardly be successful.

Germany: Marketing Expert Encourages Industrial Application of Technology

93WS0361A Duesseldorf VDI NACHRICHTEN
in German 12 Mar 93 pp 1, 5

[Interview with marketing scientist Prof. Klaus Backhaus by Peter Schwarz, in Muenster on 12 March 1993: "German Engineers Find It Difficult To Switch to Marketable Products: 'Developing Only What the Customer Pays For'"—first paragraph is VDI NACHRICHTEN introduction]

[Text] Muenster, VDI-N—Klaus Backhaus heads the University of Muenster's Institute for Plant and System Technologies. He is regarded as one of the leading marketing experts in the Federal Republic. In addition to his teaching and research activities, Backhaus serves as a consultant to many capital goods industry companies. The father of a seven-year-old son, he has illustrated his understanding of marketing as the management of comparative advantages in competition in a book of fairy tales, among other places: "But we're all market-oriented, aren't we?"—"The Fairy Tale of Marketing" (Schaeffer Publications). Recession and stiff competition from the Far East—many producers of capital goods are struggling to survive. German developers must rethink things: There is less and less demand for technologically perfect, but expensive products.

Recession and stiff competition from the Far East—many producers of capital goods are struggling to survive. Industrialists in traditionally technology-oriented industries are also being forced, more than before, to take a close look at the rules of the market game.

To set the ball rolling for the series of articles on "Marketing for Technology Products," Prof. Klaus Backhaus, one of the leading German marketing experts, expressed his views to us. In this interview with VDI NACHRICHTEN, the head of the University of Muenster's Institute for Plant and System Technologies calls on developers to rethink things: "It's difficult for engineers to concentrate their creativity on slimming down a product. They have to learn to develop only what the customer will pay for."

[VDI NACHRICHTEN] Professor Backhaus, years ago you described in a book of fairy tales how mechanical engineers can hold their own through a stronger market orientation in competition. All too many industrialists do not seem to have read your book when we look around and see how sales volume and return on investment are at present breaking into the capital goods industry.

[Backhaus] You can't measure everyone by the same yardstick. Things are not going badly for the whole capital goods industry. And if things seem to be going badly for those industries that at the moment have big problems, like the machine-tool industry, it is not necessarily due here either to their lack of market orientation. There are simply no markets there. It is precisely

German manufacturers who now have to pay for the high quality of their products. Their machines are so good that they just go on running a couple of years longer.

An innovation, like the one there was in the 1980s with CNC [computer numeric control] controls, is lacking today. This is why sales volume is breaking into the industry. In connection with which here too there are different kinds of strains. Firms that know how to operate in a market-oriented way are still comparatively well off.

[VDI NACHRICHTEN] Why is it so hard for capital goods suppliers in particular to orient themselves to the market?

[Backhaus] Because of the decades-long domination of technology.

[VDI NACHRICHTEN] ... a specifically German problem?

[Backhaus] It applies to all European suppliers, but most especially to the Germans. The technologically better is still the enemy of the good in the training of our engineers. German engineers are trained to strive for perfection. In connection with which being oriented toward technology need not be at all bad. But we have to convert technologies into marketable products.

[VDI NACHRICHTEN] Obviously, the German engineer doesn't have this in his blood.

[Backhaus] Unfortunately, there are still too many who can only think in technological terms. Many industrial leaders are excellent technicians. They love a good product for itself and not because of their customers. Over and over again on consultation projects, I hear how hard it is for engineers to concentrate their creativity on slimming down a product. But that's exactly what a good engineer has to know how to do. He has to learn to develop only what the customer will pay for. The technologically best product is not always the one that is successful. Video systems constitute a typical example. Grundig's Video 2000 is known to be substantially better than the Japanese VHS system in terms of quality. Yet it hasn't been selling well. Why? Because the Japanese allocated VHS licenses at giveaway prices. In so doing, they captured the market. Rapid penetration of the market is often decisive for the success of a product. Engineers too have to learn these rules of the market game.

[VDI NACHRICHTEN] Who's supposed to teach the engineers this, the marketing division?

[Backhaus] No, companies mustn't think that they are market-oriented simply because they add or expand a marketing division. In reality, in so doing they only add to their overhead cost. The marketing division should be kept as small as possible and, in any case, organized as a profit center. It has no justification for existing as a department that budgets overhead costs. If the company needs something like that, the regular departments are

there ready to disburse money for them. How market-oriented a company is is indicated by whether the marketing division is organized as a profit center.

[VDI NACHRICHTEN] With how many companies is this the case?

[Backhaus] With only a very few, from 1 to 2 percent at most.

[VDI NACHRICHTEN] Isn't the crisis in mechanical engineering offering them a chance? For the first time not only are they thinking about cooperation, but they're also doing something about it. Deckel and Gildemeister are now known to be cooperating on sales. Does salvation lie in cooperation?

[Backhaus] I think that's a big opportunity. And I really hope that these companies go on cooperating, even if the economic situation revives. It was stark necessity, not conviction that brought them together. It's just as important to cooperate on purchases. It's even easier for companies to go into this together. A small team of buyers cooperating worldwide can save a whole bundle on costs. And our industrialists react very positively to savings on costs.

[VDI NACHRICHTEN] Many of them look on cooperation in purchases or sales as a first step on the road to a merger. A desirable development?

[Backhaus] In any case. The present industrial structure has no future, even if the recession is over. It is an enormous obstacle to raising large preliminary investments. In addition, there is the fact that there is a very narrow understanding of what investments are in Germany. When Japanese are asked what they associate with the concept, investment, they think of developing markets. German industrialists think of something that can be celebrated with sausages and brass band music. An investment is only something that is set in brick. Investments in markets, which, first of all, we don't see anything at all of, are not the world of German mechanical engineering. If an industrialist has to spend DM500,000 to introduce a new machine, he nearly always throws up his hands in horror. To be sure, he light-heartedly spends DM10 million to develop the machine, but every penny spent to find it a niche in the market is too much for him.

[VDI NACHRICHTEN] For years now you've been preaching to industrial firms that they can only assert themselves in the market with clearly competitive advantages. Can these also involve the providing of services?

[Backhaus] One cannot achieve any decisive competitive advantage with all the services that can be built up about the product because nearly all companies take that path. Services are only interesting if they come to constitute their own business sector. But they will not make up for losses in the hardware sector in the foreseeable future. What firms need are really innovative machines. Instead

of concerning themselves with these, many companies prefer to hibernate, setting their hopes on the need for replacing [outdated equipment], which has to arise at some time. The Germans must watch out. It could happen that others get some bright ideas in the meantime.

[VDI NACHRICHTEN] Do people think the Japanese are more capable of this than the Germans?

[Backhaus] Yes. But we mustn't look to Japan as though spellbound. On the contrary. I think that the mass market strategy of the Japanese is less promising for German mechanical engineers. Our future lies in limiting ourselves, in finding a niche. We have to concentrate on what we know how to do well. Our past successes were the successes of great inventors: Gottlieb Daimler, Carl Benz, Carl Zeiss, Werner von Siemens. They were people who had a feel for markets over technological developments.

[VDI NACHRICHTEN] If there must be a breakthrough by the developers, how can innovations be forced?

[Backhaus] Every developer should see the whites of his customer's eyes at least once in his life. Developers belong on sales teams. The AEG [General Power Company] has very successfully tested this in the area of automation systems, for example. Developers too must get a feel for what's happening with the customer. And they should go to their best customers and ask them what they would like from their supplier. Such visits should be part of the mandatory sales program.

Ericsson's 1992 Results Presented

*93WS0409C Chichester INTERNATIONAL
TELECOMMUNICATIONS INTELLIGENCE
in English 22 Mar 93 pp 16-17*

[Text] Ericsson's consolidated net sales in 1992 totalled SKr47,020 million, up almost 3 per cent on 1991's sales of SKr45,793 million. Earnings were down however, with operating income, after depreciation, showing a 20.6 per cent decrease to SKr1,819 million and pre-tax income down about 19 per cent to SKr1,306 million. Net income, after taxes paid and estimated deferred taxes, was SKr479 million, or SKr2.32/share, representing a decrease of 46 per cent when compared with 1991's net income of SKr886 million, or SKr4.30/share.

Order bookings for 1992 increased 19 per cent to SKr53,427 million from 1991's level of SKr44,758 million. Ericsson's Chief Executive Officer, Lars Ramqvist, said that more than one-third of the orders received by the company in 1992 involved product areas that did not exist one or two years ago. Orders for new products accounted for half of the bookings in Radio Communications.

The order backlog at the end of 1992 was SKr38,050 million compared with SKr28,777 million at year-end 1991.

Ericsson said its share in earnings of associated companies increased to SKr230 million, compared with the previous year's SKr87 million, primarily due to continuing improvements in the Brazilian and French markets.

Minority interest in income amounted to SKr309 million (SKr498 million in 1991). The company's partly-owned subsidiaries in Mexico and Italy reported decreases in income.

Ericsson—Breakdown of Sales by Business Area (SKr millions)

	1992 total	1992 of which external	1992 total % chg over 1991
Public telecoms	19,103	16,702	-12.9
Radio comms	15,047	14,962	+21.6
Business comms	6,293	6,175	+29.2
Cable & network	6,800	6,407	-3.2
Components	2,043	842	-7.7
Defence systems	1,950	1,659	+6.6
Other operations	1,677	273	+63.9
Less: intersegment sales	-5,893	-	+8.0
Total	47,020	47,020	+2.7

Ericsson—Sales by Geographic Area (SKr millions)

	1992	1991	% chg
Europe (excl. Sweden)	21,917	20,077	+9.2
Sweden	5,993	5,831	+2.8
US and Canada	5,735	5,819	-1.4
Latin America	5,114	5,779	-11.5
Africa	709	667	+6.3
Asia	4,312	3,947	+9.2
Middle East	1,277	1,750	-27.0
Oceania	1,963	1,923	+2.1
Total	47,020	45,793	+2.7

The almost 13 per cent decline in sales from the Public Telecommunications sector was due mainly, Ericsson said, to a much lower level of capital spending in the Spanish market and divestment of its Compania Argentina de Telefonos SA (CAT) operations in Argentina (see ITI Issue 338). Gains were recorded notably in Norway and the Netherlands.

The Radio Communications sector's increased sales was mainly due to digital mobile phone systems to Germany and the United Kingdom as well as analogue mobile phone systems to China. Sales of mobile telephones also rose.

An even bigger increase in sales was seen in the Business Communications business area. This was due primarily

to Ericsson's acquisition of a majority holding in the former affiliated Austrian company, Schrack (see ITI Issue 369). Market successes were noted for the MD110 subscriber exchange systems and data networks. Sales in the German market rose sharply.

Sales in the Components business area were lower as a result of market declines in Spain and Mexico. Sales of power components decreased while microcircuit sales rose.

Cable and Network's 3.2 per cent fall in sales was due to Ericsson's divestment of two Latin American cable companies (see ITI Issues 326 & 348). The Italian market developed positively, while sales in Sweden declined as a result of the weak Swedish economy.

Defence systems reported higher sales due mainly to successes in microwave link operations. Most of this business area's sales were to the Swedish market.

Ericsson said it has consolidated the operating results of the Public Telecommunications, Radio Communications, Business Communications and Components business areas under "Telecommunications Systems" because the sectors are to an increasing extent interrelated.

Ericsson—Breakdown of Operating Income (SKr millions)

	1992	1991	% chg
Telecoms systems	974	1,963	-50.4
Cable & network	490	434	+12.9
Defence systems	152	118	+28.8
Other operations, capital gains, general expenses and eliminations	203	-224	-
Total	1,819	2,291	-20.6

The company attributed the lower operating income within the Telecommunications Systems area to its continuing investments in research and development combined with heavy pressure on prices. The earnings decline was sharp in Mexico and Spain.

Ericsson's total expenditure for research and development, including costs related to customer orders, rose 8 per cent to SKr7,651 million, or 16 per cent of net sales, in 1992 compared with SKr7,054 million, or 15 per cent of sales in 1991. Total technical development costs, which also include costs of adapting systems and products to specific markets, increased 2 per cent to SKr10,574 million, corresponding to 23 per cent of sales.

Capital expenditure for property, plant and equipment in 1992 totalled SKr3,847 million of which, SKr1,248 million involved investments in Sweden. Last year, this expenditure amounted to SKr3,583 million, of which SKr1,637 million was invested in Sweden.

At the end of 1992, Ericsson had a total of 66,232 employees compared with 71,247 at the end of 1991. Mr. Ramqvist noted that by applying new advanced technologies it is able to manufacture more in an increasingly efficient manner in fewer and fewer factories each year. He said the company's restructuring plan, based on halving the number of production facilities to 30 during the 1990-1995 timeframe, is proceeding as planned, as is the TRIM cost-efficiency programme.

Ericsson noted that as of January 1, 1993 it will apply the new American accounting rules SFAS 106 "Employers' Accounting for Post-Retirement Benefits Other Than Pensions" and SFAS 109 "Accounting for Income Taxes." Combined, the adoption of these rules is expected to have a weak positive effect on Ericsson's stockholders' equity in 1993.

French Firms Form Joint Aerospace Venture

93WS0412E Paris LA LETTRE HEBDOMADAIRE
DU GIFAS (supplement to LE BULLETIN DU GIFAS)
in English 18 Feb 93 p 1

[Text] Final agreements have been signed by MATRA HACHETTE, whose subsidiary, MATRA Defense-Espace is a European leader in missiles and space technology and CAP GEMINI SOGETI, the European services and data consultant group. The two groups will now merge their respective subsidiaries MATRA MS2i and CAP SESA DEFENSE. Once the requisite national and EC authorizations have been obtained, the merger will form a new firm, which at the outset will be co-equally held by MATRA Defense-Espace and CAP GEMINI SOGETI. The name of the new firm will be MATRA CAP SYSTEMES. Noel Forgeard, Chief Executive of MATRA HACHETTE for Defense and Space matters has declared: "Following the creation of MATRA MARCONI SPACE, the creation of MATRA CAP SYSTEMES will be an important link in the field-by-field alliance policy being followed by the subsidiaries of MATRA Defense-Espace. The aim is to join forces with the best partners available in Europe to strengthen the position of the group in all key areas involved in civil and military systems conferring superiority." MATRA CAP SYSTEMES will employ 900 engineers and specialists and is expected to have a 1993 revenue of better than 900 million French francs [Fr]. The firm will play a federal role in Europe for future orders. MATRA MS2i will contribute the competence and experience of its teams in data processing and image techniques: computerized mission control and preparation systems (known as SIC for the French Army and SARA and CINNA 3 for the air forces of several other countries), ground segments of civil and military earth observation systems (50 percent of the world market for satellite image reception and processing stations: Spot, Landsat, Meteosat, CL-289 and Brevel ground stations, etc.), image processing systems (the Helios ground segment, etc.). The firm has established a front rank position in France and on the export market. CAP SESA DEFENSE, for its part will be contributing its know-how

as an integrator in data processing and defense in France. The firm makes data processing and control communications system as well data processing systems for technical and general applications for the French Defense Ministry (e.g. AIDCOMER/SYCOM 2, SIGMA Control Systems for the French Navy and a Monitoring System for technical equipment for the French Air Force, CNS.RUBIS for the French state police force communication network control center.

France: Thomson Group's 1992 Losses Discussed

93WS0417A Paris LE MONDE in French 11-12 Apr 93
p 13

[Article by P.-A. G and C. M.: "With Proceeds From Divestment of Its Electronics Sector, Thomson SA Reduces Losses for 1992 to 544 Million Francs"]

[Text] Some habits cannot be shaken. The Thomson Group released its 1992 accounts on Friday, 9 April, the eve of the long weekend. Revenue remained stagnant at 71 billion French francs [Fr]. Its net losses (group's part) declined from Fr702 million to Fr544 million. These mingled results nevertheless still include the operations of the group's electrical household appliances subsidiary Thomson Electromenager (TEM), which it sold to the Italian group Elfi around the end of the year.

Normal? Perhaps. Commonplace? Definitely. In any case, the disposal of its electrical appliances ex-subsidiary made by the Thomson Group in its 1992 accounts renders the interpretation of those results a rather delicate one. Taking advantage of the calendar—the cession of Thomson Electromenager to Italy's Elfi took place in December—the group has allowed itself a dual bit of license. On the one hand, it has added to its own revenue the Fr6 billion of revenue earned by its ex-subsidiary. And on the other hand, it has included in its operating result the exceptional one-time "unearned revenue" of Fr443 million proceeding from the sale of the subsidiary. This makes it very difficult to assess the profitability of the group and to compare one year's performance with another.

While it complicates the analysis, the divestment of TEM nevertheless enabled Thomson to offset a part of the drop in operating results posted by its professional and military products subsidiary and flagship company Thomson-CSF, whose net profit (group's part) plunged from Fr2.35 billion in 1991 to Fr1.518 billion in 1992. A nose-dive of 35 percent that Thomson attributes to operating losses by Credit Lyonnais.

Thomson-CSF, which factors into its accounts 15 percent of the results of the state-owned bank, saw Fr256 million punched out of its 1992 profits. Although its revenue closed at Fr34.3 billion, down 2.8 percent, its net operating profit remained stable at Fr2.07 billion.

'Rebound' in the United States

Thomson Consumer Electronics (TCE), another pillar of the group, however, appears to be on the road to recovery. True, TCE is still heavily indebted, with financial charges of around Fr1.35 billion weighing heavily in its decidedly negative 1992 net result of -Fr1.77 billion (versus -Fr2.45 billion in 1991 and -Fr2.7 billion in 1990). And its 1992 revenue of Fr30.35 billion ran slightly below its 1991 revenue of Fr31.15 billion. But in constant dollars, it was up 2 percent.

"We have put a brake on our downhill slide of the last few years," says TCE's chief executive officer, Alain Prestat, pointing out the company's "formidable rebound" in the United States where it realizes over half its revenue. Under its RCA and General Electric trademarks, TCE there recaptured market shares (2 percent in television, 4 percent in video). Europe, in recession, provided the company with far less satisfaction, and the group prides itself merely on having "stabilized its market positions."

In all, after coming within a hair's breadth of catastrophe at the end of the first half of 1992, at which point its operating losses were nearing a total of Fr550 million, the Thomson group's consumer electronics subsidiary recovered and ended 1992 with an overall operating loss of only Fr330 million (versus -Fr228 million in 1991). A substantial recovery. True, it was helped by the seasonality of sales, but it has allowed Mr. Prestat to reckon in terms of "a return to a positive operating result in 1993."

With largely renewed teams, a new marketing organization, and outlays on digital research in the United States that are expected to help the company offset its high-definition TV setbacks in Europe, TCE has recovered hope.

Philips France's Recovery Strategy Reviewed

93WS0417B Paris LE MONDE in French 9 Apr 93
p 18

[Article by P.-A. G.: "Relatively Spared by Crisis, Philips France Is Critical of Subsidies Granted Its Competitors"]

[Text] The 16,000 employees of Philips's French company, one of the Dutch giant's major subsidiaries, is likely to be relatively spared by the difficulties of the parent company, which lost 2.7 billion French francs [Fr] last year (LE MONDE, 6 March). Philips France, according to its chief executive officer, Pierre Steenbrink, expects its 1993 operating year to be a "difficult" one, but does not expect to have to resort to new staff reductions, after the elimination of the 600 jobs decided on last year.

The French company began streamlining its activities very early on, reducing its fixed asset holdings, limiting its inventories, and lowering its level of indebtedness from Fr1.3 billion to Fr434 million. It has garnered the

first fruits of this effort, and on 7 April it declared a net profit of Fr313 million for 1992, down only 4.8 percent in a very difficult market. Its revenue totaled Fr21.51 billion, up 1.3 percent, and, all things being equal, it even posted a gain of 4 percent, aided by an 8.2 percent rise in exports to Fr7.8 billion. Its sales in France rose by 2 percent.

Stating his intent to "pursue his streamlining efforts," Pierre Steenbrink attacked "the dangerous drift" of the government's employment subsidy policy. The government, he charged, "is prodigiously subsidizing some Korean and Hong Kong manufacturers, in the amount of up to Fr100,000 per job created, even though those assembly sweatshops threaten jobs that produce more value added." His remark appeared aimed at the new minister of industry, Gerard Longuet, an elected representative of Lorraine, where some of these new industrial installations are located.

Germany: Siemens Faces Future Difficulties

93MI0441 Bonn DIE WELT in German 12 Mar 93
p 16

[Article by Ulrich Friese: "Company Must Revise Plans; Achieving Last Year's Profit Level Would Be a Success; Nixdorf Still Poses Problems"]

[Text] The first attempt to turn the mandatory question and answer session at Siemens AG's annual general meeting into a forum for critical shareholders failed. In view of the 56 requests for the floor made at last year's marathon meeting, which lasted for several hours, Supervisory Board Chairman Heribald Naerger planned to give each speaker "just one say." This met with a prompt reply from the floor: "I shall keep asking questions until they have all been fully answered," retorted a Siemens shareholder.

The first five months, to 30 September, of the 1992-93 financial year showed, according to Heinrich von Pierer, Siemens's board chairman, that the company had to revise its original plans. At 33 billion German marks [DM], worldwide order bookings are running at 2 percent less than the previous year's favorable figures. The year as a whole is expected to produce a figure in the region of DM86 billion, representing a slight growth of 1 percent. Revenue for the first five months had increased by 3 percent, to DM29.5 billion. The company was aiming at a 6-percent increase, as against 8 percent in 1991-92, to DM86 billion, by the end of the 1992-93 financial year. The total workforce will have decreased from 413,000 to 398,000 by September 1993. "After five years of success in increasing profits year on year, this year we would regard it as a success if we maintained last year's figure of DM1.96 billion," stated von Pierer. This led one shareholders' representative to criticize the current dividends policy, which produced a uniform dividend of DM13 in 1991-92. Siemens's financial director Baumann countered that "obviously, we are expected to be flexible only when the adjustment is upwards."

Asked whether Siemens would again buy the stagnating computer manufacturer Nixdorf on the same terms, von Pierer replied with an emphatic "no." Following the harsh staff cuts and organizational restructuring at Siemens Nixdorf Information Systems AG (SNI), which involved the creation of nine strategic profit centers, SMI's DM513 million last year are expected to be massively reduced: Reducing losses by DM200-300 million per year should make the company profitable within two or three years.

Setting a course for the power sector, another of the Munich company's key sectors, required "clarity over energy policy" from the federal government, said von Pierer. It emerged clearly from replies to shareholders' questions that the importance of nuclear power for Siemens's business was greatly exaggerated: Conventional power stations produced around 70 percent of the company's energy revenues, with nuclear reactors accounting for the remainder.

In the second part of the shareholders' discussions, criticism focused on the preference shares in the hands of the Siemens family, representing 1.65 percent of share capital, but six times as much voting power. Siemens's shareholder Ekkehard Wenger has submitted a motion that this "privilege" be abolished and the company's articles amended accordingly. As [these shares] represent 50.38 percent of the entire voting capital. The motion is expected to be defeated, however.

German Telekom To Create Mobile Phone Subsidiary

93MI0450 Bonn *DIE WELT* in German 13 Mar 93
p 13

[Text] Telekom intends to hive mobile radio off from the Bundespost corporation and transfer it entirely to its Deutsche Telekom Mobilfunk GmbH (DeTeMobil) subsidiary. This Telekom Supervisory Board decision was intended to create better competitive conditions on the rapidly growing mobile radio market, Telekom Board Chairman Helmut Ricke said in Bonn. The subsidiary hoped to achieve sales revenue of about 3.5 billion German marks [DM] by 1994, rising to about DM8 billion by the year 2000, by which time DeTeMobil would be making 10 percent of Telekom's total revenue.

Ricke said that Telekom had been "made painfully aware" of the restrictions imposed by public service and budget law and its structure as a public authority, particularly on the toughly competitive mobile radio market. In the light of this experience, he renewed his call to the politicians to give his corporation private law status in the current legislative period.

Although he did not say how the trade union representatives on the Supervisory Board had voted, he spoke of a "clear vote" in favor of the Telekom board's proposal. Now it just needed the agreement of Federal Minister of Posts Wolfgang Boetsch (CSU [Christian Social Union]),

which he regarded as a foregone conclusion. Then DeTeMobil could start work on 1 July. The company was expected to employ around 3,700 persons.

Regarding the current competitive position in the D network, which Telekom (D1) shares with the Mannesmann group (D2), Ricke conceded that the competitor "without a doubt" still held the larger market share. But the 50 percent mark was coming closer. While not stating the number of subscribers, the Telekom chief commented that the figure compared well with the 100,000 given by Mannesmann. It was planned to increase the Telekom subsidiary's share capital from the present DM300 million to DM1 billion by 1 January 1994.

Telekom is also pressing ahead energetically with the development of the "intelligent telephone network." As more and more exchanges are digitized, Telekom intends gradually to offer new services even for analog telephone lines from the fall of 1993. Telekom hopes these "value added services" will increase its sales by some DM500 million in 1995. They include "call waiting" announcement (fee DM5 per month), three-way calling (DM5), call forwarding (DM5), and closing certain lines, e.g., for calls abroad (DM7).

SGS-Thomson Becomes World Leader in Thyristors

93BR0456 Paris *ELECTRONIQUE INTERNATIONALE*
HEBDO in French 25 Mar 93 p 4

[Article signed J.-C.G.: "Thyristors and Triacs: SGS-Thomson Takes Over TAG Semiconductors"]

[Text] SGS-Thomson has just taken over TAG Semiconductors, a Swiss triac [bidirectional triode thyristor], thyristor, and diac [bidirectional diode thyristor] manufacturer (\$31 million in sales in 1992). A former subsidiary of the American group Raytheon, TAG Semiconductors employs 180 persons, mainly in Zurich, where its sole distribution site is located. Until now, it contracted out most of its assembly work, which was done mostly in the Philippines. Neither the amount paid for the takeover nor TAG's possible net earnings have been disclosed. The transaction took place only months after SGS-Thomson set up an additional production line for this type of component at its Tours location. It demonstrates SGS-Thomson's resolve to invest in discrete semiconductors; these are components for which the group ranks eighth worldwide, with sales of \$335 million in 1992, or 20 percent of its total sales, according to Tours Division Marketing Director Yves Guilloumy. The global discrete semiconductor market is estimated at \$527 million, 7 percent of which went to triacs and thyristors in 1992, according to WSTS [World Semiconductor Trade Statistics]; they represent 15 percent of SGS-Thomson's discrete components sales. TAG Semiconductor's integration within SGS-Thomson makes the latter the world leader for triacs and thyristors, ahead of Toshiba, with 15 to 20 percent of the global market. Moreover, through this takeover, SGS-Thomson will

complement its own line of small packages (1 to 8 A [ampere]), which are directed primarily at the consumer market (60 percent of TAG's sales), a field in which the Swiss company was considered a leader. SGS Thomson tended to concentrate on the 8-to-40 A line, with products intended mainly for the industrial sector. With this takeover, SGS-Thomson now has three distribution sites for power electronics in Europe (Tours, Catania, and Zurich). Although no restructuring is considered in the near future, Yves Guilloumy does not rule out that possibility in the long term.

German Aerospace Cuts Jobs, Forecasts Market Growth

3,500 More Jobs Threatened

93MI0457A Bonn DIE WELT in German 18 Mar 93 p 15

[Text] The workforce of German Aerospace (DASA) has a bitter pill to swallow: There are fears that in addition to the 7,500 losses already announced, more jobs will go by the end of 1994. When questioned on the matter, a DASA spokesman confirmed that public sector procurement economies and the poor market situation were making "further personnel cuts necessary" in the major German aerospace and defense group (revenue: 18 billion German marks [DM]).

According to the unions, a total of 11,000 jobs in the group were now threatened—i.e., 3,500 more than those officially announced in October 1992. At the end of 1992, the Daimler-Benz subsidiary employed a total of 81,870 people, including 75,400 in Germany. The spokesman of the Munich-based DASA group was unwilling to confirm the final figure because the extent of the further labor cuts could not yet be accurately estimated. "We are living a day-to-day existence," said the DASA officer, referring to the company's dependence on reliable guidelines emerging from the Bonn Defense Ministry's "Plan for the Federal Armed Forces." When Federal Defense Minister Ruehe's latest budget figures were available, DASA would decide whether the 2,750 jobs losses announced in the "defense engineering" division (excluding military aircraft) would be sufficient.

DASA's "aerospace" division has also been severely affected by the public sector procurement economies. In addition to the 500 job losses already announced, there could be more layoffs as a result of organizational streamlining measures, as several product sectors are grouped together within this division. In anticipation of the massive cutbacks that the unions are fearing, there were protest rallies yesterday at the various DASA works. Workforce representatives called for policies that would create stable framework conditions.

Market Prospects Improve

93MI0457B Munich SUEDEDEUTSCHE ZEITUNG in German 18 Mar 93 p 26

[Text] German Aerospace (DASA) is anticipating a world market demand for 16,800 passenger aircraft over the next 20 years, equivalent to a market value of \$835 billion. In a market survey, the Daimler-Benz subsidiary assumes that there will be a 4.9-percent average annual growth rate in air traffic in jets with more than 70 seats between now and the year 2012. The growth in regional traffic is expected to be even higher, at 6.4 percent. There are currently 13,100 passenger aircraft in operation worldwide.

The demand forecast by DASA is divided into 10,800 jets with more than 70 seats, with an estimated market value of \$780 billion, and 6,000 commuter planes (regional feeders) representing a market value of \$55 billion. Aircraft manufacturers supplied 776 jets in 1992, including 157 from the Airbus consortium, in which DASA has a share of just under 38 percent. Orders still amounted to 476 aircraft worldwide, including 136 placed with the Airbus consortium.

According to DASA, deliveries will fall to 600 jets per year until the end of the century and then rise again slightly above this figure. Deliveries of commuter aircraft were likely to amount to 400 per year. Important risk factors affecting the forecast were economic growth worldwide and fuel price trends, which could dampen demand for aircraft by 3 percent, or push it up by 2 percent.

Germany: Telekom Privatization Strategy Reviewed

93MI0478 Munich SUEDEDEUTSCHE ZEITUNG in German 24 Mar 93 p 34

[First paragraph is SUEDEDEUTSCHE ZEITUNG introduction]

[Text] The German telecommunications industry would like to prevent any foreign influences from gaining a hold over Bundespost Telekom. Klaus Krone from the Central Federation of the Electrical Engineering and Electronics Industry (ZVEI) told the press in Hannover that the ZVEI supported the conversion of the state-owned postal operation into a stock corporation with substantial private investment, but at the same time called for a restriction on potential foreign shareholding.

Its monopoly position and the protectionist policies operating on foreign markets make Bundespost Telekom the only customer for vast areas of the German telecommunications industry, as Krone emphasized at the CeBIT fair in Hannover. At the same time, it was also a competitor in areas where there was no monopoly (with a market share of over 80 percent in telephones.) Lastly, the industry needed Telekom as a partner for the future

markets in Eastern Europe, hence the particular importance of the planned Postal Reform II, which would bring further liberalization.

According to the chairman of the ZVEI communications association, the primary aim of this reform must be to safeguard the competitiveness and financial strength of Telekom, hence the support for its conversion to a stock corporation. However, he thought it was necessary to restrict foreign shareholding "in order to ensure the achievement of national objectives, the major goal being the long-term expansion of the infrastructure." Telekom's network and telephone monopoly should remain intact until the infrastructure in the new federal laender had been modernized, otherwise, in view of the empty state coffers, the 60 billion German marks [DM] needed for the program could not be raised. Telekom would, however, have to assume particular responsibility with regard to German industry, emphasized Krone, alluding to the company's orders placed with foreign producers and the tightening up of its purchasing conditions. Even in the future, Telekom would have to apply in full the regulations set out in the Contracting Terms for the Award of Public Service Contracts (VOL).

In Krone's opinion, the impending trade war between the EC and the United States must be avoided "at all costs." The Federation, via its European umbrella organization, had therefore proposed a six-month suspension for the EC clause that, on certain conditions, gives preference to European companies in public purchasing contracts. Although these preferences also existed in the United States, a suspension would facilitate negotiations on a mutually acceptable solution.

To remain in the context of international competition, the Telecom Association also considers that Telekom has a responsibility in industrial policy "that goes beyond calculations of a purely business nature." The industry was expecting Telekom to find out, in the event of tenders from vertically integrated companies (some telecommunications firms in the United States are both producers of appliances and network operators), "whether prices have been lowered directly or indirectly as a result of cross-subsidies from network operation." The ZVEI thought it would be helpful if the EC Commission were to develop rules for price comparisons of this type. As its spokesman emphasized with a sidelong glance at a practice that is attributed to the French, harmonization is also needed for cases where prices are distorted by state-financed research and development. Until that time, Telekom ought to iron out distortions by selective production sharing in this area with German industry.

The industry's call for protection and the harmonization of competition must be seen against the background of depressed business trends (after a boom triggered by unification). Although the German market for office systems, information technology, and communications grew again by 7 percent in 1992 to DM92 billion, as announced at the joint annual press conference of the

ZVEI and the VDME [Federation of German Mechanical Engineering Organizations] in Hannover, this is merely due to the expansion of the telecommunications infrastructure in eastern Germany, software, and services. According to Alfred Esslinger, chairman of the Information Technology Association, computer production in particular had declined in Germany. An overall sales increase of 3 to 5 percent is expected in the coming year. The telecommunications industry predicts a stagnating domestic market, but slightly higher exports. Employment is expected to remain stable. In the information technology sector, where job losses would probably continue at last year's rate (7 to 8 percent), growth is forecast only in software and services.

Netherlands: Tulip PC Manufacturer Announces Streamlining Measures

*BR2304144393 Amsterdam COMPUTABLE in Dutch
2 Apr 93 p 5*

[Article signed MU: "Tulip's Results Fall to Well Under Zero—Director Hetzenauer: 'Extraordinarily Disappointing'"]

[Text] Hertogenbosch—Tulip's net profits for 1991 of around 16 million Dutch guilders turned into a net loss of 14.6 million guilders during 1992. Revenues dropped from 403 million to 326 million guilders, mainly as a result of the sale of the printer distributor Computada. Director Hetzenauer called it "extraordinarily disappointing."

Tulip already had warned about reduced corporate profits last October. According to management, the third quarter of 1992 was bad, but the fourth was better than expected. However, in the last quarter, Tulip could not satisfy demand because of too low production plans, resulting in a backlog of 10,000 PCs.

Of this backlog, Tulip could retain orders for no more than 2,200 PCs; orders for the remaining 8,000 PCs have gone to competitors, according to Hetzenauer. "Although the fourth quarter could not have prevented 1992 from being a negative year, results could have been better had production been sufficient."

Substantial Stock Reduction

The delivery problems encountered in the last quarter of 1992 have, however, had a positive influence on stocks. This has been an advantage, as investment in stocks has been reduced. The year closed with 66 million guilders worth of stock, compared with nearly 86 million guilders at the end of 1991. The press release places this windfall under the heading of "an active stock management."

The gross margin for the largest Netherlands PC manufacturer dropped from 38.5 percent in 1991 to 33 percent in 1992. Hetzenauer expects this percentage to drop still further to below 30 percent. "If you study the balance sheets of our U.S. competitors, this is what we have to expect."

Ninety Layoffs

In order to be able to survive falling PC prices, Tulip has set up a Performance Improvement Program in cooperation with KPMG [consultancy agency]. Part of the program is a further reduction in the number of jobs from 420 to 328 (92 fewer). Hetzenauer expects to have to fire one-third of these people and to be able to find positions outside Tulip for about 60 employees.

Now that the plans for a new production site for surface mounted devices (SMD) have been suspended, Tulip has installed this line in an existing building. Director and majority shareholder R. Romein expects the line to become operational in about three weeks. Eighty percent of the PC boards will then be assembled under Tulip's own supervision. "We expect to recoup our 6-million-guilder investment within two years," he explained.

Streamlining

Another cost-cutting measure is the streamlining of production. In the past, Tulip used many boards for its different PC models. The present product range can be manufactured using only three different boards. The centralization of Europe-wide distribution in Hertogenbosch should be equally cost-effective.

Another measure, not so much to cut costs but rather to increase sales, is the soon-to-be-announced Pocketbook—a small notebook which, according to Romein, "will have a decisive success." Romein also hopes to be able to increase sales by extending the sales strategy to include "telesales." "We no longer want to be completely dependent on dealers," according to the management.

Tulip is looking for large partners who can contribute a "considerable surplus value, particularly in distribution." Hetzenauer realizes that an increase in revenues is needed to guarantee a healthy future. The Wang contract is the start. At the local level, the Netherlands firm has already entered into agreements with KPMG and Volmac. In addition, the contract with a Swedish printer distributor which is going to sell Tulip PCs is also a step in the right direction. In this respect, Hetzenauer does not regard the recent contract between Dell and Philips as a missed opportunity.

Tulip does not want to make any firm predictions about the results for the current fiscal year. Management, however, has made it known that it can survive a recession lasting two to three years by relying on its own financial means. Romein thinks that the average price of Tulip PCs will remain the same as in 1992, but Hetzenauer calls this assumption "rather optimistic."

[Box]

Quality

Right in the middle of the reorganization, Tulip announced that it was about to receive ISO 9001 certification. Although the quality certificate has not yet been

granted, the company already has been given confirmation of its award. The certificate was achieved by the product development, production, logistics, and maintenance departments.

Netherlands: Philips To Sell Fiber-Optic Activities

BR1404112693 Antwerp DE FINANCIËLE-
EKONOMISCHE TIJD in Dutch 2 Apr 93 p 11

[Unattributed article: "Philips Sells Interests in Fiber-Optics"]

[Text] (TIJD)—Philips is to sell its interests engaged in fiber-optic activities and 50 percent of its shares in Yangtze Optical Fiber and Cable Company Ltd. in Wuhan (China) to Draka Holding. Both companies plan to reach an agreement in the near future. This transaction should strengthen Draka's position in the fiber-optics market and enable Philips to put more efforts into other communications activities. When Jan Timmer [Philips president] announced the annual results, he said that some shares would be sold to boost the financial position of the Netherlands electronics giant. The transaction should not affect employment in Eindhoven or Wuhan.

Netherlands: Testing of 'Fokker 70' Prototype Imminent

BR1404113493 Rijswijk POLYTECHNISCH
WEEKBLAD in Dutch 2 Apr 93 p 1

[Unattributed article: "Fokker 70 Takes To Air"]

[Text] Amsterdam—Any day now, Netherlands airspace will experience a true first when a new prototype airplane, the Fokker 70, makes its inaugural test flight. This machine completes the Fokker range and is a logical complement to the Fokker 50 and 100.

The new 70-seater from Fokker is quite a unique airplane, although not especially in terms of its construction. In that respect, its design is too similar to that of the F-28 Fellowship, which Fokker stopped producing 12 years ago. The Fokker 70 is much more like the larger-size Fokker 100, which also was based on the Fellowship.

What makes the new machine special is the number of seats, which falls between two popular market segments: On the one hand, that of the smaller turboprops which can carry a maximum of 50 passengers; on the other, that of larger jets which can accommodate over 100 passengers. Fokker has high hopes for this gap in the market, expecting to sell around 350 of these aircraft before the year 2000, which is approximately half of the estimated market range for 70-seater airplanes.

Market Pull

The demand for small, modern airplanes for short-range flights has picked up, especially since the Gulf War. When Fokker announced its plans for the F-70 in 1991,

it was targeting this increasing demand. Another important factor in its production was the amazingly little competition in the 70-seater market. "Haste" was the watchword at the time. By launching the Fokker 70 rather quickly, Fokker hoped to stay a step ahead of the competition, all the more because the company was virtually the first aircraft manufacturer to offer an entire family of aircraft types for short- and medium-range flights—the Fokker 50, 70, and 100, respectively.

Fokker has succeeded in developing a new, modern airplane in a fairly short time. The manufacturers say that the new Fokker is a comfortable, silent airplane capable of transporting 70 passengers nonstop over a distance of 2,000 km. A special version, which has an extra tank, can boost this range to over 3,300 km. The Fokker 70 also has two Rolls Royce Tay 620 jet engines, producing a maximum thrust of almost 6,800 kg. At a height of 10 km, the airplane cruises at a speed of approximately 850 km per hour.

In addition, the construction of the airplane should make it extremely economical to operate. Its maximum take-off weight of 36.7 [metric] tons gives it the lowest seat/weight ratio in its class, making the Fokker 70 a relatively inexpensive machine. Fokker says that this makes the F-70 particularly attractive to companies which want to compete on short routes. The company plans to produce the first Fokker 70 next year.

EAST-WEST RELATIONS

EC Contributes to Eastern European Nuclear Safety

93WS0338C Paris AFP SCIENCES in French
11 Mar 93 p 25

[Article: "European Commission Pays 20 Million ECUs Into G-7 Fund for East European Nuclear Safety"]

[Text] Brussels—An EEC spokesperson indicated on 10 March that the EEC has paid ECU20 million (\$23.2 million) into the multilateral account created by the Group of Seven (G-7) to take immediate steps toward improving nuclear safety in Eastern Europe and in the former USSR.

By the end of 1993, the Community will have laid out ECU330 million (\$400 million) of the \$700 million in credits that G-7 decided to allocate over the next three years, during its Munich meeting in July, 1992, for the improvement of nuclear safety in the former USSR and in Eastern Europe.

The account is earmarked to finance work on the reactors that present the highest risks, but it will become operational only if it attains a total of ECU60 million with contributions by other donors. It will be managed by the BERD [European Bank for Reconstruction and Development]. France and Germany have already made known their intention to contribute to it.

Pursuant to the 1992 decision by Russian and Ukrainian authorities to accept on-site assistance with respect to nuclear safety, Commission experts will go to five or six sites, between now and summer, to participate in the training of technicians, and to inspect and monitor installations.

Franco-German Nuclear Safety Program in Moscow

93WS0325C Paris AFP SCIENCES in French
25 Feb 93 p 14

[Unattributed article: "Franco-German Nuclear Safety Office Opens in Moscow"]

[Text] Moscow—A Franco-German office for the safety of Russian nuclear power plants and the training of specialists opened on 23 February in Moscow. According to Mr. Klaus Toepfer, German minister of the environment, conservation, and nuclear safety, the work of the new organization will "coincide" with that of IAEA [International Atomic Energy Agency], the ITAR-Tass agency reports.

The office will be funded through orders from French and German state or private organizations, as well as through possible EC assistance. It currently has around 120 million German marks [DM] (400 million French francs [Fr]).

"We hope that the independent monitoring of the risks of Russian nuclear power plants will help to make their operation more reliable. This absolutely does not mean that we intend to decommission the first (VVER 440-230) generation of reactors. It is impossible today to do without nuclear power," the German minister said in the presence of Mr. Yuri Vishnevsky, chairman of the Russian Nuclear Safety Committee.

"Contacts between our countries' specialists are improving. This is a good thing. But we will accept the office's plans only if they are then implemented jointly with Russia," warned Professor Nikolai Ponomorev-Stepnoi, vice president of the Kurchatov Institute.

Aerospatiale, Russia Sign Cooperation Treaty

93WS0385A Paris AFP SCIENCES in French
18 Mar 93 p 12

[Article: "Cooperation Accord Between Aerospatiale and Russia"]

[Text] Moscow—In furtherance of the reconversion of Russia's military industry, a long-term aeronautics and space cooperation accord was signed in Moscow on 10 March between France's Aerospatiale group and Russia.

The accord, ratified by Aerospatiale president Louis Gallois and the president of the Russian Defense Industry Committee, Mr. Viktor Gloukhikh, envisions French participation in the development of two Russian aircraft: an MI-38 helicopter and a 100-passenger

Tupolev-334, Mr. Gloukhikh indicated. The Russian aeronautics industry for its part will have the opportunity to participate in construction of liquid-fueled engines for the future Ariane-5 rocket and crew cells for the Hermes space plane. Over the longer term, the two sides could cooperate in development of projects such as a second-generation supersonic plane.

In signing this agreement, Aerospatiale is banking on the survival of the Russian aeronautics industry, said Mr. Gallois. "It's the finest industry in the country and the one with the greatest chance to make a go of it. Better to make friends with it than get drawn into fierce competition," particularly price wars.

Aerospatiale will participate in the TU-334 program only if its alliance with Fokker-DASA falls through, said Mr. Gallois. On the other hand, the French group is eager to cooperate with Russia in development of a hypersonic aircraft. "The Russians are number one in ramjet engines, and we're number two," he indicated. They have already succeeded in testing for a few seconds the functioning of a super-ramjet engine capable of going from Mach 1 to Mach 25.

Mr. Gallois offered no figures as to the sums Aerospatiale is prepared to commit in Russia. "The cooperation process is going to be very long. There will be ups and downs. Also, the Russians don't understand about exclusive rights. For the moment, they have no money but enormous potential that needs only the opportunity for realization."

Despite the economic collapse, Russian research bureaus are working on dozens of projects, and last year Russia launched 45 satellites (compared to 100 in better years). It continues to maintain its Mir space station and is preparing to launch a second by 1996.

All the major international aeronautical companies such as Boeing and Rolls-Royce are already represented in Russia. For the moment, cooperation is focused on equipping Aeroflot with more fuel-efficient aircraft engines and supplying aircraft.

Meanwhile, as part of France's PREPHA [Research and Technology Program for Advanced Hypersonic Propulsion] hypersonic vehicle program, Aerospatiale has held talks with the CIAM [Central Aviation Engine Institute] Research Center about super ramjet technology, especially supersonic gas flow in combustion chambers, a domain where Russian specialists are doing very advanced work. Aerospatiale, by virtue of its ASMP [medium-range air-to-ground] and ANS [supersonic antiship] missile programs, has acquired very high-level know-how that should make this cooperation uniquely productive.

France, Russia Sign Nuclear Energy Treaty

93WS0385B Paris AFP SCIENCES in French
18 Mar 93 pp 22-23

[Article: "Franco-Russian Accord on Atomic Energy"]

[Text] Paris—The CEA [Atomic Energy Commission] and Russia's Ministry of Atomic Energy are going to be cooperating more closely in the field of peaceful uses of this form of power, particularly in all areas related to civilian nuclear generating stations, a CEA communique announced on 11 March.

This framework agreement, signed a day earlier in Moscow by Mr. Philippe Rouvillois, general administrator of the CEA, and Mr. Viktor Mikhailov, atomic energy minister, opens up collaboration between the two agencies on reactors, the fuel cycle, nuclear safety, dismantling of installations, basic research, public information, training, etc. It will be implemented through specific agreements in each area.

A coordination committee with equal representation from both sides is to conduct periodic reviews of progress on implementation. By terms of the agreement, research visits, seminars, joint research programs, and private contracts will be undertaken. The accord is a follow-up to the treaty signed in February, 1992, between the heads of state of the two countries and "marks a new stage in cooperation between the two sides." It replaces the accord signed in October, 1990, between CEA and the Soviet Union's "Minatomenergo-prom," the communique adds.

German Foundation Funds Grants for Eastern European Scientists

93MI0466 Bonn TECHNOLOGIE-NACHRICHTEN
MANAGEMENT-INFORMATIONEN in German
12 Mar 93 pp 11-12

[Text] The Volkswagen Foundation has provided 7.5 million German marks [DM] for an "Academic Program for Central and Eastern Europe: Grants for Young Academics." Funding the training of junior academics is one of the most effective means of helping build up or reorganize the academic system in the former communist countries in Central and Eastern Europe. Over the next few years, the Volkswagen Foundation's program will therefore enable around 3,000 trainee researchers from Bulgaria, Estonia, Latvia, Lithuania, Poland, Romania, the Czech and Slovak republics, and Hungary to spend six months undertaking research at German universities. Priority will be given to humanities and the social sciences. A special feature of the program is that the junior academics will be involved in teaching as well as working on their own research projects. It is therefore a precondition for the award of a grant that the recipient has been accepted by a German university for the duration of his or her stay.

The foundation has allocated DM7.5 million to the Conference of the German Science Academies in Mainz (Professor G. Thews), which has responsibility for running the program. The six constituent academies of the conference, in Duesseldorf, Goettingen, Heidelberg, Leipzig, Mainz, and Munich, and the "Leopoldina" German Academy of Naturalists in Halle take part in the

approval and selection procedures. University teachers from the Federal Republic of Germany may apply.

Information and application forms are available from the Conference of the German Science Academies, Geschwister-Scholl-Strasse 2, D-W- 6500 Mainz 1, Tel. (06131) 573735, Telefax (06131) 51316, quoting the reference: Grants Program for Central and Eastern Europe.

Russia Competes With Europe on Space Launcher Market

*MI3004130993 Bonn DIE WELT in German
26 Mar 93 p 16*

[Text] The European Arianespace consortium is regarding the attempt by Russian aerospace companies to win new markets in the West with suspicion. The reason for its concern is that Russian rockets provide more or less the same performance as their European competitors but cost about \$36 million, which is less than half.

In the summer of 1992, the then U.S. President George Bush and the Russian President Boris Yeltsin signed an agreement on space cooperation. At the beginning of this year, the armaments group Lockheed and the rocket manufacturers Krunichev followed suit with a similar agreement.

Only a few months before, Krunichev with its Proton rocket had snatched a satellite space launch from under the noses of the Europeans. Now Arianespace fears that the Proton (which carries a greater payload than its own rocket) may rise to become the main carrier vehicle in the Iridium project. The project involves sending up 66 telecommunications satellites (on behalf of Motorola), which will form a global network for mobile radios and telephones. Initial estimates give a one-third share to the Russians, for whom Lockheed would provide the contacts with Motorola.

As the space budgets in both East and West have been cut drastically in previous years, the Russians' advance comes at an extremely inopportune time for Arianespace, even though the consortium has had a comfortable lead to date in terms of orders. At the end of 1992, Arianespace had 36 launch contracts on its books: 14 with General Dynamics and seven with McDonnell Douglas.

The Russian aerospace group launched nearly 100 rockets last year, and is planning nearly 50 launches in 1993. Since Moscow's space budget has been halved, this ambitious target can be achieved only if enough paying customers in Europe and America are attracted. Where possible, companies like Krunichev will continue to offer "preferential prices" to make full use of their production capacities.

Fearing an impending price war in space, a management team from Arianespace has therefore already traveled to Moscow to negotiate a cooling-off agreement with the

rocket producer and the space agency NPO Energiya. The Russians are to be offered the "guarantee" of a certain volume of orders on "normal" terms in exchange for a promise not to wage an all-out battle against the European space industry at knockdown prices.

Siemens Enters Cable Joint Venture in Russia

*MI3004150193 Bonn DIE WELT in German 7 Apr 93
p 15*

[Text] The Siemens group will in future be producing industrial rubber cables together with the Russian firm Kamkabel in a recently established joint venture company, Geros Cables. According to a statement by Siemens's Power Transmission and Distribution Division in Munich, the new company in the Urals, which currently employs a workforce of 600, will manufacture initially for the Russian market, with exports to Southeast Asia and Africa planned as of 1994. The new company has a capital of 25 million German marks [DM], Siemens having a 33.6-percent stake.

The German partner is contributing manufacturing machinery and facilities, test, measurement, and control equipment, and technical and marketing know-how. Geros Cable's target is a 25-percent share of the Russian market, which is estimated to be worth DM200 million, by 1997: Siemens expects annual growth rates of 6 to 8 percent.

German Power Companies, CIS States Enter Joint Ventures

93MI0504 Bonn DIE WELT in German 2 Apr 93 p 13

[Text] The power and electricity ministers from 11 CIS states signed a cooperation agreement with leading western German power companies yesterday. The German parties to the agreement are Siemens, VEBA [United Electricity and Mining Corporation] and its subsidiary PreussenElektra, and Bayenwerk/VIAG [United Industrial Enterprises AG]. The set of agreements, which apply to all forms of circuit-carried power, cover the German parties' work with companies in the CIS states.

The agreement provides support both for new joint ventures in all areas, from prospecting in the CIS to the joint construction of power stations and power transmission, and for projects that are already under way. For example, PreussenElektra, Bayenwerk, and the French state corporation Electricite de France have formed a consulting firm with Russian partners that has investment in the power industry high on its list of priorities.

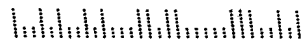
Siemens, also with Russian partners, has entered into a joint venture that will manufacture gas turbines in Russia. Why is RWE [Rhine-Westphalia Electricity Works] Energy AG missing from this illustrious circle? Board chairman Dietmar Kuhnt told DIE WELT: "We signed a similar cooperation agreement with the CIS states back in November last year."

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