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Daimler-Benz

92P60275 Munich SUEDDEUTSCHE ZEITUNG in German 4 May 92 p 26

[Text] Professor Hartmut Weule, head of research for Daimler-Benz AG, Stuttgart, has now called for strategic guidelines in microelectronics to be developed jointly by business and government in Europe. Without such an industrial policy, several industrial branches will be threatened by dependency on Japan in the future, he said.

According to Weule, only an industrial policy "supported by a consensus" is capable of preventing the branches of entertainment electronics, automobiles, and machine construction from experiencing the same fate which the Japanese competition dealt to the German optical industry about 20 years ago. Weule sees the first step to such a joint industrial policy in the German "Microelectronics Consensus Round Table," which includes representatives of such firms as Daimler-Benz, Bosch, IBM and Siemens, as well as the Federal Ministry for Research and the Federal Ministry for Economics. Europe's countries must soon declare which technologies they regard as indispensable for maintaining their competitiveness, Weule said to journalists. For Daimler-Benz, this includes memory chips, microprocessors, application-specific integrated circuits (ASICs), and displays.

In the opinion of the Daimler-Benz executive, the Japanese companies can afford the competition in microelectronics because they are more deeply organized, although this competitive race is in itself economically unfeasible. These companies presumably deliberately accept the losses of their microelectronics areas to obtain strategic advantages from the innovations for their consumer and investment goods sectors.

According to Weule, Daimler-Benz is one of the largest consumers of microelectronics in Germany; it buys about DM6 billion worth per year. At the same time, the company produces microelectronic systems and components worth about DM2.5 billion per year. But this situation is not sufficient to remain independent of Japanese suppliers in the medium term, he said.

Daimler-Benz is particularly concerned about the danger of being dependent on Japan for displays, which according to Weule have a crucial importance for automobiles. Japanese car manufacturers will be on the market sooner than Mercedes-Benz with these innovations, he said. But then Japanese companies can set the system architecture and thus the standards for future electronic applications.

IT Industry Distrustful of EC Policy

92BR0277 Amsterdam COMPUTABLE in Dutch 13 Mar 92 pp 3, 11

[Article by Nigel Tutt: "European Information Technology Sector 'Afraid' of Europe '92; Domestic Industry Calls For Preferential Treatment"]

[Text] Brussels—Automation suppliers are reacting with mixed feelings to the unification of the European market after 1992. The regulation and financial support program is coming to an end and managers are confronted with increasingly fierce competition.

The European Commission is already stepping up its involvement in the IT [information technology] sector through regulations, supervising mergers, and checking government subsidies in order to ensure fair competition. In the field of research aid and standardization, the Commission is trying to tighten the requirements. Preparations for the unified market have led to a wave of mergers and acquisitions among computer firms. Strategists of the British company ICL consider the EC as a "battlefield for cooperation" and point at frictions among industry giants. "The urge for cooperation is partially a result of the disappearance of national borders but, in particular, it is caused by companies which are strong in their domestic markets and which are now aware of the necessity to look beyond their own country," said a strategist at ICL.

Attempts by European as well as Japanese and American companies to strengthen their positions before the borders finally disappear have given rise to friction among rival companies. The EC Commission in Brussels is frequently called upon for arbitration. When ICL was taken over by the Japanese Fujitsu, the company was expelled from the European IT Round Table conference. Nevertheless, this acquisition was approved by the Commission, as well as the subsequent takeover of Philips' computer division by Digital Equipment. The Commission has also gone to great lengths to create an open market. ICL's objections against the subsidy of 6.8 billion French francs [Fr] that Bull received from the French authorities were declared sustainable.

Semiconductors

The establishment of a strong European semiconductor industry has also given rise to EC initiatives, yet the Commission is still divided on the best possible strategy. Some members of the Commission want a single, strong European supplier while others support the idea of more cooperation with Japanese and American manufacturers. Despite these high-level differences of opinion between the managements of various IT companies, the technicians of competing firms are closely involved in joint development projects. Bull, ICL, Olivetti, and Siemens-Nixdorf are cooperating successfully in the European Computer Research Center.

Manufacturers refer to the EC's ESPRIT [European Strategic Program for Research and Development in Information Technology] program, which utilizes a substantial part of the available annual research budget of $3 billion. This program has brought many of the larger European IT companies together.

Noteworthy successes resulting from this initiative are the development of LCD [liquid crystal display] screens for use in computer monitors and computer-aided development tools for the production of chips. In addition, a great

number of standards have been developed in the field of office and production automation.

ESPRIT

ICL's spokesman believes that ESPRIT has encouraged European companies to cooperate and share costs. "Many companies which were brought together in ESPRIT are currently cooperating outside the program. It is indeed much easier to work together if personal contacts already exist and if mutual areas of interest have been defined."

Another EC success story is the introduction of the tender system for government contracts. Previously, national suppliers had too large an impact on procurement strategies of their local authorities. As of 1992, European companies will be able to bid for government contracts in any European country.

According to the Commission proposals, these tenders will also be open for companies which are not based in the EC. This is a procedure to promote fair competition. The Commission has already intervened to ensure fair competition in the case of an Italian lottery computer.

Even though the Commission's efforts to achieve European cooperation are supported by many European firms, a few large companies complain that the computer industry does not receive enough support in its fight against competition from the United States and Japan.

Disadvantages

An Olivetti spokesperson claims that European companies have many disadvantages in comparison with their American and Japanese competitors. "Brussels is still not sending clear signals to stimulate industry and for this reason, it is not possible to take full advantage of the unified market. The overall attitude of the Commission is supportive and positive, but this is not enough for some parties. We want a policy which would model the European market after its American and Japanese counterparts, where national suppliers are preferred over foreigners. The unification of Europe provides the possibility to do this." The Olivetti spokesperson stressed that they are not calling for protectionism, but only for equal market conditions. "The IT sector is a strategic market and should be treated as such."

He referred to the European Nervous Network, which has been developed to link government institutions via broadband ISDN [integrated services digital network], to illustrate the Commission's minor role in the areas of joint development projects and the promotion of standards. "Together with our partners on this project—Bull and Siemens—we convinced the Commission to take a standpoint in this project. The Commission showed interest, yet the project was shelved and no concrete action was undertaken."

A number of other areas is still awaiting regulation by the European authorities. Standardization efforts in the areas of telecommunications and information technology have been delayed by red tape. The introduction of radiation limits for electronic equipment has been postponed for another four years.

A Siemens-Nixdorf marketing strategist says: "We are already operating in every EC country and we do not envisage making substantial modifications to our products or changing our attitude toward customers. We have already begun harmonizing our prices within Europe. Our prices used to vary from country to country." He expects that bidding for government contracts will gradually be opened up and warns of the increasing strength of Japanese companies. The peripherals market in particular is dominated by the Japanese while the software market is mainly in the hands of American companies, according to this spokesperson.

The European authorities are exercising increasing control over the IT sector through their involvement with mergers and stricter antitrust legislation. Funds available for development projects will mainly be spent on applied research that will rapidly result in saleable products. It is, however, unlikely that frictions between European firms, on the one hand, and Japanese and American companies, on the other, will be resolved in the short term.

French Government Promotes High-Technology Start-Ups

92BR0347 Paris ELECTRONIQUE INTERNATIONAL HEBDO in French 2 Apr 92 p 7

[Article by Michel Heurteaux: "A Proposal To Make R&D Less Risky"]

[Text] Industrial R&D is making headway, but not fast enough. To accelerate activity, the French Ministry for Industry is proposing a risk-sharing system for start-up costs.

At the initial meeting of "Technology Debates" organized by the Central School in Paris last week, some 350 experts and 1,400 participants met for two days. Of those taking part, 40 percent were from small-to-medium-sized enterprises [SMEs]. Government representatives made several speeches, reminding them of technology's crucial position in the strategy of SMEs.

Dominique Strauss-Kahn, minister for industry, emphasized the need to encourage start-up development programs. He suggested establishing a system of risk-sharing. This security system financed by the state and requiring prior approval by the Ministry of Finance would make it possible to improve the success rate of new enterprises. It would be based upon a regrouping of the financial risks in a type of banking pool, which would allocate profits and losses across a large number of ventures. Dominique Strauss-Kahn pointed out that, "of 100 new ventures, there should be at least 10 which will succeed, and portfolio diversification would permit sharing the costs of any setbacks." Furthermore, the minister for industry announced that the government would strengthen its support for tracking new technologies through existing organizations (e.g., the ARIST's [Regional Agencies for Scientific and Technological Information]), in as much as the

technology penetration rate in SMEs still remains inadequate. A recent investigation by the Statistical Studies Office of the Ministry of Industry shows that, in reality, 40 percent of SMEs are not engaged in any research and, furthermore, that they still do not attach enough importance to filing for patents.

European Strategy Against Japanese High-Tech Competition Proposed

Challenge Presented by Japan

92WS0420A Munich TOP-BUSINESS in German Feb 92 pp 18-37

[Article by Rainer Burkhardt under the rubric "Topic of the Month": "Strategies for Europe: Remedies for Japan"; first paragraph is an introduction]

[Text] Although Japan's industry has to struggle with unwanted financial and earnings problems, it still remains a serious adversary. TOP-BUSINESS shows how Europe's companies and politicians can stop it.

Japan's undertakers are looking into the future full of confidence: Japan's menacing rise in the ratio of old people to the total population—a nightmare for the job market—promises this tactful line of business annual sales equivalent to around 11 billion German marks [DM]. Decades of steady growth.

In addition, the advisors, in matters of grief, are vying to come up again and again with something new for their dear customers. For example, for an extra fee of around DM600, a funeral home in Osaka is offering a kind of high-tech ascension in the hall of the last blessing as a glorious finale to the farewell ceremony. Accompanied by the strains of a synthesizer and sent off with green and pink-colored laser beams, the casket in the end floats away in a cloud of dry ice.

Japan's undertaking industry looks like an Isle of the Blest amidst the flood of crisis reports and self-doubting that are visibly casting a cloud round the mood on the executive floors of Japanese trade and industry.

Since the governor of the Bank of Japan, Yashushi Mieno, began to apply the interest screws in 1989 in order to stop the dizzying speculation spiral, it appears to be going downhill unchecked: The real estate crash, business failures and financial scandals followed the market crash of 1990, from which stock prices have recovered only slightly thus far.

Many companies that were accustomed to get themselves money almost free of charge by an increase of share capital, convertible bonds or bonds with warrants attached, now have to refinance themselves far more expensively. Small and medium-sized family-owned companies are groaning over the fact that Japan's banks now have to be tight with their credit.

Profit collapses in the Japanese show industries of electronics, automobiles and machine tools—of about up to 60 to 70 percent—are also forcing companies to apply the investment, innovation and cost brakes.

The manpower shortage is easing only slightly because of this. In the opinion of experts, there will be a shortage of 7.5 million in the year 2000, if the immigration taboo continues to remain so deeply rooted.

In the meantime almost any means is proper for Japan's big companies in the rivalry for scarce new blood—from trips to Hawaii for young engineers to pay raises that are being denied to older employees. Critics fear that staff morale based on a sense of solidarity and seniority will be undermined in this way.

Here it fits into the picture that Tokyo economics professor Hiroyuki Itami (48) laments strongly the replacement of the over-70-year-old postwar founders in top management. The younger successors did know "a great deal about profits but nothing more about management."

With all these signs of crisis before one's eyes, it is no surprise that Western augurs are proclaiming the near end of Japan, Inc.

Peter Baumgartner, partner in UBM, Unternehmensberatung Muenchen GmbH [Munich Management Consultants Limited Liability Company], however, considers it dangerous to dispense such cheap comfort to those crestfallen before the Japanese challenge: "When nothing else at all helps any more, the principle of hope usually obliges us. However, whoever banks on the fact that it cannot go well for the Japanese in the long run has quit already here and now."

For a 12-member UBM team headed by Baumgartner and his colleagues Dieter Schneiderbauer and Klaus G. von den Hoff has thoroughly analyzed the Japanese course of action and position in 10 industries. ("Does Europe Still Have a Chance Against the Japanese Economic Offensive?" UBM-SCHRIFTEN, No 4, 76 pages. Nominal charge of DM95.)

Result: Even if the money for new machines and new products is no longer so easy for Japanese companies, since the speculation bubble has burst and businesses in the U.S., in Europe and at home are running more sluggishly, there is no cause for sounding the "all clear." The Europeans have not once been granted a breathing space. Japanese companies have already captured too many strategically decisive market and technology positions, and the cost and quality lead has been anchored too firmly in many areas.

When Europe Acts Resolutely It Will Have a Chance

Only a radical change in its way of thinking and systematic resolute action will give Europe's industry a chance to exploit the current problems and latent weaknesses of its arch rival.

Over the short term, however, the Europeans will hardly be able to cash in on this, since similar, often even greater, troubles are plaguing them now.

It is no consolation for the remaining handful of European entertainment electronics producers that not only the

economic situation but also market saturation is softening the demand for Japanese video recorders, televisions and hi-fi systems.

Alain Gomez, head of the French industry champion Thomson, and Simo Vuorilehto, head man of the Finnish Nokia Group, are battling red ink. The new management board spokesman of Schneider Rundfunkwerke [Radio Company], Hans-Juergen Thaus, is even fighting for plain survival. Even Philips reorganizer Jan D. Timmer has no time left to catch his breath in spite of regained fighting strength. Its Japanese arch rival Sony has started a brutal price war in the U.S. market.

The Japanese Have Taken Over Important Strategic Fields

The most recent "debacle of the Japanese semiconductor industry" spotted by FRANKFURTER ALLGEMEINE—brought about by economic-situation-related declining demand worldwide as well as by new domestic and South Korean memory chip competitors—can no more alleviate the misery of the European chip manufacturers Philips, SGS-Thomson and Siemens.

The tumbling of prices that promptly took place is hitting them even harder, since Europe is almost hopelessly beaten in the key technology of microelectronics (see TOP-BUSINESS, No 1, 1992).

Europe is fighting a losing battle also in office automation and computer technology. European companies still have something to offer only in telecommunications and branches of industrial electronics. Apart from that, however, Europe has its back to the wall in electronics.

By comparison, the aggressor Japan has already come dangerously close to its stated goal of dominating "the most important strategic industry at the end of the 20th century" (IBM-Germany development head Herbert Kircher). Now the Japanese are getting ready to soften up two of the last European, and above all German, bastions: machine building (see below) and the automotive industry.

Europe is the last of the three major industrial regions that it is still necessary to break into in both industries. Southeast Asia has already been a home game for them for a long time. They stormed the U.S. market in the 1980s.

America's automobile Big Three—General Motors, Ford and Chrysler—have for years seen themselves forced onto the defensive. European suppliers no longer have much to offer. The Japanese have demolished entire branches of business in machine building in the U.S.: The American market for machine tools and control technology, and even for sewing machines, is firmly in Japanese hands.

Ineffective Obstacles

Neither import quotas and local-content regulations nor the upward revaluation of the yen in 1985 forced through by the U.S. were able to slow down the advance. With on-site Japanese-style factories (so-called transplants) that again attracted Japanese suppliers, Japanese strategists taught the U.S. competition to really fear for the first time.

The capturing of the European automobile and machine market is proceeding according to nearly the same pattern. Europe's mass producers just bought themselves time with the EC import quotas, in effect until 1999, on automobiles from Japan (see INDUSTRIEMAGAZIN, No 9, 1991).

Juergen Hubbert, a member of Mercedes-Benz's management board in charge of the passenger car division, is afraid that Toyota, Nissan, Honda, Mazda & Co. will export more intensely their more expensive models to Europe: "It will be aimed entirely at the upper class." He has already learned in the U.S. market what that means: "We were succesful for decades in offering our customers the best. Suddenly we also have to confront sharp price competition."

Even Europe's High-Tech Equipment Is Under Price Pressure

Germany's machine tool manufacturers are in a similar dilemma. They do have, as Hans Dieter Betsch, chief executive officer of lathe manufacturer Traub AG believes, "as ever a technology lead against the Japanese and with that the rest of the world." However, they are paying for their custom-made high technology with such an unfavorable cost structure that the ever more high-performance Japanese standard machines are now threatening to undermine their thought-to-be-secure high-end domain.

The Strengths of the Japanese

Whether in the machine or automobile industry, whether in entertainment electronics—which the Japanese aggressor is doing so efficiently, its two-fold expertise is on the one hand, its ability, schooled in the production of large numbers of items, to make the most of cost and quality, and on the other hand, its art of evolving to technology leadership via constant market-tuned product innovation, which also quickly sells small technical advances.

In the meantime Japan is setting the pace of technical progress in many fields, above all around microelectronics, and even—as the McKinsey multinational consulting firm discovered—in automotive engineering.

The Japanese lead in information and communications technology is most impressive: 43 percent of all impact-making inventions come from the Far Eastern empire, and 28 percent from Europe and 26 percent from the U.S.

The Federal Republic is falling farther and farther behind here, as Federal Research Minister Dr. Heinz Riesenhuber recently had to deplore.

The Japanese invention enthusiasm in the area of research-and-development-intensive products is in general unequalled: For 1989 it was 200 U.S. patents granted per million workers. West Germany came behind it (160), far in front of France (100), the U.S. (91) and Great Britain (88).

No wonder then that there were five Japanese firms alone among the 10 firms that last year got awarded the most U.S. patents—including the top three, Hitachi, Toshiba and Canon.

Toward the Goal Through Perseverance

The Japanese companies owe their innovation success not least to the attentiveness with which they follow American and European basic research, the speed with which they take up discoveries and results that their Western competitors often enough overlook, spurn or frustratedly let sink into oblivion, and their tenacity in selling. "In many cases," says UBM partner Dieter Schneiderbauer, "the Japanese simply had greater staying power."

Liquid crystal displays (LCDs) are a typical example. The U.S. electronics firm RCA experimented with this technology in the 1960s. The Basel Hoffmann-LaRoche chemical and pharmaceutical company and the Swiss BBC multinational electronics company were the leaders in the 1970s. But all three gave up. They did not get a grip on the production technology: The reject rate was too high.

Then the Japanese took over the technology. They began quite modestly, with LCD displays for wristwatches and then for pocket calculators. Through this they learned to master the production technology, and climbed high in unflagging painstakingly detailed work to the laptop, first in green and white and then in color.

Today three Japanese companies dominate around 90 percent of the world market. Even IBM found itself forced to enter into an LCD alliance with Toshiba in order to keep at it. For high-resolution flat LCD screens will characterize not only the televisions but also the workstations of tomorrow.

Such tenacious innovation pays for itself economically: In 1989 Japan with a share of 20.7 percent was able for the first time to outstrip the Federal Republic (19 percent) in world trade in technology-intensive products (at least 3.5 percent R&D cost of business).

And Japan's industry is perfectly prepared for the technology markets of tomorrow: According to an analysis by the U.S. Department of Commerce, Japan and the U.S. are, all things considered, equals in the race for the 12 promising technologies—from biotechnology to superconductors: By comparison, Europe is predicted to be a growing backwater.

In most of these fields Japan will lead to the end of the decade, so proclaimed the Ministry for Industry and Foreign Trade (MITI) in Tokyo, which is in charge of research policy.

Basic Research is the Name of Japan's Weapon for the 1990s

Consequently, MITI in its vision for the 1990s—with the florid title "Realization of Human Values in the Global Era"—called for the elimination of the last weaknesses in the Japanese research and development system:

- "Have the drive to push forward to daring innovations through more creativity," reads one of the solutions. Industrial research—not just efficient manufacturing and product innovation—must be the driving force in the future: Basic research must be intensified.
- In addition, software development, system integration and information technology infrastructure projects—above all a Japan-wide optical fiber network extending into each house by the year 2015—are to strengthen and complement the traditional hardware business and with that provide new potentials for adding value.

Japan's top managers, as an opinion poll of the Dentsu Institute shows, are completely behind this new technology offensive. They will not allow themselves to be diverted from the course, even by the current financial problems, believes UBM consultant Dieter Schneiderbauer. "Setbacks have thus far only made Japan stronger. The crisis management cartel will function also in the future."

Ruthless Strategists

The successful warlike expedition in microelectronics displayed with determination, the Japanese alliance of business and government marches on toward its goal.

IBM director Kircher still remembers well how MITI made public its strategic decision made in the beginning of the 1970s to dominate microelectronics and then electronics: "We Western specialists at that time smiled amusedly at this Japanese nonsense. It was clear to us that no one hops onto the chip train moving at breakneck speed."

The insiders were totally wrong. True, in 1979 the Western semiconductor manufacturers still produced 90 percent of all 64K chips and Japan the rest. "But three years later, in 1982, it was exactly the opposite: We had 15 percent and the Japanese 85 percent." They had sharply expanded their capacities—in time for the microcomputer boom.

Within three years in a ruthless price war they drove established U.S. chip specialists like Intel, Motorola and Texas Instruments out of the memory business. At that time the U.S. firms had a loss of $2 billion in a single year. They got out, with the exception of IBM. The Japanese had a total loss of $4 billion. They stayed in. As manufacturers of electrical appliances, they were able to recover their losses from Japanese consumers, but above all, says Kircher, "They had attained their goal."

Of course their goal "was not at all the sale of and earnings from semiconductors. They were the first to assimilate what everyone knew already then: Chips are the raw material for the Information Age. Whoever dominates semiconductors controls the electronics industry, on which sales and jobs depend in more and more industries."

Japan's companies have the nation behind them in their aspiration toward being the high-tech world power. The general consensus is that their well-being depends on the success of their high-tech industry. Only the export of superior-quality industrial goods, one is taught as early as in elementary school, will make it possible for a country poor in natural resources to have enough to eat.

An adversary of this caliber, that pursues its goal so persistently, and also operates flexibly and not always by

perfectly honest means in terms of the free market, is difficult to stop just by individual company or political measures.

Only as a Team Can Europe Win the Battle Against Japan

Concerted Action for Europe

"There is no football team of aimless and directionless individualists kicking about that can win against a team with a coach and a strategy," says IBM research manager Kircher as he brings the problem to the point. "And a team can win even less if it neither knows nor can influence these rules."

As does also the head of the planning staff at the Foreign Ministry in Bonn, Conrad Seitz, Kircher advocates a European industrial strategy: Working on the judgment of companies that the Japanese offensive is threatening Europe's industrial base, a "Euro-Brain-Trust" must analyze the problem, point out the consequences, make solution recommendations and in addition enter into a dialogue with politicians, business and labor unions. A common basis for communication and action will be found in this way, in order that hand in hand, each in his place, may correct serious weaknesses and strengthen competitiveness (see below). To dyed-in-the-wool neoliberals such ideas of concerted action, which Japan is helping to bring into being, sound suspiciously like subsidization and protectionism, if not like a planned economy, which just failed in the East Bloc, they say.

However, the successful Japanese economic system cannot be comprehended by means of current differences such as market or plan.

For instance, the MITI officials do not hatch their 10-year visions to some extent in private in order for them then to proclaim *ex cathedra*. For example, detailed consultations with experts—for instance, 3,000 experts gave their opinions in 1987—and an organized dialogue in the so-called industrial structure council precede them.

Neither does MITI pour out a cornucopia of research subsidies—around 80 percent of all R&D outlays are privately financed—nor does it choose individual super champions, as many French industrial policymakers would have it.

For example, the production equipment was in fact provided jointly in the notorious microelectronics program of the 1970s. However, the two groups NEC/Toshiba and Hitachi/Fujitsu/Mitsubishi Electric were pitted against one another in the development of the chips themselves.

At any rate, when a joint technology project has been completed, the ways part: Then each competes with each in product development and in the battle for customers' favor. "Bitter competition prevails," states Dr. Walter Miller, chief executive of Dr. Johannes Heidenhain GmbH in Traunreut in Bavaria, which has purchased measuring equipment for machine tools and precision machines since 1980 via its own subsidiary.

Cooperation and Competition Are Not Mutually Exclusive in Japan

Europe could learn from the Japanese example, says IBM manager Kircher, "that a joint strategy against Japan and competition in the market are not mutually exclusive."

Europe's Public Policy Has To Be Improved

According to the opinion picture from the Munich business community talks organized by UBM at the end of 1990 on the topic "The Japanese Challenge," German company heads expect from policy first and foremost flank protection for a counteroffensive—a more favorable public policy and more resolute action against Japanese insulation maneuvers (see below).

There is a Good Opportunity to Enter the Japanese Market

The opportunity to enter the Japanese market is better than it has been for a long time: dropping real estate prices, easier building permits, family-owned companies in need of and willing to receive moral support. The main obstacle lies in the area of personnel: There are too few people in German companies who can speak Japanese. Japanese studies live in the shadows at the universities: The studies ignore practical requirements.

Professor Carl Steenstrup of the Institute for East Asian Studies at Ludwig Maximilian University in Munich would like to change this. But thus far he has had no luck in finding sponsors from trade and industry, even at large companies.

In this connection, it would definitely be of some good to all who have to keep the Japanese competition at bay if they could at least read Japanese newspapers. For then, Dr. Alexander Buerkner, Far-East general manager of DG Bank [Central Bank of German Cooperatives] in Tokyo, believes, "many things that seem incomprehensible and mysterious to us would be quite simple."

For example, the achievements of Japanese companies and managers lose the glitter of mystery when they are viewed more closely. "They were," says UBM partner Klaus von den Hoff, "through long periods simply better, more resolute and more patient strategies."

Rarely does a Western company demonstrate so much Japanese perseverance as the Darmstadt chemical group E. Merck, which, in spite of every setback, is sticking to perfecting even further liquid crystals for the LCD technology. Now business is going so well with the expensive specialty—a kilogram cost around DM15,000—that the family-owned company in Japan (world market share of 70 percent) wants to build a completely new liquid crystal factory for around DM100 million.

Only a few European industrial firms set themselves up like Japan's groups of affiliated companies. One after the other a global presence astir that permits the utilization of big advantages and adaptation potentials in development, production and marketing. No wonder that many European producers now find themselves encircled in their Fortress Europe.

Fatal Flight Into the High End

Finally, the belief in being able to retreat before the Japanese into the high-end segment, to complex high-performance machines and mainframes, or into the ostensibly lucrative business of system integration, is proving to be a dangerous delusion.

Such evading maneuvers are tantamount, as the decline of European entertainment electronics, office systems technology and computer technology shows, "ultimately to a death by installments." "For," says consultant Schneiderbauer, "whoever is no longer able to manufacture mass products at competitive prices and of comparable quality is over the short term forfeiting his competence in production and over the medium term in development." By the same token, it is easier, as the Japanese practice it, to work one's way into the top segment from the bottom step by step.

Traub head Betsch has also realized then that, "We must not leave the standard products to the Japanese and Koreans." Consequently he is now trying to reduce gradually the over-great diversity of versions and production complexity that are bringing him above all the 25 percentage-point cost disadvantage vis-a-vis his Japanese lathe competitors.

Mercedes passenger car head Hubbert is in a worse position vis-a-vis Japan with an even worse 35 percent. There is only one thing left for him to do: to break with hallowed traditions—to change products and procedures, to clear out the hierarchy and to dare team work in production (see below).

The optimization of the given fact is already resulting in 14 percent, and the adoption of Japanese examples 12 percent. Only he is not coming close to 10 percent—that is the renowned difference between the cultures.

European Machine Tool Industry Threatened

92WS0420B Munich TOP-BUSINESS in German Feb 92 p 20

[Critical analysis by Diebold expert Holger Clever]

[Text] A gloomy scenario is in the offing for German machine tool manufacturers. Practically all are lamenting a significant drop in their incoming orders. Behind this, examined closely, is a structural change that is threatening the industry's future capability.

For instance the Diebold study "Strategic Trends in Machine Manufacturing—Survival Strategies for the German Machine Tool Industry" indicates that the market shares in every non-European market shifted at the expense of the Germans. The winner in the world machine manufacturing monopoly everywhere is Japan.

The Far East strategists doubled their world market share in the last 10 years. They financed this growth for one thing via their 47 percent dominant position in the Asian-Pacific region. They increased their share eight-fold to almost 50 percent in the U.S.

By contrast the German share of worldwide machine exports dropped from 24 percent (1970) to 20 percent (1990). The German share dropped by 50 percent in Southeast Asia—a market whose volume has increased by 350 percent since the 1970s. Only 15 percent of the U.S. market, as much as a third of which was once in German hands, is still being controlled.

Further indicators of the change come in addition to the significant losses in the world market:

- A massive concentration of Japanese manufacturers in Europe
- Insufficient operational efficiency
- Frictions in the transfer of the product/market strategy, and
- Changes in the industrial value-added pattern.

In the scenario in the offing to the end of this decade, the machine industry whose structure is today characterized by small and medium-size businesses will have to decide between technology leadership and cost leadership. The result: A few large companies of global importance as well as a multitude of small, specialized, technology-oriented companies that are highly flexible and are of relative global importance will be left over.

The study shows that the path into the future leads through distinct operating area strategies: either a volume and growth policy, or, by focusing on core capabilities, solid niche strategies.

Whoever wants to survive in the machine tool industry will have to set the course quickly and precisely. Otherwise the Japanese will once again carry the day in international competition and thereby in time endanger the existence of German industry.

European Industrial Measures Suggested

92WS0420C Munich TOP-BUSINESS in German Feb 92 p 30

[Article: "Industrial Vision for Europe; 10 Business Answers to the Japanese Challenge (UBM (Unternehmensberatung Muenchen GmbH) 1991 Business Community Talks in Munich)"]

[Text]

1. Demystify Japan

We must not overestimate Japan merely because we know it so little. For this reason, companies and institutions must send to Japan their best personnel from various levels of the hierarchy in order for them to gain experience there.

2. Industry As Engine

The creative momentum for the business answer to Japan's advance must come from industry.

3. Change in the Labor Unions' Awareness

This is an absolute prerequisite for a promising European counter-strategy. Instead of the historical foe image of the employer, European labor union policy in the future has to

orientate itself by the maintenance of international competitiveness as a common objective. A consensus must be established between unions and management concerning necessary adjustments, such as the reduction of wage bracket inflation or flexible work schedules, for instance.

4. Form a Euro-Brain-Trust

In order to develop visions, goals and perspectives for a broadly supported industrial strategy, an independent committee of experts (technology council) is needed, in which business, the labor unions, the scientific community and politicians are represented. This brain trust must prepare solution proposals and recommendations on which a consensus can be reached, i.e., that are practicable and are able to be accepted, that are based on plurality and creativity.

5. Develop a Vision for the Industrial Site of Europe

This is a prerequisite for changing the socioeconomic boundary conditions. Not least, it has to be made clear to domestic consumers that they are also producers of export goods and can remain consumers at today's level only if they also remain producers.

6. Publicity Campaign by Business and Labor Unions

It must create public awareness, because the defense front will not just start with high-tech goods but obviously will start beforehand.

7. Active Support of the Euro-Offensive by the Media

The weak German press presence in Tokyo must be strengthened in order to supply realistic and clear information about Japan.

8. Set Up an Information Center in Japan

This investment will reduce the dependence on information from the Japanese Jetro foreign trade organization.

9. Actively Promote "Made in Germany" in Japan

It is essential to exploit purposefully the current goodwill.

10. Act From a Position of Strength

Self-assured and concentrated behavior of every European institution toward Japan is desirable. It cannot be the aim to imitate Japan slavishly. Too much that constitutes the Europeans' strength would have to be sacrified for this. Rather, it is necessary to find independent innovative answers to the Japanese challenge.

European Political Measures Suggested

92WS0420D Munich TOP-BUSINESS in German Feb 92 p 32

[Article: "Flank Protection Without Taboos; 10 Political Answers to the Japanese Challenge (Demands of Participants in the 1991 Munich Business Community Talks (Organized by UBM))"]

[Text]

1. Act More Effectively in Behalf of European Business Interests in Japan

Our politicians and representatives must act fundamentally more resolutely and persuasively in Japan.

2. No Lobbying for Japan

We cannot let Western European politicians allow themselves to become mouthpieces for Japanese interests. Rather, a strong European industrial lobby must be developed.

3. Business Promotion for Offensives In and Around Japan

Involvement in Japan and Southeast Asia requires long staying power, which asks too much financially of many small and medium-size companies. Therefore, appropriate promotion programs have to be developed.

4. More Adamant and More Resolute Pace in Responding to Japan

Japan has been able to bank on the Europeans' disunity in its expansion policy thus far. EC must oppose more decisively Japanese companies' violations of market economy ground rules and respond to Japanese insulation practices with equally good creative countermeasures.

5. Act United in Japan

Representatives of individual federal lands and special-interest groups dissipate our strength.

6. Adapt Antitrust Laws

National regulations should allow strategic alliances, cooperative ventures and mergers that ensure, not stand in the way of, the competitiveness of key industries. It is better to coordinate and simplify national and EC legal standards for the founding and development of European business partnerships.

7. Strategic Research Programs for Key Technologies

These comprehensive programs should be supported jointly by all groups concerned and directly promote "project alliances." At the same time it is necessary to reduce speedily subsidies for "old industries."

8. Shift Emphasis to Business Promotion

Research promotion should be oriented more strongly toward benefits for companies. Therefore, applications orientation and market orientation must be taken into account more strongly in programs.

9. Create More Industry-Friendly Site Terms

For example: a European-compatible corporate taxation system that promotes competitiveness and the reconstruction of companies (for instance, the easing of profit-neutral taxes); simplified approval processes for new facilities; broader offering of international study courses; bridging between technical and business training; coordinated European structure policy.

10. Put an End to the Tax Maneuvers of the Japanese

The tax authorities must prevent Japanese subsidiaries in Europe from deriving tax benefits by allocating losses because profits accumulate in the home market.

European Company Measures Suggested

92WS0420E Munich TOP-BUSINESS in German Feb 92 pp 36-37

Article: "Offense Is the Best Defense; 10 Company Answers to the Japanese Challenge (Findings of the 1991 Munich Business Community Talks of 28-29 November 1991 Organized by UBM)"]

[Text]

1. Encircle Japan

Very good opportunities exist at present for Western European companies to gain access via cooperative ventures and direct investment to the rapidly growing markets in Japan's neighborhood. Such involvement will be welcomed and supported by countries like South Korea or Taiwan because they are increasingly feeling their Japanese dependence to be a threat.

2. Attack Japan Deliberately Now in Its Home Market

Japan has paid for its unbeatable low world market prices in many areas, for one thing, by overcharging the Japanese consumer. If European firms offer them superior product benefits at favorable prices, Japanese export prices would consequently according to trend have to be set higher. Above all, German products possess too little utilized goodwill among Japanese consumers.

The collapse of stock and real estate speculation in Tokyo and the financial problems unleashed by this create an opportunity that will hardly repeat itself for the establishment of branches, joint ventures or participating interests in companies. The Japanese venture capital market offers corresponding opportunities also for small and medium-size companies.

3. Concentrate on Core Areas of Competence

Companies have to define what their vital core areas of competence and core products are. They have to regain or safeguard, as the case may be, technology leadership in these areas via systematic research and development strategies. Core technologies must remain on one's own premises insofar as greater production intensity can also be a competitive advantage. The Europeans should demonstrate their strengths in basic innovations, accelerating the pace much more in the meantime. At the same time cost leadership in production must be strived for based on core areas of competence in manufacturing technology. Market leadership must be the end goal.

4. Adapt Technology Strategies

Instead of constantly reinventing the wheel, European companies should take stronger advantage of knowledge available worldwide. Technology transfer between the scientific community and industry should be improved. It is often better to import patents than to export them. Crucial know-how should be bought more, defended and safeguarded. Caution is advised in technology cooperative ventures with Japan. It has to be clear which strategic objectives they are pursuing here. No licenses should be granted to Japanese firms in key technologies.

5. Globalize Research and Development, Production and Marketing

It is not the results of individual subsidiaries that are decisive, but the combined worldwide results. However, it is necessary to realize cost savings in volume markets instead of allowing oneself to be pushed off course with small numbers of items in high-end segments. Business in standard products should not be left to just the Japanese and Koreans.

Volume advantages can be obtained by standardization at every value-adding level and broader market access. This will necessitate cooperative ventures and alliances in marketing, customer service, development and production with customers, suppliers, competitors and producers of complementary technologies. Here it can be wise to have close ties also with U.S. companies or to form European value-adding and project partnerships similar to a Japanese "keiretsu" (alliance of friendly firms). Cooperation in specific areas and sharper competition ought not to be mutually exclusive.

6. Market-Oriented Planning of Innovation Management

It will be increasingly important to transform skill and new technology and market trends quickly into marketable products at attractive prices. Therefore product development must be emphasized more strongly. Here it is necessary to settle early on whether and how cost and quality targets can be attained. Smaller technical advances must also be sold and marketed quickly. Research and development efforts must be linked more closely with product objectives.

7. More Efficient Forms of Organization

The idea of lean production must reappear company-wide in leaner organization. It is necessary to debureaucratize, decentralize and to delegate more.

8. Find Creativity-Promoting Structures

Individuality and creativity are our culture's strength and success factor. To liberate this creativity means to provide free space for self-accountable action and co-decision-making, and to deliberately encourage able, involved personnel. Decentralized organizations with a laterally structured hierarchy that allow open communication offer the necessary "elbow room" for accountability and development. In addition, job rotation encourages the mental change from organizational-unit to systems thinking. Product development teams from R&D, production and marketing improve result-, customer- and competition-orientation.

9. Improve the Cost Item Drastically

Profitability and goodwill must be improved via programs for the reduction of intrinsic complexity and for lowering the break-even point. Production costs as a rule can be reduced markedly only by systematic reduction of the diversity of items and technologies.

Whoever is no longer able to manufacture mass products competitively is forfeiting competence in production and, over the medium term, in development. Therefore, continuous optimization of the utilization of resources from an overall viewpoint is required, not suboptimization via particular concepts like just-in-time or total-quality management.

10. Orient Vision and Leadership Toward the Japan Offensive

The topic of Japan, be it as threat or opportunity (after all the archipelago is the second largest market in the world), must become the chief concern. Therefore field offices and branches in Japan should report directly to management at headquarters (head-office teaching). The top-management task of making the company fit for the competition with Japan or even a counteroffensive requires vision and leadership, which is manifested in lateral, overall and long-term thinking and action across industry fences and international borders, as well as the resolute implementation of developed strategies.

FRG's Riesenhuber on Research Conditions, State Support

92WS0461A Duesseldorf HANDELSBLATT in German 3-4 Apr 92 pp K2-K3

[Interview with Dr. Heinz Riesenhuber, Federal Minister for Research and Technology: "We have Excellent Research Conditions in Many Scientific Disciplines"]

[Text] Federal Minister for Research Dr. Heinz Riesenhuber and KARRIERE editors Joachim Gutmann discussed basic questions concerning government involvement in research and current developments in the support for research. This exchange of opinions took place in connection with the Hannover Fair.

[KARRIERE] In absolute terms, government funds for research and development increased only slightly in the past 10 years, its relative share in total expenditures decreased markedly. Does this threaten Germany's position in international competition?

[Riesenhuber] Well, the international competitiveness of companies depends primarily on the research and development efforts of the companies themselves. Therefore, the increased R&D efforts of the companies in the past few years made sense.

Today, only the Japanese private industry contributes a larger portion to the national research budget than German private industry. And everybody knows by now how strong Japanese companies are in world markets, in particular when it comes to high technology areas.

[KARRIERE] What conclusions do you draw from this for the coming years?

[Riesenhuber] I hope that the companies will not reduce their research and development efforts even in view of the enormous investments required in the new states.

[KARRIERE] And what does the federal government do?

[Riesenhuber] We will do our part, although the priorities may change.

For instance, the federal government has been consistently reducing support for technologies close market introduction since 1982-83 and has concentrated on supporting research in small and medium-sized companies and supporting key technologies having a long-term impact such as information technology and biotechnology.

[KARRIERE] But that was more of a consolidation than a refocusing?

[Riesenhuber] No, because R&D support for small and medium-sized companies increased from DM340 million in 1983 to almost DM600 million per year currently.

We also used new means of support, the most recent example being research and development loans for small and medium-sized companies which want to achieve a technological "innovation jump" in their companies.

As the project funds for R&D projects close to market introduction decreased support for basic scientific research and the research infrastructure increased proportionally. Today, almost 40 percent of the BMFT funds go towards basic research, compared to approximately 26 percent in 1982.

[KARRIERE] To what extent is a research agency able to install control mechanisms with which it can operate adequately when funds are cut or when there is an increased research demand?

[Riesenhuber] In basic research, an allocation of research means based on short-term goals it would be detrimental. Here, the principle of science regulating itself applies.

Apart from university research, which is primarily the responsibility of the individual states, the Deutsche Forschungsgemeinschaft (DFG), the Max-Planck-Society (MPG) and the Fraunhofer-Society, to name only the major research institutions, receive considerable government funds which they use for research projects after thorough deliberation and evaluation.

With problem-oriented research, on the other hand, the research minister has a lot of freedom of action which is used to meet new requirements.

[KARRIERE] Can you give examples?

[Riesenhuber] Certainly. I increased climate and atmospheric research which received only minimal support in the early eighties ten-fold to approximately DM110 million per year today. The same is true of research work done in the field of forest damage, AIDS research or renewable energy sources. In this field, the federal government is now

spending more for research and development than all other European countries together.

Increased funding for critical areas means of course—especially in a tight financial situation—that there have to be cuts in other areas.

[KARRIERE] How can you design adequate adaptation and control mechanisms for the various research subsystems which have different time frames and different quality concepts?

[Riesenhuber] As to basic research, I already mentioned the self-regulating mechanisms of science. DFG and MPG have an exemplary deliberation and evaluation system even by international standards.

For the Fraunhofer-Society which conducts highly specialized application-oriented research in many areas solicitation of project funds through contracts from private industry plays an important role. In addition, project funds are being sought, for instance, under programs of the European Community.

And finally, for applied research and industrial development my ministry's support programs for specific areas play an important role. These programs are designed to continue for several years. Both scientists and future users of the research results participate in developing these programs. This shows that the adaptation and control mechanisms vary greatly.

[KARRIERE] At present, companies tend to reduce their inhouse R&D capacity somewhat because they prefer to rely on the outside scientific systems for cost and time reasons. Do you see a trend in this increased demand for contract research which could threaten the balance between the research subsystems in the medium term?

[Riesenhuber] Certainly, this question has to be answered differently for the different companies.

However, I can also see advantages in an increased use of outside expertise to solve specific tasks. In many fields, technology develops so fast that it does not make sense from a business point of view to create specialized permanent research departments.

The cooperation between universities, research institutes and companies in certain research and development projects shows that such cooperation yields faster and better solutions than developments done completely inhouse.

[KARRIERE] What can you do to keep highly qualified researchers in Germany? In particular, are regulations with regard to compensation flexible enough to be able to compete with offers from other countries?

[Riesenhuber] I think the determining factor for highly qualified researchers is where they find the best research conditions. And in this respect, Germany has quite a bit to offer.

In particular because of consistent support for sciences, for instance, through the Max-Planck-Society, but also in the large research institutions, we have excellent research conditions in many scientific disciplines today. Further evidence of this is the fact that scientists who have lived abroad for a few years are quite willing to return to the FRG.

[KARRIERE] How can an international exchange of research be promoted?

[Riesenhuber] Here, scholarship programs certainly provide a major impetus, for instance, the Alexander-von-Humboldt Foundation which contributed very successfully to an intensive exchange of scientists between Germany and foreign countries, in particular Eastern European countries and the United States.

This also includes international cooperation for specific research projects. In the past few years, we have made good progress in this direction. Since its establishment in 1985, EUREKA, the German-French initiative for technological research cooperation in Europe, has developed into an extremely dynamic and creative group of international research projects, in materials research and information technology as well as environmental and medical research.

[KARRIERE] Some of the research support programs are directed towards the establishment of companies. How do you rate their effects on research and their long-term effect on the economy?

[Riesenhuber] I think these programs will help translate research results into practice more quickly. This works particularly well when a researcher himself is interested in marketing his development. In such a case, we help with special programs. In particular in the new states, the establishment of a technology-oriented private industry with medium-sized companies plays an important role.

As to the economy as a whole I expect these programs to have an invigorating effect which will strengthen the innovative ability of our small and medium-sized companies, also by setting the necessary example.

[KARRIERE] In this context, do technology centers and transfer agencies live up to their reputation as being ideal breeding grounds for independent researchers or small and medium-sized companies?

[Riesenhuber] In certain new technology areas—for instance computer-aided manufacturing integration—the technology centers and transfer agencies can offer considerable help to young companies in the difficult initial stages or provide effective consulting services for small and medium-sized companies.

JESSI Chief Criticizes European Policy Toward Chip Research

92WS0498A Duesseldorf VDI NACHRICHTEN in German 20 Mar 92 p 6

["Politicians Underestimate Importance of Chips: R. Paletto, head of JESSI, Visited CeBIT '92 in Hannover"]

[Text] *VDI-N, Hannover, 20 March 92* A change from the usual trend in exhibits was concealed behind the general superlatives directed at the numbers of exhibitors and visitors at this year's CeBIT. Since its separation from

CeBIT, electronics (and especially microelectronics) had been more reserved for the industrial fair, but at CeBIT '92 surprisingly many chip producers and design houses were among the exhibitors. If one interprets the indications around the fair correctly, there will be even more such exhibitors present next year.

A clear sign of the growing importance of CeBIT for microelectronics was the visit of Raimondo Paletto, president of JESSI. This was only Paletto's second public appearance at such an affair since Electronica '90. Paletto used the occasion to give an overview of the current state of the Eureka Project on chip research and to describe its organization. In the so-called cluster and flagship projects, JESSI will be oriented more strongly to applications of the chips of the future.

Included among the clusters are, among others, wide-band communications, high definition television (HDTV), electronics to improve automobile safety, mobile radio, and digital radio. A total of 55 projects are currently underway, in which more than 150 European companies, universities, and research institutes are participating.

Paletto openly appealed to the national governments and especially to European politicians, who, in his opinion, still fail to grasp fully the importance of microelectronics for the entire economy. At any rate, the EC has clearly fallen behind the support level approved earlier of JESSI's initial phase, and there will be even less money available from Brussels for the first year of the main phase, which has been running since January, than was originally promised.

In Hannover, Paletto expressed his expectation that the EC will be able to increase its share of contributions to JESSI over the course of the coming years: "It is in the public interest to promote a basic technology like microelectronics, which in the coming decades will provide the basis for the prosperity of our information society." All prognostications indicate that the electronics industry will be the leading industrial sector in Europe to the year 2000. Paletto went on to say: "A position that this industrial sector will reach in Japan as early as the beginning of this decade and that is already the basis for the competitive position that Japan has already achieved today."

Germany's Riesenhuber Demands Greater R&D Competitiveness

92WS0498D Duesseldorf VDI NACHRICHTEN in German 20 Mar 92 p S1

[Article by Heinz Riesenhuber: "Technological Efficiency Also Determines Industrial Standing"]

[Text] *VDI-N, Bonn, 20 March 1992—An industry's standing in the field depends not just on the often discussed factors of personnel costs, achievements, productivity, and management. In his article, Research Minister Heinz Riesenhuber emphasizes the fact that in a technology-oriented economy the requisite depth and infrastructure of the R&D effort are also decisive factors.*

The standing of an industry in its field is determined by the interplay of many factors, for example, manufacturing-, research-, and management-know-how, the infrastructure, salary and capital costs, and the availability of raw materials. The presence of these resources varies greatly in the countries of the world and their availability changes very slowly, if at all.

Precisely because each of these factors is important in the competition for position, simply concentrating on salary and capital costs in discussions about Germany's economic standing is not enough. Properties like high product quality, good design, and the use of the most modern, and problem-adequate technologies determine the ability to compete on the international goods and services markets at least as much as do price aspects.

When one examines the export structure of the leading industrial nations more closely, one sees clearly how important a high technological performance capability really is. The fact that their share of the world trade in technology-intensive goods is greater than for other goods is equally valid for Germany, the United States, and Japan. The higher the R&D expenditures are for a particular group of goods, the greater will be the shares of the leading industrial nations in the world trade of those goods. The export structures of these three countries in research-intensive goods differ considerably one from the other. The United States is the clear leader on the world market in top technologies (e.g., communications technologies, electronics, aviation and space), whereas Germany and Japan have their domains more in high-value consumer-technologies with a faster turnover rate (automobiles, machine tools, chemical products, etc.).

If you were to compare the German and Japanese patterns of specialization in this market segment, you would see that Germany enjoys comparative advantages over Japan in the chemical industry, automobile production, and parts of the machine tool industry. On the other hand, the Japanese lead in electrical engineering, photography and optics, office machines, and entertainment electronics is indisputable. Moreover, Japanese industry is more concentrated on individual segments of the technology market than either the United States or Germany. In the forefront in this regard are products that perform key functions for microelectronics components. In this field, Japanese industry enjoys a clear dominance.

As far as the variety, quality, and price competitiveness of many Japanese products is concerned, both the progressive and flexible production organization and technology also play at least as important a role.

If you examine the fields in which German industry has comparative advantages over its Japanese competitors, they are—with one important exception—technologies in which the paradigm of production organization ("Fordism" versus "Toyotism") does not play such an important role. They would include sectors of the chemical industry, machinery manufacturing, optical instruments, as well as measurement and control technology, where, as is traditionally the case, the medium-sized industries can bring their inherent assets, such as closer contact with the

customer and the ability to provide individual and problem-oriented solutions, into full play.

In the automobile industry, on the other hand, the most modern production and manufacturing technologies (key word: lean production) play the decisive role in competition. Following substantial changes in its production organization, the German automobile industry is now aggressively confronting Japanese competitors in this fast turnover segment of the market.

One factor, if not the decisive factor, necessary to act flexibly in markets and to react to new challenges, is a reliable and consistent availability of the most modern technologies as well as the skilled personnel to use them efficiently to produce competitive products. They are the guarantee of occupying a top position in international competition. Taking chances in this competitive struggle in our kind of economy is the responsibility of the companies. In the global competition of technologies, all opportunities must be seized upon to build up the share of the market in traditional fields and to open up new markets. Through the early implementation of new technologies, companies can create the conditions for quick expansion and they can spread out their market risks.

The German economy is exerting considerable effort to secure its top position in the international technology competition. Germany has steadily increased her R&D investments in recent years, reaching about 45 billion German marks [DM] for research and development in 1990. With more than 87 percent, Germany has the second (after Japan) highest self-financing rate among the most important industrial nations. In view of the ever sharpening technology competition, German businesses dare not let up; on the contrary, they must even increase their R&D efforts further.

As compared with other countries, German companies can also fall back on a broad and effective publicly financed basic research capability. To maintain an effective research infrastructure and to promote the industrial development of key technologies will in future remain the highest priority of the German federal government.

A high level of basic research as well as of applied research in the various companies are long-term guarantees that will remain one of the leading world trade nations. The global challenges we face in the fields of nutrition, environment, energy, and even transportation, can only be met by employing the most modern technologies. These fields offer an enormous spectrum of tasks for problem-adequate, intelligent, future-oriented technology products, by means of which new markets will be successfully opened.

Italy Focuses on Expanding Science Park Network

Law on Science Parks

92MI0509A Milan ITALIA OGGI in Italian 29 Apr 92 p 26

[Text] We are publishing the text by the minister for special programs for southern Italy, decree dated 3 February 1992, of the Ministry of Special Programs for Southern Italy together with the Ministry of Finance and Economic Planning on "Directives for the implementation of the program agreement for the advancement and development of science parks in Southern Italy" which appeared in Government Gazette No. 97 dated 27 April 1992.

Presentation of Proposals for Science and Technology Parks

1. In accordance with the regulations currently in force, associations formed by certain organizations, including companies and their consortiums, public entities, both regional and otherwise, and universities, together with other research organizations, shall be entitled to submit proposals for the development of science and technology parks in accordance with the program described in the preamble hereto.

Each application must be accompanied by the questionnaire annexed hereto [not shown] which has been formulated by the technical-scientific commission, and which forms an integral part of this decree. Each page of the questionnaire must be witnessed by a representative of the applicants, having been duly and formally authorized to do so. The abovementioned applications should be presented in triplicate within 90 days of publication of this decree in the Official Gazette, directly to each of the following offices:

a) The Minister for Special Programs for Southern Italy Department for Southern Italy, 56 Via Veneto, Rome;

b) The Ministry of Finance and Economic Planning, Ministry Building, Via XX Settembre, Rome;

c) The Ministry for Universities and Scientific and Technological Research, 76 Lungotevere, Thaon de Revel, Rome

2. With regard to the question of ownership, the regulations currently applied by the various sources of funding for the proposed plans will remain in force. In particular, where the costs of projects and infrastructures are covered entirely by the Special Programs for Southern Italy, these must remain public property and be permanently directed toward the production and/or the transfer of scientific and technological resources, with the aim of increasing productivity and occupation.

3. Applications in the following instances will not be considered:

a) Projects consisting merely of a group of programs that are not functionally interrelated;

b) Projects that are already covered by specific funding from other sources;

c) Investments that cannot be brought to conclusion within a maximum period of three years from the start of work.

Conditions of Priority

4. Proposals that will be given priority for preliminary examination and in accordance with the amount of public funding required will be as follows:

a) projects undertaken on a regional or interregional level and grouping together various scientific and technological fields of interest compatible with the goals of the parks;

b) proposals capable of increasing the value of public investments compatible with the goals of the parks and that have already been finalized or are still in progress;

c) undertakings capable of achieving economic/financial autonomy in the shortest time possible;

d) support tools for the industrialization of processes that are compatible with the real growth of a high technology economic/manufacturing system in line with the most advanced European standards;

e) programs likely to generate funding for other private and public companies.

5. The proposals, accompanied by a general prospectus of the program and a schedule of the necessary funding, will be evaluated on the basis of the following criteria:

a) the validity and consistency of the proposals with the objectives and general goals of the plan as well as in relation to the contents of the individual projects that make up the program itself;

b) likelihood of the proposals contributing to the realization of the objectives of socioeconomic technical-scientific, and productive development and rebalance including additional investments, by individual companies and/or their consortiums;

c) ability to set up training programs for personnel to be involved in research activities and in the management of the parks;

d) possibility of influencing, directly and/or indirectly, the levels of employment and relative professional qualifications.

In accordance with the above, the minister for special programs for southern Italy may authorize the undertakings of studies, promotional campaigns, accompanying and monitoring programs, and any other activities deemed necessary to ensure, from both a strategic and a managerial point of view, that the program is carried out in a way most appropriate to achieve its general objectives.

6. On the basis of the proposals submitted, the Ministers for Special Programs for Southern Italy, Universities and Scientific and Technological Research, and Finance and Economic Planning will agree upon a program for the development and realization of science and technology parks in Southern Italy indicating the funding necessary to implement the program. It should be noted, however, that they are under no obligation to select one or any of the abovementioned proposals. All of the above will be carried out in accordance with the authority and procedures of the administrative bodies concerned.

7. Expenses incurred for the presentation of the proposals and projects are not refundable.

8. Plans will be carried out using the resources of the administrative bodies participating in the program, and in particular, where it is deemed opportune in accordance with the procedures contained in the "Program Agreement" and where necessary, by setting up joint work groups.

9. Monitoring and control of the investments, in each case of funding, shall be carried out by each of the administrative bodies concerned.

10. Where, during the course of this procedure, the ministers concerned consider it necessary, they shall be entitled to call for the opinion of the technical-scientific commission on specific questions regarding the implementation of these directives.

Science Park Consortium

92MI0509B Milan ITALIA OGGI in Italian 13 May 92 p 8

[Article by Stefania Sepulcri: "Science Parks Launched in the Capital"]

[Text] Yesterday morning, the Minister for Universities and Scientific Research Antonio Ruberti signed the deed of association of the new science park consortium to be established in Rome. The Industrial Association of Rome, CNR [National Research Council], ENEA [National Agency for New Technologies, Energy, and the Environment], and numerous organizations working in the R&D sector are also involved in the undertaking.

Science and technology parks are centers where university research and the business sector work together. Although still not widespread in Italy, these parks were first established in the mid-1980s. Italy has 10 parks to date, most of which are in the North. The more well-known include: ARST [Area for Scientific and Technological Research] in Trieste, Bicocca in Milan, and Tecnopolis Novus Ortus in Bari.

"Rome," said Ruberti, "has a large concentration of universities and industries that are suited to be grouped in the scientific and industrial areas: first to cooperate in research, and the development and application of new technologies, and finally to disseminate technological know-how. The establishment of this new consortium comes after the publication of the program for the creation of science parks in southern Italy in the Government Gazette.

The Rome-based consortium intends to establish an interactive network for research in Rome. Three locations have been selected by the promoters so far: Tiburtina (also called Tiburtina Valley), Tor Vergata University, and Castel Romano.

The consortium will be established within the existing facilities in the three sites. Research will focus on five fields: electronics-computer science, telecommunications, environment, advanced materials, biotechnology.

"The benefits that this ambitious project can bring to all the region," say the promoters, "are obvious and may be summarized as follows: First, the improvement of the scientific, training sector in Lazio, especially in the field of

high technology. Second, the areas chosen for the project will be upgraded. Finally, benefits for small and medium-sized industries and new job opportunities."

German Research Ministry Funds Quality Control Program

92MI0515 Bonn TECHNOLOGIE-NACHRICHTEN PROGRAMM-INFORMATIONEN in German 25 Apr 92 pp 1-4, 6-14

[Federal Ministry of Research and Technology Announcement of its Quality Assurance Funding Program for 1992-1996]

[Excerpts] In October 1990, the Federal Minister of Research and Technology announced its "framework strategy on quality assurance," stating that 1991 would primarily be a year for preparation and for identifying the measures to be taken. The outcome of this preparatory work would be the presentation in early 1992 of a detailed quality assurance funding program. This program, which both updates and gives body to the framework strategy, is described below.

1. Point of Departure
2. Development Abroad [omitted]
3. Measures in Germany
4. Conclusions
5. Funding Measures
5.1 Stepping up Basic Research
5.2 Initiating Joint Projects
5.3 Applying Quality Know-How Effectively on a Broad Scale
5.4 Intensifying R&D on Interface Standardization
6. Budgeting, Handling of Funds

1. Point of Departure

In addition to competitive prices and the ability to supply market demand, our economy's export success depends to a large extent on the quality of our products and services.

All steps taken to ensure high product quality—usually referred to jointly as "quality assurance"—are therefore particularly important. Greater demands have also been made on quality assurance in recent years because products consist of far more components and are manufactured in many more versions, and because the manufacturing processes involved have become more complex. There is less and less time in which to achieve the quality level required of the products. At the same time, the reliability and safety standards required of technical systems are rising.

Moreover, suppliers are increasingly facing the need to give their customers the assurance that they guarantee quality at every stage in the supply of a good or service. Evidence of this is being demanded with increasing frequency.

In this situation, competition in terms of quality is acquiring greater significance, especially with the advent of the single European market. It is no longer just a matter of product or service quality but of who has the better strategy and who is able to translate it most effectively into practice. Germany must remain an attractive industrial location in the future as well.

If we are to remain competitive, it is essential that firms take innovative measures and invest in quality assurance in good time. German industry already spends a considerable amount on quality assurance:

- The mechanical engineering industry spends more than 6 billion German marks [DM] a year on quality assurance measures; this represents about 4 percent of sales revenue, roughly equivalent to the average profit-sales ratio.
- The clothing industry, which has annual sales revenues of around DM23 billion, spends between DM1.2 and 1.3 billion a year on quality assurance.
- It is estimated that the motor industry spends at least 2 percent of its sales revenue on quality assurance measures in production; this does not include expenditure by its component suppliers. The high level of such supplies suggests that these costs probably account for a further 3 percent of the motor industry's manufacturing costs.
- These calculations normally consider only specific fault-prevention measures, measurement and testing, and the remedying of faults and problems resulting from faults (e.g., rejects, reworking, complaints) as quality assurance expenditure. If the costs of, for example, remedial design work and modifications necessitated by complaints were taken into account, quality assurance expenditure would be far higher. Estimates put quality costs at 8 to 12 percent of sales revenues for mechanical engineering, the motor industry, and the clothing industry. Quality costs large sums, but consistently applied quality assurance saves resources and therefore money (e.g., fewer rejects, less remedial work, fewer complaints).

Nevertheless, surveys and enquiries within the mechanical engineering industry (Roland Berger, VDMA [Association of German Mechanical Engineering Establishments], RWTH [Rhineland-Westphalia College of Technology] Aachen), for instance, show that:

- only around 10 percent of all quality assurance expenditure goes on fault prevention measures, i.e., quality assurance in the true sense of the word, whereas about 40 percent goes on measurement and testing and some 50 percent on remedying faults and problems resulting;
- only about 17 percent of the firms questioned recorded quality costs in a planned and structured way;
- only about 6 percent of firms analyzed the causes of faults in detail.

These findings clearly show that most German mechanical engineering firms are unaware of an important category of

costs, commonly called quality costs but which would be better termed "mismanagement expenditure." One reason for this is that very few viable managerial and technical instruments for determining and analyzing quality costs are available. There is also scarcely any awareness of the need for systematically structured quality assurance systems, including human labor.

One important question is: At what stage in a product manufacturing process do the causes of product faults lie? Analyses show that the causes of around 75 percent of all the faults found in a product occur in the product definition, development, and design, and work planning stages, but that 80 percent of defects are in fact detected only in finished parts or complete products. This points to a need for an integrated quality assurance strategy embracing all stages in the creation of a product. The principle must be: Don't test for quality, produce it!

Quality does not only mean the conformity of a product to certain specifications (according to DIN [German Standards Institute]: Quality is a unit's ability to satisfy established, specified requirements), but also the fulfillment of the customer's wishes, something far more exacting and a crucial factor in the market process. A change is taking place in customer and public awareness, and demands are becoming more complex. For example, aspects such as the environment and health compatibility, reliability, and safety of technical products are increasingly playing a determining role in the purchasing decision.

Employees' expectations regarding the content of their work and their ability to determine the quality of the results of their work, are increasing and represent an opportunity that must be seized.

Companies that are particularly successful in generating quality base their strategies on the following fundamental considerations:

- conscious acceptance by management of responsibility to give the lead on quality assurance;
- personnel management and training aimed at instilling a sense of responsibility and commitment into each individual member of the workforce;
- development of strategic quality comprising analysis of the quality situation, planning of quality objectives, and concrete steps for attaining those objectives;
- organizational and communications-related orientation of the work sequences in a company with a view to increasing quality;
- application to products and services of quality assurance methods and procedures appropriate to the firm;
- introduction of machinery for registering what customers want and customer satisfaction and for registering and remedying shortcomings quickly and competently.

In this connection it is important that these high requirements are equally applicable to small and medium-sized enterprises that, for instance as subcontractors, have to produce goods in an increasing number of versions and of increasing complexity but of consistently high quality to precise specifications. They must demonstrate to their customers in particular that they operate an effective quality assurance system.

It is not only the market that is increasingly demanding that firms should operate, and demonstrate that they operate, quality assurance systems. European harmonization policy (unification of laws), too, favors firms that have quality assurance systems meeting the European EN 29 000 standards and have them certified by independent outside agencies. The European EN 29 000 standards coincide with German standards DIN/ISO 9000 ff.

The EC's legal framework for product liability regardless of negligence can only be complied with by further developing industrial quality assurance strategies, systems, and structures.

These are examples of challenges that industry—and above all small and medium-sized enterprises [SMEs]—must come to grips with. They can be met only with an overall strategy and total quality management. In addition to solving management, organizational, and technical problems, these tasks primarily require a system designed to enhance human productive resources and foster the ability and motivation of the workforce to produce quality. [passage omitted]

3. Measures in Germany

Some quality assurance issues are already addressed in a number of Federal Ministry of Research and Technology [BMFT] technical programs insofar as they are relevant to specific projects, e.g., the production engineering program or the space program.

As far as joint industrial research is concerned, the Federal Minister of Economic Affairs is providing priority funding for quality assurance projects through the "Otto von Guericke" Federation of Industrial Research Associations (AIF). This funding measure began in 1989 with a pilot phase on quality assurance. Funding is provided for research projects at research institutes sponsored by several sectors or divisions, that are SME-oriented, and that can be applied on a broad scale. The projects address topics such as the analysis of certain manufacturing processes with a view to developing reliable, viable processes by clarifying the relationships between process parameters and product quality. The development of measurement, testing, and evaluation methods as part of quality assurance systems and quality assurance strategies or issues of the cost-effectiveness of preventive quality assurance systems in particular sectors or in processing particular materials are further fields covered. A total of DM22 million have been granted for 50 projects since 1989.

There are several training institutes. Suffice it to mention here the German Quality Association (DGQ) and the Rationalization Board of the German Economy (RKW) which are successfully involved in the training of specialists and publish a wide range of literature on quality issues.

4. Conclusions

The following conclusions can be drawn from the foregoing:

a) Firms are aware of the importance of quality assurance. However, only a few are attempting to integrate total quality management into company policy and personnel management and to introduce integrated quality assurance systems on a systematic, continuous basis.

b) There is no standard solution for quality assurance; product, process, and company-specific solutions are required.

c) There are significant shortfalls in quality assurance skills, specific quality know-how needs to be acquired in this interdisciplinary subject.

d) The human element is predominant in quality assurance: The level of training, motivation, and decision-making responsibility of the workforce need to be raised and extended.

e) Industry must rapidly apply existing skills and experience across a broad base.

The Federal Minister of Research and Technology therefore intends the funding measures described below to contribute to solving the problems mentioned to accelerate processes of innovation in quality assurance.

5. Funding Measures

These measures are designed to help to enable and encourage firms to introduce integrated quality assurance systems on a systematic and continuous basis. The activities focus on solutions for small and medium-sized firms.

5.1 Stepping Up Basic Research

At the instigation of the BMFT, the German Research Association has instituted the priority program on "Innovative Quality Assurance in Production." It will address the following topics:

- Methods of preventive quality assurance, including methods applicable on the introduction of new technologies (simulation methods and knowledge-based system approaches);
- Development of concatenated information processes (feedback loops) to promote and govern quality;
- Methods for describing workpieces and determining their tolerances according to the required quality and function in the light of the manufacturing, testing, and maintenance technology.

There are also plans to install research teams at universities, to enable several research institutes (university and para-university institutes) covering various disciplines, such as quality science, ergonomics, business management, and production engineering, to work together on a suprar-egional basis. Quality assurance cuts across a variety of specialties and requires such an interdisciplinary approach. The research teams will undertake advanced research on this subject and at the same time form a basis for broad, sound training.

The research requirement in this field has been ascertained in a series of discussions among specialists and published in the Federal Gazette, and an advisory committee of scientists and industrialists has been set up to assess the proposals received, settle their contents with the parties involved, and give technical support to the work as it is performed. The following topics will be covered:

The interrelationship between quality assurance and organization/work structuring.

The introduction and implementation of comprehensive, preventive quality assurance systems in industry in many cases requires far-reaching adjustments and changes in the way a company is run and the work organized. The purpose of the research is to identify these, to reveal the obstacles and difficulties faced, and to indicate approaches and ways of overcoming them.

The increasing development of intercompany production networks involving subcontractors, component manufacturers, and customers requires similar intercompany quality assurance schemes. This development greatly affects small firms. A particular aspect of the studies conducted in industry will therefore be to determine the technical, organizational, and staffing conditions that will enable the various types of subcontracting firms to achieve integrated, preventive quality assurance at intercompany level.

Quality assurance in production logistics.

Logistics are becoming increasingly important in view of the keener international competition to which industrial firms are exposed. Because production and logistics are closely linked, a company's success increasingly depends not just on product quality but also on logistical factors such as production time, meeting deadlines, or supplying the exact quantity ordered.

The research teams' objective is to draft and design a logistical quality assurance system for manufacturing concerns that will use preventive measures to guarantee the logistical quality of operational sequences within the firm and that can equally be applied to operations involving customers and suppliers. To this end, technical quality assurance and controlling methods will be examined for applicability and modified, and theoretical models will be developed at the various levels within the company structures.

Knowledge-based systems in quality assurance.

Existing knowledge-based quality assurance support systems are generally isolated applications. They are either not or only partially integrated into existing organizational and EDP [electronic data processing] structures. The main problem is creating and maintaining the knowledge base economically. This problem is greater with quality assurance because quality knowledge charges constantly with the products.

The research teams aim to investigate how knowledge-based subsystems can use quality knowledge base to communicate with each other and with conventional CAO

[Computer-Aided Quality Assurance] and CIM components [Computer-Integrated Manufacturing]. They will also seek to reveal ways in which the cost of creating and maintaining the quality knowledge base can be reduced. There is no point in making wide use of knowledge-based systems in quality assurance unless a suitable cost-benefit ratio can be achieved.

The research team will also examine how knowledge-based systems can be designed with teamwork in mind, how to ensure their acceptance among users, and how to ensure that users preserve existing know-how.

Quality assurance in the service sector.

Systematic quality assurance, such as is successfully practiced in many instances in manufacturing industry is still rarely found in the service sector. The research team aims to arrive at a basis for designing comprehensive quality assurance systems in the service sector. Quality characteristics and their attributes will be derived and quality assurance methods developed for various types of service from an analysis of the actual state of affairs and from a service typology that will be drawn up for the purpose.

To this end, quality assurance measures used in industrial production will also be examined for transferrability to the service sector. The findings will be used in joint industrial projects to work out quality assurance strategies for various types of service, which will then be tried out in pilot schemes.

Quality information systems.

The purpose of corporate information systems is to collect, collate, process, transfer, and supply all the requisite data at different levels within the company. If quality assurance is to be given effective support in all areas, existing information systems must be expanded to include quality-related information, or new ones must be designed. Such quality information systems embrace corporate, process, product, and market information and information flows. Be developing a source-sink model, the research team will contribute to achieving more efficient information system design in terms of quality assurance. It will take full account of all the functions of a firm and of a product's entire life cycle, from design through the various stages of manufacture to the use and disposal of the product.

Zero-fault production in the process chain.

For the most part, production faults have their origin in the development and planning stages of products and production processes whereas they are not generally remedied until the stages following manufacture are reached. Preventive quality assurance measures are therefore required to prevent faults occuring at all, if possible. The fault rate in component manufacture is increasing as technical requirements rise higher and higher. As production work is generally divided into successive or parallel process chains, the process capability of both the individual processes and the process chain need to be improved. Only when the impact on subsequent stages are taken into account and the chain concerned is optimized can the desired result be achieved. With this in mind, the research team will investigate every opportunity for avoiding and preventing defects, with a view to arriving at a zero defects strategy for a typical multistage process chain in component manufacture.

Interaction between quality assurance and business management.

Traditional areas of business management such as personnel, marketing, cost accounting, and controlling are increasingly obliged to meet the new challenges of total quality management and to use them as a performance yardstick. Appropriate management tools are thus essential to ensure that the right management decisions are made. The claim that high quality necessarily also means high costs is wrong and is prejudicial to the use of quality assurance systems. The research team's objective is to develop a comprehensive decision-supporting quality control system for quality management that will render the costs and benefits of quality assurance measures transparent and calculable and demonstrate the economic potential of quality assurance systems.

5.2 Initiating Joint Projects

Joint projects are cooperative ventures based on division of labor, involving several firms and research institutes seeking to address relatively long-term issues of mutual interest in the precompetitive stage. In particular, such joint projects will also accelerate the transportation of the research institutes' scientific findings into industrial practice.

a) Topics

Joint projects focus on the following topics, which have been identified in detailed discussions and workshops with experts from industry and science.

Methods and aids for implementing DIN/ISO 9000 ff on the introduction of quality assurance systems.

For small and medium-sized enterprises in particular, the interpretation and practical implementation of the very general rules set out in DIN/ISO 9000 ff and other relevant standards is a great obstacle to the systematic introduction of quality assurance systems that is difficult to overcome. The development of methods and aids for introducing quality assurance systems in accordance with the standards to take account of the particular requirements of firms in manufacturing industry, the service industries, or craft trades, with their differing structures and sizes, is therefore very important. Solving these complex and highly interdisciplinary problems requires wide-ranging research and development work.

Quality-enhancing organizational and management structures.

Experience shows that organizational and management structures have a significant effect on the quality of a company's work. The factors and structures affecting a firm's quality will be scientifically investigated and new organizational and management strategies developed on the basis of the findings. In this connection, paying due regard to employee know-how in all the firm's departments

and considering people, organization, and technology as an integrated whole, play an important part in activating hitherto unexploited quality potential.

Information systems supporting quality assurance in firms in the manufacturing and service sectors.

People, organization, and technology depend on information supply and exchange to produce and ensure quality. This means that information concerning all quality-relevant facts from development through production to the customer must be collected, processed, and supplied in the best possible way from a quality point of view. A quality information system of this type must be compatible with and capable of integration into the company's other information bases.

The economics of quality assurance.

Quality-related cost accounting is still largely confined to specific fault prevention measures, measurement and testing costs, expenses incurred remedying faults, and costs resulting from faults, while the costs of items such as remedying design faults and making modifications in response to complaints are not generally seen in this light. Although quality assurance measures do appear as expenditure in the cost accounts, the "quality gain" in the form of less remedial work, fewer complaints, etc. is difficult to assess financially. One reason for this is the lack of suitable accounting and technical procedures for recording and analyzing quality costs and the lack of methods for assessing quality measures.

Acquiring knowledge and exploiting quality-related factors.

Investigations show that about 75 percent of faults have their origin in the basic idea for the product, development, design, and production planning, in other words upstream of production, and that some 80 percent of faults therefore become apparent only during manufacture or use by the customer. One reason for this is that important customer requirements and actual and potential sources of faults are not known when the product is taking shape.

The systematic collection, processing, and supply of knowledge concerning customer requirements, environmental impact, regulations, manufacturing processes, and other quality-related factors throughout the entire product cycle therefore always plays a major role in the pursuit of quality. Fault prevention right from the outset and methods for achieving this are still to be found only in embryo.

Quality assurance in the integration of comprehensive systems.

In mechanical, electrical, and chemical engineering, highly complex installations are frequently built as one-offs or in very small numbers involving machines, instruments, and software from a wide variety of sources and with a great diversity of specifications that have to be combined into a system. Their complexity, the large number of people involved in the development and construction process, and the limited opportunities for gathering experience when the people and components involved change from one job to the next, render the problems of assuring quality from the outset particularly acute. There are no methods capable of reducing the cost of failure in integrating systems.

b) Stage reached in preparations

The first joint project on these topics was announced in the Federal Gazette in August 1991: Methods and Aids for Implementing DIN/ISO 9000 ff on the Introduction of Quality Assurance Systems.

This announcement aroused a great deal of interest, and 168 project outlines were submitted. Around 790 organizations wish to take part in these projects. About 600 of these are commercial enterprises, about a quarter of them from the new laender. More than 90 percent of them are small and medium-sized enterprises. About 190 of the interested parties are research institutes, associations, and other institutions.

This reaction shows the broad interest and the high level of commitment on the part of those involved, with whom appropriate project structures and know-how transfer strategies must now be set up. The remaining topics will be announced in the Federal Gazette in the course of 1992.

5.3 Implementing Quality Know-How Effectively on a Broad Scale

The terms of reference of the research teams and the joint projects are so formulated that the knowledge required for effective quality assurance will be processed and made widely available for personnel training in firms. In order to intensify the conversion of knowledge and experience into practice and to close any remaining gaps, technology transfer will be promoted by existing institutes and establishments, which will provide the following services:

- exchange and dissemination of general information on quality assurance measures and quality assurance systems (e.g., development trends, R&D findings, experience);
- guidance on the basic procedure for drafting suitable quality assurance strategies and installing quality assurance systems;
- organization of seminars, workshops, planning games, etc., with a view to transferring knowledge, new findings from the research teams, joint projects, and standardization work, and experience acquired in the introduction of the systems concerned rapidly into widespread company practice;
- demonstration of exemplary solutions for putting quality knowledge into practice within firms;
- organization of events for the exchange of experience.

The principal target groups for these measures are small and medium-sized enterprises. The parties involved in the transfer of quality assurance technology will cooperate closely with one another while at the same time sharing the work. They will tailor their services to the specific requirements of one or more target groups (e.g., groups from different industrial sectors). New approaches to technology trasfer will also be explored with a view to reaching a broad

and diverse audience and creating awareness of the importance of quality as a factor in competition.

The organizations responsible for this measure will be primarily institutes from the aforementioned research teams. The German Quality Association and the member institutes of the "Wuppertal Circle" (German Association for the Promotion of Executive Development Training) concerned with quality assurance must also be involved, as also will other relevant trade organizations.

In the first stage, a special working party will develop strategies for putting existing quality assurance knowledge into practice in companies.

In so doing it will bear in mind that, while Germany already has a wide range of seminars for imparting the specialist knowledge required for quality assurance, two problems have emerged as regards its practical exploitation:

- The knowledge and training on offer is very extensive; it is hard to obtain an overall view and assess what knowledge is really necessary and appropriate for which task;
- People who have attended such courses have great difficulty in translating this knowledge into practice and passing it on in the practical situations they encounter at the workplace.

The working party intends to close this gap by analyzing and evaluating the knowledge on offer and drawing up strategies for the transfer and practical application of the relevant know-how in real working situations in all departments of a firm responsible for quality. These strategies must embody the integrated approach to quality assurance. The results will be processed in such a way that they can be taken up by, for example, professional training and further education associations and institutes and passed on to their trainees from industry so that they will then be able to use the quality knowledge in their workplaces.

5.4 Intensifying R&D on Interface Standardization

Standardization has a crucial role in the current interplay between markets, especially in view of the unification of the EC internal market, and this is particularly true in the case of quality assurance.

As in other fields of technology subject to rapid change, the standardization of quality assurance interfaces cannot be put off until a particular stage in development has proved viable in practice. Rather, standardization must be regarded as an integral part of technological research and development, and conditions must be created in which standardization can go hand in hand with development.

Firms today require new and more efficient operational and organizational structures to achieve quality within complex integrated production and service processes. Standardization must, therefore, always pay particular attention to the quality assurance interfaces between a company's functions and information flows.

An ad hoc working party will be formed by relevant research institutes in conjunction with the DIN to give the Federal Republic of Germany a sound scientific basis for the standardization of quality assurance interfaces. This working party will act as a national research center, assisting industry by jointly taking up important R&D topics, working on them, and incorporating them into standardization work. This will also help to substantially improve international awareness and representation of German interests. The working party will be constituted for a limited period (four years); it will be partially financed by the Federal Ministry of Research and Technology.

Before the quality assurance interfaces between the functions and information flows of a firm's many operational units can be standardized, it must be possible to describe them, i.e., they must be modeled. The working party's priority R&D task is therefore to develop a strategy for an integrated quality assurance interface model. If it is to depict operational reality, it must register the static and dynamic characteristics of both the company's conventional production facilities and its human resources. It therefore requires an interdisciplinary approach to research.

The model may also serve a number of other purposes, e.g., describing the genesis of a product, reviewing quality assurance measures, integrating quality assurance methods and internal communications, and communicating with customers and suppliers.

6. Budgeting, Handling of Funds

The following resources are envisaged in the Federal Budget (heading 3004/68323) to finance these measures:

	1992	1993	1994	1995	1996	Total
in DM million	10	80	100	100	60	350

The funding is subject to budget decisions; the measures will be handled by the Production Engineering and Quality Assurance Project Manager Karlsruhe Nuclear Research Center Postfach 36 40, [D-] W-7500 Karlsruhe 1 and the Dresden Branch Office Hallwachsstr. 3, [D-] 0-8027 Dresden.

France: New Environment Research Center Created

92WS0535D Paris L'USINE NOUVELLE in French 23 Apr 92 pp 76, 78

[Article by Michel Raphael: "Manosque Pins Its Hopes on the Environment"; first paragraph is L'USINE NOUVELLE introduction]

[Text] The Manosque region has one trump card: It is home to the Cadarache Nuclear Research Center. It also has the expertise to set up training and equipment. Now all the region has to do is attract manufacturers.

Alps-de-Haute-Provence is investing in environmental technologies. The department—not exactly a magnet for industry—has thoroughly grasped the advantages to be gained from industries that are sure to bloom quickly. Picking up the ball, the city of Manosque has decided to

create the first specialized research hub of the Provence-Alps-Cote d'Azur region. It has established the European Center for Environmental Research and Technology Transfer (CEERTE) in collaboration with the Atomic Energy Commission (CEA), Electricity of France (EdF), local collectivities, and a group of manufacturers. The project's instigator is a local manufacturer, Bernard Jeanmet, who is the chief executive officer of Barras Provence. Mr. Jeanmet plays a pivotal role, both as supplier and partner to the Cadarache Nuclear Research Center (which falls under the CEA) and EdF, and assistant for economic issues to the mayor of Manosque. For Mr. Jeanmet, the choice is clear: "The environment is going to enjoy a boom comparable to the one the robotics industry just went through." Hence the avid jockeying for position in a highly coveted niche.

The Manosque area had plenty of challengers. Nice and La Ciotat, to name just two, were contenders; but CEERTE prevailed. It will be able to balance its first budget, thanks to help from the region (1.5 million French francs [Fr]), the Alps-de-Haute-Provence general council (Fr200,000), and the city, which provided the buildings. Brussels is studying a funding request. Manosque had a trump card: the support of the Cadarache Nuclear Research Center (CEN) and the help of its 4,000 technicians and researchers. "We are ready to share our experience in waste treatment and pollution measurement," says Yves Le Niger, CEN's assistant director. Proof of CEN's active cooperation is the assignment of Dimitri Antonakas, one of the center's managers, to CEERTE. The director of the new center is none other than Antoine Guidicelli, lately the director of the Rhone Valley CEA, which takes in the Pierrelatte and Marcoule sites.

The center's top mission is training. It will offer a first session this May on the treatment of liquid and gas effluents, the treatment and processing of solid waste, and the environmental impact of manufacturing facilities. But the educational component will really come into its own in October, when the center will set up an IUP with the University of Aix-Marseille I. The Cadarache CEN is playing a role here too. "We will provide logistical support and intellectual assistance," says Alexis Bouchicot, the assistant director of the National Institute of Nuclear Sciences and Technologies, an engineering school that is part of the CEA.

The second objective of the new "pole of expertise" is to make vital equipment available to researchers, instructors, and manufacturers. The investments are significant and costly. Financing has already been found for the purchase of a mass spectrometer that can achieve a rare level of analysis at a cost of Fr4 million.

A Training Role

But CEERTE will not just rent out machine time: It will also offer services and research. CEERTE's third and final mission is to transfer technology.

Although the CEA's image as an inpenetrable fortress may have detered companies from knocking at its door, an association ready to disseminate its know-how should lure private researchers. That, at least, is what Antoine Guidicelli reckons. He is still hopeful that an experimental platform for industrial and urban waste treatment—producing environmentally harmless ash—will some day set up shop in Manosque. He is also counting on attracting the major building and public works firms and companies specializing in measurement equipment.

The creation of CEERTE is a windfall for Manosque. It finally gives the region a chance to gain recognition as a full-fledged economic entity. "We cleaned the straw out of our clogs a long time ago," jokes Bernard Jeanmet. Indeed, in a traditionally agricultural region, the presence of EdF and the CEA has spawned an industrial culture.

Barras Provence is not the only company to have profited from the lure of Cadarache. EBIM (a computer company) has also taken advantage of the center. The 30-year-old company does not just distribute computer hardware. It is also a software factory and research laboratory. After tackling the very closed market of television transmitters five years ago, EBIM has become France's third-ranking manufacturer. It is also developing simulators for the air force and the SNCF [French National Rail Company] (high-speed train conducting). As a result EBIM's 240 employees rack up sales of Fr155 million, up 30 percent.

The region is fertile ground. It has spawned the robotics and electronics group Secia-Spectec-Secimo, which the Marseilles company Cybernetix recently took over. It has also produced the APS company, now called Eden Land after its management filed for bankruptcy and acquired the company. Eden Land specializes in automated management of irrigation; its engineers have developed computerized control systems (and their low-voltage power supplies) for gate networks. The company designs its own computer boards and software. Its customers include field and greenhouse farmers and water distributors.

A Still Fragile Potential

Such manufacturers do a significant amount of training. A network of small subcontractors and service companies has grown up. Yet their potential is still fragile—too fragile, in any case, to withstand the technological fever that has gripped the coastal strip of the Paca region these last 10 years. The danger is reinforced by the opening of the Alps highway, which, although ending Manosque's isolation, makes it a close suburb of Aix-en-Provence. Styling oneself as a specialist in a business as booming as the environment is a safeguard, not a luxury. But the claim will have to be based on the creation or transfer of firms. Manosque's breeding ground already has a superb startup story to its credit—that of Eric Venturelli. His company Analys makes titrated reagents to calibrate measurement devices and offers analytical chemistry services for industry and the environment. It has garnered 170 customers in two years and will earn Fr3 million in sales this year. Analys's portfolio boasts some of the biggest names in French industry. "We perform 90 percent of the services in the market's line. Once the spectrometer is installed in CEERTE, we will be able to meet our customers' needs

completely," says a pleased Eric Venturelli, whose buildings will be near the new spectrometer.

The Cadarache CEN made its equipment available to the young company from the outset. The center says it will do the same for any company that expresses the need through CEERTE. For the Atomic Energy Commission, there is nothing exceptional about the offer. "It is," according to its directors, "a normal extension of our public service mission." It may also be a way to prepare the future.

Germany: Changes in 'Blue List' Research Centers Expected

92WS0536B Munich SUEDDEUTSCHE ZEITUNG in German 30 Apr 92-1 May 92 p 67

[Article by Martin Schneider: "An Arrangement for the Blue List? The Fifth Column of State Research Grants Is Reevaluated"

[Text] There could soon be another scientific organization on the German research landscape. The Science Council has set up a working group intended to deal with reorganizing the so-called "Blue List." Specifically, with German unification the number of research institutes found on this list, which are jointly financed by the federal and laender governments, rose from 47 to 80. Up to now, the "Blue List" was basically nothing more than a niche for research institutions that could not be easily classified—institutes that are of "supraregional or national significance" without being part of a college or scientific organizations (such as the Max Planck or Fraunhofer Gesellschaft). They were too small to be "proper" major research installations, but with their annual budget of 2.5 million German marks [DM], they did surpass a certain "triviality threshold." There are scarcely any other features that these institutions have in common. The economic research institutes known for their prognoses are just as much a part of it as the German Museum in Munich or the Pedagogic Section of the German Adult Education Association. The Heinrich Hertz Institute for Communication Engineering, the Institutes for German Language in Mannheim and for Petroleum Research in Clausthal-Zellerfeld, or the Institute for Scientific Film in Goettingen are also Blue List institutes.

Some of the research institutions have a 100-year tradition; in 1975, the federal and laender governments agreed in principle to finance them jointly. In this way, a fifth column for German research promotion was created next to the German Research Community and the major research institutions such as the Max Planck or Fraunhofer Gesellschaft. And since the first list of these institutes was printed on blue paper, the "child"—for lack of other common features—immediately had a name. Initially, 47 research and service institutions for science had settled into this "niche" of the German research landscape. Then, on 1 January 1992, there were additions to the family in the "blue house." After evaluating the research institutes in the new Laender, the Science Council last year proposed 33 institutions for inclusion in the "Blue List." At the same time, others were also added, for example, five agricultural science institutes—a field that had been completely unrepresented in the Blue List—but also the Institutes for Polymer Research in Dresden, for Wild and Zoo Animal Research in Berlin, or for Semiconductor Physics in Frankfurt an der Oder.

This represented a growth in the list of 70 percent, while the number of employees rose from 5,000 to 9,300. This year, around DM1 billion will flow into the coffers of all the Blue List institutes. Thus, this is no longer a "niche in the research landscape." Even the Max Planck Gesellschaft did not have this much money at its disposal before the "revolution." And the Fraunhofer institutes must get by with as little as half that amount. The college rectors conference now fears an imbalance between nonuniversity and university research. The Fraunhofer Gesellschaft is concerned about competitive distortions because of the new technological Blue List institutes, to which the state devotes more financial attention. In order to thoroughly clarify the situation, the Science Council has set up a working group to come up with ideas for a new structure of the Blue List.

"This will be the first major acid test of the capacity for reform in the united Germany," believes Wilhelm Krull, the spokesman for the Cologne committee. "Here we have an opportunity that should not be wasted through simple, superficial, and cosmetic changes." For example, the working group will raise the question of whether a sponsoring association or governing board should be set up for the Blue List.

Krull sees a possible "thematic niche" for the Blue List in a position between the Max Planck institutes, which are more or less dominated by the spirit of pure basic research, and the Fraunhofer institutes, where applied research is carried out. A new "corporate identity" in the direction of "problem-oriented basic research" could naturally mean for some institutes that their name would no longer be printed on blue paper. With museums, for example, the question would arise of whether there is still room for them in such a model. Indeed, they are primarily on the Blue List because right now there is no other formal way in which the federal government can be involved in their financing. A certain lump-sum "research proportion" is assumed for them, which the federal and laender governments then split in half. For the heavily visited "German Museum," for example, this figure is 30 percent, while for the "Museum Alexander Koenig" in Bonn it is 50 percent.

But even at the other "established" Blue List institutes, initial worries about the future are being felt. "Competition for remaining on the Blue List will certainly become more fierce in the united Germany over the next few years," believes Juergen Schlegel, the secretary general of the Federal-Laender Commission for Education Planning and Research Support (BLK), in which the state research financiers sit down at a table and make decisions about joint financial support. Even though all the institutes already had to prove to the BLK every two years that they still satisfied Blue List conditions, that was more or less a formality. "In each case, only the letterheads were changed," insiders report. Nor is there really anything comforting about the announcement by Science Council chairman Dieter Simon

that his body "cannot stop at the former border of the GDR in evaluating research institutions."

In the past, the Science Council had also taken a look around the institutes about every eight years, and that process did indeed result in the removal of institutes that were deemed too idiosyncratic. The fear is that the new competition from the East could now also displace the measuring staff for the old institutes. Fear of pink slips from Cologne is rampant especially in the six "old" natural science institutes, whose approval had been planned long before unification and is now due to take place in July under the new circumstances. If competition actually invigorates business, then things should really be hopping on the Blue List before long.

Germany: Humboldt Foundation Presents 1991 Report

92MI0537 Bonn WISSENSCHAFT WIRTSCHAFT POLITIK in German 13 May 92 p 6

[Text] The Alexander von Humboldt Foundation has presented its 1991 consolidated balance sheet in Bonn. The foundation sponsored a total of 2,163 scientists, and awarded 808 research grants and 161 research prizes. Its work was financed by 76.4 million German marks [DM] from the federal budget and DM2.7 million from private donations.

More Applicants Than Funds

The main activity of the Humboldt Foundation, fostering collaboration between foreign and German scientists, is as much in demand as ever: 2,641 scientists from 82 countries applied for grants. The greatest interest came from the countries of the former Soviet Union, from India, Poland, the Peoples' Republic of China, the United States, and Japan.

Impetus for Eastern German Science

The radical changes in Central and Eastern Europe, in particular, pose great financial problems for the Foundation, but great progress is already being made in bringing East and West closer together. Scientists from the new German laender are also gradually being integrated into German and international scientifc activity. The Humboldt Foundation supported 101 eastern German grant-aided research students during their time at western German institutes in 1991, and more and more foreign guest scientists are choosing to spend time at institutes in the new Federal laender for research work.

France Forms Research Advisory Group

92WS0544A Paris AFP SCIENCE in French 23 Apr 92 p 2

[Unattributed article: "Preparation of the 11th French Plan: Creation of a 'Research, Technology, and Competitiveness' Group"]

[Text] Paris—A "Research, Technology, and Competitiveness" group was created as part of the 11th plan preparation, and Mr. Guy Paillotin, assistant general director of the Atomic Energy Commission (CEA), was appointed as its president, the General Planning Board announced on 16 April.

The group includes about 40 members. Its task will be to consider the relationships between research and higher education, the ways to balance efforts at various levels (regional, national, international and European), and the problems linked with the dissemination of technology and the financing of innovation, the communique indicated. The group consists of government representatives and representatives of unions and professional organizations, regional personalities and experts from universities and university-level schools and from the world of research and industry. The group's work will be based on statistical data produced by the Science and Technology Observatory.

France: Renater Telecommunications Network for Scientists

92WS0556A Paris MESSAGES in French Apr 92 pp 38-39

[Article by Remi Scavenius: "Renater: Network for Real-Time Communication With Supercomputers"—first paragraph is MESSAGES introduction]

[Text] In building a telecommunications "superhighway" for scientists in the Paris region, France Telecom is taking a decisive step toward creating a great national research network dubbed "Renater." Eventually, public and private research centers all around the world may be linked up...

With the installation of a national telecommunications network for the scientific community, France Telecom will definitely be turning scientists into communicators. Actually, the era of solitary geniuses is long gone, even though Epinal's imagery still enshrines the traditional picture of the lonely scientist working tirelessly in his dusty laboratory to discover the philosopher's stone. These days, progress in science is based on investigations in many different areas carried out by organized teams of researchers. Today's scientists need access to enormous databases, they need to exchange information, and they work with the world's most powerful computers. In short, communication is the backbone of their activity. One striking example: An astronomer in France can link up directly with an observatory in Hawaii (a superb sky-watching site)—and even direct the telescope from his work station.

Most scientists also need the enormous computing capacity which only supercomputers can provide. Such machines are rare. The solution in many cases, if money is available, is to link up with a partner's computer to perform the onerous number-crunching operations in a reasonable amount of time. The Cray 2 installed at the Ecole Polytechnique is thus as indispensable as mothers' milk to scientists in the Ile-de-France [Parisian] region.

The problem is that the standard public telecommunications network is just not set up to provide the kind of service they need: massive transmissions at irregular intervals. And while it is impossible to endow all of France's research laboratories with supercomputers, it is at least

possible to improve the communications system that links them with heavy-duty computer servers. Such a communications infrastructure has long been sought by research centers, which often pool their computing resources to gain rapid access to big databases.

All this has led to an ambitious national project dubbed Renater—"National Research Telecommunications Network"—which France Telecom is inaugurating this year. Starting in June, this high-capacity (up to 34 megabit) network, a veritable telecommunications superhighway, will link the various regional networks that have been put in place since last year. The "Remip" network in Toulouse started up in March 1991, the R3T2 network (Provences-Alps-Cote-d'Azur) in September of that year, and the Vikman network in February 1992. Most recently, the Ile-de-France network—the keystone of the whole project—has just been opened.

Ile-de-France covers only 2 percent of France's territory but accounts for 60 percent of the nation's scientific resources. Which means it was high time to set up a modern communications system. In July 1991, the Regional Council and France Telecom signed a partnership agreement resulting in what officials now call the telecommunications "Francilienne"—which since its March 1992 inauguration has proven even easier to navigate than the superhighway of the same name. Seven sites participated in the project's pilot phase in the last quarter of 1991: CNET [National Center for Telecommunications Studies], INRIA [National Institute for Research on Data Processing and Automation], the Center for Vector Calculus at the Ecole Polytechnique, CNRS [National Scientific Research Center] and Paris VI (Jussieu), ONERA [National Office for Aerospace Studies and Research] and EDF [French Power Company] in Clamart. France Telecom hopes to link up some 160 sites to the system between now and 1995.

The system proposed by France Telecom is a dial-up network relying on dynamic bandwidth-sharing. This means scientists can simultaneously query big databases and perform number-crunching tasks on the computers. The capacity of the "Francilienne" will be increased as more subscribers sign on. France Telecom plans to augment its capacity to 140 megabits.

The current 34-megabit capacity has already made a revolutionary difference in the work habits of scientists who have had the chance to enjoy its benefits. Two joint CNRS-Paris VI research units—LODYC [Laboratory of Oceanography and Climatology] and the Laboratory of Theoretical Fluid Physics—are among the happy few that participated in the pilot phase. The LODYC team is studying changes in ocean temperatures and currents. The work involves digital simulations that only a supercomputer can perform. From the start, the researchers have been doing their work on the Ecole Polytechnique's Cray 2.

Security First

Up to now, software applications were linked to the supercomputer via Transpac or Transcom, or even more simply via modem and telephone line. On the first two communication systems, it took 20 seconds to retrieve a file. Using a modem, it could take nearly half an hour to display a polymer series! It's hard to speak of "interactive" communications with such enormous transmission delays. Today, thanks to the new network, scientists in the two laboratories at Jussieu can access the supercomputer in real time. According to research engineer Bernard Bernu, the time saved makes a substantial difference in the quality of his work. "You have the impression the Cray 2 is right in the room with you," he explains.

To enjoy the benefits of the communications superhighway, the CNRS and Paris VI laboratories first had to connect their own Ethernet LAN [local area network] to the LAN on the university campus, which itself is connected to the Ile-de-France network. In the same way, France Telecom plans to link together all the local networks of the various French laboratories. The service will require interconnecting the IP (Internet Protocol) LAN's that are very widespread in the scientific community with high-capacity X-25 private-sector services.

A national administration center (CDN) is to be France Telecom's sole interface with clients for maintenance and operational management. France Telecom has designed a network access architecture providing hot standby in case of line interruptions or switching breakdowns. Security is a priority concern, given the threat of mischief or espionage in sensitive domains like nuclear science and space. France Telecom engineers still vividly remember the notorious Ver Internet virus, which paralyzed the entire American science network for several hours in November 1988. A researcher on the network had designed this innocuous virus (it blocked computer operations but did not destroy files) in order to alert authorities to the inherent vulnerability of such systems to mischief-makers. Computer operators, terrified at the spread of the virus, decided to shut down the big supercomputers, thus incurring hundreds of millions of dollars in operating costs...

So security is the watchword of the day, especially since the Renater national research network will eventually be linked up with NSFNet [National Science Foundation Network], which connects the main public and private research centers on the American continent.

Danish Expert Assesses Strengths, Weakness of Research Effort

92WS0565A Copenhagen BERLINGSKE TIDENDE in Danish 5 May 92 Sec 5 pp 8-9

[Article by Peder Olesen Larsen, chairman of the Basic Research Fund: "Danish Research Needs Leadership and Concentration"—first paragraph is BERLINGSKE TIDENDE introduction]

[Text] Denmark's Basic Research Fund was established under Law No. 409 of 6 June 1991. Backed by 2 billion kroner in capital the fund is designed to help stimulate outstanding research on the international level. While the fund waits for the interest to accrue it is getting started by designating what is best in Danish research. On this basis

the chairman of the fund's board of directors, Peder Olesen Larsen, assesses where Danish research stands today.

If one wants to know something about Danish research one must go and talk to the researchers and research institutions. One must ask the researchers to talk about their plans, goals and visions.

For this reason Denmark's Basic Research Fund has paid 50 visits to the research scene between February and the end of April and we have asked research people to send in their ideas and proposals by 1 May. At the time this article is being written we do not know how many we will receive but it will be well up in the hundreds.

Fifty visits are a lot, but these were only the main actors on the Danish research stage. We talked to the six research councils. We talked to all five universities and other institutions of higher education (Denmark's Technical College, the Agricultural College, Denmark's Pharmaceutical College, the National Teachers' College and the three business colleges). We talked to 19 branch research institutions and technological service institutes. And we talked to 10 private firms with big research and development budgets.

Thus we are taking the temperature of Danish research. The result will not be a single figure. It is not a question of whether the patient has a fever or not. It is not a question of whether we will spend 1.6 or 1.7 percent of our gross national product on research. It is an aggregate picture whose many details provide considerable insight into how Danish research is doing.

The main impression is an encouraging, I might say, a surprisingly encouraging picture. There is growth, a wealth of initiative and enterprise in research. We are holding our own internationally. We have opportunities to keep abreast in the years ahead. But of course there are also weak features: The efforts are scattered, there is too much bureaucracy and there is a need for more leadership at practically every level.

New Challenges

Research has always been international. Even so internationalization is the most important feature in research developments today. We are heading toward the internal European market. We are also moving into the European research market. Research results are only good enough if they measure up on the international yardstick.

Research is an exciting combination of cooperation and competition. Cooperation occurs between equals. There is no benevolence in the research world. But there are opportunities to make progress through cooperation. This is a question of cooperating with the best in the field and being selected as a cooperative partner by them.

It is vitally important for us to have something that is outstanding. One of our goals must be to have five or more institutes and institutions that are among the best in their fields in Europe and the world. It is not enough to have star researchers; we must also have star research institutions. We must be visible on the research map. We must be well-known; people must think of us first.

These are big goals. But the alternative is to be on the sidelines. Our universities know that. They are moving into the European university market where the cleverest young people will choose their education without regard to national borders. It will be good if Danes choose to get their university education abroad. But only if a corresponding number of young people from other countries attend our own universities.

Our universities and research system also know that our research training system must be as good as those in England, Germany, France and the United States. And that it has to be modeled along the same lines. This is necessary in order to encourage young people from other countries to come here for their research training. It is the decisive reason why we need a research training reform. A reform that is currently being discussed but that will hopefully move beyond the discussion stage very soon.

Our branch research institutes and technological service institutes, including the ATV [Academy of Science and Technology] institutes, also know that they must obtain a very large part of their research jobs and funds from Europe—in competition with similar institutions in other European countries. There is no longer any question of a protected domestic market. On the other hand there will be opportunities for the best in the field to make their mark in a far larger market.

Does this mean that in the future our research will be directed from outside? There has always been a lot of autonomous direction in research. Research results indicate interesting avenues to explore. But this simply means that we can move in the directions we consider most valuable, while respecting the autonomy of research, its nature. There is plenty of room for Danish direction of Danish research.

Status of Research

Our visits showed that there has been a very big positive development in Danish research in the last 10 years. This is also indicated in many other ways. Whether the development has been sufficiently rapid and positive is another question. The others are also constantly moving. I would like to mention five positive features:

First, there is now fairly general agreement on the distribution of work among the actors. The universities must supply basic research which gives us access to a broad spectrum of knowledge and produces good graduates and researchers. The universities and other public research institutions and private firms agree that the public sector should not provide development laboratories for the private sector. But the universities must supply some graduates and researchers who have had a rigorous international education so they know what research "with a capital R" is all about. Public research must also take care of the research infrastructure. The universities' research must be open. At the same time there must be easy paths to cooperation among all the actors in the research area.

Second, branch research has been tightened up considerably. Ten years ago it was characterized, at least in some areas of branch research, by too much direction from above, too much mingling of routine supervisory tasks with research, too many commissioned jobs, too little publishing in the international literature, too little national and international cooperation. Today we find clear goals and priorities, international quality requirements, cooperation and a determination to be among the best.

Third, a number of big research programs have been useful. Here I will mention the two biological research and development programs, the materials research and development program and FOTEK, the food products technology program.

The choice of subjects is not very original; other countries have chosen the same things. But the Danish programs have taught us how to cooperate across all institutional lines and across the boundaries between the public and private sectors. The centers without walls have been a very positive innovation. Again the concept of centers without walls is not very original, but it has worked and it was new in Denmark.

With regard to the fields of study in general: of the 10 private firms we visited six are working in the biological engineering and pharmaceutical area. If we had decided to visit 20 firms, 12 would probably have been working in this area. It is good that we have such strength here, but one could wish that there were other areas in the private sector that were given this much research emphasis. In any case the public research system has something to live up to in the biological area.

Fourth, there has been a substantial expansion of research training. The Research Academy—which is an original Danish innovation—has given things a tremendous boost. And the entire research system is involved in research training to a far greater extent than it used to be. More people are being trained and more go abroad during their research training period. The new generation is on its way and it has a far greater international orientation.

Fifth, the EC research programs and the European Research Coordination Agency (EUREKA) have done a lot for internationalization. Everyone knows them, everyone wants to participate and a lot of people have done so. Denmark has done a good job of holding its own. The most important thing is not how much EC money we have brought into the country. The important thing is how many Danish research institutions have been given a lift.

We Also Have Problems

Although a lot of good things can be said about Danish research we are by no means without problems. We have the prerequisites for holding our own. But it will take a lot of hard work. I would like to mention five problem areas here:

First, we have a great many small units, all of which try to keep going. But we cannot afford this much internal competition if we have to hold our own on the international stage. We visited 19 branch research institutions and technological service institutes. They come under eight different ministries, none of them under the Education and Research Ministry. And if we had included all the branch research institutions, five more ministries would have been involved.

If we are to maintain our standing internationally our home bases must be in order. This requires concentration and priority setting within the research area. Instead we see diffusion. And we see how the budgets for important branch research institutes are set by the individual ministries on the basis of overriding criteria that have little to do with research. Regardless of how important a role these branch research institutes have in the total Danish research system.

Perhaps the public research system needs more money. At any rate more money could be used for quality research. But there is an equal need for making choices and setting priorities—across ministry lines.

Second, there are big problems concerning the recruitment and mobility of researchers in the research world. Researchers talk a lot about the lack of opportunity to give young researchers permanent jobs. There are problems here. But it disturbs me that the older researchers are primarily talking about permanent employment for young researchers at their own institutions, of hiring researchers who have spent their entire research lives in that place. It would be better if they talked about the possibility of attracting researchers from outside and of being able to send their own new workers out to find permanent jobs elsewhere in the Danish research system.

We must guard against inbreeding. Inbreeding has done a lot of damage in Danish research. There are a good many new appointments in the Danish research system as a whole. But there are imbalances and in some areas there are problems. We must make an effort to do something about this.

Third, there is too much bureaucracy. Too many cigar boxes, too little stability in decisions and grants. Bureaucracy is like the dragons of old. For every head one chops off, three new ones grow in its place. There are plenty of heads to chop off at the moment.

Fourth, there are quality problems. Some of the private firms we visited said that not all university graduates fulfill modern requirements. The universities are accepting more and more students. I am afraid that this will have a negative effect on quality. But how refreshing it would be if a university refused to accept everyone, said it would accept only those who will be a credit to the university when they complete their education. Imagine a university saying this kind of thing, even though it would involve cuts in its budget.

Fifth, there is a need for more research leadership. This applies to individual research groups, individual university institutes, individual research institutions—and to those at the higher administrative level. In the last five years we have experienced a number of international evaluations of Danish research. It started in 1987 with the

OECD evaluation of Danish research policy. After that we have had evaluations of environmental research, Danish physics and health research. An evaluation of agricultural research is coming up soon. Each time we have been told that more is needed. Coordination alone will not suffice. It is often carried out in an attempt to avoid providing leadership. Have we paid enough attention to the foreign evaluations?

Minister on Denmark's Role in EC Research

92WS0565C Copenhagen BERLINGSKE TIDENDE in Danish 5 May 92 Sec 5 pp 24-25

[Article by Research Minister Bertel Haarder: "Denmark Well Represented in International Projects"—first paragraph is BERLINGSKE TIDENDE introduction]

[Text] Denmark can acquire both knowledge and funds in the international research programs subsidized by the EC, according to Research Minister Bertel Haarder.

The Danish government is currently preparing itself for the approaching EC chairmanship in the first half of 1993. This is especially true of the research area, which comes under my jurisdiction. During the Danish chairmanship period the research ministers will make important decisions concerning the EC's research policy in the years ahead.

Faced with such a challenge it might be interesting to take a brief look at our possibilities in European research work (primarily in the EC) in the immediate future. Let us begin with Danish preparedness (especially national support) and then see how we have done in European research so far.

Danish Research Support

National support for research and development in this country is provided through a multistrand grant system that is designed to promote renewal and market adjustment.

The cornerstone is the state budget appropriations which amounted to just under 6 billion kronor in 1992, a little more than 80 percent of the total public research budget. In addition over 1 billion kroner in funding was fairly evenly divided among EC funds, tax subsidies, county and municipal research funding and money from the new Basic Research Fund. A major goal of the new financing sources has been to make the support more decentralized, market-oriented and nonbureaucratic.

In establishing research preparedness the government has been guided by the qualified advisory groups. This is especially true of the Research Policy Council and the research councils. For example, the Basic Research Fund was set up on the recommendation of the Research Policy Council to promote basic research and thus strengthen Denmark's long-term competitiveness.

All the big programs involving materials, food products, environmental technology and biotechnology, etc. have been set up as a result of recommendations from the research councils and developed in cooperation with them. The object is to "fertilize the ground" in areas where Denmark has special opportunities because of the talent of our researchers and those who will apply the research.

Our Status in EC Cooperation

Denmark has done extremely well when it comes to economic benefits from our project participation in the various EC research programs. Thus over the last five years the average total EC support level has amounted to around 5 percent of state research and development expenditures in Denmark, corresponding to an annual supplement of a little under 300 million kroner in 1992.

In the last two years—1990 and 1991—the Danish share represented around 3 percent of the EC contribution for participation in the (multinational) projects into which the research programs are divided. In other words well over the 2 percent we pay to the EC's general budget. Thus we get 3 kroner back for every 2 we put in.

The three main areas where Denmark received the largest share of EC funds, in 1990 were: marine and environmental research (7-8 percent), bioscience and technology (a good 6 percent) and non-nuclear energy research (almost 5 percent). In 1991 the share was largest in these areas: non-nuclear energy research (just under 14 percent), marine research and technology (almost 13 percent) and environmental research (a good 7 percent).

The three research areas where we did the poorest in both 1990 and 1991 were: nuclear energy research (less than 1 percent), the program involving researcher mobility, etc. (less than 2 percent) and the ESPRIT information technology program (around 2 percent). The last result "dragged down" the total average because of the size of the program's budget (over half of the grant funds appropriated by the EC went to ESPRIT in 1990 and 1991). With respect to the economic benefits from the researcher mobility program the result is somewhat disappointing compared with previous years.

More Than Money Involved

Participation in the EC research programs is not just a question of financial contributions to Danish project participants, however. The goal of project participation should never be purely financial. There must be a principal idea and vision behind the efforts. Participation contributes to the internationalization (including specialization) of Danish research institutions and businesses which in the years ahead will be of vital importance for Denmark's competitiveness as a result of the strategic expansion of our knowledge, among other things.

Therefore we should also be pleased that Denmark actually participates in far more programs than one might think on the basis of the economic percentages. Participation is fairly evenly distributed among private businesses, universities and institutions of higher education and other research institutions (the Riso Research Center, other branch research institutes and institutes under the Academy of Technical Sciences). Thus in 1990 we were involved in more than 15 percent of all new EC research

projects (for the ESPRIT program it was 20 percent and in some subareas it was even over 25 percent).

However the effect of our participation in EC research could be further increased with stronger links between the academic world and small and medium-size firms and research parks, as well as greater cooperation between public and private research. Perhaps our internationally oriented universities and institutions of higher education could be the cutting edge in a process aimed at such a goal.

Quality is the Key

In any case quality should be the sole deciding factor when EC research money is distributed. We must not accept the demands of some countries for special consideration on regional and social grounds. We have the rapidly growing regional funds to take care of that.

Therefore quality in EC research will be one of the "major issues" that will be advanced in the spring of 1993 when I occupy the EC chairman's seat and I will try to create a satisfactory compromise on research policy in the EC.

In addition, basic research, the training of research workers, support for Central and Eastern Europe, increased possibilities for participation by small and medium-size firms and further improvement in the efficiency of the administration of the various research programs are among the issues I will address in my position as EC chairman.

Top Scorer in EUREKA

So far I have concentrated on Denmark and the EC, but obviously the world does not end there. I have always been a big advocate of Nordic cooperation on research and development and I am looking forward to being the first to welcome our Nordic friends to the EC-European Free Trade Association (EFTA) cooperation that will begin on 1 January 1993 at the same time as Denmark takes over the EC chairmanship.

Nor should we forget other types of research initiative that have been organized on the European level. Among the most successful is the European Research Coordination Agency (EUREKA) initiative that includes the EC and EFTA countries as well as Turkey, with Hungary scheduled to be added soon. Support for EUREKA projects is granted solely on the national level and provides up to 50 percent of the expenses. In Denmark this involves loans that must be repaid when the project results reach the point where they can be commercialized. As BERLINGSKE TIDENDE reported recently, Danish firms participate in more than one in seven EUREKA projects, making Denmark one of the top scorers among the member countries.

Danish Initiative for Better Coordination

Denmark also participates in true research organizations such as the ESA [European Space Agency] (space research), the ESO [European Southern Observatory] (astronomy), CERN [European Organization for Nuclear Research] (nuclear physics) and EMBL [European Microbiology Laboratory] (molecular biology).

We in Denmark are in the interesting situation that the research minister's sphere of responsibility includes all the organizations and areas mentioned. This circumstance contributed to my sponsorship of an informal discussion among EC research ministers on the possibilities of future coordination and rationalization of European research activities within, for example, the EC, EUREKA, ESA, ESO, CERN and EMBL.

The aim should be to achieve a more optimum utilization of both international and national resources in the area of science and technology. Not just on the European level but also on a more global level. On my initiative and that of others, steps were recently taken in the OECD to establish a so-called "megascience forum," a kind of "clearing-house" or information exchange for big new research initiatives. I have just received the acceptance of the United States. Denmark, the United States and Japan are the countries that took the initiative when introductory speeches by these three countries set the stage for a more global cooperation during the recent meeting of OECD research ministers in Paris.

At the same time I have proposed to the EC that steps be taken to coordinate and rationalize the existing European research activities. I have also offered to host a subsequent informal conference of ministers that would be attended by the countries concerned, including the EFTA countries.

Thus research is one of many examples that a small country can also achieve influence and take initiatives and in this way help to shape the future.

EC Commission's Third, Fourth Framework Programs

92WS0574A Duesseldorf VDI NACHRICHTEN in German 10 Apr 92 p 4

[Article by Hermann Bohle: "Competition or Subsidy"]

[Text]

The Argument About Support for Research and Technology in the EC Continues

More Funds Requested for the New EC Research Framework Program

The new research programs of the EC Commission are now in preparation in Brussels. More and more doubt is being expressed regarding the performance of these programs, the shortage of funds are being criticized.

More than one of every two of the approximate 60,000 inventions registered in 1991 at the European Patent Office (EPO) in Munich originate in the U.S. and Japan. The 14 European EPO countries account for the rest—together with the other continents. The Germans still have about 13,000, the French and British, 5,000 and 3,700, respectively.

These figures should actually demonstrate that the European Community, with its research framework programs, is making a significant contribution. But this is far from the truth. At a conference in Brussels on "Transnational Research and Development," it was pointed out last week

again that the third EC five-year framework program prepared for 1990-1994 will not really start moving until Autumn 1992.

The situation will be no better for the fourth program. The EC Commission has just presented to the member governments. Before the program even starts, it could run out of money. This is according to Debora McKenzie at the conference in a study on the "EC Research and Development Extending Beyond Borders and the Horizon." According to this study, there is tremendous discord both between the member governments and within the European Parliament regarding the amount of "precompetition" basic research versus "applied," thus closer to industry, research.

It is clear that the new unification agreement on the European Union with its regulations regarding industrial politics, research and technological development, is not to clear any secret paths for pampering uncompetitive branches and companies. Filippo Maria Pandolfi is the EC Commissioner in charge of research and technology. He left no doubt on this subject saying, "It is important that the projects be able to stand competition."

The new EC action is intended to make the European national economies internationally competitive. In this way, the fourth program fits into the plan known as "Delors II" after EC Commission President Jacques Delors. This plan will also lead the EC domestic market, starting in about nine months, to success. For his plan, Delors wants to balloon the current EC budget of ECU66.5 billion (ECU1 = 2.04 German marks) to ECU87.5 up to 1997.

For his part, according to Pandolfi, "technological priority plans" are involved. These include key technologies such as electronics and information technologies, software engineering, new materials and molecular biology.

Pandolfi and his General Director for Research, Michel Carpentier, have their sights set on economical applications. These include automobile manufacturing, environment-friendly production methods, environmental protection and research programs on the problem of changing climate.

Pandolfi emphasizes the close contact the EC Commission keeps with the practitioners while working out its plans. "The Commission is in constant consultation with industry, both European and worldwide." This does not prevent Yves Farge from Pechiney of France from issuing the warning that Brussels should concentrate on technologies that "all industries have in common." Robin Nicholson (Pilkington in Great Britain) adds that the role of the EC in this arena must be in the "conversion of science into technology and innovation." In this conjunction, Carpentier speaks of "even more selective" education programs, of a "crop rotation between education—R&D—production—market."

Bernhard Salzer (CDU) is the deputy chairman of the Committee for Energy, Research and Technology in the European Parliament. Recently, he clearly expressed the demand of his parliamentary group for a reorientation of the EC research policy. "A competitive European information technology has not been achieved." In nuclear fusion, telecommunications, and alternative energies, the watchword is continue—with considerably more money than before. In the European Parliament, a figure of 6 percent of the EC budget is being discussed. That would be at least ECU12 billion for five years. In the current program, it is ECU5.7 billion. The member governments, led by Germany, France and Great Britain, reduced the appropriation for the EC Commission in 1989 by 2 billion.

The European Parliament delayed the start of the current third framework program itself. This was to push through its demands for research focal points of environmental and politico-social relevance. Salzer wants to retain the precompetition character. Other representatives, those who really wish to pay alimony to uncompetitive branches and companies, are of a different opinion. Debora McKenzie talks of "interventionism with research that is close to the market instead of simple subsidies."

The argument over principles may cost time. The EC Executive Council may only decide unanimously on the program and the European Parliament can block it at any time.

EC agencies responsible for small businesses point to a problem. Many programs are only publicized but not put out formally for bids. This is because the research management of the EC Commissions fears "too many bids." Result: Potential participation by small and medium-sized businesses is bypassed. This was the case for BRITE (industrial manufacturing processes) and EURAM (advanced materials).

Germany: Problems in University Research Discussed

92WS0577A Duesseldorf HANDELSBLATT in German 13 May 92 p 8

[Article: "Erichsen: Eliminate Imbalance In Funding Distribution"]

[Text] Rostock—An imbalance in research funding was criticized by the president of the Conference of University Presidents (HRK), Hans-Uwe Erichsen. Erichsen said at the presidents' meeting in Rostock that while the budgets of major research facilities had a nominal growth of 45 percent since 1980, and the budget of the Max Planck Institute grew by 65 percent, aid to university research was stagnating.

Erichsen noted the continual decline in university research funding relative to the volume of research that it did not reflect the "special burden" of the universities.

According to Erichsen's calculations, the entire 1990 research budget amounted to approximately DM66 billion. Of that amount, 71 percent went to industry, 12.6 percent to non-academic public research facilities, and 13.6 percent to the universities. He conceded that the universities had been able to increase their third-party funding acquisition from DM650 million to DM2.1 billion

between 1970 and 1985. But the universities' inadequate operating base made a further rise in solicited third-party funding appear illusory.

Benno Mueller-Hill, the professor of Gene Technology at Cologne, didn't want to paint such a negative picture of the "future of university research" on the second day of the presidents' conference in Rostock. He said that his institution had been successful in reconciling first-class teaching and research. German university researchers should imitate their American colleagues and not wait for financial blessings from the government. "For us, research with state funds alone is scarcely possible; we finance research almost exclusively through third-party funds," said the genetic researcher from Cologne.

But he said that the question of recruiting in the sciences was more problematic. He could not complain of inadequate equipment or lack of space, but it was virtually impossible to attract "very good people" to the universities. Many young researchers preferred the security of industry and non-academic research facilities to university work.

Hans Guenther Danielmeyer, a member of the board at Siemens AG, tried to dispel this concern. He said that the universities must not be eviscerated; their educational mission must remain unequivocally within their competence. The contribution of the universities to research was worthy of respect considering their slender means. "Industry is dependent on university research," said Danielmeyer. But this should not be misunderstood as carte blanche. It didn't make sense for the universities to want to educate 30 percent of a class as "top researchers." That was not in the spirit of Alexander von Humboldt; the modern university would have to diversify more.

Danielmeyer demanded a shift from specialized disciplines to interdisciplinary research. From the point of view of industry, in the future the need would be for a combination of various disciplines, such as electrotechnology, informatics and physics. Siemens had had excellent experiences with hetergeneous research groups.

Above all, said Danielmeyer, the universities had to display more openness, and the working atmosphere in the field was urgently in need of improvement. Young colleagues, students and doctoral candidates, in particular, had to realize what was going on in the world. "The universities must not seal themselves off nationally." A little more openness to the world would certainly also be advisable for the Scientific Council, Danielmeyer noted.

Professor Klaus Pinkau of the Max Planck Institute for Plasma Physics also believed that he could make a case for internal university problems as the main obstacle for future university research. The unity of research and teaching was a fiction. Only a few "personalities" truly did justice to this claim at the universities. The universities must reform themselves, and ought to cooperate more intensively with non-academic research facilities.

Pinkau considered the lack of accountability of "collegial bodies" at the universities to be the main obstacle for university research. These steering committees at the universities would have to be set up to function over a period of many years, with the possibility of re-electing the representatives. Only then could innovations be introduced and the "future of university research" guaranteed.

Germany: Laser Sensor Finds Oil, Chemical Discharges

92WS0577B Duesseldorf HANDELSBLATT in German 13 May 92 p B4

[Article by Christine Backhaus-Lautenschlaeger: "Laser Sensor Finds Oil and Chemicals More Reliably"]

[Text] The guardians of the law will be blowing a stronger wind in the faces of those who sin against the environment. Air patrolling of federal German waterways will be significantly improved technically and equipped with new, highly sensitive electronics for search and reporting to get on the track of pollution by oil and other toxins more quickly and to fight it more effectively.

Soon the DO-28's which have been used by the federal navy for air surveillance will be replaced on board by two machines of the DO-228 type with a new kind of sensor system. The group leader of the special federal office for "Ocean and Coastal Oil Spills" (SBO) in Cuxhaven, Ulf Bustorff, reports that one thing this involves is a laser fluorescence sensor developed at Oldenburg University.

The sensor is capable not only of recognizing oil on the water, but also of classifying the various oils in a certain band width, whether they are heavy oil, gasoline oil or light crude oil. According to Bustorff, this offers "significant advantages for providing convincing evidence" against the perpetrators and makes some sampling unnecessary. The sensor can also locate and measure oil and other toxins not only on, but also under the surface of the water at various depths according to degree of discoloration.

Bustorff states that a new generation of microwave radiometers (MWR) will also be employed. The new MWR scanners, which will incorporate larger amounts of oil and will function at night and under adverse weather conditions, have a higher resolution than their predecessors. They provide data about the distribution of layer depth for an oil field.

All data from the total sensor range (including the lateral radar, utraviolet and infrared data recording already provided) are finally entered in a data processing system. On-board image evaluation makes it possible for an offense against national and international environmental regulations (MARPOL agreement) to be recognized immediately in the aircraft. The aircraft data are passed on directly to the pollution-fighting ships, which are equipped with receivers. Thus their deployment can be rapidly coordinated.

Besides the aircraft, oil-pollution fighters have a fleet with a total of 22 ships at their disposal, 14 for the coastal area and eight for the high seas. SBO colleague Bernd Scheffel says that he is satisfied with the state of oil-spill fighting in the Federal Republic. But he said that it is not possible to

get out again every drop of oil which has flowed in. In future our eyes must increasingly be fixed on chemical transport ships. This range of materials conceals great risks for the marine environment, he said.

The special federal office, together with the special office of the coastal laender, have been responsible for fighting oil spills in the Federal Republic since 1980. Scheffler says that the partnership is increasingly using hardware and software solutions which are submitted to a constant and rigorous practical test. A unique umbrella data processing system is to be introduced which will combine the various individual data processing systems.

MBB/ERNO, a Bremen company, is working on this concept of a computer-supported system to fight spills, called "Remus." It makes fully automated information sources available for those who are fighting oil or toxin spills. With the use of networking, already existing information systems like chemical data banks or the simulation models of the Federal Office of Ocean Shipping and Hydrography will be integrated into the data collection. In case of catastrophe, "Remus" will provide both situational analysis (e.g. identification of hazardous substances, dispersal prognosis, jurisdiction) and decision-making assistance (in the advice mode), and performs record-keeping tasks.

Industrialist on Chemical, Genetic Research Issues

92WS0577C Duesseldorf HANDELSBLATT in German 14 May 92 p 5

[Article: "Strube: Promoting Own Interests Considered Disreputable"]

[Text] Ludwigshafen—Legislation, administrative practice and lack of public acceptance are increasingly threatening to harm the climate for innovation in the German chemical industry. The chairman of the board of BASF AG, Ludwigshafen, Juergen Strube, gave an urgent warning about the possible dangers for the state of industry in Germany, such as those revealed in the form of falling behind significantly in gene technology.

In a speech in the Rhineland-Palatinate House of Representatives, the head of BASF pleaded at the same time for a better dialog between economics and politics. He challenged legislators to be more mindful in future of the possible usefulness of new developments in regulations applying to chemistry.

The German chemical industry, which up till now has taken a leading position in international competition, is particularly reliant on good conditions for innovation, as Strube emphasizes: for the branch which used to employ approximately 600,000 persons in the old Federal Laender and earned about 10 percent of industry's contribution to the GNP spent approximately DM11.3 billion in 1990 for research and development. This corresponds to about one-quarter of the research funding for all of German industry. The chemical industry is also the most significant licenser in Germany, with licensing fees of more than DM1 billion per year.

But in Strube's view, over the years hurdles based on legal and administrative grounds have increasingly been incorporated into the important period of conversion from research results to marketable products. He considers the excessively long approval times for production plants in the chemical industry to be particularly damaging for innovation. At an average of 13 to 18 months, they are longer in the FRG than in any other European locations.

He said that the length of approval procedures for pilot plants was also a hindrance to innovation. At the moment up to two years must be allowed for this. Additionally, after approval a plant can be run for only two or at most three years. This is much too short for most developments in processing technology.

Strube sees a further hindrance in the law on chemicals which, for example, imposes the requirement of a testing procedure for internal intermediate products which does not discriminate based on the potential for danger, a law which is unknown in other countries. Before this law was introduced in 1982, BASF brought 30 to 40 new products on the market every year, but afterwards it brought out an average of less than 10. Strube said that it is seriously doubtful whether this restriction brought progress in environmental protection and work safety.

In Strube's view, a deterioration in the climate of innovation is evident in a particularly serious way in the area of gene technology. In the FRG today only two firms are manufacturing gene technology products; by contrast, in neighboring Denmark, for example, there are already seven production plants, in Japan approximately 130, and in the U.S. significantly more. He said that this is particularly astonishing and disquieting because the FRG not only has strong research-intensive pharmaceutical and chemical companies available, but also has more than 1,000 gene technology laboratories in which scientific work is going on.

Strube pointed out that many basic scientific principles for genetic transfer, for example, were worked out on plants in Germany, but that the fruits of this research were harvested in other countries. BASF needed more than 27 months to obtain approval for the production of genetically engineered medication (TNF). According to Strube, competitors in the U.S. could reckon on no more than three to six months.

"The example of gene technology," Strube concludes, "shows that acceptance forms an indispensible basis for economics and research." He says that he considers the lack of consensus between the public, the economy and science to be the "decisive root of the evil." Among other things, the consequences are revealed in the fact that in the past few years no more foreign businesses have invested in gene technology in the FRG. Strube declares that BASF's decision to build its new research center in Boston, U.S., is also "more and more justified every day by the excellent scientific ambience and the great public acceptance of new technology in the U.S."

In view of these developments, Strube urges that the possible usefulness of new products should be taken more

into account in future legal and administrative regulations. He was pleased for "the preventative principle of avoiding risk to be further developed into the service principle of achieving usefulness." In Strube's view, this could mean the following in detail:

—Regulations should have added to them the obligation to consider the possible usefulness of new developments.

—They should be oriented towards laboratory standards and not to the risk potentials of large production plants.

—Innovative industrial processes which would have consequences for research and development and thus for the international competitiveness of industry should be considered.

—Internationally renowned scientists should develop recommendations for policy decisions in an institution modeled on the American National Academy of Sciences.

In this context Strube spoke out emphatically in favor of a closer dialog between economics and politics. Economics would no doubt be asked to recognize the necessity for compromises in politics and to develop more understanding of political processes. On the other hand, he said that the impression was often given that decisive economic forces were not sufficiently accepted: "We often think then that our expertise is not in demand because promoting one's own interests is considered disreputable."

He said that a more intensive personnel exchange between economics and politics would be desirable. More communication could form an important building block for the enhancement of Germany's standing. For a broader consensus between politics, economics, science and the public would form an indispensable bases for industry's ability to innovate.

French Research, Defense Ministers To Collaborate

92WS0596B Paris AFP SCIENCES in French 14 May 92 p 1

[Unattributed article: "The Fourth 'Science and Defense' Seminar at La Villette"]

[Text] Paris—Civil and military research people had an opportunity for two days of direct talks, on 12-13 May at the La Villette City of Sciences and Industry, in Paris, on the occasion of the fourth Science and Defense Seminar.

The 1992 version of this event, which was inaugurated by the minister of research and space, Mr. Hubert Curien, brought together some 100 speakers and an audience of over 1,500 researchers, manufacturers, army officers, and engineers from the General Delegation for Weapons (DGA), who had come to discuss four major themes: space technologies, information and communication systems, acoustics and vibrations, and mobile robotics. For the first time, foreign speakers were received at La Villette.

"It is quite natural," Mr. Curien stated in his speech, "to consider subjects of a dual character, whose end purposes concern both the civil and the military sectors. In such a case, nothing replaces direct dialogue, like the one that can be initiated at the Science and Defense Seminar." The minister recalled that the French 1991 military research and development budget amounted to 34 billion French francs [Fr], compared with some Fr50 billion for the civil budget. Space technologies (telecommunications and observation), he pointed out, are "especially important" for defense.

In this sector, where the French military effort represents close to Fr3 billion per year, compared with Fr8-9 billion on the civil side, it is "absolutely necessary to achieve very good coordination" between the two sectors. "Certainly," Mr. Curien went on, "this cooperation is already well organized; the CNES [National Center for Space Studies] and the DGA have a joint consultation committee, the 'Delta committee.' But Minister of Defense Pierre Joxe, and myself, wish to go much further. We are currently considering improvements to existing structures in order to achieve still closer cooperation."

As for Mr. Joxe, speaking at the closing session, he stated that it was "necessary" to intensify the scientific community's participation in preparing France's "strategic lines of thought and choices." From this point of view, he added, a "standing reflection group" on "science, technology, and strategy" will be set up following a proposal from the Academy of Sciences. "The group will contribute to the revival of strategic reflection in France and, starting in 1993, a major Ministry of Defense award will be attributed by the Academy to reward basic research work."

Mr. Joxe also indicated that the future Delegation to Strategic Affairs (DAS) that he intends to create within his ministry will include a special "entity" responsible for "technical-operational projections." Following a forthcoming decree, the DAS will replace the present Delegation to General Studies, with expanded responsibilities. The minister also "decided to multiply scientific information conferences for the officers of the various arms."

In closing, the minister recalled his determination to create a scientific pole on the Palaiseau plateau (Essonne). It will include the Polytechnic School, the National Higher School for Advanced Techniques (now in Paris), DGA laboratories, the Weapons Documentation Center, and a Technology Transfer Center, "a project currently under consideration."

Balance of Research Activities in Eastern Germany Viewed

92WS0603A Berlin ING DIGEST in Germany Jun 92 p 11

[Article by Guenther Ludvik: "Courage Is the Resource in Shortest Supply"]

[Text] Dr. Heinz Riesenhuber, German minister for research, is not taking the reproach that he sees everything through rose-colored glasses lying down. In late 1989 there were about 87,000 individuals involved in R&D in the former GDR economy. The often-cited figure of 29,000, supposedly representing the number still so occupied, is too low because it is based only on the large enterprises

(the former combines). The minister's estimate of between 35,000 and 40,000 R&D positions in the new German states as of late 1991 has been supported both by the Foundation for the German Economy and the Truehand Trust. This figure also includes the small and medium-sized enterprises.

No one denies that much of that research capability has been lost as a result of structural changes. Reestablishing the R&D capabilities from the enterprises in the form of Forschungs-GmbH (Research Companies), initially viewed as the ideal solution, has run into a dead end. Riesenhuber has therefore emphatically informed the Truehand that the R&D capability is not to be neglected during the privatization program. Precisely because of the precarious position of the newly established research companies, the minister has made 80 million German marks [DM] available from Revitalization East funds this year to tide over about 250 projects. "In this way, the concerns of the Truehand, the ministry for economics, which itself has allocated DM100 million for this purpose, and the federal states are being shared in supporting the especially endangered researchers in these special companies. The research companies will also profit to a substantial degree from our special research project measures."

Riesenhuber designates the attainment of successful technological competitiveness to be the first priority of the companies. About DM750 million have been made available to the new states in 1992 to support projects in environmental research and technology, the base technologies in information science, renewable energy sources and efficient power use, materials science, and other fields. The companies should get some DM300 million of this.

In an interim report in the Berlin branch office of the German Federal Ministry for Research and Technology [BMFT], Riesenhuber, with satisfaction, pointed to successes in the promotion of technology-oriented businesses. "As early as June 1991, on the initiative of the BMFT and through consultations with the equivalent offices in the former GDR, a beginning could already be made in promoting the establishment and expansion of technology and founder centers as well as in supporting technology-oriented businesses." Of the 25 technology and founder centers, supported by the BMFT, 18 are already operational. "It is especially heartening that the new states are establishing 15 additional such centers under their own direct management at the same time."

The West-East commissioned research program, introduced this year, with which R&D assignments are linked in the new states, where in some cases outstanding capabilities are still not being fully utilized, is well underway. Of the 221 applications to date, and following a four-week inspection period, 165 approvals accompanied by grants totaling DM10 million (promotion rate 35 and 40 percent) to 150 firms accepting the orders were awarded. In 1992, some 11,000 R&D positions are being supported in the new federal states [NBL] under the various BMFT programs, i.e., about one out of three. Despite this really good balance sheet, the minister, as far as the overall field is concerned, is not yet satisfied. The Western companies are still hesitating too much before plunging in unchartered eastern German waters. "Everything is there really—the money, the know-how, and all the rest. But the courage to navigate in unknown waters is currently the resource in shortest supply in Germany at the moment."

CORPORATE STRATEGIES

Alcatel Alsthom Closes FY 1991 With Increased Profits

92BR0325 Groot-Bijgaarden DE STANDAARD in Dutch 9 Apr 92 p 15

[Article signed P.C.: "Alcatel Alsthom Closes 1991 with 20-Percent Profit Increase"]

[Text] Paris—The French industrial group Alcatel Alsthom closed fiscal year 1991 with a net consolidated profit of 6.18 billion French francs [Fr] (more than 37 billion Belgian francs [BFr]), which was 20 percent more than in 1990. The increase in profit was higher than that in sales revenues, which rose by 11 percent to Fr160.1 billion (roughly BFr960 billion). At a press conference yesterday, Chairman Pierre Suard anticipated a further increase in results for 1992.

For Alcatel Alsthom, the year 1991 was characterized by numerous takeovers, mostly in Germany, Italy, and North America. The main acquisitions included Telettra in Italy, AEG Kabel in Germany, the transmission division of the American Rockwell, Canada Wire, and the energy products division of the Canadian MIL group.

The takeovers accounted for 4 percent of the sales increase, more than two-thirds of which resulted from internal growth. Suard attributed this result to the group's commercial dynamism and competitive strength.

Last year, Alcatel Alsthom simplified its financial structure. In early 1991, it took over the companies Generale Occidentale, SAFT [Traction and Fixed Accumulators Company], and Locatel; in the last quarter of 1991, the entire capital of Cegelec, Alcatel SEL, and Electro Banque was acquired. The simplification process was completed early this year by the acquisition of the U.S. ITT's remaining 30 percent stake in the telecommunications company Alcatel (of which the Belgian Alcatel Bell is a subsidiary).

Suard said he had three reasons to anticipate a bright future. The first is the group's technological strength. Last year, Alcatel Alsthom spent Fr15 billion (about BFr90 billion) on research and development. One of the main research areas is mobile telephony; Alcatel has recently also made inroads in the Belgian market.

A second asset, according to Suard, is Alcatel Alsthom's presence on markets which are both complementary and promising. We are a truly international group, said Suard. For the first time in the company's history, France and Germany will make an equal contribution to the 1992 revenues. In five years time, the share of foreign activities in the sales figure rose from 36 to almost 70 percent.

Finally, concluded Suard, the third reason why we can face the future with confidence is our structure and our financial strength.

Asea Brown Boveri's Innovation Strategy Outlined

92BR0344 Rijswijk POLYTECHNISCH WEEKBLAD in Dutch 26 Mar 92 p 2

[Article: "Asea Brown Boveri Invests in Research & Development"]

[Text] The Swedish-Swiss electrical engineering group Asea Brown Boveri (ABB) spent $2.3 billion last year on research and development, $400 million more than in 1990. This is an increase of 21 percent, due to a sharp increase in expenditure on the development of gas turbines and cleaner coal technology.

The sum of $2.3 billion represents about 8 percent of ABB's $28.8-billion turnover in 1991 (1990:$26.7 billion). ABB President Percy Barnevik announced in Stockholm last week that corporate profits went up by 2 percent, reaching $1.153 billion.

In view of the recession that has hit 60 percent of ABB's markets, ABB is pleased with the result. For 1992 the company again expects a declining demand, but when compensated for by an improvement in productivity, the overall result will be at the same level as in 1991. Expenditure on R&D is expected to remain at 8 percent of turnover.

Environmental Regulations

ABB is very concerned about the environment, particularly because the company believes that clean-technology businesses are experiencing and will continue to experience a growth. From now on environmental regulations will only become more stringent. ABB would rather be in the forefront of developments, such as in gas turbines and electricity production by means of fluidized bed combustion, or the so-called pressurized fluidized bed combined-cycle (PFBC) technology. According to ABB, the emissions of the latter, cleaner coal technology lie far below accepted levels in most Western countries. Before these power stations were put into use, they were thoroughly tested. ABB now has three of the stations in use; in Spain, the United States, and in Sweden. The most recent success dates from last week: The Japanese firm Kyushu Electric announced that it intends to build a fluidized bed combustion installation based on ABB's PFBC technology. This 350-MW power station will be four times larger than the present PFBC stations and will cost about $100 million.

In comparison to coal fired power stations, the fluidized bed combustion technology produces lower amounts of sulphur dioxide, nitrogen dioxide, and carbon dioxide.

This is why the energy company Stockholm Energi has been able to build its factory on an old location, in the middle of the Stockholm suburb of Vaertan. The coal store is under the ground and therefore can do no harm to the surrounding area.

Fluidized Bed Combustion

Hans Malm, chairman of ABB Carbon in Sweden, believes that the market for fluidized bed combustion installations will grow by some 900 power stations in the next 15 years. ABB hopes to build about one-third of these. "The PFBC technology will be even better in five years," predicts Malm. "Then we will have reached the point where the turbines will be able to operate at a higher temperature than 850 degrees centigrade. This will lead to even lower emissions."

The current 135-MW turbines operate under a pressure of about 100 bar and at a temperature of 500 degrees centigrade.

Foreign Investments in French Electronics Sector Outlined

92BR0351 Paris ELECTRONIQUE INTERNATIONAL HEBDO in French 9 Apr 92 p 6

[Article by Michel Heurteaux: "France, the Favorite Target for Foreign Capital"]

[Text] The economic environment is certainly not bright, but foreigners are betting on the future by investing mainly in electronics. Activity will accelerate with the recent liberalization measures for capital movements.

Despite the worldwide economic slowdown, France appears increasingly to be a privileged welcoming ground for foreign investments. In fact, these investments have been progressing more and more rapidly, reaching 61.1 billion French francs [Fr] last year for all economic sectors combined, according to the latest balance-of-payments figures. This record sum now puts France in third place for transnational investments, behind the UK and the United States. As noted by the Ministry of Economic Affairs: "Investors have positive views concerning the attractiveness of our country because of its geographic location, the stability of our currency, and the quality of its labor force." Supplying almost 58 percent of all foreign capital, the EC countries remain the largest investors in France, with Germany at the top with Fr10.6 billion, a 60 percent increase over 1990. U.S. and Japanese capital, however, was much less apparent last year compared to 1988, 1989, and 1990.

Single Market Prospects

Still, the situation has not cleared up in 1991 for the French electronics sector. The efforts undertaken by the Asian groups cannot be ignored. For instance, the Korean company Daewoo recently announced the opening of a color TV plant in Lorraine with an annual production capacity of 400,000 receivers. Investment—Fr850 million over three years. For the Japanese, it is said at the Japanese Electronics Industries Association (JEIA) headquarters that they will continue their strategy of settling in France and Europe with a view toward the 1993 single market. According to some projections, such investments in building "screwdriver factories" or R&D centers are expected to be 18 times greater by 1995 than those made by Europe in Japan.

The French Finance Ministry's recent liberalization measures concerning non-EC capital that were approved two months ago should also encourage the influx of new capital due, in particular, to the measure that encourages the purchase of French companies with sales of no more than Fr500 million.

France: Sextant Avionique Closes 1991 With Deficit

92BR0368 Paris ELECTRONIQUE INTERNATIONAL HEBDO in French 23 Apr 92 p 4

[Unattributed article: "Net Loss of Fr545.1 million for Sextant Avionique"]

[Text] Sextant Avionique registered a net consolidated loss (group share) of 545.1 million French francs [Fr] for 1991 versus a profit of Fr188.7 million for 1990. The aeronautical electronics equipment company, controlled equally by Aerospatiale and Thomson, states that the result was occasioned by Fr365.3 million in exceptional charges corresponding to the Fr390 million reserve to cover the planned elimination of 1,085 jobs. This drop is also attributable to the slowdown in the company's activity: the "aeronautic, space, and defense" branch chalked up a turnover of Fr4.193 billion, a drop of 7.4 percent in comparable terms, because of the cutback in military budgets and air transport in 1991, the company points out. The "industrial components" branch dropped off 4.5 percent to Fr1.37 billion because of the slowdown in European industrial investments. Overall, current business results went from a profit of Fr378.3 billion in 1990 to a loss of Fr252.5 million in 1991, for a sales figure of Fr5.56 billion, down 7 percent (in comparable terms) from the Fr6.09 billion in 1990. Sextant adds that the order load has also been affected by the current slump: The order book was worth Fr4.9 billion at the end of 1991, versus Fr5.3 billion a year earlier. Activity in 1992 should be around the level of 1991, says the company which anticipates rebalancing the books in 1992 as a result of the scheme to reduce operating costs, which is expected to produce results as from the second half of the year.

Philips Posts Profit

92WS0406D Paris L'USINE NOUVELLE in French 5 Mar 92 p 42

[Article: "Philips Returns to Black"]

[Text] Jan Timmer's Centurion Plan has borne fruit: Philips has posted a net profit of 3.6 billion French francs [Fr], even though its Fr171 billion revenue rose only 2 percent. This is a far cry from last year's Fr12.7 billion loss, more than half of which was owing to restructuring costs. The company's ailing branches have been pruned (SRAMs [static random access memories], data processing), and its staffing has been reduced by approximately 33,000 persons. Despite this turnaround, Jan Timmer is manifestly concerned over the performance of the company's Consumer Electronics Division: Its operating results plummeted 32 percent.

Daimler-Benz's Strategy To Become Global Concern

92WS0472A Duesseldorf HANDELSBLATT in German 10-11 Apr 92 p 21

[Article by Georg Heller: "Daimler-Benz Concern: Interview With Finance Manager Gerhard Liener: The Road to Global Player Must Be Paved With Billions"; first paragraph is HANDELSBLATT introduction]

[Text] Dr. Gerhard Liener heads the key departments of finance and materials on the board of directors of Daimler-Benz-Holding. Since joining Daimler-Benz AG in 1967, Liener, who will turn 60 on 23 April, has been active in the department that "administers" investments, and has been a board member since 1982. The concern's growth through investments has been largely organized and managed by Liener. Today, as an executive holding company, Daimler-Benz also plays the role of "financial turntable" for the new technology concern. As finance manager, Gerhard Liener is critically involved in its integration and development into a "global player."

Stuttgart—The Daimler technology concern is being internationalized into a "global player" in three dimensions: Global marketing, with which the former automotive concern began its internationalization efforts, must be followed by global producing and global financing.

Thus far, a worldwide production arrangement is being developed only in the area of commercial vehicles. In the area of aerospace technology, "strategic alliances," or as the company prefers to call them now, "business alliances," are replacing the company's own foreign production. But in the commercial vehicle sector as well, where the responsible director Helmut Werner is promoting the "multi-domestic concept," there is a growing tendency to enter into joint ventures or license out the manufacture of Mercedes products instead of developing the company's own production facilities abroad. In an interview with HANDELSBLATT, the concern's finance director, Gerhard Liener, cited the licensed production of pickup trucks at Ssan Yong in South Korea as an example of this.

The presence of the Daimler-Benz concern on the Tokyo and London stock markets that has been achieved over the past two years—of the most important international financial centers, only New York is still not represented—creates the preconditions for global financing. The new "integrated technology concern" needs this for the time being, primarily for the sake of regional refinancing of sales financing for its products, from automobiles to airplanes, which has been undertaken on a large scale. Liener said that Daimler-Benz's first yen loan is expectedly shortly.

Thus far, admission to the New York stock exchange has been blocked by the U.S. regulatory commission for stock markets, the SEC [Securities and Exchange Commission], which requires that accounts be prepared according to U.S. valuation rules. Together with the three big German chemical concerns, Daimler took the initiative in trying to achieve a provision for the admission of European transactions. This initiative was unsuccessful, Liener says. It

was halted, he says, because EC authorities are now attempting to bring about "a certain amount of harmonization" based on the principle of reciprocity. (European stock exchanges do not require transactions based on European valuation rules for U.S. companies.) He assumes that officials in Brussels can bring significantly greater authority to the negotiations, and he is now waiting to see what results are achieved. It is certain that no solution will be found this year. This also means that if there is an increase in capital stock in 1992—which Liener does not rule out—then he expects none of the unusual situations that could be associated with admission to the New York stock exchange. If the next capital increase occurs this year, "then it will be similar to the last one," says Liener. The last time, in 1989, Daimler-Benz's capital was increased by 212 million German marks [DM] to DM2.33 billion, and this at an issue price of DM460 per DM50 share, with an exchange price of approximately DM750.

Nor is any unusual situation expected in terms of Kuwait. The optional bond that has been discussed in public was the idea of a bank consortium, according to Liener, and "not Kuwait's invention." He says that he can say that with utmost certainty because he discussed this with the head of the Kuwait Investment Authority in London. It can be assumed that Kuwait has no desire to give up its Daimler stock holdings of approximately 14 percent, either entirely or in part, and intends to participate in any capital increase.

With the 1989 capital increase, Daimler-Benz stockholders were actually asked for money for the first time. Long-term investments should continue to be financed "entirely from the company's own resources, if possible," i.e., from its self-furnished cash flow "supplemented by occasional equity borrowing," says Liener. "That is something that we practically never had in the past. Our capital increases in the old Daimler-Benz AG—still strictly an automotive company—were actually more symbolic in nature; they were not based on the need to involve the stockholders in financing company growth."

This should essentially cover the enormous financing needed to reorganize and shape the new company divisions of DASA, debis, and AEG, and to integrate them with the traditional automotive division into a "technology concern" and "global player." At the same time, however, the limits have been determined "for what we can afford," says Liener. Priorities are being established in the holding, as a financial turntable. The leeway for acquisitions—such as investment in the metal industry, which cost around DM400 million—is determined by liquidity. If necessary, the traditionally high liquidity of the concern can be maintained by utilizing authorized capital (at present, DM600 million is still available). The concern's board of directors wants to borrow money only in order to cover resources needed in the short and medium term, essentially for sales financing and the leasing trade.

Approximately DM36 Billion Invested Through 1996

For the five-year period from 1992 to 1996, the concern's medium-term planning envisages fixed-asset investments of DM36 billion. In addition, the company should spend DM25 billion for research and development during this period. Added to this is DM17 billion for contracted research, which is financed by the principal, basically for projects in the field of aerospace. Liener thus figures that the concern can self-finance fixed-asset investments and research and development spending amounting to DM12 billion a year over the next five years.

Although the money being borrowed worldwide to finance the leasing trade accounts for a large share of the Daimler concern's balance-sheet total—up to one-fourth—these funds are revolving. Liener points out that the relatively short-term sales financing trade, with its congruent refinancing worldwide, works with an equity share of 7 to 10 percent. This will significantly change the structure of the concern's balance sheet, he says, but it does not signify "a deviation from Daimler-Benz's previous balance-sheet principles."

On the markets and in finances, the concern has grown to global proportions, but this is more difficult on the level of production. Liener says that although the previous strictly automotive concern was already active on an international scale, it had no ambition to be a "global player." A "global player" must be an "insider" in the most important regions of the world. Previously, Daimler-Benz's commercial vehicles in other countries were copies of vehicles that had been developed in Germany. The autonomy of outside production sites was relatively limited.

Today, the sites for commercial vehicle production are being given the additional job of developing vehicles appropriate to the region in which they produce. This type of vehicle, suitable to the local region, e.g., in the Third World, is produced with local wages and suppliers. This manufacturing concept—called "multi-domestic" at Mercedes—also makes the "global player" less dependent on exchange-rate problems.

Passenger Car Assembly in Mexico Begins Small

In this regard, Liener notes two developments that he describes as entirely new: the licensed production of pickup trucks at Ssan Yong in South Korea, and the new passenger car assembly facility in Mexico. This passenger car assembly, which is beginning on a very small scale, could in the long run become a seed for production in the United States.

Liener describes the cooperation with Ssan Yong Motors—a licensing agreement with a small investment (that can be expanded)—as a "very basic case" and as a "significant step in East Asia." Because the licensed production not only will supply the South Korean market; in addition, an "X quantity, beginning with 15,000 vehicles" will be available to Mercedes, "with brand name and star," for sale in the other countries of East Asia. In addition, this manufacturing site must be regarded in the context of production, whereby it can serve as a possible source for "global sourcing."

In 1983, the then-automotive concern Daimler-Benz employed around 185,000 people, of which 34,000 worked

abroad. The Mercedes-Benz division is comparable to that today; of its 237,000 employees in 1991, around 52,000 work abroad. Thus, the share of people employed abroad has risen over the past eight years from 18.4 to 21.5 percent. This has been brought about not only by the major South American commercial vehicle production sites, but also by freight liners in the United States and, increasingly, Spanish production as well as the plants in Turkey. Asked whether global producing should be promoted at a faster pace in the future, Liener notes a statement by board chairman Edzard Reuter, who emphasized that the Rastatt and Ahrensdorf automotive plants will probably be the last new installations built in Germany. But work on Ahrensdorf has scarcely gotten under way, so that for now the domestic capacity is continuing to grow. For this reason, the new strategy abroad is targeted less at new construction or the assumption of production sites than at cooperative arrangements. Combined with established companies, Mercedes will "automatically be an insider," which in many countries is very difficult to achieve by going it alone, says Liener. In addition, significantly less capital is tied up. That is critical, given the gigantic task of integrating the concern, which must be handled at the same time.

Asked about the production goals in the former CEMA markets, Liener notes, surprisingly, that Mercedes is not interested in a takeover of Avia and Liaz in the CSFR, but only in a joint venture. No thought is being given to building a new plant here either. (On the present situation, he says that there are still many unresolved questions. The fact that the Czechs have decided in favor of Mercedes-Benz does not mean that an agreement has been reached on the content of the contracts.)

There is apparently another good reason for not expanding production activities too much: Liener points out the question of risk that is associated with a large market share. Mercedes is already the world's largest producer of commercial vehicles, and it must examine whether creating further capacities is justifiable. Licensed production, like the kind at Ssan Yong, is "much better for us and significantly less risky."

Limiting Risk Through Licensing

Relative to the total concern, global producing accounts for only a small percentage of the overall output of more than DM95 billion. But in other areas, such as aerospace engineering, "we will not and cannot achieve a global player situation by expanding or acquiring companies in North America or Southeast Asia, but rather only through business alliances," says Liener. He refers to the cooperation with France's Aerospatiale in the "Eurocopter" or with UTC and Pratt & Whitney in engine construction.

A strategic alliance with Mitsubishi in aircraft construction is not possible, because the company is committed to long-term agreements with Airbus competitor Boeing. There could prove to be possibilities for cooperation with Mitsubishi in engine construction, where there are no such restrictions.

According to Liener, who is Daimler's "liaison officer" for talks and negotiations on business alliances with Mitsubishi, "a whole series of projects is being discussed." He has learned two things from this process: In discussing things with the Japanese, one must invest much more time and patience than he initially thought. And it has proven to be the case that the only projects that are promising are those in areas in which both sides would be starting something new. If one side has to join something that is already finished, then it will not work. Liener cites the example of auto recycling. This is promising by mere virtue of the fact that it is removed from competition and both sides can only profit from the fact that they do not have to bear the costs alone.

Head of Deutsche Aerospace Discusses Future Strategies

92MI0473 Bonn DIE WELT in German 24 Apr 92 p 9

[Article by Ulrich Friese: "The Long Road Ahead of DASA"—first paragraph is DIE WELT introduction]

[Text] Deutsche Aerospace [DASA] chief Juergen E. Schrempp has taken on a major task. He wants to convert this Daimler subsidiary into a player on the world stage, but he will not be able to pull the feat off without alliances with foreign partners.

The DASA board chairman is searching for all he is worth for new strategic alliances. The initial outlines of this, the largest aerospace and defense engineering enterprise in Germany, can be identified, but some of the components to make up the perfect structure are evading the corporate strategists in Stuttgart. Insiders report that "mergers are therefore on the agenda" at DASA, in no way merely meaning the link-up with the Dutch aircraft manufacturer, Fokker, which is expected to come about shortly. If the Munich company is successful in Amsterdam, DASA chief Schrempp will have reached an important milestone along the way, achieving a pioneering concept for the civil aircraft product range within the key aeronautics division.

On the one hand, industrial control at Fokker, which DASA will probably wish to reinforce with a majority shareholding, will create the world's largest producer of short- and medium-range civil jets. At the same time, all the major European manufacturers will in the future be in the same boat with this project. The quartet headed by DASA would consist of Fokker, Aerospatiale (France), and Alenia (Italy)—and even the inclusion of British Aerospace now seems possible.

Schrempp's "Euroconcept" is already in place for DASA's helicopter product range. With the assignment of the controlling majority to Aerospatiale, Eurocopter was established in Paris, becoming a commercial unit that is competitive worldwide. Whether the two other DASA aviation divisions, Airbus and military aircraft will be established depends, however, on the answers to two questions: Will Deutsche Airbus have been integrated into DASA before 1996? Will Bonn give the green light to build the 90 fighter?

If Deutsche Airbus GmbH in Hamburg continues to produce dazzling business results—pretax profits of over 300 million German marks [DM] are anticipated for 1991—this large-scale aircraft manufacturer, which is now in the black again, could enter the DASA alliance in the coming year, i.e., three years earlier than planned. On the other hand, whether or not establishing the military aircraft division is worthwhile will be determined by the politicians with their (in any case costly) decision for or against the new "Eurofighter."

The Munich company is already greatly affected by the dramatic decrease in orders for the armaments sector. DASA's former and new core business in defense and civil systems, in which a halving of orders in the next five years is not unlikely, has to engineer a rapid switch from military to civil production. A thankless task, which now falls to Schrempp's deputy, Johann Schaeffler, the "Number Two" at DASA, to perform.

The absence of government orders must also be offset by DASA's Space division. Since lucrative prestige projects such as Hermes and Columbus have been diverted to the slow track, only the commercial satellite programs hold out opportunities for balancing the books. The high point in the ups and downs of DASA's operations is still the DASA engine division. Close collaboration with American partner Pratt & Whitney has secured for DASA engine manufacturer MTU [Motor and Turbine Union] an established place among the three global players in the world market.

DASA's business divisions are taking on sharper outlines. The thorough shake-up that Schrempp has given the management structure of the Daimler Benz subsidiary followed the maxim "Lean administration—high accountability for the operative production divisions." In the next two years, up to 400 middle management positions are scheduled to fall victim to this internal kill-or-cure remedy. The provisional structure of the "new" DASA will then look like this: For reasons of company law, the two DASA companies, MTU (engines) and Dornier (space), will remain, while the capital assets of MBB and Telefunken System Technik will be transferred to the aviation and defense and civil systems divisions respectively.

The point of this costly revolution, which will initially take the intermediate legal form of a "Daimler-Benz Aerospace Holding Company AG" and only achieve its goal in the medium term, is to increase internal efficiency. The drastic cut in overhead, which will at least streamline the decision-making hierarchies in the DASA combine, is intended to raise per capita net product by at least 20 percent. The long road towards an integrated technology concern of the type that the Daimler-Benz strategists have in mind depends on the success of such steps. Schrempp, however, will have to pin his hopes on the staying power of his employees, the parent company, and his customers.

Bayer Invests in East German Chemical Industry

92MI0483 Bonn DIE WELT in German 29 Apr 92 p 14

[Text] Leverkusen-based Bayer AG's move into the Bitterfeld area, for which contracts were signed at the beginning of this week, could provide the impetus for the economic recovery of the central German chemical industry region. Klaus Schucht, Trust Agency director with responsibility for the chemical industry, expects decisions to privatize substantial portions of Buna AG and Leuna AG, whose refineries were transferred to a consortium at the beginning of the year.

Bitterfeld Chemicals AG, whose factory adjoins the 53 hectares of industrial wasteland and farmland where Bayer is to begin building in June, are also reported to have attracted "half a dozen" potential purchasers. According to Bayer board member Schwericke, the land development work would remove "a certain amount" of contamination from the site; the company retains an option that it may take up later on parts of Chemie AG, though it would first require restructuring. "Reasons of German unity" had prompted Bayer's decision to invest 645 million German marks [DM] in the eastern German factory at a time when it already had ample spare sites in Europe, said Helmut Lehmann, future managing director of Bayer Bitterfeld GmbH: The land of Saxony-Anhalt's top funding rate of 23 percent had been an essential prerequisite for reassuring shareholders that the investment was "a viable business proposition."

Four production lines will follow one another into operation from the middle of 1994, at quarterly intervals. Lacquer resin and cosmetics lines would subsequently extend Bayer's capacity in these areas, said Lehmann, whereas with over-the-counter drugs the company was introducing the latest in production facilities to concentrate and increase its output in Europe. The company's management had also decided that the previously planned expansion of its Wolff Walsrode AG subsidiary's methyl cellulose capacity by an annual 4,500 tonnes would also involve the Bitterfeld factory, and according to Lehmann there is also talk of building an ion exchanger production facility.

Bayer is creating a total of 650 jobs in Saxony-Anhalt, and a similar number will also follow in the service and maintenance sectors. However, Economics Minister Horst Rehberger emphasizes "only a fraction" of those previously employed in this sector in the former GDR.

Thousands of jobs have vanished and need to be replaced through the regional redevelopment. A chemicals and industrial estate is to be created near Bitterfeld. The latest news is that the American power corporation Enrom of Houston is to build a power station jointly with the regional electricity company. Saxony-Anhalt is the only one of the new laender to have spent almost all its industrial support funds in 1991; in 1992 it will not be possible to fund every project not directly related to manufacturing industry.

Germany's Efforts, Competitiveness in Microsystems Assessed

92WS0485A Stuttgart BILD DER WISSENSCHAFT in German Apr 92 pp 102-104

[Interview of Herbert Reichl, professor, doctor of engineering, director, Institute of Electrical Engineering, Technical University of Berlin, head, department of microelectronic hardware technology, by Wolgang Hess, place and

date not given, under the rubric "Technology Trends; Microsystem Technology": "Germany's Big Chance; Microsystems Will Strengthen Small and Medium-Sized Businesses"; first paragraph is an introduction]

[Text] While the boat has been missed in microelectronics, the Europeans can still make it in time in microsystem technology. Professor Herbert Reichl, top-ranking brain of German systems engineering, comments on the prospects of this technology.

[Hess] Lately concepts like microperipherals, micromechanics, micromachines or microstructure engineering have been inundating the technology pages of journals on the subject. Professor Reichl, can you disentangle the mess?

[Reichl] The starting point for all these concepts is microelectronics, which led to intelligent data processing. Then electronics gained an entry to metrology. Because it became possible by means of sensors to process measurement data from the environment without readings being taken manually by a human.

[Hess] How long have microsensors been around?

[Reichl] Since around 1975. The concept of microperipherals was also formed at that time. Microperipherals are nothing other than the coupling of a signal-processing chip with sensors or actuators, i.e., final control elements. Chips for control processes formed according to pure computer technology and signal processing. It was quickly found out here that the silicon technology so successful in microelectronics is also suited for the manufacture of miniaturized sensors and actuators.

[Hess] Who investigated this—the Japanese, Americans or the Germans, perhaps?

[Reichl] We made and tested sensors for research purposes as far back as 1975 in order to develop new principles for the fabrication of sensors by the silicon technology.

[Hess] And you were scientifically ahead in this?

[Reichl] Some pressure sensors had already been fabricated from silicon. However, the general principles were still a mystery. It became apparent for the first time then that silicon as a single-crystal material undergoes no permanent material changes if it is deflected in an acceleration sensor for example. Furthermore we saw that small three-dimensional mechanical structures could be made from this material by chemical etching, whereupon we had arrived at micromechanics. This resulted from around 1985 in inexpensive sensors that react to pressure, temperature and acceleration.

The idea was arrived at within the framework of the federal government's microperipherals promotion program of integrating sensors and actuators on a single substrate together with signal processing. This was extraordinarily technically relevant, because by its means the most different fabrication processes can be reduced to a single—if also highly complex—process. This idea was then called from 1989 microsystem engineering. Dr. Walter Kroy, chief investigator at MBB [Messerchmitt-Bolkow-Blohm], and Professor Anton Heuberger of the Fraunhofer Institute for Microstructure Engineering here in Berlin have a substantial interest in this.

[Hess] A new grants pot was agreed on in February 1990. What is there money for now?

[Reichl] Applications, especially in small and medium-sized industry, were given grants first. It will become apparent here where this technology is superior to long-standing fabrication processes. The 400 million German mark [DM] program has had a very successful beginning. Many industry applications for grants projects were received in a relatively short time.

[Hess] The program is meant for small and medium-sized businesses, i.e., the part of industry about which one often speaks of a great tendency to inertia. Why this rapid success then?

[Reichl] New product development is being supported by means of so-called indirect specific promotion. This perspective is profitable for many companies.

[Hess] Seasoned applicants are needed in order to get hold of grant money. But small and medium-sized businesses often cannot offer precisely this personnel.

[Reichl] The application formalities were not at all so large-scale in this case. I think that any company that is interested in this is also able to file an application properly.

[Hess] There is in addition a second fiscal shot in the arm within the scope of the microsystem engineering promotion priority.

[Reichl] The second part of the program is aimed at so-called joint projects. Several companies are cooperating with scientific institutes here in order to tackle problems completely. The goal here is not specific products but the elaboration of the technology. For example, an attempt will be made to develop new construction and connection techniques, i.e., to improve bonding, assembly and packaging. What is more—and this is especially important—microelectronics, microoptics and micromechanics will be coordinated with one another. This is a very demanding task.

[Hess] The initial success of this program clearly belies each and every statement that has invariably claimed that there is no great interest in microtechnologies in Europe. Has Fritz torn off the night cap?

[Reichl] Formerly we supported basic research above all. Now we will try for the first time to support product development with existing technologies. That way it could be possible to interest industry in this technology much sooner than thus far. However, we still need basic research.

[Hess] The Japanese, whom one would like to accuse of deficiencies in basic research, have just now reported a 10 year program for basic research in microsystem engineering for which DM25 million have been donated.

[Reichl] Indeed with this they want to demonstrate by models what can be developed by means of this new

technology. Specific product development is not involved here. Nevertheless, the Japanese know how to rouse their fellow countrymen to enthusiasm already in the present phase of development of this technology. At the micromachining conference held in Japan last year there was a track event for miniature robots that had to measure less than one cubic centimeter in volume. A microrobot that was even able to wave the Japanese flag at the finish won.

[Hess] Besides the Japanese microrobot, are there additional show products that illustrate so nicely what else microsystem engineering can do?

[Reichl] The field of metrology and control is a major application area. All the sensors that can be used here can be precisely defined simply through microsystem engineering and be manufactured economically. But I expect still much more: Because of the three-dimensional compactness, information exchange no longer requires nearby components in order to take place electrically. Enormous expense is still being incurred today in order to suppress disturbing physical processes like heat flow. In microsystem engineering this behavior could possibly be looked upon as a direct signal path and accordingly one could save oneself the detour via electronics.

[Hess] The question once again: Which products are you thinking of specifically?

[Reichl] An artificial pancreas. A micropump coupled with a flow sensor could administer insulin to patients so that the procedure that is still irksome today can be dropped. Another example is microlasers that would be able to transmit far higher quantities of information than is possible even with high-performance microelectronics.

[Hess] Mr. Reichl, unlike most German university professors you very early went out on a limb to provide a public forum for microsystem engineering. Supported by the Berlin senate, since 1990 you have organized an international congress and show every other year.

[Reichl] We wanted to bring together experts in microelectronics, microoptics, micromechanics and systems engineering so that they can briefly talk about their development problems. We are right at the beginning in design engineering, because the designing of new products can by no means proceed as one is accustomed to doing from microelectronics.

[Hess] In view of this development shortfall, what is to be thought of studies that predict precisely the market potential of the years to come?

[Reichl] I think that it is right to give some thought today about where the journey can lead. I see the first major potential in medicine and in metrology and control engineering, but also in environmental protection and telecommunications. The automobile will also be an application priority sometime or other.

I have become cautious timewise. I have vividly experienced a similar situation with sensors. As early as 1978 they were talking about a gigantic growth market that lay immediately ahead. However, in actual fact the expectations became realized very slowly. We institute researchers have had to learn to go to companies and show them that the new products are also a bit of insurance for the future and not just institute developments that are remote from reality. In addition we have learned that companies still have to put in a lot of hard work in order to make a marketable product from a laboratory model created at an institute.

[Hess] In the meantime the Japanese have also noticed with what verve you are acting. You must be permanently included in Far Eastern basic research.

[Reichl] You are wrong there. I have just conferred with MITI personnel as to whether there is interest there, and also to organize a workshop at our next microsystem technologies conference.

[Hess] Did you find confirmed in your talks the old prejudiced idea that the Japanese receive information more generously than they provide it?

[Reichl] There are big differences there.

[Hess] Do you have access to all the information you are looking for, then?

[Reichl] I know Japanese companies in which they talk about many details with us and they are prepared to exchange knowledge for knowledge. On the other hand, the presently adopted MITI program for discovering the underlying principles of microsystem engineering is so high-pressure as regards security of know-how that it has produced no major activity at foreign companies.

[Hess] So the knowledge will stay in Japan?

[Reichl] Indeed many discoveries would not get out of the country so quickly.

[Hess] Who will get the benefit of this program, companies like NEC, Hitachi and the like or outside institutes?

[Reichl] It is essentially already big business whose basic research is being subsidized to 100 percent there. Of course institutes are also being taken into consideration. MITI is determining the proportion.

[Hess] Many scientists are warning against making, in basic research, the same mistakes as were made in manufacturing decades ago—by inviting Japan to have one good look around. Is the international MITI program for the promotion of the underlying principles of microsystem engineering only a clever move to siphon off foreign expert knowledge?

[Reichl] We certainly have to be careful. This applies especially to research at institutes and universities, where we are accustomed to carrying on a very open dialogue. On the other hand we need the cooperation in order to stimulate us. We can still learn a lot from Japan in several technologies.

[Hess] Quite large-scale continuous series-type production should play no role for microsystems. No doubt small or medium-sized series will more likely be the question. Japanese technology is still not so dominant there.

[Reichl] It can definitely result in an advantage for us Europeans that in microsystem engineering many solutions

can come from small and medium-sized industry. And we indeed have an extensive supply there. Big business, of course, must also take part. Because the international market, that will later also benefit small and medium-sized businesses, will ultimately be occupied by it.

France's SEP Publishes 1991 Results

92WS0501C Paris AFP SCIENCES in French 9 Apr 92 pp 9, 10

[Article: "SEP: Space Barely Compensates for Reduction in Military Programs"]

[Text] Paris—The European Propulsion Company (SEP) has reported its net profits (group share) for 1991 came to 91.1 million French francs [Fr]—a significant decline (39.3 percent) from its Fr150 million profit in 1990—on consolidated turnover of Fr4,663, slightly up from 1990's 4.6 billion, according to a communique released on 8 April by the SNECMA [National Company for the Design and Building of Aircraft Engines] subsidiary.

The growth in space activity (Ariane engines) which SEP is experiencing has barely compensated for problems encountered in the military sector (missile propulsion) with the suspension of the S45 missile program and the slowdown in other defense programs. In the face of these difficulties, SEP last year began implementation of a plan to phase out 248 personnel positions by the end of 1992.

In terms of financial performance, SEP notes that net profits actually declined by about 20.6 percent, since the profit-and-loss statement for 1990 was bolstered by about Fr35 million of nonrecurring capital gains related to creation of Ariane Espace Participations and sale of the Industria subsidiary.

The parent company, SEP, had Fr4.54 billion in turnover, compared to Fr4.48 billion in 1990. Operational profits for the two years are practically identical (Fr205 million versus Fr203 million), while net profits declined from Fr103 million in 1990, not counting the nonrecurring capital gain, to Fr87.2 million in 1991, as a result of expenses related to the company's adjustment program. SEP says that at its 4 June shareholders' meeting the board of directors will propose keeping the dividend at its current level of Fr10, less tax credits.

SEP says it has two medium-term objectives: To strengthen its positions in present areas of expertise—defense and space—and to seek "expansion in the domain of industrial equipment and services that are closely related to these areas, in terms of markets or technologies."

As of the end of March 1992, SEP's experience with engines includes the following:

- Viking engines (P427, D426, G64, ELD8, V49): 526 engines built (43 of them for Viking injector reception); 81,000 seconds of cumulative operation, including 43,700 seconds in flight; 1,050 ignitions.
- HM7B engines (M12959, M1213, V49): 85 HM7B engines built; 121,700 seconds of cumulative operation, including 30,900 in flight; 691 ignitions.

France: Hybrid Circuits Industry Converts to Civil Applications

92WS0518A Paris INDUSTRIES ET TECHNIQUES in French 10 Apr 92 pp 58-59

[Article by Ridha Loukil: "Hybrid Circuits Go After the Civil Sector"; first paragraph is INDUSTRIES ET TECHNIQUES introduction]

[Text] Cars, household appliances, and entertainment electronics all represent new markets for hybrid circuits. Some manufacturers are targeting the top of the line—which is closer to their original product—while others are going after volume.

The current buzzword in the hybrid circuits industry is diversification. Hybrid circuits are the emblem of an advanced technology that has long been dominated by the military: Now these electronic components are setting out to conquer new industries. The traditional market for hybrid circuits is running out of steam, and manufacturers are trying to recycle their product in the civil sector. They are discovering niches—cars, household appliances, and medical equipment—whose potential they never suspected.

Thirty years ago people were predicting the death of hybrids at the hands of integrated circuits. Wrong! Hybrid circuits have withstood the combined attack of ASICs (application-specific integrated circuits) and CMSs (surface-mounted components), both of which are recent technologies developed for miniaturization. Better still, sales of hybrid circuits have continued to surge, creating a market in France that the Volt company estimated at 1.5 billion French francs [Fr] in 1991. According to the research firm Frost & Sullivan, the world market for hybrid circuits should climb from $1.17 to $1.49 billion betwen 1991 and 1995. Although hybrids met the technological challenge posed by ASICs and CMSs, becoming an essential complement to the newcomers, they are now faced with a different kind of problem: How to offset the drop in military orders through civil applications. All the hybrid manufacturers are in contention. The timidity of some contrasts with the boldness of others.

Dassault Electronique's hybrid circuit business brings in Fr200 million. The company's shift toward civil applications began with products for Dassault's other divisions (automatons, terminals, etc.) and continued outside the group. "But we have no interest in volumes of several hundred thousand items," says Yves le Goff, of Dassault Electronique's industrial management team. "We want to exploit our know-how with sophisticated products for professional use and civil avionics and space applications, where volumes rarely exceed 1,000."

Thomson Hybrides, which has sales of Fr200 million, 70 percent of which are made outside the Thomson group, is following the same strategy. The company does 60 percent of its hybrid circuit business with the military and 40 percent with civilian customers. The goal of Thomson Hybrides' general manager, Luc Bleriot, is to reverse those figures between now and 1995, without pursuing consumer applications. Thomson Hybrides intends to maintain its

status as a top-of-the-line manufacturer, by going after civil avionics, space, and telecommunications applications.

Sextant Avionique is more open. The company produces 60,000 hybrid circuits a year, and has earmarked military-related markets for development. But it has not declared high-volume applications such as automobile electronics and electrical engine control off limits. "The space and temperature constraints for those applications are similar to what we encounter in the military and oil industries, our traditional markets," explains Gaetan Menozzi, head of development. Mr. Menozzi favors diversification into "hot" applications.

Sagem and SAT (Telecommunications Company) are making a more radical shift: Henceforth, they will target such industries as automobiles, entertainment electronics, and radiotelephones. Volumes in the millions will replace annual runs of fewer than 1,000. And prices are falling from a factor of 10 to 100. This is nothing less than an industrial revolution for the two manufacturers, the first of which has traditionally specialized in military and space, and the second in public telecommunications. To succeed in their conversion, Sagem and SAT combined forces and invested massively in production. They are now making sales of Fr200 million from hybrids, and channel 20 to 30 percent of their production to non-inhouse customers. "We installed robots that are able to place four million components a day, preparing us to meet the new challenges," says Jean-Paul Rouet, the marketing head of Sagem-SAT's microelectronics division.

Sorep is making a similar effort. Originally involved in military, space, and oil-industry applications, the company will now shift its focus to two in particular: automobiles and mobile telephones. Sorep's changeover is grounded in automation. It teamed up with Erulec in 1990 to create Puces Industries, an ultramodern large-volume plant located in Grand-Fougerais, on the Rennes-Nantes highway. In addition to that Fr30 million investment, it has launched a Fr10 million automated line for telecommunications products at its Chateaubourg factory. The applications Sorep is targeting in the automobile industry include injection, ignition, and engine control.

Manufacturers that are diversifying at the top of the line are not merely stepping up their marketing efforts. Thomson Hybrides has also rationalized its production plant and invested Fr40 million in Massys. Fifteen million went to develop a new technology—the copper/polymide thin multilayer—that it is heralding as the spearhead of its strategy to redeploy into civil industry.

This mutation cheers Valtronic and Power Compact, two of the rare manufacturers to have based their development entirely on the civil sector. Switzerland's Valtronic specializes in average-size runs of 1,500 to 30,000 items for medical, instrumentation, and consumer uses. It is considering stepping up its large runs, such as the HF filter for cabled networks that it makes for the SEE company at the rate of 100,000 a year. Power Compact is a small Bordeaux firm that employs 50 and has sales of Fr25 million. It manufactures power hybrid circuits for industry that are used in power supply systems or actuator control. "Thanks to hybrid circuits, electronic components that are now confined in a separate box will be condensed so that they can be integrated into the engine," promises Jacques Le Poec, Power Compact's marketing director. That development has implications for a host of applications (electrical cars, etc.), and should account for half of Power Compact's business in three years.

A Host of Consumer Products on the Line

The first consumer products to respond to the lure of hybrids are those that require simple functions, such as sensors, heating elements, control units, etc. Hybrids are used as strain gauges in Philips' electronic scales. Besides their miniature size, hybrids offer an excellent tradeoff between robustness, cost, and ease of use. The precision of the 5 x 3 cm circuit's laser-honed resistances guarantees the reliability of the reading. Tefal uses hybrids in scales as well, thereby cutting the cost of the weight sensor to half that of its former technology. Of the 4,000 scales it produces each day, 3,000 already employ hybrids. Ultimately, the company will convert all its production to hybrid technology.

Philips uses hybrid circuits in its electric shavers for their compactness, lightness, and power. They recharge batteries in under 10 minutes. Such qualities are assets in a host of portable products. Philips uses hybrids in its car radios for similar reasons, while the Melita coffeemaker employs hybrids to keep coffee hot. The main attraction of the 5 x 5 cm circuit that functions as a heating element is its extreme flatness, which blends well with the coffeemaker's esthetics.

Today hybrids are tackling somewhat more complex functions. Power Compact is working on a coffeemaker that would improve the taste of coffee by incorporating a coffee grinder. The power, control, and safety electronics will be condensed onto a hybrid circuit that will be integrated into the grinder's drive motor. Tefal is readying a "smart" self-cooker that will adjust its heat to prevent, for instance, the milk from boiling over. A hybrid circuit will regulate problems of space and temperature.

Hybrid circuits have already been promoted to sophisticated functions in cameras and videos. Thomson is using them for picture inset in its 16:9-screen television sets. The application makes sense due to power requirements and lower costs. Sony is taking advantage of the flexibility of hybrids to update its VCRs more quickly: Key functions are handled by hybrid circuits, which need only be changed to design a new piece of equipment in a matter of months, instead of the usual two to three years.

The charm of hybrids in medical applications lies in their miniature size and reliability. ELA Medical's pacemaker, 15,000 of which are produced each year, exploits both of those qualities. So does Intrason's hearing aid, designed to be inserted into the ear canal, and Springler's electronic stethoscope, which must amplify the heartbeat without adding any noise.

Piaf, Innovatron's computer-card parking meter, takes advantage of the miniature size and weather resistance of hybrids.

Germany: DASA Becomes Major Fokker Shareholder

92MI0533 Bonn DIE WELT in German
23 May 92 p 15

[Article by Helmut Hetzel: "DASA Acquires 51 Percent Stake in Fokker: Plans for German/Dutch Coproduction as Good as Complete—Aerospatiale & Alenia not Involved in Negotiations, says Nederkoorn"]

[Text] The German-Dutch alliance in the medium-range jet market is practically set and sealed, according to Fokker chairman Eric Jan Nederkoorn, with Daimler-Benz-owned German Aerospace (DASA) acquiring 51 percent of shares in Fokker and thus becoming majority shareholder. A contract to this effect will be signed "before the summer," said Nederkoorn in a Dutch television interview. DASA has described the talks as constructive and positive, but has denied that an agreement has been reached.

Nederkoorn stressed that the planned takeover of Fokker NV by DASA was a purely German-Dutch joint venture in which the French company Aerospatiale and the Italian Alenia were not involved. He stressed, however, that the French and Italian companies would have an opportunity to become partners in the imminent German-Dutch venture in the future. Nederkoorn dismissed as fantasy the recent statement by Aerospatiale chairman Henri Martre that DASA had also been negotiating on behalf of Aerospatiale and Alenia.

In this connection DASA, too, had a problem with its French and Italian partners, said Nederkoorn, commenting complacently that DASA "could not simply jilt its French girlfriend and run off with a new Dutch one." DASA could not and would not leave its French and Italian partners in the lurch, as Fokker fully appreciated.

It was also worth noting, according to Nederkoorn, that the agreement with DASA did not involve the Germans taking responsibility for developing future aircraft systems out of Fokker's hands. The agreement guaranteed that Fokker, controlled by DASA as its majority shareholder, would continue to develop its own aircraft in the Netherlands and sell them worldwide. "The Germans had the Airbus model in mind," stated Nederkoorn, "but it's an idea we don't believe in." The agreement provided for Fokker, together with DASA, to go ahead with modernizing the F-50 and F-100 medium-range airplanes, and to develop new models seating between 65 and 130 passengers. The collaboration with DASA would prove its worth in the long term, stated Nederkoorn, who was confident that the Dutch government, which owns 32 percent of Fokker shares, would agree to the deal with DASA.

"In fact, I get the impression that the government's aim is gradually to get rid of its shares in Fokker," stated Nederkoorn. The Dutch economics minister, Koos Andriessen, who has responsibility for this decision, is keeping his cards close to his chest and has not yet commented on Fokker's agreement with DASA. His spokesman has stated only that Fokker would still have to "contribute to the Netherlands' technological infrastructure" in the future.

Dassault Aviation Launches Cost Reduction Plan

92WS0535B Paris L'USINE NOUVELLE in French
23 Apr 92 p 29

[Article by Sophie Peters Van Deinse: "Dassault Mobilizes to Cut Costs"; first paragraph is L'USINE NOUVELLE introduction]

[Text] The plan affects all employees. Two hundred people who were broken up into small groups devised their company's cost-cutting policy.

Military budget cuts and stepped-up competition from exports have meant that Dassault Aviation has not been spared the trials of the aeronautics industry. The company's sales, for instance, averaged 16 billion French francs [Fr]. They are going to slide to Fr13 billion between 1992 and 1994, then, according to manufacturer forecasts, climb back up starting in 1995 with the Rafale and Falcon 2000s. "How we get through this period will partly determine our future," says Michel Herchin, the vice-president in charge of industrial and social affairs.

The stakes are clear: Dassault must marshall sufficient cash flow over the next three years to continue funding its major programs, namely, Rafale, the Mirage 2000-5, the Falcon 2000, and space. In other words, the company must execute what in aviation lingo is termed a "pullout": when a pilot halts a nosedive and moves the control stick to begin reascension. Hence the aptly named "Pullout," a three-year plan (1992-94) that aims to control spending and make productivity gains in every area. Twenty topics were selected, from data processing, travel, and insurance contracts to business use taxes. Although the company's cost-cutting goal is hardly original, it did go about setting it in an innovative way. Some 200 company personnel, out of a total of 12,000, were divided into small groups of about 10 and assigned to study the budget items and meet the three-year targets selected. The groups mingled all echelons, occupations, and work sites, and have just submitted their proposals for the 1993 and 1994 budgets. Their objective: Reduce overhead 30 percent between now and 1994 (see boxed material).

The obvious outcome is that administrative service and production support staff will drop. Dassault Aviation wants to be totally open about that as well. In the inhouse newspaper, Michel Herchin does not beat around the bush in informing all the personnel of the measures being considered. A total of 300 employees in greater Paris and 400 others in the airplane maker's 11 other sites are expected to go. The solution settled on involves a cooperative effort to manufacture turnover. Besides retirement discharges, early retirement, career switches, and other "traditional" measures, the company will use "voluntary departure" agreements.

The trade unions, which are no doubt well aware of the need to cut costs in a company that is not used to doing so, have given a fairly warm reception to the "Pullout" plan.

The CGC [General Confederation of Managerial Personnel] even went so far as to call it vital.

Boxed Material: Where the Pullout Plan Will Save

1. TRAVEL EXPENSES. Three-Year Objective: 30 percent. Measures: investing Fr50,000 in a video-conference center to reduce travel between sites; management allocation of the number and franc cost of the travel budget; business trips must respect a charter.

2. MANAGEMENT DATA PROCESSING. Three-Year Objective: 30 percent. Measures: a study on optimizing resources; centralization of "hardware."

3. ADVERTISING AND AERONAUTICS SHOWS. Three-Year Objective: 18 percent. Measures: reduced participation in shows. Fewer participants and fewer aircraft on display.

4. TELECOMMUNICATIONS AND OFFICE EQUIPMENT. Three-Year Objective: 28 percent. Measures: a campaign to educate personnel about the cost of telephone and copy services.

5. BUILDINGS, LAND, MACHINERY, STOCK. Three-Year Objective: 37 percent. Measures: reducing rented space (Suresnes, Saint-Cloud); reducing the business use tax by removing unused machines; development of tight flows.

Thomson Consumer Electronics CEO Seeks Commercial Strategy

92WS0552A Paris L'USINE NOUVELLE in French 16 Apr 92 p 26

[Article by Dominique Commiot and Jean-Pierre Jolivet: "Thomson TV in Search of Commercial Strategy"; first paragraph is L'USINE NOUVELLE lead]

[Text] Regardless of the future capital structure of Thomson's consumer electronics subsidiary, it is going to have to learn to sell, and fast. Its new president has begun the race against time.

CEA Industrie's financial contribution to Thomson Consumer Electronics (TCE) will attenuate one of the fundamental problems of Europe's number 2 consumer electronics firm: under-capitalization.

However, it will not resolve the group's other chronic difficulty: a company culture that places too little emphasis on sales and marketing. Revenues have plummeted 15 percent in two years, hovering at 31.5 billion French francs [Fr] in 1991. Worse, TCE is losing market share in television sets (53 percent of its business) everywhere. In France, TCE is down to 22 percent of the market. In 1990 it tied with Philips, which has climbed back up to 26 percent. In the United States, its share fell from 20 percent to 17 percent over the same period. "Thomson management has not been able to take advantage of the dynamics of the buyout of RCA, as Alcatel NV management did after the takeover of ITT," according to one of the group's managers.

At Sony, the commercial culture is incarnated by the president himself. Akio Morita is his company's leading salesperson. Not so at Thomson, as a TCE misadventure in Spain illustrates. Before obtaining its concession for a pay TV channel in that country—in the days before the running battle between Alain Gomez and Andre Rousselet—Canal Plus proposed a joint venture to Thomson. The idea was to promote the sale of television sets with a channel-decoder-equipped Peritel hook-up. Thomson did not appear really interested. Three days after the concession agreement was signed, Sony called Canal Plus. Akio Morita himself took the initiative. In no time, a deal had been reached between Canal Plus and the Japanese group. "Engineering debates have too often overrode the sales and marketing approach, as in the battle over D2-MAC [Definition 2 Multiplexed Analog Component]," according to a former Videocolor manager. Having launched into the European HDTV [high-definition television] program, which allowed it to receive Fr2 billion in public financing for an investment of Fr500 million of its own and still avoid the wrath of Brussels, TCE forgot the commercial dimension of the project.

What is the market for HDTV? When will it materialize? Alain Prestat, TCE's new president named in January, responds more cautiously to these questions than his predecessor, Bernard Isaultier. Nevertheless, he is convinced that 16:9 format wide-screen television has a market niche.

TCE has a real technological lead in this field. It is still the only manufacturer that can produce 16:9 format cathode-ray tubes at an acceptable price. It has invested over Fr1.2 billion in the big tubes and 16:9 at its Anagni plant over the past three years. Japan's JVC buys its 16:9 tubes from Videocolor, TCE's specialized subsidiary. So does Philips, but only until May. The Dutch group has just begun production of its own 16:9 tubes at its Aix-la-Chapelle plant. This has TCE racing to consolidate its lead, betting on the "product line effect." By the second half of this year, it will be offering consumers a family of three 16:9 models (91, 81, and 71 cm).

To win this bet, Alain Prestat began his tenure by tackling TCE's commercial shortcomings—a task made easier by this telecommunications engineer's 40 years of experience with the firm. Named planning director by Alain Gomez in 1986, he participated in the negotiations with General Electric on the takeover of RCA before becoming an adviser to Michel Rocard at Matignon [Hotel de Matignon: the prime minister's office].

Selling Innovation

Alain Prestat's first decision was to terminate the sales and marketing director for Europe and Asia, the director for TV Europe, and the legal director. He also set up a product development structure that pools commercial, technical, and human resource capabilities. The goal is to find ways to sell innovation. In the United States, a young Italian designer has been hired to design new television lines that appeal more to young people. In Europe, TCE is finally

going to clarify its product lines by keeping only three (Telefunken, Saba, and Thomson) of the five makes it still offers.

Despite the group's disastrous financial position—a Fr12 billion debt and a deficit on the order of Fr1 billion in 1991—TCE management refuses to listen to the many prophets of doom. Their optimism is fueled by imminent capital contributions and their wide-screen product. However, they know they are running a terrible race against time to succeed where Bernard Isaultier failed, despite his intentions of making TCE a "market-driven company" [in English]. They must instill the group with the commercial culture it is cruelly lacking, and fast.

French Firm Targets U.S., Japanese Silicon-on-Insulator Market

92WS0552B Paris L'USINE NOUVELLE in French 16 Apr 92 p 27

[Article by Jean-Pierre Jolivet: "Soitec, the Tom Thumb of Silicon"; first paragraph is L'USINE NOUVELLE lead]

[Text] A new technology makes it possible to fabricate integrated circuits that resist radiation and high temperatures. The market is developing at top speed in Japan and the United States.

Thoughts are turning to maximizing the technologies in France's Silicon Valley. In Grenoble, two researchers employed by LETI [Laboratory for Electronics and Data Processing Technology] (the microelectronics laboratory of the CEA [Atomic Energy Commission]) have founded the firm Soitec in order to commercialize silicon wafers for fabricating circuit boards.

The six-person company is off to a running start. It has already acquired a Japanese distributer, Seika Corp., and is getting ready to sign an identical agreement in the United States. "Being a small company is not a handicap. The market is in its infancy, and our only competitor is the U.S. firm Ibis," according to the general manager, Andre Auberton-Herve. He even predicts a gross income of 10 million French francs [Fr] for the first fiscal year.

Eight years of work on the silicon-on-insulator (SOI) technology have prompted Andre Auberton-Herve and Jean-Michel Lamure to try their hand at manufacturing—and not without reason. This technology, which makes it possible to fabricate integrated circuits that will operate under severe conditions (radiation, temperatures of up to 300°C), is ripe. Formerly reserved for military and aerospace components—the sector was transferred to Thomson-CSF—it is now breaking into the civilian markets. These include the nuclear industry, of course, but also automobile electronics, integrated sensors (in which polysilicon silicon membranes will be easily replaceable by SOI), the petroleum industry (wellhead sensors), and hyperfrequencies (SOI is an alternative to gallium arsenide up to 10 GHz).

The eventual target is VLSI [very large scale integration] semiconductors. The SOI technology can produce high-speed, low-energy components that integrate several different kinds of logic. In fact, the keen interest on the part of the Japanese is for the development of DRAM [dynamic random access memory] memories. "By the end of the decade, the world market should reach $1 billion," Andre Auberton-Herve said.

Meanwhile, Soitec will be using production equipment developed at LETI. With a capacity of 20,000 to 25,000 wafers an hour, these machines will allow it to supply half of the market—and to aim for a gross income of Fr10 million in three or four years.

The managers of this small Grenoble company hope to follow in the footsteps of another French start-up, Picogiga, which has become one of the world's leading suppliers of GaAs wafers.

France's Alcatel-Alsthom Posts 1991 Profit

92WS0552C Paris L'USINE NOUVELLE in French 16 Apr 92 p 32

[Unattributed article: "Alcatel-Alstom: Profits Up 20 Percent"]

[Text] Despite a provision of 2.7 billion French francs [Fr] for the restructuring, necessitated by numerous acquisitions, Alcatel-Alsthom's 1991 consolidated net income was Fr6.18 billion, up 20 percent. This gave the third-largest industrial group a net margin of nearly 3.9 percent. The group's performance is mainly due to Alcatel NV, whose operating results improved by 23 percent. However, the picture is not all rosy. The world's leading telecommunications company registered a decline in sales and gross profit on sales.

German Machine Tool Industry Seeks Strategy Against Japanese

Difficulty in Competing

92WS0563A Munich TOP-BUSINESS in German Apr 92 pp 17-22

[Article by Rainer Burkhardt and Guenter Schaefer: "An Industry Streamlines"]

[Text] Those were the days, when Munich machine tool manufacturer Fritz Deckel enjoyed the West German economic wonder to the fullest measure. That party when, as the mood turned wet and happy, he shoved the mink-clad and bejeweled wife of industrial financier Rudolf Muenemann into the host's lighted swimming pool and then jumped in himself to "save" her, became a jet set legend. The furious husband was pacified with a 3,000 German mark [DM] donation to the Red Cross.

His nephew and successor Michael Decker had less reason to celebrate: Under his aegis, first as chairman of the board, then as deputy chairman of the board of directors, the tradition-filled company, founded in 1903, threatened to go down the drain, so that the family's majority interest

had to be sold to Mainburg construction machine and real estate businessman Walter Eder (see also TOP-BUSINESS 1/1992 [not included]).

Meanwhile, not only a part but large chunks of the mostly medium-sized German machine building industry is in water up to its neck.

Crisis meetings with bankers and workers' councils are following one upon the other; reports of dramatic contract setbacks and considerable losses, of temporary work, layoffs and plant closings are following one another in that branch of industry which in 1990 was still booming—above all in the machine tool industry, the strategic core of the branch.

The decline in foreign demand, which began as early as 1989 and intensified in the past two years because of exchange rate and payroll costs, is revealing the strategic and structural weaknesses in German machine building:

- One-sided technology orientation; costly product complexity and program versatility, excessive throughput flow;
- Insufficient globalization;
- Too small units in the volume business, which serves the Japanese rivals as a basis for attack on the last German bastions—high-performance machinery and Europe.

Only a few forward-looking businessmen such as Swabian Berthold Leibinger (Trumpf sheetmetal processing technique), Hubert Hermle (milling machines) or Gerhard Schubert (packaging machines) set the course correctly ahead of time.

But many, who during the boom dismissed the warnings of knowledgeable advisers, are feverishly trying to streamline their product and manufacturing structures. And the realization is growing that sensible coproduction and alliances are often better suited to conquer lost or new terrain than going one's own way with a medium-sized company.

Even leading machine tool manufacturers such as Deckel, Gildemeister, Maho and Traub no longer shy away from the ultimate taboo of a merger (see following article).

The realization is increasingly beginning to prevail that yesterday's prescriptions for survival in the 1990s are no longer good enough.

Thus, the strategy largely followed in the 1980s by the machine tool or sewing machine industry of taking refuge from the attacking Japanese in the high end of manufacturing—that is to say in tailor-made, technically highly advanced solutions, is increasingly turning out to be a dead end (see INDUSTRIEMAGAZIN 6/1991).

The high-volume markets were lost, the broad range of variants and thus the cost of complexity are growing. But now the Japanese, who have come threateningly close technologically in the upper machine categories as well, are attacking; behind them the Taiwanese already lurk.

Now the FRG's standard production machine builders are paying for the fact that during the 1980s they left the field and the large production runs for cost-beneficial production with hardly a fight to their Japanese rivals in North America and, above all, in the Far Eastern growth market. This in turn allowed the Nipponese machine builders to keep prices low and at the same time to make big profits (see graphic).

DRASTIC DIET; How German Machine Tool Manufacturers Can Again Keep Up in Competition With the Japanese

	Cost Structure*		Measures
	German Manufacturers 100	Japanese Competition 75	
Administration and operations	18	15	Cutting back admin., but still only low potential
			Broader product base to provide better coverage for sales resources, new forms of marketing
Design	4	2	Increase R&D return through higher volume and broader international market access
Production	32	13	New production strategies; Volume increase and less complexity, from fewer variants, for example, optimization of location
Materials	46	45	

Figures in percent; Source: Traub AG, UBM

Reinforced by this, the Japanese strategies are ready to force the big German names, who—although mathematically the world's champion exporters—sell 77 percent of their production in Europe, to go on the defensive in their own territory.

The Japanese have primarily set their sights on the machine tool industry, the technological key to advanced metal production—from electrical engineering to flight and space technology, from machine-building to the automobile industry. Mainly in Great Britain and Italy, as well as in Switzerland and France, the Japanese acquired considerable market shares between 1985 and 1990 at the expense of the German machine tool manufacturers.

If it continues in this fashion, "the Japanese will one day determine which cars are built in Europe," suggests Axel Kemna, head of the executive board of lathe manufacturer Gildemeister AG, Alarm.

The fact that the arch rivals from the "Land of the Rising Sun" are now, as a result of the lasting U.S. recession and a cooling economy in their own country, suffer from an even worse slump in orders, is to him no reason for sounding the all-clear. On the contrary, he fears that for that very reason they will now really try to force machine tools from their domestic, U.S. or even European factories onto the Euromarket.

In so doing they hold the better cards, as far as the ability to outlast everyone. For thanks to a higher sales volume and a slimmer organization, reflected in an almost three times higher turnover per capita than the German average for the machine tool industry, they were able to accumulate thick profit cushions during the boom years.

Lower Prices, More Profit; Japanese Machine Tool Industry Produces More

	Germany	Japan
Price Development 1	114	95
Per capita turnover 2	150	425
Profit-turnover ratio 3	2.7	7.8

1. Index for lathes (1985 = 100)

2. in 1,000 marks

3. Company average in percent

Source: UBM, Prof. Werner Pfeiffer (FIV); all data for 1989

For example, at Amada, number one in 1990, 10 percent of total sales or approximately $134 million were left in profit before taxes, while at Trumpf GmbH & Co., which as the most profitable German machine tool manufacturer is one-third the size, it was less than one-sixth (or slightly more than five percent of the turnover). The fifth largest Japanese, Mori Seiki, even managed 12 percent net earnings as a percentage of sales.

Whether considered before or after taxes, the Japanese machine tool manufacturers are, as shown by analyses by Diebold Deutschland GmbH in Eschborn and by UBM Unternehmensberatung in Munich, nearly uniformly clearly more profitable than their German competitors—and their profitability lead is growing with higher sales. The same applies to machine building in general.

The defenders have little to oppose the attacker's collective financial power: 80 percent of the western German machine builders—that is to say those with fewer than 200 employees—together achieve only 20 percent of the industry sales. Just 3 percent (one-third share of the turnover) have more than 1,000 employees. Only a few of even the largest family companies have found their way to the stock market—and often too late; the rest continue to have to rely on self-financing.

It is all the more urgent for the medium-sized companies in the industry to decide in favor of a strategy which is appropriate for their own profile of competence and to implement it consistently.

Diebold advisers Rolf Graf, Dr. Holger Clever and Thomas Gumsheimer are convinced that every time they fiddle with things it just saps unnecessary strength. They only see two alternatives for the German machine tool industry:[1]

- The so-called core strategy is aimed at achieving the technological lead in a relatively narrowly defined application segment through special, outstanding key components—for example in a particularly demanding processing technology such as gear cutting or special, customer-specific machines such as transfer lines for engine manufacture.
- The growth strategy strives for size advantages and connected learning effects to achieve a cost edge in high-volume markets; ultimately, the aim is for a global marketing, production and development presence.

A company specializing in contract work stands and falls with the ability to keep costs in check despite custom-tailored production on schedule. Only someone who can manage this high-wire act can maintain a lead in innovation, which in turn gives the customers the hoped-for productivity advantages.

No wonder that companies which can cope with this challenge are among the highest earners in German machine building.

Such as special machine builder Ex-Cell-O, which configures its flexible processing centers at lower cost from a modular system and only manufactures 10 percent of the parts needed. "Our strengths are our engineers' ideas, our software, assembly and installation," explains finance director Rudolf Schmuecking.

Packaging machine specialist Gerhard Schubert also swears by a cost-saving modular system—supported by easily adaptable robot technology (see story below). Working with mass-production components is not a detriment to the designers' motivation and creativity; on the contrary: "They enjoy being able to make new combinations out of them every day or coming up with new simplifications." The guideline is "what the customer really needs."

Consistent aim for the customer's need instead of what is technically feasible, a favorable price-performance ratio through production simplification, minimizing the variants, standard module and same part strategies are the theme precisely for those machine building companies which have to go on the offensive in the volume business, because they are already too large for the high-end niches.

For example, using "dealer-friendly" products Pfaff wants to recapture extra-European markets, which were lost to the two Japanese industrial sewing machine giants Juki and Brother. Marketing chief Dr. Hartmut Huelshoff uses the following to define what that means: "Machines in which technical complexity is not unnecessarily cultivated, and where the customer can dispense with adjustments and modifications." Something new at Pfaff: For a year marketing and sales have been setting the development targets.

The new cost-benefit path in product innovation requires close cooperation by the various departments. What is

self-evident for up-and-coming milling machine manufacturer Hermle AG ("We discuss things a lot," according to board member Harald Hermle), has been systematically tested by Trumpf in a pilot project (see story below).

"Considerable rationalization reserves can still be achieved" with modern development and quality assurance methods, says Helmut A. Roschiwal, head of the well-known Roschiwal & Partner Ingenieurbuero GmbH in Augsburg.

In reclaiming the volume markets, overhead costs, which had inflated from the overgrown product range, are now the target.

This is where, for example, Dr. Carl Behrens, chairman of the board of Trumpf competitor C. Behrens AG in Alfeld, has applied the reorganization axe. And Traub CEO Hans Dieter Poetsch is applying the planned location optimization to the overhead cost ratio (see below). Based on such considerations, it is sensible to separate out the business of customer-specific solutions—as at Trumpf, for example.

There is no patent prescription for optimal production depth. To be sure, the leading Japanese machine tool and sewing machine builders achieve their high per-capita output primarily by having entire components delivered by specialists to much greater extent. On the other hand, in each individual case there are good reasons for higher in-house production (see below).

The Achilles heel of the German machine tool industry, however, turns out to be the solitary tinkering with CNC controls. Even today, machine tool manufacturers who want to sell standard machines in the United States and southeast Asia can hardly get by without Japanese world market leader Fanuc (share: 50 percent). "A dependence which endangers our existence," warns UBM consultant Peter Baumgartner, "which makes concerted action by Europe's machine tool and control industries indispensable."

One reason for the critical situation, according to Walter Riester, head of IG Metall of Baden-Wuerttemberg, is that CNC controls in this country "are conceived by computer scientists rather than by using the experience of skilled workers."

The greatest challenge for German mass-produced machine building is globalization, of course. Only a few companies have gotten as far today as Trumpf GmbH & Co., which develops and produces industrial laser types in Europe, the United States and Japan.

Opening up the growth market in southeast Asia, above all, cannot be done alone. And it cannot just stop with marketing alliances. In the machine tool industry, according to consultant Baumgartner, "the concentration process has only begun."

Example: Traub

Hans-Dieter Poetsch, CEO of the Swabian lathe manufacturer, is fighting against the Japanese competitor's 25 percent cost advantage.

Three-fourths of that alone is related to production costs: They are 32 percent at Traub, but only 13 at the Japanese company. The blame rests by no means with just higher wages or shorter working hours. The labor costs for direct, productive activities represent only 9 percent at Traub, but overhead costs—from operating funds to plant management—are 23 percent.

This is the other side of an organization aimed at a large product range instead of volume. It can be streamlined primarily through development and design: Through clear product concepts coordinated with marketing, standardized components and Simultaneous Engineering between development and production. But Poetsch will also have to reorganize the production structures:

- The highly automated parts manufacture (capital and other overhead costs 76, direct personnel costs only 24 percent), which requires highly skilled workers, is being centralized in the Reichenbach parent plant, insofar as Traub-specific parts are involved. Standard parts are to be procured from specialized suppliers, in assembly groups, if possible.
- For assembly with an average 55 percent personnel cost ratio, Poetsch takes a varied approach: Customer-related assembly of high-tech machines remains in Reichenbach, and anonymous assembly of standard machines will be concentrated to French subsidiary Sonim. The development division will also be correspondingly split.

Example: Trumpf

Project leader Peter Bytow can be satisfied with the development result: The new Trumatic 500 Rotation, a machine for punching, nibbling and forming sheetmetal, needs more than 30 percent fewer production parts, meaning 600 instead of 900 at the start, and costs 25 percent less to produce—thus enabling a very favorable price-benefit ratio. The new model was also presented at Trumpf GmbH & Co.'s product days last November, which was visited by about 350 customers.

With that, the new development approach at Trumpf had passed its test: For the first time a machine not only had to meet certain demands for function and quality, but a cost limit was prescribed—assembly for assembly. From the beginning development, production scheduling, manufacture and sales worked closely together—also a first—in order to achieve the goal in several optimization loops. Even the design was already discussed with the production people. Cost accounting was a constant companion during design; sometimes several variants were tested.

Such cost-based procedures on a level independent of departments, which is commonly known as Target Costing in Japan, will become the rule at Trumpf in the future, and not only for new products. Trumpf chief Leibinger regards it as an equally profitable construction goal "also to make products that have been on the market for two or three years cheaper when they are due for overhaul."

Example: Schubert

Hardly a single packaging facility sold by Gerhard Schubert, founder of the corporation with the same name, is the same as any other, and yet they are almost exclusively produced from mass-produced components.

As early as the beginning of the 1970s, as a businessman he implemented the idea of a modular system which as a Bosch employee he had failed to get his boss to use.

The development of a robot which specializes in putting candies, chocolate bars or batteries that arrive totally randomly on a band into boxes, was used by Schubert for additional product simplification.

Example: Hermle

There are some unusual things at Maschinenfabrik Berthold Hermle AG in Gosheim: With a milling machine turnover of approximately DM100 million it is far smaller than German market leaders Maho and Deckel, but nevertheless quite profitable. The reason, among others, is that, as paradoxical as it may sound, it combines a comparatively large production depth with "Just-In-Time" procurement of outside parts.

The rule for the choice between in-house production and outside procurement is: Where high quality is decisive and Hermle has the corresponding production know-how, they make it themselves. Otherwise, according to production chief Dietmar Hermle, "we buy the best that is offered by the market."

Milling parts for the machine tools are made by Hermle itself, for example, although an expensive machine is needed for it. This is still profitable, because the company founded in 1938 as a screw and profiling lathe factory uses it to mill precision parts for the auto industry, for mechanical engineering, optics, flight and space technology as well as for their own laboratory centrifuges. "These two divisions bring in the quantity, and the quality benefits all three."

He also does not want to give up his own sheetmetal processing. All test production runs for sheetmetal parts up to eight millimeters are run there. For larger production runs, however, orders are subcontracted to suppliers who have earned his trust over many years.

Hermle cultivates and protects the "very high supplier loyalty" and a first-class quality and cost advantage through partnership-type cooperation. The company thus offers its suppliers framework contracts with "interesting volume figures," which are the result of the marketing plans for which chairman of the board Harald Hermle is responsible. From that a 12-month list of requirements is derived using the critical path method, and out of that a fixed plan for each upcoming six-month period. The suppliers as well as the materials industry have access to that and can prepare for it. The "Just-In-Time" delivery requests take place according to weekly schedules. The clever machine builders are thus utilizing something they once had to learn themselves as auto suppliers.

Footnote

1. The Diebold study "Survival Strategies in Machine Tool Building" also gives detailed conversion advice (such as for entering the market in Japan), which can be transferred to similar cases.

Possibility of Mergers, Fusions

92WS0563B Munich TOP-BUSINESS in German Apr 92 pp 25-28

[Article by Thomas Luber: "The Fighting Cocks are Tired"]

[Text] Werner Babel, majority stock owner and chairman of the board of Maho AG in Pfronten, leaves no doubt about his willingness to fight: "Those two have been hacking away at my chair and now they have to go," is the way the combative man from Allgaeu comments on the "leave of absence" without notice for his two deputy executives Dr. Henning Baehren (Research and Development) and Ralf Schiller (Materials Industry).

They are not the only ones who have to clear out after the stormy board meeting on 17 February; when Babel lashed out all around him, personnel chief Manfred Jehle and marketing chief Rolf Schmidt fell victim as well. They, too, had fallen into disfavor with the autocrat. The reason was that in view of the catastrophic business situation—an estimated DM80 million in losses and DM500 to DM600 million debt for the current 1991-92 business year, with consolidated sales that had slipped below DM500 million—they had expressed criticism of his leadership style.

But Babel, who over 20 years expanded a small supply company into the tenth largest machine tool manufacturer in the world, does not want to have his subordinates meddling even now. On the contrary: The showdown at the edge of the Alps could soon have a sequel since the Maho CEO no longer trusts even veteran brothers-in-arms such as his deputy Dr. Georg Werntze.

The miserable situation at Maho is not the only reason for the internal revolt. A reorganization in Allgaeu could also contribute to the actual implementation of an idea, continuously discussed in the industry but shelved during the boom years, of forming larger, more powerful units in the machine tool industry.

For it has been a long time since Babel has been the undisputed master of his house despite his cleanup work on the director's floor. At the insistence of house banker and chairman of the board of directors Dr. Rolf-E. Breuer, a member on the board of Deutsche Bank, he has had to accept a restraint in disposal over his shares.

Furthermore, at the beginning of the year the man from Deutsche Bank sent in-house business advisors Roland Berger & Partner to Pfronten in order to work out a reorganization concept as quickly as possible. The consultants will be followed in the spring by a new board member, appointed by Deutsche Bank, who is to implement Berger's plans.

Breuer knows just as well as Babel that Maho AG is hardly able to survive even with the best rationalization concepts. The beefy Allgaeuer is feverishly searching for a partner to form a strategic alliance, in order to save at least a last shred of independence. Thus, just one day after the turbulent board meeting on 17 February he flew to Bielefeld in order to negotiate with Dr. Axel Kemna, chairman of the board of Gildemeister AG, about cooperation.

Strategist Breuer, on the other hand, is attempting to achieve a big solution: Several machine tool specialists who complement each other's product range should merge into a group which is able to compete with the leading Japanese competitors.

Negotiations have therefore been under way ever since the beginning of the year in which—among others—along with Trumpf and Deckel, Gildemeister and traub, IWKA [Industriewerke Karlsruhe-Augsburg] and Maho, nearly everyone who has any name and ranking in the industry is involved. In parallel, the Berger specialists are working on a pilot study in order to explore the synergy effect of the various cooperation possibilities. The ultimate goal is the founding of a "German Machine Tool AG"—possibly even this year.

This was something unthinkable in past years, despite all the hypotheses and talks. Even cooperations in partial fields foundered on the stubbornness and egotism of the family business owners, something that in the case of combatants Deckel and Maho even lead to ruinous price wars and serious management errors.

Babel, for example, built an assembly hall for mountings in Kempten at a cost of DM150 million when Deckel started to skid because of technical problems and the chief of Maho saw his chance of pulling ahead of the arch enemy. According to Berger's analyses, the building, which was planned for a turnover of DM1.5 billion, would not pay for itself even when fully utilized.

The rivals now have their backs pressed so close to the wall that Werner Babel is even negotiating with Dr. Peter-Juergen Kreher, chairman of the board of Deckel AG, about possibilities of cooperation—perhaps on a jointly produced control, until now something that was a distinctive, jealously guarded product. This approach is facilitated by the fact that in construction machine builder Walter Eder a new majority shareholder has the say at the traditional Munich firm.

Eder is one of those whom Breuer of Deutsche Bank cannot get by if he wants to build a new house for the German machine tool industry, because the publicity-shy Eder, who enjoys great financial strength from owning a large amount of real estate, is said to have his own plans for establishing a machine tool conglomerate.

But the favorite to dominate the holding company sought by Breuer is considered Dr. Wolf Hartmut Prellwitz, chairman of the board of IWKA. The head of a group worth DM2.5 billion, which, through subsidiaries such as Boehringer Werkzeugmaschinen GmbH in Goeppingen, is already involved in lathes, he has constantly expressed his interest in larger business units in the machine tool industry.

The 61-year-old is supported by his large customers BMW and Mercedes-Benz, represented on the IWKA board of directors by, respectively, Volker Doppelfeld and—until December 1991—by Juergen Hubbert. Both want to prevent the German machine tool industry—a key branch for the metal industry, like chip production for electronics—from ending up under Japanese control.

There is indication that IWKA might become a bellwether since the group is already well entrenched with welding lines and robots in the auto industry, has engineering and systems know-how, reorganization experience and, above all, enough money.

As partners, in addition to Deckel and Maho, Traub AG of Reichenbach and Mauser-Werke Oberndorf GmbH are being mentioned. In such a southern combination Westphalian Gildemeister AG would have to remain on the outside, not just because its lathes and processing centers would collide too much with Traub AG's product range, but also because Friedel Neuber, head of Gildemeister's house bank WestLB, would mean the addition of a rival to Deutsche Bank with industrial and regional policy ambitions.

A merger of Deckel and Maho under one holding company roof would also be problematic, because the programs overlap and the respective customers are exceedingly brand name-fixated. In that case, according to the "personal opinion" of Berthold Leibinger, president of VDMA [Association of German Machine Tool Institutes] and a member of the board of directors of Maho, "much substance would be lost," besides the fact that the business cultures would have a hard time becoming integrated.

Leibinger has not yet decided how far he himself will become involved in a German Machine Tool Corp. For him there is actually no reason to bring his profitable Trumpf GmbH & Co. into the holding company, since the sheetmetal processing technique represents a special segment. Synergy potentials in foreign sales could also be utilized by means of joint ventures. Leibinger could thus also enter the holding company privately as a minority shareholder.

Banker Breuer would in any event like to see this pioneering, sophisticated businessman as chairman of the board of the new creation which will be worth at least DM1.5 billion.

For at least as difficult as finding out the rationalization potential of individual companies and adjusting them to each other is getting their chief executives under one roof. At any rate, it is difficult to envision solitary fighters such as Werner Babel pigeonholed in a committee.

Expert Views Strategy

92WS0563C Munich TOP-BUSINESS in German Apr 92 pp 28-33

[Interview with VDMA president Berthold Leibinger conducted by TOP-BUSINESS editor Rainer Burkhardt; date and place not given: "The Art of Survival"]

[Text]

[Burkhardt] Dr. Leibinger, from one year to the next the German mechanical engineering industry has fallen from a boom into a difficult marketing and profit crisis. Is that just an economic problem?

[Leibinger] The German mechanical engineering industry experienced the largest export decline in the postwar era in 1991. This cannot pass without a trace in an industry which owes 50 percent of its livelihood to export. In important export markets such as the United States, Great Britain and Scandinavia there is recession, but even in the rest of Western Europe the demand for investment goods is decreasing. Add to that the loss of Eastern Europe.

[Burkhardt] But only 6 percent of the German machine exports went there.

[Leibinger] An important 6 percent for the profit situation, however, because we were able to achieve good offsetting contributions there. And do not forget that the eastern German mechanical engineering industry, which still has nearly 300,000 employees, was extremely oriented toward the Eastern markets, particularly the former Soviet Union. Tremendous personnel adjustments are still necessary in this area.

[Burkhardt] If you leave out the collapse of the Eastern trade, then what remains is the recessionary tendencies in the United States and Western Europe. The Japanese ought to suffer just as much from that.

[Leibinger] Not necessarily. To be sure, the Japanese mechanical engineering industry, particularly machine tools, is also suffering a massive decline in orders at the present time. For us, however, the competitive situation has clearly deteriorated because of the strong appreciation of the mark against the dollar—an annual average in 1990 of about 16 percent compared to 1989—and against the yen of 22 percent. To Amada, Trumpf's principal competitor, this meant a price cut of 22 percent everywhere in the world, without having to do anything.

And there is one more thing: the fact that an increase in unit labor costs in the German metals industry by a good 6 percent was much steeper than for the foreign competitors. All of that—worldwide recession, exchange rate and labor cost disadvantages, as well as increased burdens from interest rates and public surcharges and fees—is difficult to cope with for an industry, which even in good years does not have too much profit to show. At an average of about 2 percent, the net earnings as a percentage of sales is absolutely insufficient.

[Burkhardt] And this should be due solely to adverse external circumstances?

[Leibinger] I would not say that. But think about it, that as late as 1990 in large parts of the mechanical engineering industry we still had great trouble coping with our orders. Structural problems were certainly neglected in the boom years, and they are now surfacing all the more harshly.

[Burkhardt] So where is it urgently necessary to act?

[Leibinger] A general problem in German mechanical engineering is surely the overly large product range in many companies. We must be able to keep our technical lead and use it to produce less expensive series—not only by cutting back the variety but also the complexity of the products. We must teach our engineers that it is a creative performance not just to design a machine but also to simplify an existing product in order to produce it more cheaply.

[Burkhardt] As an additional requirement in the book listing the work duties, so to speak?

[Leibinger] Right. Because we must continue to distinguish ourselves through innovative, more efficient technology from the worldwide competition. Even with higher quantities and slimmer production we will remain 10 to 15 percent more expensive than the Japanese.

We are making a mistake if we only compare wages at Daimler-Benz and Mitsubishi and overlook the fact that second and third-rank Japanese supply companies pay distinctly lower wages than the major companies. Despite the lower cost of living, a skilled worker for a supplier in the Swabian Alps earns almost exactly the same as one with Daimler in Stuttgart.

[Burkhardt] But concerned industry experts also see serious, industry-wide weaknesses. The typical machine-producing medium-sized company, they complain, wants to do this all by itself, and thus falls behind the Japanese competitor, who operates globally, utilizes large volumes and is correspondingly more financially secure.

[Leibinger] Well, every structure has its pros and cons. I still think it is an advantage for the German industrial community that it is characterized by medium-sized companies, which are flexible, innovative and, above all, faithful to their workers in hard times—that is to say, represent a stabilizing factor in the recession.

[Burkhardt] But in the present machine tool crisis one does not notice any of that.

[Leibinger] Sure, you are right, one has to see the disadvantages clearly as well. For a medium-sized company it is already a problem to be present worldwide in all important markets; on the other hand, the increasing complexity of the products makes it necessary at least to be on the spot with one's own service people. In this area I urge cooperation. In China, Trumpf, for example, has a joint service organization with Maho. We are planning the same thing with Traub in Singapore.

[Burkhardt] But those are only drops in the bucket. Should one not establish joint, region-wide sales networks?

[Leibinger] But that could not be realized all at once. Often there are long-term contracts, for instance with trading companies, which are not so easily cancelled.

[Burkhardt] However, there is a need for cooperation in production and development as well. It will simply be too expensive when everyone manufactures housings, stands or other not all that competitively determined parts themselves or has his own control specialty developed.

[Leibinger] I think that in just five years the world of the machine tool industry and similarly structured special branches will look different from today. That is to say, the individual manufacturers will supply each other more heavily and utilize common procurement sources. My vision is that the manufacturing depth will be shallower, but the companies will simultaneously keep the production of key components under their control, in order not to lose know-how which is decisive in the competition. One cannot be a swimming coach without knowing how to swim.

[Burkhardt] But not every machine tool manufacturer needs NC controls tailormade for him, while the Japanese owe their price advantage in the standard machine range primarily to Fanuc's controls, which are produced in large quantities.

[Leibinger] The Association of German Machine Tool Factories (VDW) therefore requests an open control, which, based on large-scale manufactured hardware, permits software adaptation to the specific task of the machine manufacturer. There are concepts for that as well, and the German control manufacturers are listening to that or are at least thinking about it.

[Burkhardt] How seriously are the machine tool producers really supporting that?

[Leibinger] About as much as a married couple in the matter of raising the children. One always agrees quickly on the principles, but in a particular case opinions sometimes differ.

[Burkhardt] So there really is something to the accusation that the machine tool producers are unable to cooperate?

[Leibinger] Individuality—all the way to obstinacy—by the business personalities fixated on their own company does not, of course, make it any easier to form cooperations. But the willingness to cooperate is growing.

[Burkhardt] Do cooperations and alliances limited to partial areas suffice? Or might it not be necessary to cobble together even larger units in order to be a match for the global presence and the large volume of the Japanese?

[Leibinger] I think that we need larger volume—DM500 million to DM1 billion turnover—for standard machines and that we will get it as well. Best of all would be to combine companies with complementary programs, meaning lathes and milling machines and processing centers, perhaps also loops.

[Burkhardt] And for special machines?

[Leibinger] I think that there we are very well advised to remain with small, flexible and customer-related units. Take, for example, gear grinding, a specialty of my colleague, VDW chairman Bernhard Kapp in Coburg. There is no market for a billion-mark turnover there; he is quite happy with his DM90 to DM100 million. It does not make much sense to bundle together 10 DM30 million companies with totally different specialties into one DM300 million firm.

One more remark about that: The mergers in the English machine tool industry into five large groups at the end of the 1960s, beginning of the 1970s did not by any means stop the decline.

So, size alone does not do the trick. The art of survival consists in not letting any point, whether product, production, marketing or innovation be too weak and to achieve at least a "satisfactory" result everywhere.

Thomson R&D Policy Focuses on Diversification

92WS0576B Paris LE MONDE in French
9 May 92 p 14

[Article signed P.-A. G. and C.M.: "Problems of Consumer Electronics; The Chief Executive Officer [CEO] of Thomson Electronics Gives Himself Two Years to Start a 'Renault-Type' Recovery"—first paragraph is LE MONDE introduction]

[Text] Appointed CEO of Thomson Consumer Electronics (TCE) in January, Mr. Alain Prestat gives himself two years to end the persistent decline of TCE sales, which fell from Fr36 billion in 1989 to Fr31.1 billion last year (-14 percent). The company, whose losses amounted to Fr2.4 billion in 1991, will then have to give up producing televisions only in order, as its CEO said, to "retain its fourth rank worldwide."

"It took eight years to straighten out Renault: two to stop the decline in sales, four for the company to become profitable again, and eight for French Formula-1 engines to supplant Honda's!" As head of a company that can truly be said to have been hit by disaster, the new CEO of Thomson Consumer Electronics (TCE) has found his model. His reference. Like Renault in 1984, TCE accumulates all the symptoms of a disaster: a 14-percent drop in sales, cumulative losses of Fr5.2 billion in two years, Fr12 billion in debts, and a production focused on a "mature" market, televisions...

However, like Renault at the time, TCE still possesses enviable strongholds: its 18 percent of the U.S. TV market, and its 14 percent of the European market still earn it the first and second ranks on these two continents. The company owns a modern production plant, largely "relocated" in countries where labor costs are low—Mexico and especially Southeast Asia: after all, TCE is the largest employer in Singapore. Its production of cathode ray tubes, which it just extended to Poland, makes it one of the world's leading manufacturers.

Like Renault, therefore, TCE must first return to growth. "To curb the erosion of its market shares in a market that

is also going through a recession," as acknowledged by Mr. Prestat, who believes that the company started stalling around mid-1991. Remobilizing the troops, regaining control over management—a few heads fell—repositioning brand names (between Telefunken and RCA, the company owns eight brands), reorganizing... The CEO hopes that his policy will yield results within two years. "For 1992 the game is already over; 1993 products are already developed. The first true deadline is in 1994."

Not Before the Year 2000

Genuine recovery should follow, with a return to profits and "better luck." But not before the year 2000 can the group hope to get the dividends of a research and development policy that Mr. Prestat intends to strengthen in spite of all obstacles. "Thomson must no longer be just a television manufacturer, even if that remains its core activity and even though the company proved, with the D2-MAC standard and the 16/9-format televisions, that it could innovate. It cannot expect to retain its fourth rank worldwide without a minimum of diversification." Multimedia terminals, pay-channel decoders, digital VCRs, camcorders... Nothing, a priori, is ruled out. TCE has not reached that stage yet. First, because, despite its privileged cooperation with the American David Sarnoff laboratory, the company has never been especially innovative, contrary to Philips or Sony. Then, because part of its recovery is linked to its debts, i.e. its recapitalization. This is a parameter of which Mr. Prestat acknowledged that "he doesn't have a hold on it," neither on its amount nor on its scheduling. Pending possible developments concerning the Thomson-CEA Industrie case, TCE can now count only on the Fr1.2-billion capital increase promised by its parent company, Thomson SA. An amount that, after all, is merely the compensation for the sale of patent rights (LE MONDE, 2 May). An amount that is far from adequate to improve the TCE balance sheet.

Renault, the "model," had part of its debts canceled and was able to conclude with Volvo a strategic alliance from which both partners expect considerable economies of scale. Yet, its recovery remains shaky.

Arianespace's Iserland on Competitivity, Exchange Rate, Ownership

92WS0581 Duesseldorf HANDELSBLATT in German 18 May 92 p 15

[Article by Rolf H. Fricke: "Consortium's Main Problem is Low Exchange Rate of Dollar"]

[Text] Evry—The European satellite deployment consortium Arianespace hopes to claim a share of the world market for commercial satellites of approximately 50 percent by the end of this decade. In a conversation with HANDELSBLATT, Dr. Klaus Iserland, deputy general director for the international company, said that at the moment its share is almost 60 percent.

Iserland estimates that the demand for deployment of commercially used satellites in a geostationary orbital position (at a height of 36,000 km above the equator) up to the year 2000 will be about 20 in all. Including existing contracts, he said that Arianespace can surely maintain the current pace of 10 satellites a year.

Iserland stressed that the 1980s had been an extraordinarily fruitful decade for Arianespace. They had succeeded in acquiring new customers in the U.S., Brazil and Mexico. Contracts from the U.S. rose after the tragic accident with the U.S. space shuttle at the beginning of 1986.

In the words of the German manager of Arianespace, "The essential systems are now in place." Now, he says, it is mainly a question of renovation, of providing replacements. In this area technical progress is rather a drawback for the company. He said that previously, at a rough estimate, satellites had had a functional life expectancy of seven years on average. At present, life expectancy is 10 to 12 years, which delays replacement orders. According to Iserland, the extension of life expectancy is due to technological advances in the solar panels which provide the satellite with energy to function. These now have the same functional life expectancy, 10 to 12 years. He said that it is therefore now worthwhile to enlarge the satellites' fuel tanks. The artifical heavenly bodies need the fuel in order to be able to execute course corrections in their geostationary position.

At the moment, he said, the main problem of the Arianespace consortium is the low exchange rate of the dollar, which is bringing down profits. U.S. competitors can therefore make lower bids. As in the market for civilian aircraft, satellite deployment is also priced in dollars all over the world. If the downward tendency of the dollar continues, the European group will find it difficult to keep pace with its American competitors in price, Iserland said. But he definitely sees advantages for Arianespace in the market. The main one is continuity: for more than four years launches have been taking place on schedule and without interruption. The U.S. competitor Delta only began satellite transport using one-way rockets two years ago, after quite a long interval, and even then it suspended operations for half a year. The other U.S. competitor, Atlas-Centauri, did not reactivate its civilian satellite program until a few months ago. It is known that the U.S. initially stopped deploying satellites with the space shuttle after the shuttle accident, and this led to delays in the program.

Iserland sees a further advantage for Arianespace in the satellite business in the fact that the Ariane 4 rocket can launch two satellites into orbit simultaneously. This makes the arrangement profitable for the customers, for if two satellites are shot up at the same time the satellite manufacturers can share the deployment costs, which are now around $100 million per launch, regardless of whether one or two satellites are involved.

The Americans are not fully competitive in double launches with their one-way rockets, Iserland said. Of the three U.S. companies, only Titan has offered a double launch so far, but it had to develop the launch system from the German Dornier, since the corresponding technology is not yet available in the U.S. after the many years in which satellites were put into orbit exclusively with the

space shuttle. On the other hand, using the Ariane 4 rocket Arianespace has a great deal of experience with these double launches, so popular among its customers. Asked about the market potential in the new democracies of Central and Eastern Europe, Iserland said that they could become a market mainly for satellite manufacturers. For carriers, and thus for the Arianespace company, the manager sees more dangers.

In his words, "The Russians have plenty of carriers." He said that Russia could not sell any satellites, since they were unsuitable for western transport technology because of their great weight. "But the Russians would like to sell complete launches to the West," Iserland emphasizes, "and there is real danger for Arianespace in that." The Russian republic would underbid the prices of the Western European consortium by a half or more if it could gain a foothold in the Western market.

He said that sooner or later the problem of Russian transport rockets was sure to be put on the table. Then Western Europe and the U.S. would face a challenge. So far there had been no official contacts on this question, "but the Russians cannot be permanenly excluded from the market," said Iserland. But the experiences of the U.S. with the People's Republic of China were not encouraging. The United States had granted China a total of nine launches of Western satellites over a period of six years with the requirement that the Chinese should adhere to Western prices. This had not happened, he said; instead, there had been massive underbidding. In addition, the authorities in Peking had not kept to the agreement not to pass any knowledge on to certain countries. In this connection Iserland mentioned Iran. For this reason the U.S. repealed the treaty with China several months ago.

And then Iserland came up with a small sensation. In the foreseeable future France will lower its capital share in Arianespace—the original capital amounts to Fr270 million—from the current 51 percent to 45 percent. This is a sensation because France, which thought up Arianespace, has really always regarded this consortium as a French istitution with European associates. Only a few years ago giving up a majority share of the capital would have been unthinkable in Evry.

At the same time Germany's share in the aerospace capital is rising from its present 18.6 percent to 22 percent. The German air and space companies are thus the second-largest shareholders and have significantly narrowed the gap between themselves and France. The Italians will also play a larger role, as their capital share rises from 4 to 7 percent. The main cause is increased Italian involvement in equipping the Ariane 5 rocket, the consortium's newest project. The German share in equipping the Ariane rockets is at present precisely 20.3 percent.

Total sales for the consortium, which was founded in 1980, have been oscillating in the last few years between Fr4 and Fr5 billion. Last year record sales of Fr5.8 billion were achieved. But this number is not very revealing, because it is basically a question of bookkeeping. Arianespace's net profit has settled down to between Fr130 million and Fr150 million. Shareholders receive a contractually guaranteed dividend of 6 percent, which is being paid out again for 1991. The rest of the profits are allowed to accumulate. According to Iserland, the cumulative reserves currently run to Fr1.3 billion.

According to Iserland, insurance premiums for the rocket launches, which shot up every time there was a failure, have stabilized at a reasonable level. Thus he said that Arianespace is now classed as a better risk than its U.S. competitor, Atlas. The insurance agencies have gone over to classifying the premiums according to rocket type.

The total of 50 shareholders in Arianespace come from 11 European countries: Germany, Belgium, Denmark, Spain, France, Great Britain, Ireland, Italy, the Netherlands, Sweden and Switzerland. Besides the company headquarters in Evry, south of Paris, the consortium maintains offices in Washington and in Tokyo. The launching pad is in Kourou in French Guyana, only five degrees north of the equator, which has competitive advantages.

Since 12 March 1981 Arianespace has succeeded in obtaining contracts for the deployment of a total of 97 satellites. In that period its clientele has been made up of 32 satellite users, 46 percent of the total contracts came from Europe, 54 percent from outside Europe. At present the total contracts for 31 satellites have a value of Fr13.5 billion or $2.4 billion. Fifty-five percent of the contracts in this total come from the U.S., from international organizations and from other non-European countries. The flagship of the consortium is considered to be the three-stage carrier rocket Ariane 4, for which the German firm of MBB-Erno supplies the second stage as well as supplementary liquid fuel engines.

French Aerospace Companies' 1991 Results Presented

Dassault Aviation

92WS0621A Paris LA LETTRE HEBDOMADAIRE DU GIFAS in English 16 Apr 92 p 1

[Text] Because of a general world economy crisis combined with a retrenching of defense budgets, 1991 was not a remarkable year for Dassault Aviation. Revenue for the year was 14,353 million French francs [Fr]. Of this figure, 74 percent was accounted for through military products and 26 percent by civil products and space. Net profits after taxes and after Fr69.8 million set aside for participation and personnel sharing came to Fr102.8 million. The firm stresses that it is burdened by no structural debts and that most of its debts represent the mobilization of supplier credits to the benefit of foreign customers. In 1991, Fr12,017 million worth of orders was booked, with civil and space items representing 25 percent of total orders. The consolidated turnover of Dassault Aviation and its affiliates was Fr15,901 million for consolidated net profits of Fr263.9 million. After reorganizing and setting up a new strategy aimed at bringing military revenue to around 55 percent, most action involved: investing in major programs (Mirage 2000-5, Rafale and Falcon 2000), to be ready for tomorrow's market, improving competitiveness

by continuing to pare costs and reduce operating expenses. Dassault Aviation is also gearing-up for the future by expanding space activities, especially in connection with the Hermes and by setting-up international cooperation schemes for future programs. During the General Assembly of Shareholders, scheduled for 11 June 1992, the Board of Administration will propose a dividend of 4 francs per share combined with a fiscal credit of 2 francs.

A1 - Dassault Aviation - 16 - 4 - 1992 - Contact: Mrs. C. Mougin - Phone: 33 (1) 47 95 86 91

SEP

92WS0621B Paris LA LETTRE HEBDOMADAIRE DU GIFAS in English 16 Apr 92 p 2

[Text] Societe Europeenne de Propulsion (SEP) is quoted on the second board of the Paris stock market under the title "Europeenne de Propulsion." The company is mainly involved in powder and liquid-burning rocket motors for defense (strategic and tactical missiles) and space (Ariane 4 and 5 and satellites). Space activities have enabled the firm to expand and see its defence percentage fall down to 22 percent in 1991.

The propulsion of strategic missiles accounted for practically all activities of the Le Haillan plant in 1980 (in the vicinity of Bordeaux), but today, accounts for only half of total activities although remaining at the same level. Since Ariane lift-offs were resumed in September 1987, space activities have experienced constant technical and commercial growth within the structure of a vast European cooperation scheme. With many developments probably in defence and space activities, SEP has set two medium-term goals for itself: consolidating its position in the European and international space-defense market and expanding the related industrial equipment and services fields either the form of contracts or technology. Revenue for 1991 was 4,536 million French francs [Fr], a slight growth over the Fr4,477 million scored in 1990. The Fr205 million yield was close to the Fr203 million earned the previous year, but, owing to exceptional expenses for readapting the firm, led to a net profit of Fr87.2 million in 1991 against Fr103 million in 1990 (not including exceptional added value). Consolidated turnover was Fr4,663 million, a slight increase over the Fr4,600 million of 1990. Profits posted by the groups were Fr91.1 million against Fr114.8 million in 1990 (not including exceptional added value). These results indicate a profit-investment proportion of 10 percent and for the final 1991 quotation a share-profit ratio (PER) of 7.6. The Board of Administration has decided to ask the General Assembly of Shareholders to maintain the dividend at the 1990 level of Fr10 (which goes with a fiscal credit of Fr5.) for a total revenue per share of Fr15. (7.5 percent of the final 1991 quotation).

E1 - SEP - 16 - 4 - 1992 - Contact: Mr. A. Aardenburg - Phone: 33 (1) 47 28 86 75

Sextant Avionique

92WS0621C Paris LA LETTRE HEBDOMADAIRE DU GIFAS in English 23 Apr 92 p 2

[Text] The Board of Administration of Sextant Avionique met on 16 April under the chairmanship of Jean-Robert Martin, to close accounts for the 1991 fiscal year. The 1991, revenue of the Sextant Avionique group was 5,562 million French francs [Fr], down 7 percent for comparable structure. Of this sum, Fr4,193 million was accounted for through aeronautical, space and defense activities and Fr1,369 million through industrial components. Orders reflected the recession. At the end of 1991, order books were at Fr4.9 billion against Fr5.3 billion at the end of 1990. In 1991, Sextant Avionique nevertheless consolidated its position as a major equipment vendor for programs such as the Airbus A340, the Tigre and the Rafale owing to intensified research and development efforts during the year. Instead of profits, the group has losses of Fr545 million. This decline is due to a general slump and changes in work allotment as well as to provisions made during the year to improve adaptation and to prepare for the markets of tomorrow. Aside from substantial operational provisions decided in 1991 to adapt to the financial situations of customer aeronautical firms and overruns on development contract costs, a new structure has been adopted, the costs of which are reflected in 1991 accounts (Fr390 million). In view of the situation, the Board vetoed the payment of a dividend for 1991. It is expected that 1992 activities will be similar to those of 1991. It is also expected that the pruning to cut operating costs will start to be felt during the second half of the year and that a balancing of accounts should be achieved, or nearly for 1992.

C1 - Sextant Avionique - 23 - 4 - 1992 - Contact: Mr. Salvinien - Phone: 33 (1) 45 29 88 30

EAST-WEST RELATIONS

Transfer of Russian Scientific Technology to Europe Discussed

92WS0514C Paris LE MONDE in French 25 Apr 92 p 11

[Article by Jean-Paul Dufour: "The Shipwreck of Soviet Science"]

[Text] Residents of the region have long referred to it as Akademgorodok, or Academy City. And the six scientific and technical institutes that stretch along a few kilometers of national highway are, in fact—together with 20 or so small businesses—the sole source of employment for the 30,000 inhabitants of Troitsk city, which lies 40 kilometers from Moscow. As employers, they leave much to be desired. It is not uncommon for researchers to be paid over a month in arrears, and the city thinks that "humanitarian aid" will again be necessary for the population to get through next winter.

None of that weakens the shatterproof optimism of Oleg Tumanov, the science secretary of the Spectroscopy Institute. "The opening of Russia to the West will allow us to

convert Troitsk into a technopolis, like your Sophia Antipolis. Besides, several French banks are interested."

But Vladimir Blank, the under-director of the Institute Vereschagin, which makes artificial diamonds, is considerably less enthusiastic. "We've been contacted by many adventurers who primarily wanted to loot our technology," he says. "As for the banks' representative, he came to see us two years ago, and we haven't heard anything about it since." The truth probably lies somewhere in between these two extremes.

"The Russians are the best-educated people in the world in theoretical and applied mathematics," says Jacques-Louis Lions, the president of the National Center for Space Studies (CNES) and a renowned French mathematician. "Moreover, their computer scientists have developed remarkable programming and software expertise, which enabled them to partially offset the technological lag in their hardware."

This assessment is valid for many other scientific and technological fields. "They are good in optics, not bad in mechanics, and can work miracles with bits of plastic and rubber bands. Set loose in a French laboratory, they would be hugely successful," asserts a French company head. Many Russian scientific and technical establishments, notably in Troitsk, have already capitalized on this flattering reputation by signing contracts with Western firms in fields as diverse as biology (antiviral medications), lasers, computer science, space, and industrial diamonds. But the picture is not as rosy as the media hype surrounding certain spectacular agreements might suggest.

"Not Succumbing to the Fad"

Many poorly informed Western businessmen were a bit quick to believe in an Eldorado. Actually, with a few exceptions, the most serious agreements have been concluded by companies that had already been collaborating for a fairly long time with the USSR, and who are well established in cutting-edge fields. The others, who came looking for easy money, have most often gone home empty-handed.

"The Russians do possess expertise and very interesting technologies. But they are frequently incapable of moving from the laboratory to a finished, marketable product," explains Philippe Aubourg, the marketing director of the French company Quantel (lasers). Quantel has just signed contracts with the Troitsk Spectroscopy Institute and the Moscow Institute of General Physics. Teaching them how, or doing it for them, requires long experience...and a strong back. "Small mixed companies with a taste for adventure are not risking much if they stick to a little trade," explains an economic advisor working out of Moscow. "But the others should understand that they will have to invest for the long term, position themselves for the future. The cost will be high for a certain number of years."

For now, Quantel is settling for acquiring the know-how of its Russian contractors, to incorporate it into its commercial lasers. The same principle holds for the most spectacular deals, such as the Americans' purchase of a space nuclear and a plutonium reactor from the Moscow Kurchatov Institute (see LE MONDE, 1 April and 8 April). It is also the case for the computer programs that a few Moscow laboratories are developing as subcontractors for big American firms.

"We are extremely cautious," stresses a French space manufacturer. "We are not about to jump in indiscriminately and succumb to the current fad which says that everyone should rush to the CIS. We are limiting ourselves to a few narrowly-defined contracts—to see how the Russians react to the management of joint projects." In that respect, the French company Carrar's decision to have CS KB in Samara (1,300 km southeast of Moscow) make medical equipment for the Eastern European market is almost the exception that proves the rule.

But the situation could change in short order. Helene Bourlakov is in charge of Moscow relations for the National Center for Space Studies (CNES). She knows the heads of the "combinats," the gigantic space companies, well. "Under the former regime, they enjoyed almost unlimited financial resources and full powers. But that did not mean they didn't have to meet the often difficult goals of government plans. Today they are discovering the market and productivity, which are new concepts for them. But they are very excited by the new challenge, and show a sometimes touching desire to learn. They should not be underestimated. These excellent engineers are also shrewd politicians, whose past responsibilities taught them how to navigate in troubled, rough waters."

The picture for basic science appears much simpler, at least in the short term. Researchers from the former Soviet Union have always been welcome in Western laboratories, whenever they could get out of the country. For instance CERN (the European particle physics lab) began collaborating with the USSR as early as 1967.

"Eighty CIS researchers are collaborating on our research programs," says Robert Klapisch, an advisor to the general director (and a former director himself) of CERN. "Thirty of them are now working in our Geneva laboratories. In light of their country's difficulties, we have decided to pay them ourselves. But it is an advance, not a subsidy. We are certain that the CIS will repay us sooner or later—probably in kind, either with technical assistance or materials. An example would be the niobium we need for the superconducting magnets of our future LHC hadrons accelerator."

The Brotherhood of Physicists

On the strength of these long-standing contacts, Lev Okun, a Russian physicist who is a member of CERN's scientific council, and Carlo Rubbia, a Nobel physicist and CERN's general director, floated a proposal to combat the decline of Russian science and the brain drain. Francois Mitterrand picked up the idea and submitted it to his G-7 industrial partners (see LE MONDE 22 April).

The proposal calls for an international foundation that would grant subsidies and scholarships to individuals or groups for specific research programs. International scientific experts specializing in the fields concerned would

evaluate the studies, which would be conducted in collaboration with Western teams. But 90 percent of the funds—Mr. Mitterrand is proposing ECU50 million to ECU100 million, or 350 to 700 million French francs [Fr]—would be spent in Russia.

The "Rubbia-Mitterrand initiative" has been well-received, both in the ex-USSR and the West. Indeed, the grumbling of Russian researchers—who are humiliated by their too frequent treatment as developing country nationals, to be worked long hours for low pay—is getting louder. Subsidized by an international, purely scientific, non-profit foundation, they could regain some of their prestige.

Moreover, even though American universities and cutting-edge industries are still trying to lure the best specialists, American officials are aware that too blatant a pillage of Soviet science might not sit well with the new ally. Henceforth, the United States is trying instead to "help Russian researchers and engineers stay where they are and work in their country," says Alan Bromley, President Bush's scientific advisor.

However, for obvious political reasons, Washington is giving priority support for now to the International Center for Science and Technology (CIST). CIST aims to recycle researchers who had heretofore been working in the Soviet defense, and especially nuclear, industries into the "civil" sector. The United States would like to set up a similar center in the Ukraine as well. Two to three thousand of these scientists possess knowledge that is essential in developing nuclear weapons. They could be tempted by the offers of "sensitive" countries such as Iraq, Iran, Korea, and Libya. And if in the opinion of Russian and Western officials, not one of them has yet succumbed to these offers, "it is only because they have chosen not to, out of a sense of ethics or patriotism," says a researcher who knows them well.

Japan and Europe are slated to participate in the CIST, an initiative that was launched by Messrs. Baker, Genscher, and Kosyrev. With some reluctance, in some cases. "Either the researchers will work under military contract to the United States, in which case our funds are excluded; or they will actually do civil research, and will be paid to do nothing. We will probably see a mix of all three [as published] scenarios," comments a disillusioned high-ranking French official.

Liquidating the Old System

OECD [Organization for Economic Cooperation and Development] ministers recently studied the proposals in Paris (see LE MONDE, 13 March). They are similar in approach to those of Europe and France, which emphasize collaboration and exchanges. Seven hundred forty-five researchers from Eastern Europe are now in France at the invitation of the research ministry and the big establishments "for relatively short periods of time [from one month to one year] so as not to encourage the brain drain." In imitation of the Paris Ecole Normale Superieure and the Moscow Landau Institute, laboratories and institutes are setting up "sister" relationships. An "interministerial mission" that was established in 1990 supports them in this effort.

To "orchestrate" this policy on site, the National Center for Scientific Research (CNRS) has opened a permanent office in Moscow run by Brigitte Godelier, the organization's former head of Eastern European relations in its Paris office. Given the CIS's current economic situation, her job requires a wealth of ingenuity and self-sacrifice. Each case is often a real human drama. And when researchers are able to leave, they complain that a lack of resources prevents them from continuing the work they began in France on their return. It is an endless, and sometimes discouraging, task. Especially, stresses a Ministry of Research official, as "this type of emergency treatment will not solve the long-term problems."

How, then, can Soviet science be saved? And, more importantly, which Soviet science to save? "Certainly not the existing one," is the curt reply of a French expert. The Soviet scientific community was the spoiled child of the Communist regime, and was much too large, by Western standards, for the country's population. It prospered as a closed, rigid world, whose members scratched each other's backs. There were certain advantages to the system under a totalitarian regime, but it is totally ill-adapted to economic liberalism.

"Letting the old system, most of whose members are still in place, perpetuate itself would be suicidal," echoes Sergei Zemlianoi, a member of Boris Yeltsin's cabinet. "The shock therapy that we are now administering will have its victims." According to Zemlianoi, 800 of the 4,000 scientific or technological institutes that exist in Russia now have no funding. Yeltsinian "young wolves", who are often scientists who made the switch into business, are trying to create other private institutes with Russian—or, they hope, Western—funds to employ the best of their former colleagues. All amidst a joyful anarchy.

"It will take us two or three years to get going again," says an optimistic Sergei Zemlianoi. "Until then, our main task is to survive." But many observers doubt that Russian science will. "Especially," adds a French expert living in Moscow, "as the current chaos may last a long time. The gravest social problems are yet to come. It's a sorry sight. You feel as if you're watching a country liquidate itself. They are playing Monopoly..."

Czech Philips Subsidiary Begins Operating

92WS0621J Chichester INTERNATIONAL TELECOMMUNICATIONS INTELLIGENCE in English 4 May 92 p 1

[Article: "New Philips Subsidiary Goes Into Operation"]

[Text] Philips Kommunikations Industrie of Nuremberg says its new subsidiary in Czechoslovakia has begun operating in Prague. The new company, Philips Komunika ni Systemy Spol. [word illegible] (PKCS), will be geared towards supplying Philips' transmission, switching, and

data communication systems to network operators in the CSFR to establish, modernise and expand their communication networks.

According to Philips, PKCS is expected to begin independent production early next year, at which time the company will employ between 150 and 200 workers in research, manufacturing, sales and administrative operations.

In accordance with Philips' plans, by 1994 PKCS will have a staff of 250, attaining a turnover of approximately DM50 million. To date, PKI says orders worth around DM5 million have been received.

According to the Managing Director of PKCS, Norbert Rex, a PCM30FC multiplex system is already undergoing testing with the research institute of the Czechoslovakian PTT, VUS. When the system receives approval, PKCS will manufacture a pilot series, says Heinrich Holle, sales manager at PKCS.

PKCS' new office is currently located in Prague in Konevova 141, 130 00 Praha 3, Telephone; (02) 26 41-9; (02) 26 32 88-9. A second office will open in Bratislava shortly.

At the end of last year, Philips-TRT of France reached an agreement with Tesla Prievidza and APRC in Czechoslovakia to establish a joint venture company called Signal Telecom to produce the multi-access subscriber distribution systems IRT 1500 and IRT 2000 in Czechoslovakia (see ITI issue 315).

EUROPE-ASIA RELATIONS

Hong Kong, German Companies To Jointly Develop Cordless Telephones

92WS0621K Chichester INTERNATIONAL TELECOMMUNICATIONS INTELLIGENCE in English 4 May 92 p 3

[Article: "Far East Technology for Cordless Phones"]

[Text] Hong Kong-based SA Megga International has signed a collaborative agreement with Telenorma of Germany to develop and manufacture a new range of cordless telephones for the German and European markets. These will be based on the German specification for CT-1+ analogue transmission at 900MHz. The Hong Kong firm says it plans to invest HK$2 million in the installation of a new production line for the phones at a factory in Dongguan, China.

Leung Ray-Man, Chairman of SA Megga, said, "We expect to produce 700 sets each day. Each will be priced at US$170 to US$250." He added that the phones will be sold in Europe under the Telenorma Bosch and Blaupunkt brands. Leung Ray-Man claims that his company has already spent HK$14 million on research and development for the project.

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