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24 May 1984

# West Europe Report

SCIENCE AND TECHNOLOGY

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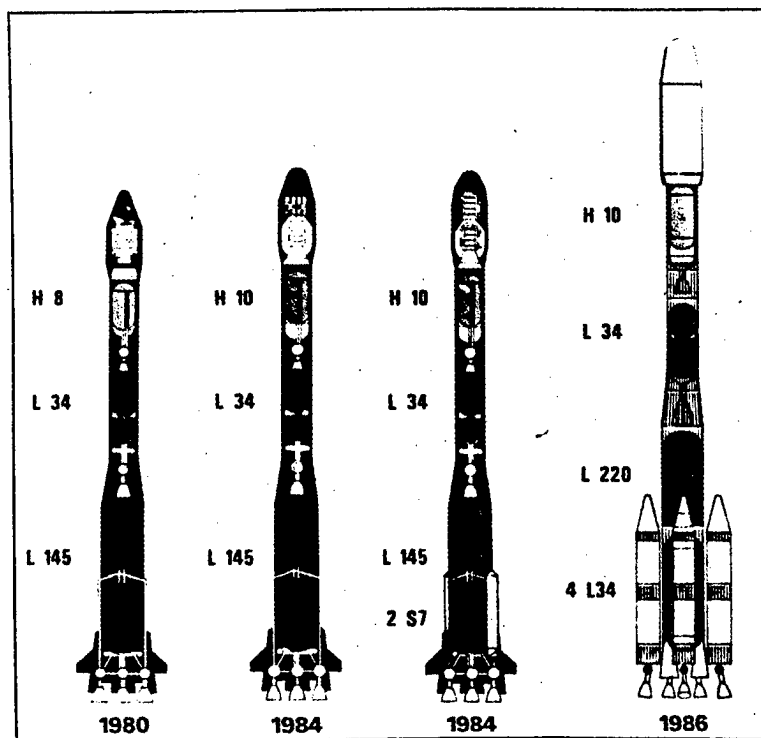
AEROSPACE

OUTLINE OF ARIANESPACE PLANS, LAUNCH SCHEDULE THROUGH 1987

Paris AVIATION MAGAZINE INTERNATIONAL in French 15 Mar 84 pp 40-41

[Article by Jacques Dubourg: "Arianespace--The Commercial Era"]

[Text] The Ariane V8 launching early in this month of March is the last of the promotional flights under the responsibility of the European Space Agency (ESA) and the National Center for Space Studies (CNES). Each launching is henceforth identified by the chronological number of the flight. With flight V9, Arianespace will truly be inaugurating the commercial era of space transport next Spring.



Launching Schedule for Ariane

Above: the Ariane family of the 1980's. From left to right (fuel loads for placement in geostationary orbit): Ariane 1 (1,700 kg), Ariane 2 (2,000 kg), Ariane 3 (2,400 kg, with two solid-fuel motors), Ariane 4 (from 2,400 to 4,300 kg, with four liquid-fuel motors). (CNES Documents)

<u>Date</u>	<u>Flight No</u>	<u>Ariane No</u>	<u>Mission</u>	<u>Contract</u>
Mar 1984	V8	1	Intelsat V-FU-8	F
May 1984	V9	1	Spacenet 1	F
Jul 1984	V10	3	ECS-2 + Telecom 1A	F
Sep 1984	V11	3	Marecs B2 + GStar 1A	F
Nov 1984	V12	3	Arabsat A + Spacenet 2	F
Jan 1985	V13	3	Telecom 1B or SBTS-1 + GStar 1B	F
Mar 1985	V14	3	SBTS-1 or Telecom 1B + Spacenet 3	F
May 1985	V15	1 or 2	Spot 1/Viking or Intelsat V	F
Jul 1985	V16	1	Giotto (release)	F
Aug 1985	V17	3	SBTS-2 + ECS-3	F
Sep 1985	V18	2	TV-Sat	F
Oct 1985	V19	1 or 2	Intelsat V or Spot 1/Viking	F
Nov 1985	V20	2	TDF-1	F
Jan 1985	V21	2	Intelsat VA-FU-15	F
Mar 1986	V22	4	Ariane 4-01	--
May 1986	V23	2	Intelsat VA-FU-13	F
Jun 1986	V24	3	--	DL
Aug 1986	V25	4	Unisat 1	R + DL
Nov 1986	V26	3	STC	R + DL
Dec 1986	V27	4	Intelsat VI	R
Feb 1987	V28	4	Tele-X + Unisat 2	F + R
Mar 1987	V29	3	DBSC-1	R
Apr 1987	V30	4	Intelsat VI	R
May 1987	V31	3	TDF-2	R
Jun 1987	V32	3 or 4	DFS-1 or Anik + operational Meteosat 1	R + R + F
Jul 1987	V33	3	L-Sat Olympus	F
Aug 1987	V34	4	Intelsat VI	R
Sep 1987	V35	3	DBSC-2	R
Oct 1987	V36	4	Italsat + Rainbow	R + R
Dec 1987	V37	2	Spot 2	F

F = firm contract. R = reservation. DL = launch availability.

NB: All the satellites are planned to be put into geostationary orbit, except for Spot 1 and 2 and Viking, for which a heliosynchronous orbit is planned.

Arianespace has a firm-order book totaling Fr 6.1 billion (40 percent of which is from outside Europe), which corresponds to the launching of 27 satellites (2 of them after 1987) for 14 different clients, 5 of them outside Europe (GTE Spacenet, Embratel, Arabsat, Immarsat, Intelsat). In 1985, the second launch pad (ELSA 2) will increase the rate of launching from 8 to 10 per year.

The first flight of Arianespace V9 will be followed by six double launchings until 1985--i.e., a total of 13 satellites of the semi-Ariane 3 class, equivalent to the PAM-D class.



In 1985, there will also be the launchings of:

- Giotto, the ESA's space probe toward Halley's Comet;
- Spot 1, the French earth-observation satellite belonging to the CNES;
- Viking, a Swedish Space Corporation satellite for study of the earth's magnetic field;
- TV-Sat for the FRG and TDF-1 for France, and finally, the first launching of the new-version Ariane.

In mid-1986, Arianespace as provided for several launch availabilities (V24, V25 and V26), which will make it possible to handle any eventual relaunch demand, in case of necessity, and on the other hand, to meet a certain number of requests presently being negotiated with other customers.

There are reservations for 18 satellites up to 1988-1989:

- three Intelsat VI satellites;
- six direct-TV satellites, including three American ones;
- seven telecommunications satellites, including two American ones;
- two satellites for the ESA (Hipparcos and ERS-1).

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CSO: 3698/406

CIVIL AVIATION

AIRBUS PRODUCT LINE, PRODUCTION RATE, SALES

Munich SUEDEDEUTSCHE ZEITUNG in German 30 Mar 84 p 34

/Unsigned Article: "Lufthansa Wants Long-Range Airbus"; Economic Minister Indicates Help--Unfair U.S. Sales Methods/

/Text/ sza Lisbon (own report). The German Lufthansa Co, Cologne, has reaffirmed its request for supplementing its Airbus product line with a long-range aircraft equipped with four jets and at least 200 seats. This request--presented by Lufthansa Vice President Reinhardt Abraham during a meeting of Air Transportation Press Clubs in Lisbon--is supported by the Federal Ministry of Economics whose representative, Joachim Jahnke, gave assurances that the federal government and other European governments "will continue protecting the Airbus industry for a long time to come."

Jahnke deplored the unfair sales methods of U.S. competitors (Boeing bought up Airbuses even before their delivery in order to push their own machines on the market) and rejected American complaints about European Airbus subsidies. He commented that, in view of the research and development subsidies of the Department of Defense and the space agency NASA as well as the marketing assistance provided by the Export-Import /EXIM/ Bank," the United States was sitting in a rather large glass house."

Both Jahnke and Abraham advocated more extensive financial support by the industry since otherwise, in the words of Abraham, "the industry's right to exist may be questioned." However, in the opinion of the Lufthansa representative, the industry continues to count on government grants which have not yet been approved and which can be expected only "if the funds so far invested in the Airbus program show very large returns." According to Jahnke, Bonn so far has subsidized the Airbus program with about 4 billion marks.

Abraham views the four-motored jet Airbus TA-11 not as a marketing problem but solely as one of industrial policy, production strategies, and financing skills. Beginning in 1991 the new model is intended to replace obsolete jets with four engines such as the Boeing 707 and the DC-8, and also the long-range jets with three engines such as the DC-10 and the Lockheed L-1011 Tristar.

Abraham holds, however, that smaller short-range aircraft must be replaced at the same time. There is consequently a danger of backedup capital expenditures because of "enormous demands for replacements" and corresponding requirements for financing by both airline companies and aircraft manufacturers. Since valuable time and great opportunities were lost in the TA-11 project, the problem of "timing" has become almost "insoluble." Lufthansa will have to come up with imaginative ideas concerning the problem of financing since "the Federal Republic does not provide for a system of tax exempt investment reserves." Additional depreciable quantities must be created in order to make the investment capital available again at the end of this decade.

Both Abraham and the Airbus vice president for marketing, Pierre Pailleret, expressed themselves optimistically about the air transportation growth rate following the low brought on by the recession of the last years. The average growth rate is believed to be between five and six percent. Pailleret believes that the appeal of "larger" aircraft will increase, not least because air safety will require it as a result of air traffic density, already high and still increasing. He estimates that the market can absorb a total of about 1,300 aircraft of the type represented by the intercontinental Airbus TA-11. A successor to the first Airbus A-300 is already considered by the Airbus industry.

However, as previously reported in the Monday edition, the production rate for 1984/85 for both the A-300 and its "sister," the A-310 must be reduced from 4.6 to 4 machines per month. It is supposed to increase again gradually beginning with 1986 when production will be two-thirds A-300 and one-third A-310. According to Pailleret, a total of 47 machines will be produced in 1984. At the moment, the Airbus industry is "sitting on" 20 unsold aircraft. So far there are firm orders for 244 A-300 (beginning with 800, subsidies must be repaid!) and 108 firm orders for the A-310. Fifty-one orders are on the books for the new A-320 whose development has recently been given the green light by the release of subsidies.

12628

CSO: 3698/374

CIVIL AVIATION

V2500, CFM56-4 COMPETITION FOR 150-SEATER MARKET

Paris AVIATION MAGAZINE INTERNATIONAL in French 15 Mar 84 pp 24-25

[Article by Jean-Jacques Valignat: "The Engine Side of the '150-Seater'"]

[Text] While a month ago (see our No 868) Boeing was pretending to consider the 150-seater market a negligible quantity, not everyone on the other side of the Atlantic was showing so much detachment. At the same time, indeed, one could read in a document from the United Technologies group that "the airline companies that customarily use Pratt and Whitney engines will be able to order the Airbus A-320 without losing the engine-builder's advantages of quality and service. The market is thus broadened."

The new consortium IAE [expansion unknown] notes that the V2500 is the only new engine to be developed for the 150-seater market, and stresses the fact that the CFM56-4 was not launched at the end of February, whereas the V2500 was launched on 1 January.

This line of argument is identical in all points on the other side, where they say: "Are you sure that the V2500 will ever see the light of day, and how is it that Airbus Industrie has not yet received any official, contractual offer for that engine?" The usual subtleties. It is undeniable that the European airplane builder is having discussions with the IAE and that the alternative engine would serve its purpose. It is no less certain that until now it has been approaching the airline-company clientele with a twin CFM56-4 with which it had already begun to fill its order book.

The fact remains that the engine builders do not deny that they believe in the market for airplanes of between 120 and 180 seats. Pratt estimates that 3,000 twin-engine planes will be built between now and 2004--i.e., 8,000 engines, including the spares. Of this total, the American firm sees the 150-seaters, strictly speaking, taking two-thirds of the market (2,000 units), with 800 units in the 120-seater category, leaving the 180-seaters far behind, with 200 units. These are unofficial figures, but Pratt and Whitney considers that the V2500 will account for more than half of the engines involved--i.e., more than 4,000.

Such is not entirely the view of its partner Rolls-Royce, which draws a pessimistic picture in which the 10-tonner has a potential of 5,000 engines up

to 2008, and probably 3,200 or 3,300 for the V2500, without taking into account the future existence of a TA-11.

One can therefore conclude from this a total turnover of Fr 130 to 200 billion (1983 value) for this class of engine in the coming 20 years.

There is obviously no room for a third engine. But one unknown badgers the lives of the forecasters: the propfan. Intermediate between the jet turbine engine with turboblower and the turboprop engine, this sort of propeller engine that no one knows how to build successfully is already credited with a 25-percent fuel saving--a thoroughly hare-brained figure because the conditions for it would have to be stated and one would have to be able to resolve some striking technical difficulties.

Everyone is waving the veiled threat of the propfan at the others. Ten years, 15 years: no one knows, but many specialists claim that the market for the 10-ton market could be shaved down--speaking of the 120-seater slot --by this new technology.

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#### The New "10-Tonners"

<u>Characteristics</u>	<u>CFM56-4</u>	<u>V2500</u>
Maximum thrust at takeoff	11 tons	10.4 tons
Architecture	1F/3 + 9/0/2 + 4	1F/1 + 10/0/2 + 5
Pressure ratio	25.5	36.2
Dilution rate	6.1	5.7
Diameter of turboblower	1.73 m	1.57 m
Length	2.4 m	2.85 m
Weight	2,147 kg	2,220 kg

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These figures, not yet official, are given only by way of indication.

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All the hypotheses, it is quite clear, have one common element: the per-gallon price of jet fuel, the current level of which, less than \$1, is deciding the terms of the optimal compromise.

A study by SNECMA [National Aircraft-Engine Design and Construction Co] shows the influence of a 10-percent variation of each of the parameters on the direct operating costs (DOC) for the 150-seater. Thus, a 10-percent variation in specific consumption would have an influence of 4.5 percent on DOC; a variation in the price of the engine would have a 0.5-percent effect; of the cost of maintenance, 0.4 percent; of the engine mass, 0.25 percent.

The interest of the engines must therefore be considered in the light of these ratios. Comparison of the two remains chancy, for while the CFM56-4, since it is a cousin of the 56-2, can be defined well, the V2500, whatever its stage of development may be, is shrouded in secrecy. Thus the figures that we publish now are to be taken with reservations.

Thrust: 24,000 lb (11 t) for the CFM56-4, instead of 23,000 lb (10.4 t), because Airbus recently asked for an increase in thrust. Furthermore, CFM-International is preparing to go up to 25,000 (11.4 t), because it is rare for an airplane not to get bigger in the course of its development.

Officially, the V2500's thrust is 23,000 lb; but it is said to be capable of increasing. It is not yet known how the IAE's engineers will manage this without increasing the size of the turboblower (diameter of 52 in, or 1.58 m, as against 68 in, or 1.735 m, for the CFM56-4).

There is a lively controversy over consumption. IAE swears that its engine will be 14 percent below its competitor. CFM-International's reply: "There will be no more than an 8-percent difference, and we have made a commitment to Airbus Industrie to achieve an additional 5-percent improvement in the 2 years following placement in service, if the market makes this necessary."

The polemic is lively with regard to the selling price of the engine too: "We will be no more expensive than our competitor," declares one of the partners in the IAE, which competitor does not refrain from writing everywhere that the V2500, because it will cost a million and a half dollars in investment [as published] (as against 200 million for the CFM), will obligatorily be sold for at least one-third more. Whom to believe? The hypothesis circulating in the informed circles, of \$2.3 million for the CFM56-4 and \$3 million for the V2500, has the ring of probability.

Technically speaking, and although the IAE has not, as we go to press, made its choices known, the two engines seem very different. The architecture of the V2500 shows a turboblower stage (resulting from Rolls-Royce's work on the RB211-535E4 and the RJ500, the latter with the Japanese) without stub and with wide-chord blades. Behind it comes a low-pressure stage, then a 10-stage high-pressure compressor (already in production at Rolls-Royce) with high output, since by itself it would reach a 20.8 compression ratio, out of a total pressure ratio of 36.2. This compressor is one of the elements accounting for the progress introduced by the V2500, but it is certainly not without technical difficulties. Thus, the height of the vanes of the last stage could be less than 30 mm, which gives an idea of the complexity of the active control of the plays between the rotor and the stator, of which it is known that they dilate, but not at the same moment.

The Americans are making the combustion chamber, derived from the PW2037, which itself came out of the E3 energy-saving program carried out with NASA.

Behind it, the two-stage high-pressure turbine comprises a number of discs made of monocrystals, heavily loaded and of wide chord, as in the PW2037 and the PW4000. Next come the five low-pressure turbine stages.

Nevertheless, these engines have not been built. The archives of the museums are full of paper engines--full-size mockups and even working jet engines for demonstration purposes, which on the whole have been highly useful but whose names have been forgotten by posterity. Today's rumors make more noise than tomorrow's engines. But that is certainly not sufficient to convince the airplane builders and airline companies of the seriousness of the proposals.

CIVIL AVIATION

PILOT CAD/CAM CENTER AT FRANCE'S AEROSPATIALE

Paris AVIATION MAGAZINE INTERNATIONAL in French 15 Mar 84 pp 43-44

[Article: "A Pilot CAD/CAM Center at Aerospatiale"]

[Text] In order to maintain their competitiveness in an increasingly severe international context, the big firms must make use of, in particular, sophisticated data-processing equipment. Aerospatiale, within its Central Technical Directorate, is devoting particular attention to CAD/CAM--i.e., Computer-Aided Design and Computer-Aided Manufacture.

In the DCT [Central Technical Directorate], Daniel Claude oversees the servicing of the CAD/CAM needs. This is how he explains the importance of the strategic choices and details those choices: "The very lively international rivalry and the competition that the firms in the aerospace sector carry on require them to constantly upgrade the products they offer to the clientele as well as the tools and methods used (performance characteristics, quality, delivery timetables). In these conditions, mastery of the computer-aided techniques, such as computer aided design, manufacturing, and drafting should be considered. It is on account of this that in 1979, Aerospatiale's general management decided on the one hand to create an interdivision CAD/CAM working group, and on the other, to strengthen the CAD/CAM facilities of the Sur-esnes pilot center."

In Aerospatiale, each manufacturing or design site is responsible for its choices in the area of data-processing equipment--hardware and software. Nevertheless, "a pilot center plays the necessary role of coordinator. Indeed, it is necessary to look ahead, to train, to transfer knowledge, but also to stimulate and conduct experimental activity," Mr D. Claude adds.

"The center has also been assigned a mission to put CAD/CAM into practice and a support mission when it acts on behalf of certain entities that do not have any data-processing facilities, as is the case for the Airbus GIE [Economic Interest Group] in particular."

The total group comprises 80 persons and has many pieces of equipment (centered around a VAX 11/780) that fill the bill and meet the company's needs.

Aerospatiale stands today as the first European user of CAD/CAM systems and makes use of data-processing equipment that is highly diversified and capable of meeting all of the group's needs in the area of research.

The objective consists in making better tools available to the group's various divisions, for the purpose of saving time and improving the design of the products.

The pilot center collects, coordinates and anticipates the needs, and, correspondingly, works out and decides on the doctrine for use of the facilities at its disposal.

A CAD/CAM is conceived around three components: the central computer, the applications software, the graphics stations. Each of them has to have the best performance characteristics and be as well-suited as possible to the needs to be met; and the totality must, of course, have "ascending" compatibility, both local and in relation to the other existing (or future) systems in Aerospatiale.

The balance-sheet of the experience of the divisions and of the studies carried out in the pilot center leads to definition of a standard for each component: at present, Computervision for the computers, CDM 300 for the software, and Tektronix for the graphics consoles. Each site can acquire non-standard equipment when better opportunities are offered in the market. In conjunction with the standard equipment, a certain amount of diversification therefore offers a security that is indispensable in a strategic area: security of supply, performance and reliability of the materiel tested, and independence vis-a-vis the suppliers.

This is clearly illustrated by the choice of the central computer used since 1980. Aerospatiale looked for a machine suited for work distributed in real time, capable of supporting design-department tasks--preparation of mechanical pieces--and offering the power and speed necessary for systems-design work--i.e., the software tools.

Having decided, for reasons of diversification, to depart from the Computervision standard, Aerospatiale sought a manufacturer known in the area of CAD. IBM offered only processing by lots. "After several consultations, the choice fell to the VAX, in a very pragmatic way--all the more so because this 32-bit supermini is almost a world "standard" for computer-aided work in design departments, which gave us the possibility both of testing a good piece of equipment and of comparing ourselves with the competition and with CAD users in general."

At present, four projects in various stages of advancement are being developed in the Suresnes establishment. The first--CAP (Computer-Aided Presentation)--is already operational. CAP is a diaporama on a video screen--an interactive animation of artificial images--used for presenting to a client a technical-economic simulation of the aircraft that he will use, on the basis of operational data chosen by him.

Parameters such as runway length, choice of stops, commercial weight and the price of fuel enter into the system, which replies by displaying the performance characteristics of the aircraft--for example, cost per passenger-kilometer, optimal speed, fuel consumption. CAP enables a vendor to



demonstrate, in a few minutes, the product's possibilities, personalized in function of the client, which no kind of paper documentation could do. The system was used for presenting the ATR-42 at the Farnborough show in 1982, and at the last Le Bourget show, thanks to Digital and Tektronix, who lend the equipment for these events.

CAP is being used and is continuing to be upgraded on several consoles connected to the VAX of Suresnes, to Aerospatiale's headquarters in Paris, and to Consultants Associes, also in Paris.

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CSO: 3698/406

COMPUTERS

EUROPE PLANS INTERNATIONAL COMPUTER NETWORK

Munich COMPUTERWOCHE in German 2 Mar 84 p 19

[Article: "European Research Network Planned"]

[Text] Stuttgart (pi)--Following the American pattern, an international communications network will be established in Europe also which will link universities and research institutes.

According to information from IBM Germany GmbH, "Big Blue" will aid the establishment of the "European Academic and Research Network" (EARN): The market leader will supply computers and, in order to get the project under way, will initially lease the required lines. EARN will remain under the direct control of the participating institutions and is open to all European universities and research centers, regardless of whether these institutions use IBM products or products of other manufacturers.

The backbone of the network, according to the Stuttgarters' information, is formed by data processing facilities in the FRG, France, Great Britain, Ireland, Israel, Italy, Sweden, Switzerland and Spain; already existing national networks will be brought in.

It is expected that other countries will become participants so that by the end of this year more than 250 university computers in Europe will be able to communicate with one another. In addition, it is planned to establish a link between EARN and the American counterpart BITNET so that more than 130 computers of leading universities and research institutions in the U.S. can be accessed. In the FRG, EARN is thought of as an important contribution to the development of an even more expansive FRG research network.

9160

CSO: 3698/370

## COMPUTERS

### COMPUTER-AIDED INFORMATION SYSTEM TO CONNECT FRG SCIENTISTS

Duesseldorf VDI NACHRICHTEN in German 6 Apr 84 p 1

[Article: "German Research Net Links Scientists"]

[Text] In the future, a computer-based information and communication system will connect research groups all over Germany with one another and with foreign collaborators. On March 30, at the Society for Mathematics and Data Processing (GMD), Sankt Augustin, the "Association for Furtherance of a German Research Network" (DFN) was presented to the public for the first time during the founding congress. The board chairman of the DFN association, to whom the research minister handed the task of executing the project, is GMD Chief Prof Norbert Szyperski. The build up of the DFN will be supported by the Federal Government through 1988 with a total of DM 100 million.

As an open communication system, the DFN can make available to the scientific community a full line of data processing services at an affordable price. Also universities can gain access to super computers and complex software packages via the association. The network is also the prerequisite for the increasingly important joint-venture research mode and for the extraregional collaboration of universities, other research institutes and industry. It is expected that the scientific landscape of the FRG will be strongly influenced by these interactions. The Network is based on the public infrastructure (Datex-P); its central problem however will be linking with the computers of different manufacturers. To this end, interfaces and rules (communication protocols) will have to be developed. The following services will be offered by the DFN in the future: direct-dial, unimpeded access to the dialog equipment of participants of all data processing services in the entire network (dialog link); transmission of data packets between participating institutions (data link); computer to computer communication (program link); exchange of text and report material (report link). From the start, planning shall include developments in broadband transmission and future satellite links.

Great importance is placed on the capability of transmitting graphic information. Already definable fields of application are microelectronics (computer-based design of VLSI circuits, simulation, error detection); CAD/CAM in machine design; civil engineering; architecture; ship-, aircraft- and automobile building; high-energy and plasma physics; decentralized hardware and software development for robots (robomation); picture processing and pattern recognition and joint use of distributed databanks (expert information centers).

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## COMPUTERS

### EC EXPERTS COMMENT ON PROSPECTS FOR 'ESPRIT' PROGRAM

Frankfurt/Main FRANKFURTER RUNDSCHAU in German 23 Mar 84 p 15

/Article by Detlef Puhl: "ESPRIT For Europe's Unity"; Programs For High Technology To Bind EC/

/Text/ A new magic word is making the rounds: high technology. The joint race of the 10 European Community /EC/ countries to catch up with the superiority of the Japanese and Americans is not only supposed to cure the backwardness of the old continent versus the "new" economic powers, but also to recement the slowly crumbling European Community. This is what the ruling Socialists in France wanted, according to a memorandum they presented for a new "relance europeenne" (European revival) and a later memorandum calling for a "new industrial policy." This wish is also shared by the ruling Christian Democrats in the Benelux countries and in the Federal Republic where they share power with the liberals; the same holds true for the EC Commission in Brussels and the EC Parliament in Strasbourg.

Is this the way to overcome the crisis which has afflicted the Community for several years? This is the question posed by parliamentarians, by officials from the Commission and from ministries, and by scientists and journalists during a recent conference of the Evangelical Academy Loccum on "Assessment and Outlook for the European Community." The controversy over the constantly diminishing funds in the EC budget, which has raged for years, and the constantly growing agricultural surpluses which are devouring more and more funds, and which nobody wants, have long since taken the wind out of the "Concept of Europe," despite avowed loyalty to the idea still voiced in Sunday speeches.

What else but vexation can result, for instance, when Hans-Helmut Waechter, director of the "Adjustment and Guarantee Fund for Agriculture /EAGFL/" of the EC Commission complained graphically that just during the 2 hours of his speech and the ensuing discussion, his fund already expended 10 million marks for price supports. As it is, the refrigerated warehouses for storing butter are almost full. There is already almost a year's supply of butter in storage.

Theoretically, there is not the slightest doubt that without reform of agricultural policy, public support of farmers' income will become inevitable, thus threatening the collapse of the Community of Ten. But is this enough? Three months before the second direct elections to the European Parliament, politicians

of all parties are trying to use future prospects for the EC as a means of inducing voters to at least go to voting places.

Heinrich von Moltke tries to explain why just such a joint policy for promoting high technology ought to be suitable for this purpose. He is a member of the executive board of the EC Commission which is responsible for industrial policies. The life cycle of modern products has become much shorter according to von Moltke. New products reach the market place at ever shorter intervals, a market place in which the EC industry has lost a share; not because its technological achievements are weak, but because the structure of the economy and politics create bottlenecks and barriers which must be removed. Pierre Pflimlin, mayor of Strashbourg for many years and departing vice president of the European Parliament, illustrated European inefficiency in figures: In the area of microprocessors alone the EC member states spent 500 million dollars from 1977 to 1981; Japan spent only half of that, but the share of EC's European products represents only 10 percent of the world market, while that of Japan represents 40 percent.

By way of contrast, von Moltke reported that small U.S. companies, wanting to begin production of new high technology products, were able to raise 15 billion dollars annually of so-called "risk capital" through their banks and financial institutions. Credit institutions in EC countries, on the other hand, made only 400 million dollars available annually for this purpose, which prompted Kurt Kasch of the Deutsche Bank to confess in mannered bankers' German that: "innovative drive is not 100 percent in the German credit system." The EC Commission wants to give it a boost through the ESPRIT program, which has the approval of the 10 ministers responsible for research, by providing support to smaller firms in the development of new communications technology.

However, von Moltke sees the greatest obstacle for EC's industry in the fact that "national champions" continue to dominate the technological market place in the EC. The reason for this, in the opinion of this EC official, is the "politicization of the system by which public contracts are awarded" which is particularly important to communications technology (mail service, radio, television), to energy saving processes (power plants, supply grids), and also to biotechnology (hospitals, scientific institutes). The market for such products is confined to the national scene because public contractors still favor their "purveyors to the court."

This brings us back to the demand to make the intracommunity market of the EC a reality at last--a goal already aimed at in the charter agreements.

However, Professor Beate Kohler of the Technical University of Darmstadt has her doubts. Is it not a fact that the creation and development of this Community is based on a political idea with historical conditions and values of the fifties? Not at all, in the opinion of this political scientist who has studied the problems of European unity for years, and who believes that it is just EC's emphasis on the goal of accumulating greater wealth, which is to say the creation of an intracommunity market for the EC, that keeps the population from political identification with this Community. EC policies therefore lack legitimacy, especially now when determination to reform in order to adjust to the environment of the 1980's is called for.

Since the realization of the intracommunity market no longer suffices to justify EC policies, the only chance for the Community to overcome its crisis of legitimacy lies in expanding its vision and to engage once more in arguments relating to the very goals and character of the Community, that is to say when it becomes once again worthwhile to be involved in the continued development of the Community.

This controversy about the identity of the EC cannot, in the opinion of Beate Kohler, take place within councils of ministers within governments or in summit conferences. Governments are after all elected to achieve breakthroughs which are in the "national interest" as defined by the respective countries. Debates over new goals and the future of the Community can, in her opinion, only be ignited by party representatives in the European Parliament who have an interest of their own in a party-political image and also in the definition of policies for the Community.

Controversy there must be--but not over the price of agricultural products or steel quotas, no matter how important these things are to those directly concerned. After all, only farmers associations and the steel industry are participants; consumers and steel workers are only impotent bystanders; the rest of the population looks away in boredom or responds in anger.

Controversy there must be about the Community itself--about the values it holds today and which it could, or must, hold tomorrow.

It appears doubtful, therefore, whether the promotion of European high technology is the subject which will fan the interest of the European public, and not just of a few leading functionaries, and convince it of the value of a European Community. This subject, moreover, is already being assiduously pursued by federal and state governments. Additional promotion of industrial branches which are already receiving support will not bestow legitimacy on EC policies.

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## FACTORY AUTOMATION

### BRIEFS

NEW TRALLFA HYDRAULIC ROBOT--Stavanger, 25 April-- Trallfa Robot A/S [Inc.] at Bryne has gotten a new leg to stand on. After a year's research the firm, which hitherto has gained a reputation for its welding and painting robots for the European and American automobile industry, has developed a handling robot which it has great expectations for. "We have begun series production of the new robot and the first series of five robots will be ready at the beginning of May," Trallfa Robot Sales Chief Kjell Jaeger informs NTB [Norwegian Wire Service]. The pilot version was bought by the Sandnes Decarbonizing Plant, where it has been in use for a couple of months. Unlike competitors, who base their handling robots on electric power, Trallfa's new creation is hydraulically driven, which makes it possible for it to be used also in explosion-hazard areas. It also makes it extra strong. The robot can lift about 70 kilograms. [By NTB] [Oslo AFTENPOSTEN in Norwegian 26 Apr 84 p 19] 8985

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## MICROELECTRONICS

### RESULTS OF FRG'S SIEMENS FOR FIRST QUARTER 1984

Duesseldorf VDI NACHRICHTEN in German 13 Apr 84 p 2

[Unattributed article]

[Excerpt] During the first three months of the business year, Siemens increased the orders it received by five percent, while the domestic business contributed with an increase of 12 percent. These figures were quoted by Dr. Karl Heinz Beckurts, member of the Siemens board, during a business meeting on 4 April at the Hannover Fair. Orders received for components have increased by fifty percent as compared to the previous year, and with integrated circuits there is even a doubling of orders.

"In the long term, it is not sufficient to purchase technologies, but technologies must be mastered," emphasized Beckurts. "A presupposition for innovative products is the capability to access new technologies at any time." However, so the top management thought after going over the Fair, the dynamics of innovation are expressed here only rather weakly. One really would have to have a certain sixth sense to recognize trends here. Siemens is the sixth largest electronic enterprise in the world, and is indeed supposed to be a good image of development.

In terms of business policy, Siemens sees four major points of emphasis for the 80's and 90's:

- production increases in the office,
- digitalization and integration of communication equipment,
- automation of production technology, and
- securing of the energy supply.

According to Beckurts, double-digit growth rates are expected for the office-technology market during the coming years. The high future expectations of the manufacturers are also characterized by the plethora of products offered in the market. At the same time, it is not easy for the user to select from the copious supply the proper devices for his tasks, so as to optimize the individual work station and the meaningful joint action of the work stations. In the Federal Republic of Germany, 13 million people are supposed to be employed in offices, that is every other wage earner. This



work area is supposedly rather unstructured, so that the deployment of electronic aids will probably not immediately yield the desired effect.

To be able to approach the problem of productivity increase in the office by technical means, one would have to know and analyze the various tasks, functions, and activities of the various offices, and would have to offer appropriate terminal units on the market.

To achieve the above-mentioned research and development objectives, and to strengthen and further expand the position in key technologies, an entire bundle of measures has been initiated. Thus, Siemens held research and development seminars, to work out innovations still faster and with greater specificity, to get a still better handle on the complexity of characterological problems, and to utilize still better its advantages as a "generalist." Furthermore, it is supposedly important to promote the establishment of innovative enterprises and to strive for increased industrial cooperation in the "precompetitive" area. In this connection, Siemens supposedly welcomes the new framework plan of the federal government for the further expansion of information technology. Research and development need especially well trained technical people, even more now than previously. "Just for our new microelectronics program, we expect a research and development expenditure of more than a thousand man years. Engineers and physicists with supplementary training in information have especially good opportunities."

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## MICROELECTRONICS

### UK GOVERNMENT ANNOUNCES MICROCHIP INVESTMENT AID PROGRAM

London THE DAILY TELEGRAPH in English 20 Mar 84 p 1

[Article by Roland Gribben]

[Text] More Government aid was announced yesterday by Mr Tebbit, Trade and Industry Secretary, to encourage more microchip investment in Britain to cope with demand and avoid shortages.

Extra funds of L120 million are being earmarked up to 1990 to provide grants of up to 25 percent, to increase the number of firms making microelectronics and to stimulate further developments in Scotland's "Silicon Glen" and along the M4's "Silicon Corridor."

The microchip aid formed the bulk of incentives totalling L177 million announced by Mr Tebbit in the Commons to help industry buy advanced equipment, including robots.

Between 1978 and last year production of microchips more than trebled. Britain has caught up with West Germany as the biggest consumer of microchips in Western Europe, accounting for 29 p.c. of total demand.

Earlier Government aid for microchip production of L55 million is fully committed and is expected to stimulate investment of about L270 million.

#### L100m Investment

The other aid announced yesterday includes L20 million to encourage the footwear, clothing, knitting and textile industries to use more electronic and computer-controlled equipment.

The four-year scheme, involving grants of up to 20 percent, is expected to generate investment of over L100 million.

The Government is also providing L20 million for flexible manufacturing systems, L12 million for the computer software industry, L5 million for a scheme helping firms to improve quality and for increasing the number of information technology centres from 150 to 175.

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## SCIENTIFIC AND INDUSTRIAL POLICY

### FRG HAMMERS OUT PLAN FOR MASSIVE AID TO ELECTRONICS INDUSTRY

#### Opinions, Approaches Differ

Duesseldorf WIRTSCHAFTSWOCHE in German 9 Mar 84 pp 18-19

[Text] In the coming week, the cabinet in Bonn plans to decide on a comprehensive package of measures to assist information technology. Minister of Economics Lambsdorff prevailed in the fight about procedural policy with the minister for research.

If it were up to no one but Minister for Research Heinz Riesenhuber, the Free Democrats in Bonn suspect that no later than next week an industrial policy would exist which is not too far removed from state control of capital investments. The CDU minister has moved too briskly for the tastes of his liberal colleague in the Ministry for Economics, Otto Graf Lambsdorff.

Consequently, Graf Lambsdorff argued with Riesenhuber for several months about formulations for a market economy. Nevertheless, the measures that came out in a 33-point catalog are treading on the slippery ground of questions of basic principles of procedural policy.

For example, in the years ahead entire branches of industry in the field of electronic components are to be nursed back to health with more than DM 1 billion:

--DM 400 million (original proposal: DM 100 million for 3 years) are set aside between 1985 and 1989 for supporting "microperipherals." This refers to electronic components (sensors, actors) which link microprocessors and microcomputers with conventional mechanical or electric machines.

--The government wants to spend DM 500 million by 1988 for a "submicron technology interlink project" (these are chips with a considerably higher information content). In the second half of the 1980's, according to the plan, the FRG is to be "internationally competitive" and have available "mass manufacturing on this basis."

--In the same period, new component technologies are to receive DM 200 million in support.

--Companies which push ahead with the development of integrated optics will receive an additional DM 120 million in subsidies.

Altogether that is DM 1.22 billion for one branch of industry. Prof Erich Staudt, the Duisburg expert on innovation, for whom resorting to this type of "indirect specific" assistance "only blurs the responsibility," says: "What kind of expertise allows ministers for research and economics to entice entire industries into innovative areas like lemmings?"

In the case of direct support a recipient could at least "be asked to give an accounting after 3 years," in the event that the supported proved to be a mistake, and the need for justifying it was also greater.

The wrangling between Liberals and CDU/CSU politicians about the responsibility for indirect support of research must be seen against this background. In November, the spokesman on economic policy for the FDP fraction, Helmut Haussman, had demanded that this branch of research assistance be returned to Lambsdorff's Ministry. The FDP, including Lambsdorff, is afraid that Riesenhuber's vigorous activities are working against the desired reduction in subsidies.

The nature of Lambsdorff's misgivings also has to do with the policy concerning competition. This is shown by a comparison of the first draft from December last year with the "reworked" version, which the cabinet will most probably approve next Wednesday.

The Ministry of Research had worded No 2 of the 33-point catalog, concerning "European cooperation," as follows: "The government emphatically. . . supports the development of overall conditions which will encourage companies from the member nations to work for a broader European base and to continue to develop into 'European companies'."

The new requirement now reads: ". . . overall conditions which encourage companies from the member nations to seek closer cooperation which is warrantable under the laws concerning competition."

Also cut, for example, was Riesenhuber's intention to set up a "working group for information technology," in which science, industry and the unions were to discuss "strategic questions of information technology."

There are legitimate doubts concerning Riesenhuber's suppositions that it is a matter of eliminating technology gaps. It is clear, and this also emerges from the cabinet draft, that German technologies, taken by themselves, are still among the best in the world. The draft states: "In microelectronics the technology base could be essentially maintained. German manufacturers came through the recent component crisis in an economically better condition than most of the manufacturers abroad." However, the profit margins were "relatively too small for a long-term secure market position."

The example of entertainment electronics demonstrates that the causes are not always to be sought in technology gaps: "The high technical quality of German

entertainment electronics is crassly disproportionate to its ability to penetrate the industry."

Prof Erich Staudt of the University of Duisburg commented on this: "It is not a question of a lack of ability to penetrate the industry. Anyone who compares German automated equipment with Japanese equipment in a production application will ascertain that we have the most modern equipment, while work is carried out more efficiently in Japan with automated equipment that is 5 to 10 years old." According to Staudt, the advantage the Japanese have over us is a qualified (to some extent even overqualified) middle level of experienced skilled workers who can integrate the new technologies better into the existing, partially old stock of machinery. Staudt says: "In the entertainment electronics industry in the FRG this qualified middle level has been totally wiped out. What is left are semiskilled, low-wage earners and management that is top-heavy. Leaps in technology are hard to achieve with this arrangement."

As a result, a thrust into the area of education is part of the government's new plan. Schools, universities and vocational training are to teach working with computers more intensively in future. Bonn is banking heavily on industry, which is to donate school computers and "support the schools with their expert staff," in the way the Association of German Computing Centers, the VDI [Association of German Engineers] and the Mathematical-Scientific Faculty Congress have already offered to do.

The state also plans to promote more innovation in its capacity as client, at Lambsdorff's request, however, "without reducing competition." Upcoming amendments to the "Allocation by Contract for Public Works" are to provide leverage, making it possible to consider, for example, additional bids, proposals for change and alternative technical solutions.

The government is also hoping for some crucial impetus from the expansion of the communications infrastructure through the Bundespost.

--By 1987 at the latest the capability will supposedly exist of offering ISDN (Integrated Services Digital Network) on a narrow-band basis.

--By 1995, with the assistance of the ISDN wide-band network, the communications system "Everyone with Everyone" will be available to 4 million participants. Support: DM 250 million.

--This year a "mobile telephone" is to be introduced which will be available to 1 million participants by the end of the 1980's.

--In the next 5 to 7 years a cable installation rate of 50 percent is to be achieved. The original plan to "harmonize" the expansion of copper cable with the buildup of the fiberglass cable network is missing from the new cabinet proposal.

Finally, Bonn plans to support efforts "to create the conditions necessary for high-resolution television as quickly as possible." The new 1200-line tele-

vision is said to make color pictures possible that are as sharp as etchings and flickerfree. Among the possible applications are videotext and graphic screens for personal computers.

Ultimately not only companies in electronic components technology can anticipate the benefits of money from Bonn: DM 140 million are set aside for the priority assistance area "computer-assisted design systems (CAD systems) for computers and software" (1984-1987). The priority area "New Computer Structures" will cost DM 125 million. DM 165 million are to be spent on the program "Knowledge Processing and Model Recognition." Finally there are plans for a research and development program, which has no estimates for financing, for "new encoding technologies," specifically "for the purposes of data protection and national defense."

It will soon be apparent whether the lemmings have a clear path. The misgivings of the Ministry of Economics have not been eliminated. At many points the cabinet proposal was changed from the formulations of the original decree into "trial contracts."

#### Consensus Reached, New Figures

Duesseldorff HANDELSBLATT in German 15 Mar 84 p 1

[Text] Bonn, Mar 14--Between now and 1988 the government plans to make about DM 3 billion available in assistance for information technology. This emerges from the "Government Report on Information Technology," which was approved on Wednesday by the cabinet and was subsequently clarified by Minister for Research Heinz Riesenhuber.

Riesenhuber talked about a "comprehensive plan to support information technology." It had been announced by Chancellor Helmut Kohl in his government policy statement. The areas of support comprise basic electronics technology, system designs for data processing and technical communication as well as fields of application in industrial automation, office equipment and entertainment electronics.

The government's plan has been developed following tough consultations between the Ministries for Research and Economics, as well as a series of strategy discussions with the economy and science. The economy and science have announced their willingness to participate in mutual cooperation as well as to cooperate with the government.

The measures approved by the cabinet concentrate on five task areas:

--stimulating and strengthening market forces by improving general conditions, with particular emphasis on risk capital, market openings and innovation-oriented public purchase.

--motivating people to face the challenge of technology, by improving overall conditions, with special emphasis on risk capital, market openings and innovation-oriented public purchasing.

--future-oriented expansion of the infrastructure in communications and innovations in the area of final equipment.

--the technology base is to be expanded in the area of defense technology.

--development of a research capacity in the public and the private sector, in order to meet "the demands of international competition with regard to quality and quantity" in priority areas. Riesenhuber described the processing, transmission and presentation of information with the assistance of new information technologies as a process "of crucial importance for the continued development of our nation's economy." He said that an unusually large potential for innovation and growth existed in information equipment, which absolutely had to be utilized in order to ensure the FRG's international competitiveness in this area and at the same time to create jobs. The minister characterized the new information equipment as "the raw material of the future."

According to the government report, the German information equipment industry still holds a leading position worldwide in several areas. However, the government was viewing with some concern that competitive ability in micro-electronics and in subareas of data processing, faced with worldwide efforts in this area, was in danger. The government stresses that it is banking on the self-generated dynamism and the ability to innovate of the German economy. The primary objective of the assistance measures was to support the information equipment industry by means of better general conditions "to utilize chances in the future worldwide markets in information equipment in a way that meets the market."

Of the anticipated approximately DM 3 billion, DM 530 million alone will go to supporting industrial automation, DM 600 million to the submicron project, which is new materials for even more compressed information storage, DM 320 million for a special microperipherals program, DM 280 million for expansion of a digital telephone network and optical information equipment, DM 200 million for new component technologies, DM 60 million for wide-band distribution networks and DM 160 million each for computer-assisted design (CAD) in computers and software as well as computer structures. DM 100 million are to be spent to help in strengthening basic research in information technology.

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## SCIENTIFIC AND INDUSTRIAL POLICY

### FRG RESEARCH MINISTER ON PRIORITY AREAS FOR R&D AID

Duesseldorf HANDELSBLATT in German 4 Apr 84 p A2

[Article by Heinz Riesenhuber: "New Technologies Are Becoming The Future Sources of Growth"]

[Text] The German economy is once more on a growth path. In the course of 1983, for the first time since 1980, there was a real rise in the gross national product. Following the prognoses, an average growth of about 2 to 3 percent will be possible for 1984.

If one looks at current statistical results in order to establish our position in the world market, the situation has all the appearance of being satisfactory. With 18 percent, we are in first place in the export of industrial goods among the OECD countries. This positive balance does not show that we can fall behind in important high-technology areas. Our share of the world market in high-technology goods is stagnating, while Japan's share in the last decade has doubled. We cannot overlook this, if we want to maintain our leading position in the 1990's as well. The situation is still good, but our dynamism is revealing weaknesses.

The new priority areas in our policies for research and technology must be seen against this background, because it is becoming clearer and clearer that new technologies in the industrial nations will become the real sources of growth.

One of the most important new priority areas for state support of research and technology is information equipment. To this end, the government has approved the comprehensive plan to support microelectronics, information and communication technology, announced by the chancellor in his government policy statement. In this plan we are documenting our determination to accept the challenges of informational technology and to improve our competitiveness.

Just in the budget of the Ministry for Research and Technology (BMFT) DM 2.9 billion are being set aside between 1984 and 1988 to strengthen our research capacity, to expand the communications structure and to ensure a technology base.



The potential for innovation in biotechnical processes for multiple applications in safeguarding the environment and health and ensuring foodstuffs and raw materials, the full extent of which cannot now be seen, requires a joint effort on the part of science, the economy and the state. It will be their task to speed up technical development and to create suitable conditions for research at our institutes.

A third priority area is materials research, because new materials and material characteristics are increasingly determining the technical possibilities for development. It is the task of state support for research in the economy to improve science's ability to obtain results in research and development and to convert them for use more effectively. To this end the government is pursuing a clear line: industrial research and development is the very first assignment of the economy. This also holds true for the conversion into innovations. The state cannot order innovation by decree or define its content; its task is to stimulate this process, to make it easier, and to reduce or remove obstacles.

Guided by these considerations, the Ministry for Research and Technology has begun to concentrate direct support for projects in the economy on high-risk undertakings, which may only bring results over the longer term, to expand indirect measures for assistance, and to draft and introduce new indirect measures.

The advantages of indirect measures for support initiated on a broad scale:

- exploitation of the search function of the market
- strengthening the economy's own forces
- reducing the danger of misdirection by the state
- dismantling of the bureaucratic mechanisms of control

will, in my opinion, have a positive effect on the economy's research and development activity, and in particular on its readiness for innovations.

The new measures include:

- Against the backdrop of reduced investment activity by German companies, which has been noticeable in recent years in the area of research and development, the government has created special writeoffs for research and development investments through the 1984 tax relief bill. In conjunction with the investment allowance, these writeoffs should boost innovative investments.

#### Support for Staff Expenditures

With its program "Grants for Expenditures for Staff in Research and Development" the government has created an important measure to provide assistance in the area of research and development staff. To complete this widely accepted first step, consideration is being given in the BMFT to a measure to support research and development staff which does not start with existing staff levels but with the increase in staff. The result should be that support funds flow into innovation-oriented, growth-rich companies.

--One of the hindrances blocking the establishment of new, innovative companies is the absence of a market for risk capital, which is quite different than in the United States, or even in Great Britain. To provide some stimulus here, we have set up the model experiment Establishing Technology-Oriented Companies. It started up in August last year. A total of DM 100 million is available for consultation assistance, allowances for development costs and risk participation.

#### Technology Transfer through Minds

--Technology transfer between research institutions and industry occupies a high place in this policy of innovation. Consequently, the BMFT's assistance program "Contract Research and Development" was expanded and funds were increased to DM 40 million for 1984.

--A particularly effective technology transfer is the one that takes place through "minds." By its very nature, the difficulties are greatest here. In order to create additional opportunities for companies and to bring out the learning effects in all those participating, a portion of the staff costs will be refunded to companies which employ younger generation scientists and send them to a research institute of their choice for a period not exceeding 3 years.

--Finally, mention must be made of indirectly specific assistance, which is apparently being carried out successfully in the current special program "Applications for Microelectronics." This instrument of policy is particularly suitable in cases where a basic innovation is to be converted in individual products or processes on the largest possible scale. Another indirectly specific new project, with a total of DM 350 million, is being put into action in the manufacturing technology program, to support development work on factory applications of CAD/CAM systems and the development of industrial robots and handling systems.

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BERLIN VENTURE CAPITAL FIRM BEGINS OPERATION

Duesseldorf VDI NACHRICHTEN in German 6 Apr 84 p 10

[Unattributed article]

[Text] On 22 December 1983, the Baldwin Industrial Bank (AG BIB), the German Bank of Berlin AG, and the Industrial Credit Bank AG (Berlin-Duesseldorf) founded the Venture Capital Company for Innovation mbH in Berlin. This company has now begun its activity. As the business manager, Dietmar Gruener, explained, the company will make a contribution towards revitalizing the medium class economy of Berlin. For small or medium enterprises with good growth expectations, the company will offer capital resources and management support, so that the problems of introducing new products and methods into the market can be solved better than previously.

As Gruener emphasized, Venture Capital participation extends beyond pure capital participation. The idea was to collaborate with the businesses "entrepreneurially". In the case of businesses that are being founded, the point already is to collaborate in the conception of the enterprise. The Venture Capital Company is ready to provide capital resources between 0.5 million and one million DM. However, it is presupposed that the partner enterprise has a majority participation. The furnishing of equity capital can also be considered if the question concerns the introduction of new products into the market by taking over an existing enterprise or the spinoff of part of the business by the previous manager.

With its equity capital, the Venture Capital Company accepts the same risks and opportunities as its business partner. For Gruener, the profit orientation stands in the foreground, thus providing an example against thinking in terms of subsidies. However, the resulting profits should not be disbursed but should be used primarily to further strengthen the equity capital position of the associated enterprises. The companies, in terms of their capital, will thus become more secure against crisis and more competitive.

Since the beginning of its activity, the Venture Capital Company has received a total of 38 capitalization requests, 14 of which came from Berlin and 24 from the federal area.

## SCIENTIFIC AND INDUSTRIAL POLICY

### EXHIBITION SHOWS JAPAN BROAD SPECTRUM OF FRG S&T ACTIVITIES

Frankfurt/Main FRANKFURTER ZEITUNG/BLICK DURCH DIE WIRTSCHAFT  
in German 18 Apr 84 p 5

[Article by Dr. Werner Gries]

[Text] From 23 April through 6 May, the special exhibition of the Federal Postal Ministry for Research and Technology will take place in Japan. This exhibition is supposed to show to the Japanese technical people the top technical accomplishments of German industry. In the following article, Dr. Werner Gries, press agent of the Federal Research Ministry, elucidates the scope of the exhibition from the perspective of the BMFT (Federal Ministry for Research and Technology).  
The Editors

The special exhibition from the Federal Ministry for Research and Technology will show the top achievements in research and technology. The objectives of research and technology policy, important results, as well as the multiplicity of German research and technical development will be presented.

The broad spectrum, from basic research through applied research through industrial research, technological development and innovation, is shown in five blocks within the special exhibition of the Research Ministry: energy, transportation and traffic, information and production technologies, multi-national collaboration/space technology, as well as large-scale research.

As regards nuclear energy, research results are presented in three topic areas:

Advanced reactor lines, model of the prototype breeder power plant SNR 300 with electrical power of 300 megawatts. This prototype is being constructed at Kalkar at the lower Rhine and is supposed to start operation in 1986.

Vitrification of Highly Radioactive Waste

Reactor safety and reactor maintenance. A leak-indicator system is being presented. BLISS (Bartex-Leakage-Indication-Sensor-System) accomplishes its monitoring function directly at the pipe, detects every change - even during startup and shutdown operation.

2-D and 3-D Model. The objective of the trilateral 2-D/3-D project is to study the multi-dimensional thermal hydraulic processes in the pressurized water reactor (DWR) after a loss of coolant accident. These studies are both analytical and experimental and involve work division and coordination.

Nuclear waste disposal. A model is being shown to vitrify highly radioactive waste (Pamela) as well as the model of a transport and storage container made of nodular cast iron, for the transport and intermediate storage of used-up fuel elements (Castor).

As regards solar energy, there are research efforts along the entire breadth of this area. Outstanding examples are presented in pictures, textual tables, and exhibitions. Solar panels, thin-layer solar cells, and photovoltaic exhibits can be seen. Pictorial interpretations give an insight into other focal points of energy research and their results. Explanations are given about coal hydrogenation, and about the environmentally compatible future coal power plant system at Voelklingen, and regarding the circulating fluidized bed.

In this second topic area, the areas of local traffic and rail-bound long-distance traffic are presented in terms of three outstanding exhibits:

The unconventional rapid transit system Transrapid, a long-distance traffic system with non-contacting drive technology (Electromagnetic Levitation System with a linear motor drive). This system is currently being tested in a large-scale test using a realistic 200-person vehicle, on an experimental installation in Emsland, up to speeds of 400 kilometers per hour. It is almost ripe for deployment.

Furthermore, an advanced wheel-on-rail system, the Intercity Experimental (ICE), is being shown as a precursor for the next railroad generation.

The BMFT stand is exhibiting a track bus model from the local-traffic area. This novel development points the way for the future and has already proven itself in city traffic in Essen (Ruhr area).

Two information systems are available to visitors of the German exhibition in Tokyo to answer their questions:

Inka, the information system from Karlsruhe, offers 44 bibliographical data bases, comprising a total of about nine million documents ready to be called. The emphasis is on the energy area.

This data base stores all research projects that are funded by the Federal Ministry for Research and Technology.

In the area of data processing, the Society for Mathematics and Data

Processing (GMD), one of the thirteen non-university major research institutions in the Federal Republic, is exhibiting products from software and hardware research.

The two exhibits on software:

A program system to minimize vehicle deployment in non-railbound transport (TOP). TOP primarily provides planning and decision aids to set up favorable route layouts for buses.

A programming language which simplifies complex programming languages (Reduction Language System). For this programming system, especially developed computer architecture is available which is especially suited for applying this program.

The Society for Mathematics and Data Processing is also exhibiting the project Starlet from the area of hardware development. This is a completely new multicomputer system with new architecture. It combines high power, a favorable price-performance ratio, high software availability, and low maintenance as well as modern programming methods.

Topics of information technology in the service of health and for the handicapped, a heart-frequency monitor with a monitoring alarm as well as a voice-controlled automobile are being shown. The heart-frequency monitor makes it possible for people with heart disease to monitor their cardiac function continuously by means of a complex electronic unit about as big as a wrist watch. In the voice-controlled auto, functions such as the gear shift and door opening are triggered by voice commands via a microphone and a computer.

The following is shown from the area of production engineering: a CNC control simulator, the real-time data base, the work station for robot programming, and a sensor-controlled detection system for robots. These developments come from the area of applied research (Fraunhofer Society, Battelle).

#### Developments of Small Enterprises

To obtain an insight into the research and development work of small enterprises, the technology center of the Association of German Engineers (VDI) is presenting top achievements in this area;

A logic-analysis system, an economical, easily portable instrument which is used primarily in production and quality control;

A light-conductor bus system. This is a system designed for the industrial production area to facilitate data communication between computer systems and peripheral units in a manner independent of their manufacturer.

It works on the basis of light-wave conductors and communication computers;

A filling-level measuring unit, and

An electronic organ (technique for playing).

The essential organizations are shown in which the Federal Republic of Germany collaborates in the research area. German contributions which were made within the framework of this collaboration can be seen at the exhibition in pictures and exhibits, among others also the booster rocket Ariane (model), an apogee motor for Ariane, the space-travel laboratory Spacelab, and the antenna system Girl. Furthermore, top achievements from our own German programs are shown, especially in the area of space technology. These include for example:

A metric camera, the camera system that can be used in space to achieve high-grade photographs of the Earth's surface, a microwave radar unit, a multi-faceted radar unit at the highest technological status.

The X-ray satellite Rosat. This satellite is supposed to be started by NASA in 1987 by means of the space shuttle. The objective is the first complete scan of the entire sky by means of an X-ray telescope.

The experiment carrier Spas (Shuttle Pallet Satellite). This unit was first used in the spring of 1983, being deployed from the space shuttle. When the mission is completed, it can again be intercepted (reusable satellite).

A modular optoelectronic multispectral scanner for tasks of Earth exploration (MOMS).

In the Federal Republic, major research is primarily being carried out at the thirteen government-funded non-university major research institutions. These research institutions employ a total of about 18,000 persons. They are joined together in a working community for major research institutions (AGF) and they exhibit at the BMFT stand. Outstanding examples are shown, and specifically from the following areas:

High energy physics. In this area, the most recent information concerning the basic building blocks of matter is being presented. Among other things, the planned hadron electron ring in Hamburg is also shown. The joint research project between Japan, Germany, and England, which is known by the abbreviation Jade Experiment, shows the close collaboration between these countries.

Environmental Simulation Chamber

Nuclear research and nuclear engineering. Besides nuclear research

and reactor safety, the introduction of nuclear energy into the heat market is also shown. By means of the EVA/ADAM System, heat can be supplied at temperatures up to 600° Celsius. The distances that can be spanned amount to several hundred kilometers. For practical use in nuclear engineering, the remote-controlled caterpillar vehicle MF 3 is being developed for intervention tasks of all types.

Environmental protection and environmentally compatible technologies. Here, the worldwide unique environmental simulation chamber for air pollutants is being exhibited. Furthermore, an etching system for semiconductor etching, about as big as a typewriter, is being shown, which has successfully avoided the otherwise usual environmental burdens.

Bioengineering. A cell fusion technique developed by the nuclear research installation in Julich is being shown here in pictures. This technique makes it possible to fuse various living cells to new cell types (hybrid cells) with the combined properties of the starting cells. Application areas are the production of new patient-specific drugs, the conversion of chemical production processes to a bioengineering basis, the breeding of new useful plants (for example high-yield, saltwater-compatible plants).

Nuclear fusion. As regards this future-oriented research area, the Max Planck Institute for Plasmaphysics at Garching near Munich is presenting research whose objective is to solve the plasma physical and engineering problems of a nuclear fusion reactor. The tokamak experiment Asdex is being presented by pictures and exhibits. Asdex, by means of a magnetic diverter, achieves discharges up to twelve seconds duration and temperatures up to 55 million degrees.

All exhibits are shown in summary in an information document. These brochures will be available at the stand (in the Japanese language). Films will also be shown regarding several points of emphasis. Some industries and enterprises, who are represented at the BMFT stand by their own exhibits, furthermore have their own stands within the German exhibition. These represent primarily enterprises of the electrical industry, in connection with the topic of nuclear energy and information technology, as well as enterprises of the air and space industry.

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## TECHNOLOGY TRANSFER

### SWEDISH COMPANIES CIRCUMVENT COMPUTER EMBARGO

Stockholm DAGENS NYHETER in Swedish 19 Apr 84 p 9

[Article by Bjorn Anders Olson: " Companies Circumvent United States Computer Embargo"]

[Text] Swedish companies now buy components in the Soviet Union, mount them in Swedish computer equipment and then export the products back to the Soviet Union. All this in order to circumvent the American embargo policy.

One of the companies that has first imported from, then exported, to the Soviet Union is ITT-Standard Radio & Television.

It is an obvious source of irritation to them that the information has leaked out.

"It's only a question of some minor, occasional transactions," says Gosta Eriksson at the company.

Since the United States pursues a more and more strict embargo policy towards Eastern Europe, as far as advanced technology is concerned, it is necessary to find other suppliers than American ones.

The report about the Swedish way of circumventing the American embargo policy, was published in the magazine, Industrial Data Technology. This report has now been confirmed to DAGENS NYHETER.

"Yes, we have purchased components in the Soviet Union, in the amount of a few thousand dollars," says Gosta Eriksson.

[DN] "Why do you buy from the Soviet Union?"

"Since we export back to the Soviet Union it is better for them to have their own, familiar components in our products, intercom equipment."

No Bother

"Furthermore, the United States is not bothered this way," says Gosta Eriksson.

He also believes that the United States will not react adversely to the transactions with the Soviet Union.

Otherwise, the United States, nowadays, pursues a more and more strict embargo policy.

Sweden has been involved in some "transactions" and therefore risks a more intense scrutiny. (Some of these transactions are Datasaab's secret export of American equipment of the airport in Moscow, the smuggling affair in Helsingborg etc.)

Therefore, as far as Sweden is concerned, it has to find other suppliers than American ones, if it wants to export to East Europe.

Japan has been a loophole until now, but it is being closed because of American pressure.

#### Similarities

In order to be able to export more complicated technology to the East, Sweden may, in the future, import missing components from there to a greater extent.

Furthermore, it is no secret that many Westerners think that several Soviet components have a striking similarity to their American counterparts, even though the Soviet Union insists that the products have been developed there.

The Soviet Union points out that there are several other companies that import components. Not only ITT-Standard Radio & Television with its ties to the United States, but also, among others, Ericsson Information Systems. The latter company does not want to comment.

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TECHNOLOGY TRANSFER

ANNUAL REPORT CITES S&T ESPIONAGE INCREASE IN FRG

Duesseldorf HANDELSBLATT in German 9 Apr 84 p 4

[Article: "Espionage is Focused on Leading-Edge Technology"]

[Excerpt] HANDELSBLATT 7/8 April 1984, Duesseldorf. The Federal Republic of Germany successfully resisted the challenge of the extremism and terrorism in 1983, declared Minister Friedrich Zimmerman upon presentation of the 1983 Report on the Protection of the Constitution.

The East has intensified its espionage activities in the FRG, and the focus of these efforts is increasingly on industrial and scientific espionage. In 1983, as also in past years, the FRG--due to its exposed political, geographical, military and economic position--was subjected to intensive electronic surveillance by the telecommunication services of communist controlled countries. Again, as in previous years, the chief perpetrators of the espionage directed against the FRG were the telecommunication services of the GDR.

Also, in 1983 the enemy services operated out of the embassies and consulates of their countries and out of the "mixed companies" in the FRG, including Berlin. In 1983, 31 people were arrested on suspicion of espionage activities. In the course of further investigation the suspicion was borne out in 28 of the cases.

Zimmerman pointed out that the Warsaw Pact Countries undertake extreme efforts to acquire information about leading products in the fields of microelectronics, data processing, chemistry, microbiology, energetics and nuclear technology. In the area of political espionage, interest has shifted to the parties of the federal coalition.

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## TECHNOLOGY TRANSFER

### ASSOCIATION UNITES FRG RESEARCHERS, INDUSTRY REPRESENTATIVES

Duesseldorf HANDELSBLATT in German 3 Apr 84 p 3

[Article: "Access to Data Banks and Computers from any Location"]

[Text] HANDELSBLATT, Monday 2 April 1984, hjs Bonn.  
In Bonn the largest combined project in the field of communications technology has just been founded. It is the German Research Network Association (DFN). On the occasion of the founding, FRG Research Minister Heinz Riesenhuber called attention to the great importance of the association for shaping research policy.

The minister spoke of a "First for the FRG," since for the first time representatives from university research, the big research institutes, the Max Plank Society, the Fraunhofer Society and industry have united in a common undertaking. The Association has set for itself an extraordinarily ambitious and difficult task in the realization of the German Research Network, which can only be realized with united effort and a fusion of all forces," said Riesenhuber.

The German Research Network is technically situated right on the boundary between telecommunications and data processing and thus in an area with high innovation potential for the development of new data communications services. The Research Ministry is allocating DM 60 million for the DFN project over the next 4 years to ensure participation of the governmental institutes in the association. The business community will pay its own way.

As an open network, the German Research Network will facilitate communications exchange both inside the FRG and with foreign countries. In the opinion of many scientists, the communications environment and customs will change radically in Germany. It is regarded as important that early cooperative research effort be undertaken to prevent Europe from being partitioned by standards barriers. The initiatives which unfolded in connection with the founding of the DFN association are considered to be of utmost importance in view of sharpened competition among the industrial countries and because of rapid technological progress. In this connection,

the minister had more to say: Competitive positions in the international market can only be won and held when industry and science work intimately together and mutually establish centers of concentration. "At that point in time when thinking in European dimensions finally begins, the association will stand ready with a communication channel which the partner countries can use to present a common position in the field of computer networking," emphasized Riesenhuber.

The German Research network provides the research community access to the total spectrum of data processing, including special programs, data banks and computers. Access will be independent of geographic location. Using this approach, the investments in large and super computers and in software development can be more economically utilized. In addition, it will be possible over such networks to develop new potentials of communication and cooperation in the research sector.

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## TECHNOLOGY TRANSFER

### BRIEFS

FRANCE-EGYPT TECHNOLOGY TRANSFER--Paris--Thomson-CSF [General Radio Co] Cooperation, a subsidiary specializing in training and technology transfer, is going to install in the Military Technical Institute of Cairo a data-processing technology department whose task will be to train specialists in aeronautical electronics, the French group has indicated in Paris. This center's main mission will be to give its students practical training in operating the air-defense systems delivered to Saudi Arabia by Thomson; the total contract amount is Fr 35 billion. Thomson-CSF Cooperation, created in 1975, has instructed 6,000 foreign trainees from 56 countries, which puts it in the first rank of French firms that train foreign personnel. It has had a turnover of Fr 230 million and employs 400 persons. [Text] [Paris AFP SCIENCES in French 23 Feb 84 p 24] 11267

FRG-USSR MACHINE TOOLS--Professor Dr. Starnick, President of Berlin Technical University and Professor Dr. Solomentzev, Director of the College for Machine Tool Construction and Tools, Moscow, have signed a partnership contract. Both colleges wish to collaborate more closely in the area of production engineering. The subject of the contract is the exchange of experience in research and teaching, the exchange of technical literature, as well as participation in research and seminar functions. The agreement that was made developed from long years of economic relationships between German and Soviet industry, which were accompanied by numerous scientific meetings. [Text] [Duesseldorf VDI NACHRICHTEN in German Feb 84 p IV] 8348

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