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18 April 1984

West Europe Report

SCIENCE AND TECHNOLOGY

FBIS FOREIGN BROADCAST INFORMATION SERVICE

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CONTENTS

ADVANCED MATERIALS

MBB USES NEW CFC FORM TOOL FOR TITANIUM ALLOY AIR INTAKE

Duesseldorf VDI NACHRICHTEN in German 2 Mar 84 p 20

[Article: "Superplastic Forming in a Carbon Forming Tool: Air Intake Duct Is Manufactured in One Piece"]

[Text] The air intake in the Tornado fighter plane consists of 16 individual drawn plates with almost 5,000 rivet connections and the corresponding sheet metal connecting plates; quantities of plastic are required for sealing the rivet connections. By forming the complicated air intake superplastically out of a tubular hollow body it is now not only possible to reduce the weight but also to produce an air intake duct without rivet holes which is resistant to fuel and is absolutely leakproof. It can be used for partitioning an integral tank.

The Augsburg plant of the Messerschmitt-Boelkow-Blohm aeronautical and astronautical firm by linking up two new technologies has shown a method of manufacturing large structural components which is both weight-saving and economical in comparison with presently employed processes. By superplastic forming in a forming tool made of carbon fiber-reinforced carbon (CFC) the development engineers have produced an air intake section out of titanium alloy.

The outlet pipe constructed out of the TiA16V4 alloy has a plasma-welded longitudinal seam, has a diameter of 460 mm, a wall thickness of 3.5 mm and a length of 1,500 mm. It is closed at both ends and "blown" at a temperature of 925° C with argon in a forming tool made of CFC. At this temperature the titanium alloy enters the superplastic state and may be formed with a forming velocity of about 1 percent per minute, with elongations of several hundred percent being easily attained. After the superplastic forming the nominal length of the finished test component amounts to 1,000 mm and comes to over 1,400 mm if one counts forming overruns. The contour varies continuously from a 700-mm diameter circle to a rounded rectangle which is about 720 mm by 500 mm.

An entirely new feature of the immediately successful test is the first-time use of carbon fiber-reinforced carbon (CFC) as a forming material. CFC has the same strength at 1,000° C as it does at room temperature. CFC is very light. The forming tool for the component exhibited here weighs only 84 kg. A forming tool of heat-resistant steel would weigh 100 times as much.

In cooling the CFC tool shrinkage is less than that of the component formed in it and hence releases the latter easily. On the other hand a steel tool would shrink about 1 percent more and in consequence seize the component or damage it.

A CFC tool is designed like a normal carbon fiber component. It is also possible using this tool to handle difficult component geometries easily. Especially important here was the experience of the Augsburg MBB in the manufacture of components out of carbon fiber-reinforced plastic (CFK).

In the CFC tools structural component geometries can be handled through superplastic forming which could be realized only with great difficulty in the traditional tools made of heat-resistant steels. Superplastic forming not only permits the shaping of a component within very broad limits at relatively low cost in comparison with conventional manufacture but there is also an additional cost reduction resulting from the use of CFC as a tool material.

The manufacture of a complete air intake duct about 4.5 meters long in one piece by superplastic forming is planned for the near future. Such an air intake duct will be required for the fighter plane of the nineties.

In this latter case, too, the outlet unit will be a TiAl6V4 tube having a length of 5,000 mm and having longitudinal seams welded by the plasma process.

Supplier firms have contributed to the success of the engineers at the Augsburg MBB plant. The CFC tool was created in cooperation with the Sigri Elektrographit Company, Inc., in Meitingen. The Robert Zapp Distributors Company in Duesseldorf supplied the longitudinally seam-welded TiAl6V4 tube on the basis of MBB data. The sheet metal used for the tube was manufactured by the RMI Company in Niles, Ohio (United States). The tube was manufactured at the Valley Metal Works in El Cajon, California (United States).

8008
CSO: 3698/313

CALENDAR OF ARIANE LAUNCHES 1984-1987

Paris AFP SCIENCES in French 23 Feb 84 pp 14-15

[Text]

MAR		1984	[1]V8	[2]AR1	INTELSAT-V-FU 8
[3]GTO					
"	MAY	1984	V9	AR1	SPACENET-1
"	JUL	1984	V10	AR3	ESC-2 + TELECOM-1A
"	SEP	1984	V11	AR3	MARECS-B2 + GSTAR-1A
"	NOV	1984	V12	AR3	ARABSAT-A + SPACENET-2
"	JAN	1985	V13	AR3	TELECOM-1B OU SBTS-1 + GSTAR 1B
"	MAR	1985	V14	AR3	SBTS1 OU TELECOM-1B + SPACENET-3
"	MAY	1985	V15	AR1/2	SPOT-1/VIKING OU INTELSAT-V
[4]HLS/GTO					
	JUL	1985	V16	AR1	GIOTTO
LIBERATION					
	AUG	1985	V17	AR3	SBTS-2 + ECS-3
GTO					
"	SEP	1985	V18	AR2	TV-SAT
"	OCT	1985	V19	AR2/1	INTELSAT V OU SPOT-1/ VIKING
GTO/HLS					
"	NOV	1985	V20	AR2	TDF-1
"	JAN	1986	V21	AR2	INTELSAT VA-FU-15
"	MAR	1986	V22	AR4	ARIANE 4-01
"	MAY	1986	V23	AR2	INTELSAT-VA-FU-13
"	JUL	1986	V24	AR3	D.L.
"	AUG	1986	V25	AR4	UNISAT-1(R) + D.L.
"	NOV	1986	V26	AR3	STC(R) + D.L.
"	DEC	1986	V27	AR4	INTELSAT-VI (R)

1 V = FLIGHT
2 ARI = ARIANE
3 GTO = Geostationary Transfer Orbit
4 HLS = Heliosynchronous Orbit

"	FEB	1987	V28	AR4	TELE-X(C) + UNISAT-2(R)
"	MAR	1987	V29	AR3	DBSC-1(R)
"	APR	1987	V30	AR4	INTELSAT-V1 (R)
"	MAY	1987	V31	AR3	TDF-2(R)
"	JUN	1987	V32	AR3/4	DFS-1(R)/ANIK(R) + METEOSAT-1(C)
"	JUL	1987	V33	AR3	L-SAT"OLYMPUS"(C)
"	AUG	1987	V34	AR4	INTELSAT-V1(R)
"	SEP	1987	V35	AR3	DBSC-2(R)
"	OCT	1987	V36	AR4	ITALSAT(R) + RAINBOW (R)
"	Dec	1987	V37	AR2	SPOT-2(C)

HLS

Up to and including V23: firm contracts

After V23 (C) = contract
(R) = reservation
(D.L.) = launch availability

The first flight of Arianespace V9 will be completed by six double launches up to 1985, totaling 13 Demi-Ariane 3 class satellites equivalent to class PAM-D:

--ECS-2 and ECS-3	for ESA/Eutelsat
--Marecs-B2	for ESA/Immarsat
--Telecom-1A and B	for CNES/DGT (General Telecommunications Direction in France)
--3 Spacenet and 2 GSTAR	for the American Company GTE-Spacenet
--Arabsat 1	for the Arabic telecommunications satellites organization ARABSAT
--SBTS 1 and 2	for the Brazilian telecommunications agency EMBRATEL

In 1985 the following will be launched:

--Giotto	ESA space probe to Halley's comet and two satellites in heliosynchronous orbit
--Spot 1	French Earth observation satellite, belonging to the CNES
--Viking	Satellite studying the Earth's magnetic field, belonging to the Swedish Space Corporation

The following launches include three launches of "INTELSAT V" satellites of the international organization INTELSAT as well as two direct television satellites:

--"TV-SAT"	for Germany and
--"TDT-1"	for France, and finally the first launching of the new version Ariane 4.

Arianespace predicts some launch availabilities (V24, V25 and V26) in mid-1986 which will enable any relaunch request to be met if necessary and will also meet a number of requests currently in negotiation with other clients.

The reservations cover 18 satellites through 1988-1989 and include:

--3 INTELSAT VI satellites

--6 direct television satellites 3 of which are American (1 for the Satellite Television Corporation, 2 for the Direct Broadcasting Satellite Corporation), 2 satellites are for the British company UNISAT, and 1 French TDF-2.

--7 telecommunications satellites of which 2 are American (for the Rainbow Company), 1 Australian (AUSSAT), 1 Canadian (Anik for the TELESAT Company), 2 German (DFS 1 and 2 for the Deutsche Bundespost) and 1 Italian (ITALSAT).

--2 satellites for the ESA: Hipparcos, astronomical satellite and ERS 1 (Earth Resource Satellite).

12434
CSO: 3698/308

AEROSPACE

CNES OF FRANCE REORGANIZES ITS GENERAL MANAGEMENT

Paris AFP SCIENCES in French 1 Mar 84 pp 22-23

[Text] Paris--The National Space Studies Center (CNES) is preparing for the great thrust to commercialize and exploit space, by reorganizing the structure of its general management after having done the same at the technical level.

In an announcement published on 28 February, CNES announced the reorganization of its management, intended to improve its ability to fulfill the new tasks it faces as a result of the significant growth in the French space program, and of the desire to promote abroad space products "made in France" and in Europe (various satellites and their launchers, and so on).

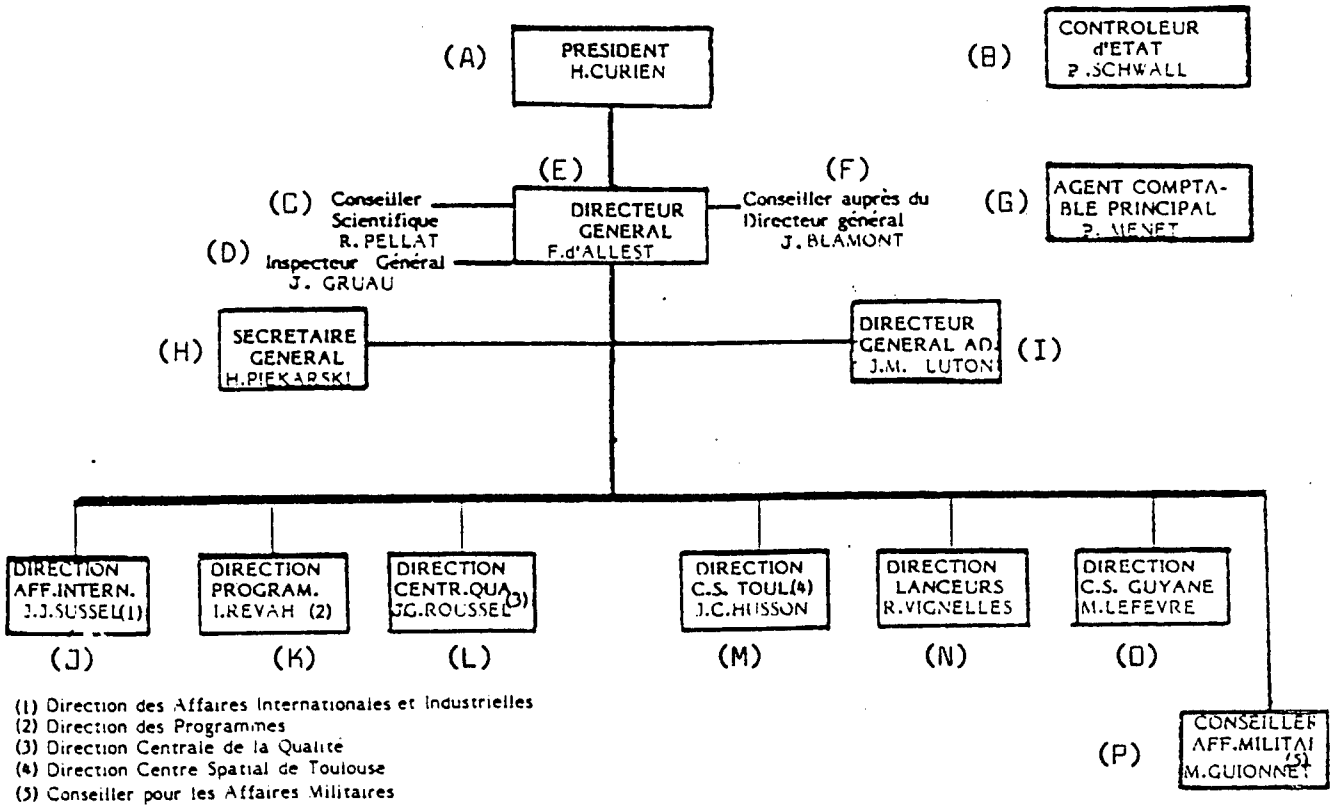
At the age of 41, Jean-Marie Luton becomes deputy director general of CNES, and will be specially charged with a synthesis and coordination task in formulating French space policy, and with a synthesis of economic studies for the financial activities of the CNES.

The only new position is that of Jean-Gerard Roussel, 47, named central director for quality. Mr Roussel will be responsible for controlling at the highest level, and in conjunction with manufacturers and laboratories, the quality of space projects whose complexity is increasing.

As director for international affairs, Jean-Jacques Sussel, 41, will be responsible for all cooperations, within ESA (European Space Agency) as well as with other countries, and for foreign promotion of the French space industry.

Isaac Revah, 49, former director of the Research Center for Physics of the Earth and Planetary Environment, a joint laboratory of CNET (National Center for Telecommunication Studies) and CNRS (National Center for Scientific Research), is named program director. His task is to formulate long term programs in scientific research and applications, and to implement a policy toward users of space facilities.

New organization chart



(A) President, H. Curien
(B) State controller, P. Schwall
(C) Scientific adviser, R. Pellat
(D) Inspector general, J. Gruau
(E) Director general, F. d'Allest
(F) Adviser to the director general, J. Blamont
(G) Head accounting agent, P. Menet
(H) Secretary general, H. Piekarski
(I) Deputy director general, J. M. Luton
(J) Directorate for International and Internal Affairs, J. J. Sussel (1)
(K) Programs Directorate, I. Revah (2)
(L) Central Directorate for Quality, J. G. Roussel (3)
(M) Toulouse Space Center Directorate, J. C. Husson (4)
(N) Launcher Directorate, R. Vignelles
(O) Guyane Space Center Directorate, M. Lefevre
(P) Adviser for military affairs, M. Guionnet (5)

Compared to the United States and USSR, which pursue their leadership in this domain, as well as to Japan, which appears more determined than ever to play its part in space exploration, and considering the American plan to build a large manned space station during the next decade, and to exploit its shuttle to the fullest, the French government has decided that it will not be outdistanced and seems to be in agreement with many other countries in Europe.

It is in this spirit that we must view the decisions taken by the general directorate of the French NASA, while awaiting its decisions about the French space program for the next 10-15 years--decisions which according to reliable sources could be taken in three to four months.

Although European, 63.87 percent of the Ariane rocket is actually financed by France. Aerospatiale and Matra--to name just two companies--have become with time, serious competitiors for American manufacturers of satellites of all kinds. The value of French and European scientific experiments is acknowledged everywhere, in the United States as in USSR, and this research has resulted in important and most advanced Franco-American and Franco-Russian cooperation programs.

A French astronaut has flown in space with the Russians, and another is preparing to do the same with the Americans. French technology has landed on the moon (the laser reflectors of Lunokhod). Other devices will enter Venus' atmosphere. The French role in ESA scientific experiments remains very large. President Mitterand has recently introduced the idea of a European space station, and so on.

11,023
CSO: 3698/314

CNES OF FRANCE CREATES QUALITY ASSURANCE BRANCH

Paris L'USINE NOUVELLE in French 15 Mar 84 p 20

[Article by Marc Chabreuil]

[Text] The era of prototypes is past. The French space industry will mass produce for exportation, launchers and satellites with increasingly complex applications. This forces enterprises to change their production methods. At the same time, they will have to establish their credibility, which is still lower than that of their American competitors. For the National Space Studies Center (CNES), the success of this reorientation in the space sector involves a rejuvenation of its quality assurance policy. It has therefore just created a Central Directorate for Quality, which was entrusted to Jean-Gerard Roussel, engineer from Ecole Superieure d'Electricite, who at the age of 47 has spent all his career in the space sector.

Quality is not just a recent interest at CNES. Fifteen years ago, it was one of the first agencies to organize project reviews at all production levels, and each technology center has quality control teams on whose support Mr Roussel will be relying. "But today, quality assurance is no longer limited to strict specification control. It has become a management method and a public relations technique. It is answerable to the highest echelons," indicates Mr Roussel, who is attached to the CNES general directorate.

Mr Rousssel has already lived through a period in which quality was particularly topical. That was in 1972, when after having been in charge of the first European rocket probe projects, and then having participated in the national program Diamant-B, he had just been made responsible for Diamant-B.P4. The management had asked him to make it zero-defect. With the European Space Agency (ESA) having turned over Ariane's prime contract to CNES, it became necessary to show Europe that France had moved beyond the stage of industrial crafstmanship. A goal he accomplished, because in 1975, three successful launches made it possible to place into orbit four French satellites. It was not a difficult problem, since in Mr Roussel's opinion, French technicians are "almost too good." Perfectionists at times, they contribute innovations which often are not part of the manufacturing drawings. "They will have to use their acquired skills on prototypes, for new, small batch production methods."

Today, Mr Roussel wants to turn quality assurance into an exportation support for manufacturers. This is not a new interest for him, having led the international and industrial Affairs Division. "While exportations had only reached 200 million francs until 1978, they exceeded 7 billion during the next five years."

For 1984, Mr Roussel has set as his priority the training of CNES personnel in quality assurance methods. "Halfway between the Japanese approach (mass training) and the American one (training of trainers), we will simultaneously train trainers, heighten to its maximum the awareness of CNES workers through one or two-day courses (to be created from scratch), and provide a basic training for specialists in software, components, fatigue, and so on." This will be the preparatory stage for an action directed toward manufacturers, contractors, and equipment suppliers, which have been making a great quality effort for the past two years. While improving his dialog with them, Mr Roussel wants to unify CNES' quality requirements and make them compatible with available installations and the capabilities of enterprises.

This action should be extended at the level of laboratories (for scientific satellites) and especially of French companies. Aerospatiale, for instance, must now use different quality assurance policies for Ariane (CNES), missiles (Ministerial Weapons Delegation), or telecommunication satellites (CNES or PTT). The requirements however, are practically the same. Mr Roussel would next like to have this standardization adopted by ESA, which does not have a unified documentation for quality control. "Convergent and unified methods are the only things that can engender lower costs for quality, and make French and European space equipment more competitive."

Highly influenced by the ideas of the two great American quality assurance specialists, Edward Deming and J. M. Juran, Mr Roussel would like to convey two key ideas to the industry: personnel mobility is not a good thing (attachment to a job and habit are determining factors for quality), and relations with sub-contractors must change from the stage of conflict and savage competition, to a climate of trust and cooperation. In personal terms, Mr Roussel goes even further: "Since the trend is toward a reduction in work hours, part of the time made available could be devoted to a sort of 'small quality-assurance clubs'." In his view, an informed worker is more responsible and more likely to do his work.

At first, Mr Roussel will have to convince the 11,000 people who work in the French space sector, that their future depends on a quality assurance policy adapted to the circumstances.

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BRIEFS

JULY LAUNCH FOR ARIANE III--Scheduled for next July, the first launch of the Ariane III rocket will mark an important stage in the Ariane line. This new version has benefited from a number of improvements at all levels: engine thrust for the first two stages will be increased by 9 percent, the combustion duration of the third stage will be lengthened by 140 seconds, its power will be increased, and so on. But in particular, the basic stage will carry, in addition to the customary four Viking engines, two solid fuel accelerators manufactured by BDP Difesa Spazio. Containing 7.35 tons of powder each, they will provide a unit thrust of 70 tons for 28 seconds, bringing the takeoff thrust from 240 tons (Ariane I) to 404 tons. The launcher payload will go from 1.8 tons to 2.58 tons in geostationary orbit, thus reducing by 20 percent the price per kilogram in orbit. After subjecting these Italian boosters to several bench tests, Aerospatiale has successfully tested at its Mureaux installation, the compatibility of the first Ariane III flight model with an added propellant mockup. [Text] [Paris L'USINE NOUVELLE in French 15 Mar 84 p 10] 11,023

SPOT TESTS SUCCEED--The French remote sensing satellite identification model "Spot" passed the radiated electromagnetic compatibility tests in the new electromagnetic environment test chamber "INTESPACE" in Toulouse, the Matra company announced. These tests confirmed that there were wide gaps between specifications and results. During this time, assembly of the flight model continues with integration of on-board and supply management equipment. [Text] [Paris AFP SCIENCES in French 23 Feb 84 pp 19] 12434

CSO: 3698/308

AUTOMOBILE INDUSTRY

PEUGEOT TALBOT OF FRANCE TO INVEST IN UK PLANT

Paris AFP AUTO in French No 3435, Mar 84 AFP 061742

[Text] London, 6 March (AFP)--The Peugeot-Talbot group confirmed on Tuesday that it had invested 20 million pounds (240 million French francs) in its Ryton plant, near Coventry, where it will build its new family of intermediate size cars for the British market.

Still being completed at Poissy, this new model which is known only by the code number C.28, will be offered with a choice of diesel or gasoline engines.

Launching is planned simultaneously in France and England for the end of 1985.

The British version will be built mostly with parts imported from France. Gearboxes will be imported complete from France, as well as body and engine parts which will be assembled at the neighboring plant in Stoke.

Nevertheless, the car rolling out of the plant will be about 60 percent British, because in addition to manpower, wheels, tires, fittings, and various accessories will be of local fabrication.

A production of 750 to 1000 cars per week is forecast in England.

This project, officially disclosed on Tuesday by George Turnbull, chief executive of British Talbot, during the presentation of the new Peugeot 205 GTI to dealers, formally refuted the rumor that the group had totally abandoned the idea of manufacturing cars in England.

In an announcement, Talbot UK states that the investment was made possible by its great financial recovery last year. According to a spokesman, the 1983 results which should soon be published, will show a "very healthy" financial situation after the heavy losses of the four preceding years. This recovery will enable the subsidiary to self-finance the new cost, except for about a 10 percent share (2 million pounds) which will be covered by the British government under the title of investment aid.

11,023
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AUTOMOBILE INDUSTRY

GDR TO BUILD VW ENGINES IN PLANT SUPPLIED BY VW

General Terms of Contract

Duesseldorf HANDELSBLATT in German 10/11 Feb 84 p 15

/Text/ The VW plant wants to enter into a production cooperation and delivery contract with the GDR. In this connection, VW **Vanegans** and other vehicles are to be delivered to the GDR; the VW engines, which are made in East Berlin on a license basis with the help of supplier shipments, are to be produced on an assembly line likewise supplied by VW. If the contract does materialize, this would be the second biggest deal between VW and the GDR after the delivery of 10,000 VW Golf vehicles in 1977.

The delivery and service volume to be achieved as part of this deal between VW and the GDR is around DM600 million. If the contract, as planned, is signed by the middle of this year, then 2,000 VW **Vanegans** could still be delivered to the GDR this year as a onetime operation; after that, 2,300 **Vanegans** would follow each year in 1988 until, initially, 1993, in other words, once again almost 14,000 **Vanegans.** By comparison: VW was able to increase its **Vanegan** sales in the FR last year from 55,700 to 69,200, in other words, 24 percent; the year 1982 however did produce a low point. The GDR deal undoubtedly resulted in a somewhat better utilization of the Hanover-Stoecken **Vanegan** plant; at that plant, it had been necessary for a number of years to reduce jobs and to some extent workers were put on short hours.

By way of reciprocity, the GDR wants to supply VW annually with 100,000 body engines (without auxiliary subassemblies such as radiator, starter, light unit, etc.). These engines are to be produced on an assembly line which VW will dismantle in Hanover and which will be set up again at a location in the GDR. Because the capacity of this plant is considerably larger than 100,000, the GDR will have VW engines available with 1.05 liter (basic engine: Polo) and 1.3 liter and 55 horsepower (Polo and Golf) for its own use. Auto experts believe that these engines could also be installed in the Wartburg model but not in the Trabant which as of now has a 26-horsepower two-cylinder two-stroke engine and which would certainly be by far overpowered with the soon to be produced VW engines. If the GDR should have the intention of shipping engines or GDR cars equipped with VW engines abroad, then an additional license agreement would be necessary. Within CEMA there is also an agreement as to division of labor in the auto industry by countries whose details are not precisely known in the West. But it is to be assumed that the GDR would not be able readily to produce new passenger car model series without coordinating with its CEMA partners.

VW was assured of federal backing for the delivery of the engine plant. Corresponding export financing is being prepared. A VW spokesman, in response to an inquiry, did not see any negative employment effect on VW as a result of the desire to contract with the GDR--if anything, he saw a somewhat better utilization of the Salzgitter plant; whether the supplier shipments from West German suppliers would be touched is something that one could not tell until after all contract details have become known. But some suppliers are afraid that their delivery volume to VW would be reduced as a result of the contract. This fear was expressed for example in foundry industry circles.

As for the rest, the VW deal with the GDR in recent years was "not world-shaking"; considering East Berlin's foreign exchange shortage, this does not come as a surprise. The last major deal was transacted by VW in 1977 when 10,000 Golf vehicles were shipped to the GDR where they were completely sold out within a few days at a price tag of 10,000 DM-East. At that time--probably for optical-ideological reasons--the GDR assumed a currency ratio of 1:1 although, according to the purchasing power, 1 DM-West would have had to be figured at least at 3 DM-East. According to statements by users of the Golf vehicle sold at that time, the model proved to be very good and this probably also contributed to the fact that the GDR this time once again picked VW as contract partner although there were offers from foreign firms, for example, from Renault and Toyo Kogyo-Mazda.

Speculations according to which the compensation and production cooperation deal between VW and the GDR could also signify an opportunity for the people at Wolfsburg to get into a broader Eastern European deal, as of now cannot be supported. This by the way in the light of past experience depends essentially on the development of the political climate between East and West.

Chance to Obtain Technology

Hamburg DER SPIEGEL in German 13 Feb 84 pp 24-25

/Text/ Volkswagen is helping to provide modern engines for GDR cars and is hoping for further cooperation possibilities.

When VW boss Toni Schmuecker in 1977 sold 10,000 Golf cars to the GDR, he was hoping to get followup contracts soon. To no avail--his successor Carl Hahn was able to pull off the bigger deal.

By 1988--it was announced on Thursday of last week--Volkswagen is to build a complete assembly plant for the GDR, to turn out almost 290,000 engines annually. In addition, Wolfsburg, according to the current status of negotiations, is to deliver a total of more than 15,000 VW Vanegans by 1993.

All in all, this involves 600 million Marks. "This is not small potatoes, like the Golf deal," commented Hahn. "This is a really big operation."

The VW boss might just turn out to be right. If the contract with East Berlin--which has been negotiated with the exception of a few details--actually does

come about as planned, then the Volkswagen concern will become the most important helper in the planned modernization of the East German auto industry.

Neither the citizens nor the government economists could really have been satisfied with past state-owned passenger car production in the GDR. While other East Bloc states, such as Poland, Romania, or the USSR, again and again tried to catch up with western auto engineering through license contracts with Fiat and Renault, very little was happening in this field in the GDR.

The two East German models--the Wartburg which was produced in the former BMW /Bavarian Motor Works/ plant in Eisenach, as well as the Trabant from the former **Auto Union** plant in Zwickau--are completely outdated. These cars are still driven by two-stroke engines which not only have little power but which also consume much fuel and moreover pollute the air.

The Trabant--which GDR citizens rather lovingly call Trabi--is probably the world's most tired car. The car takes an entire minute to reach its top speed of 100 kilometers per hour. Its chugging little 26-horsepower engine burns up to 10 liters of gasoline and oil mixture for every 100 kilometers and expels foul-smelling clouds through the exhaust pipe.

Now Trabi is to become a real car with the help of the VW concern. On the assembly line from the FRG, the auto makers of the GDR starting in 1988 want to install only modern water-cooled, four-cylinder, four-stroke engines in their passenger cars instead of the air-cooled two-cylinder and three-cylinder two-stroke engines.

And three types of the 801 VW engine series are to be built in a new plant which is probably to be erected in Karl-Marx-Stadt (Chemnitz): a gasoline engine with 1 liter of stroke volume and 40 horsepower, as well as a 1,300-cubic centimeter engine with 55 horsepower which so far have already been used in the Polo and Golf models. A diesel version is also to be built for the larger engine.

The GDR annually wants to produce about 190,000 units of these three engine types for its own use; another 100,000 units are to be delivered to VW as body engines. In this way the GDR will pay for the production facilities and the **Vanegans** supplied by VW.

The return business, which will not cost the GDR any foreign exchange, was set up by CDU /Christian Democratic Union/ politician and VW board of directors member Walther Leisler Kiep. The details of the plan--as to how VW can help the GDR in modernizing its auto industry--were figured out by a friend of Kiep's, that is, VW boss Hahn.

In the Hanover and Salzgitter VW plants, Hahn has two assembly lines for small engines, both of which are far from fully utilized because more powerful engines are once again in demand. "We have one plant too many," said the VW boss, "and the GDR needs one. Why should we not get together?"

Hahn and Kiep had gone to East Berlin during the first week of June in 1982 in order to present their plan to GDR State Secretary Gerhard Beil in the

Foreign Trade Ministry; that plan from the very beginning provided for a return business deal. The GDR policymaker found the offer enticing and offered to enter into negotiations.

Top-level SED officials were invited to attend a dinner given by Hans-Otto **Braeutigam**, the FRG representative in the GDR, for the West German visitors. On that occasion, the dinner partners agreed that a deal, such as the one offered by the Volkswagen concern, was entirely in the political interest of both German states.

After that, negotiations progressed briskly. When experiments finally showed that the VW engines could be installed in the Wartburg and Trabant models without any trouble, the breakthrough had been achieved. The rather difficult international political situation, the dispute over the West's effort to install new missiles, likewise no longer endangered the agreement between the German negotiators.

The people at Wolfsburg turned to Bonn to get financial backing for the production cooperation contract with the GDR and the Federal Ministry of Economy promised to help. The federal government wants to give a guarantee amounting to DM280 million for this deal. The people in Bonn also hope that the VW example might lead to further agreements on closer economic cooperation between both German states.

VW boss Hahn feels particularly encouraged by the fact that his enterprise was able to prevail over several foreign competitors in this production cooperation deal. Both the Japanese firm of Toyo Kogyo (Mazda), which, like VW, once before had sold 10,000 cars to the GDR, and the French government enterprise of Renault offered license-based engine production to the GDR. But neither Mazda, nor Renault could or wanted to get into a return business deal.

For the first time in VW history, Hahn commented, the location disadvantage had turned into a location advantage: "Nobody is as close in terms of language and geography as we are."

But nobody submitted a better offer to the GDR. With the help of the VW engines, the GDR government can extensively accomodate the consumption desires of their citizens for whom a car is a high priority. Besides, it will be able to save foreign exchange when it comes to importing petroleum because the VW engines consume 40 percent less fuel.

Last but not least, the GDR can--through the introduction of the four-stroke engine--achieve an effect in the fight against the killing of the forests in its area that is similar to the effect achieved in the FRG with the installation of catalytic converters. And all of this can be done without any hard currency.

On the other hand, the deal also seems to present some disadvantages for Volkswagen. At least the approximately 500 VW workers--who until now produced the series 801 engines in Hanover--will hardly be happy over the move of their machines and tools to the GDR.

Production in Hanover, the concern boss assured us, was to be discontinued anyway and was to be concentrated at the central VW engine plant in Salzgitter. But Hahn cannot promise more jobs, perhaps as a result of the sale of Vanegans to the GDR. The Vanegan plant has been on short hours for many years.

In the opinion of the VW boss, the meaning behind this desired deal with the GDR is to be found not so much in short-term advantages but rather in long-term possibilities. The engine, says Hahn, is the "heart of the auto and you can achieve much through the heart."

Political, Economic Comments

Hamburg **DIE ZEIT** in German 17 Feb 84 p 19

/Article by Rainer Frenkel: "New Horizons"/

/Text/ VW Benefits from Production Cooperation with GDR

Theodor Heuss was thinking of his able Swabians when he praised the "model of German possibilities." At that time it certainly would have taken too much imagination to think that this concept would some day be applied also to the relationship between Saxony and Lower Saxony.

But this description is entirely deserved by what the VW plant and the GDR auto industry are now planning together--provided it works.

By 1988, VW wants to and is to dismantle a 10-year-old assembly line for engines in Hanover and to install it in the GDR. The annual output capacity is to be 290,000 units.

By 1993, the GDR will buy about 15,000 Vanegans from the VW plant; the figure will be 2,000 by the time the contract is concluded and the rest, starting in 1988, will come at equal annual installments.

These facts look a little bit dry at first sight although they do add up to a business volume of 600 million Marks. Only the description of the circumstances involved in the deal, its terms and outlook, can add up to something really exemplary. This is not simply a case in which a deal is being worked out; this is the beginning of a long-term production cooperation effort which ties both partners together--the VW plant and the GDR auto industry.

Unless, of course, this rather sensible relationship is again upset. VW boss Carl Hahn at any rate is unhappy with the leak that revealed the entire undertaking. It might irritate the partner. Said Hahn: "This thing opened a crack which I am really worried about." And CDU /Christian Democratic Union/ politician Walther Leisler Kiep, member of the VW board of directors and the man who got the talks started, recalled the case of the "advance publication" of the famous billion /Mark/ loan. (Of course there are no further connections between both projects. Said Kiep: "I do not want to assume that Mr Strauss did not know anything about VW. I at any rate did not know anything the billion /Mark/ loan.")

Both of these worries are only too understandable. Once before, VW and the GDR had established initial contacts. That was in 1977 when 10,000 Golf vehicles were shipped to the neighboring country. The hoped-for followup deal however did not materialize because the GDR leadership did not like the comments on the performance capacity of GDR industry.

It was not possible to resolve this tension until June 1982. High-ranking SED officials--including State Secretary Gerhard Beil--met in East Berlin with Hahn and Kiep and listened to their proposals obviously with interest and scheduled negotiations which later on were conducted mostly by board of directors member Horst Muenzner who is responsible for purchasing and material management. Everything is to be clear by the middle of this year. It is said that not much remains to be done.

Kiep commented: "As part of my work as member of the board of directors for VW I also tried to get my many years of political contacts with the GDR involved in this effort." Moreover, "the conversations took place under favorable political conditions." In this way he outlined one of the model's strongest points: the cooperation between industry and politics, for mutual benefit, which in this case certainly is not shady and which even opens up prospects for other branches. Once again, we hear from Kiep: "This benefits both the enterprise and politics." Here is why: "The economic aspect is so decisive because there are initial incentives here for doing something." Applause also came from Bonn. Philipp Jenninger, minister of state in the Office of the Chancellor, had this to say: "This project is advantageous for both sides and it is a gain for both sides."

And Carl Hahn replied to the now obvious question, as to whether he allowed himself to be misused here for political purposes, as follows: "We basically do not allow ourselves to be misused. This thing is attractive for both of us."

Something special must have been achieved successfully or must yet be achieved successfully where compliments go back and forth and where there is so much satisfaction. Although there are as yet no comments from the GDR, the interest of the German neighbor is easy to describe.

Here is the benefit for East Berlin: The GDR auto industry is to be decisively modernized, "the engine after all is the car's heart" (Hahn). The new engines (40 and 55 horsepower, as well as a yet to be developed diesel variant of the more powerful engine) according to Hahn are "the best we make." They moreover fit into the Trabant and Wartburg; they pollute the environment less intensively and they also consume 40 percent less fuel and that makes the oil bill cheaper. Besides, they help improve the auto supply--in the GDR only four out of every ten households have a car whereas in the FRG nine out of ten families have a car. Finally: because the whole thing is set up as a return business deal, the GDR can purchase these advantages without any foreign exchange.

Here is the benefit for Bonn: This kind of long-term economic production cooperation supports political relations. Although a guarantee is given for half of the total amount, this nice deal does not burden the budget.

The benefit for Wolfsburg: The engine assembly line in Hanover was to be closed down anyway because larger engines are now in demand. Sales negotiations with other interested parties had failed. The production of small engines is to be concentrated in Salzgitter. This is happening as planned; to be sure, jobs are now also lost due to the fact that later on--as a part of the return business deal--100,000 body engines are to be procured from the GDR. Looking at the balance sheet as a whole, however, VW, according to Hahn, is losing less jobs than had been feared--and this is made possible by the shipment of Vanegans. A new market has opened up here for VW although it is still "rather modest." Last but not least however: "Through this step," in Kiep's conviction, "the GDR has picked VW for the further development of its auto industry"--and Renault and Toyo Kogyo (Mazda) are out of the running.

And all of this came about not by chance and in spite of German-German sensitivities and in spite of the fact that VW is a western myth for the people of the GDR and therefore was occasionally a subject of suspicion for the powers that be.

Of course, hopes had been dashed at the end of the 1970's but business deals certainly did materialize. When Kiep says that the Golf deal at that time "was compensated to the extent of 170-180 percent," this means: VW always purchased more from the GDR than the return business deal demanded. Accordingly, Wolfsburg was highly satisfied with the offer.

Carl Hahn confirms this decisively: "We are constantly purchasing in the GDR." For example, "entire press lines in Wolfsburg and Mexico are equipped with large presses from the GDR." "Internationally absolutely competitive" in terms of price and performance. The same applies approximately to the Golf headlights.

As far as Hahn is concerned, there are "quite natural relations" anyway with the Saxonian auto industry, not just of a geographic nature--the border location suddenly became an advantage for VW--but also in terms of historical significance: after all, the front-wheel drive idea of the Saxonian DKW /German Motor Vehicle Plants/ after the war was picked up by Auto Union, Inc., the subsequent VW affiliate Audi, in Ingolstadt--and in the end it wound up at VW via Polo and Golf.

Now VW must prove that "the economic expectations will also materialize in fact." "New horizons" could indeed open up. And, looking far ahead, Carl Hahn can feel stirring "a vision which I would rather not yet express in words."

5058
CSO: 3698/329

BRIEFS

VW RESEARCH CENTER--In the presence of the FRG minister of research Riesenhuber on 3 February there was transferred to his direction in Wolfsburg the VW concern's research center erected at a cost of 73 million DM. In this complex directed by Dr Eng Ulrich Seifert there are 650 persons employed at the present time, of which over 200 are engineers and diplom-engineers. For research alone VW has expended about 140 million DM in the past year; for research and development 1.4 billion DM has been expended throughout the entire company. That is 3.5 percent of the company's turnover. The federal minister of research hailed the efforts of the VW concern to strengthen its competitive position by expanding the research domain, especially as such competitive strength is to the advantage of the entire German economy. He also welcomed these activities because the state is in a position only to provide an intact environment for the automobile through roadbuilding and through its efforts to maintain prudent regulations governing the movement of traffic. [Excerpt] [Duesseldorf VDI NACHRICHTEN in German 17 Feb 84 p 2] 8008

CSO: 3698/313

BRITISH CONSIDER BIOTECH DATA BANK

Solothurn CHEMISCHE RUNDSCHAU in German 12 Oct 83 p 15

/Text/ As part of long-term biotechnological research, the British Ministry for Trade and Industry has ordered a feasibility study for setting up an on-line data bank in which the records and information of the nine national culture collections and some private cultures would be combined. According to the ministry, the government chemical laboratory (Laboratory of the Government Chemist) has been put in charge of the study. The type of data bank will be adapted to the requirements of industry. Should industry need such a data bank, the costs for its establishment would be borne by the ministry, while operating costs would be applied through user fees.

Plans have been made for data-bank services to be based on the already computerized system of the National Collection of Yeast Cultures (NCYC), which is located at the Food Research Institute (FRI) of the Agricultural Research Council (ARC). In addition to almost 2,000 authenticated yeast cultures, data on about 100 characteristics is electronically stored at the NCYC. The search fee, with corresponding specific yeast application combinations, is 20 pounds sterling for industry and 10 pounds for nonprofit organizations. Plans have also been made to incorporate the collected data into the ministry's data system.

The nine government culture collections store cultures for microbiological and biotechnological research and also have information available in this connection. They offer identification and advisory services. In addition, possibilities are available for storing microorganisms which form the basis for patents. Five of the collections, the Culture Center for Algae and Protozoa (CCAP), the National Collection of fungus Cultures (NCFC), the National Collection of Industrial and Marine Bacteria (NCIMB Ltd.), the National Collection of Cultures for Bacteria in the interest of Human and Veterinary Medicine (NCTC) and the NCYC, are covered by the 1977 Budapest agreement on international recognition of storage of microorganisms for patent purposes.

The other culture collections include the National Collection of Dairy Organisms (NCDO), the National Collection of Pathogenic Fungi (NCPF), the National Collection of Pathogenic Plant Bacteria (NCPPB) and the National Collection of Wood-Rotting Fungi (NCWRF). There are a total of nearly 30,000 cultures in the nine collections.

12580
CSO: 3698/184

BIOTECHNOLOGY

BAYER CHAIRMAN PRAISES GOVERNMENT SUPPORT

Solothurn CHEMISCHE RUNDSCHAU in German 26 Oct 83 p 16

/Text/ Besides traditional chemical-processing techniques, biotechnology in particular will become more important in the future. The president of the association of the Chemical Industry and chairman of the board of Bayer AG (Leverkusen), Dr Herbert Gruenewald, stated during a general meeting in Baden-Baden that progress in biotechnological research has made it possible to expect new production methods for natural compounds and basic chemicals. According to the association president, the interdisciplinary nature of biotechnology makes it necessary to develop new forms of cooperation between university research institutions and industrial research.

In this connection, Gruenewald recalled the "Fund for Biological Chemistry" established by the chemical industry in 1982, a fund which has provided assistance to university professors of biochemistry, toxicology, physiological chemistry, microbiology and related fields. Gruenewald welcomed the recent announcement by the minister for research and technology, Dr Heinz Riesenhuber, that his ministry would contribute DM 4 million to the cooperation project, which has a total of DM 10 million. The association president considers this a "good example of meaningful cooperation between industry and government in a field of research with a promising future."

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CSO: 3698/184

BRIEFS

STRETCHED ATR PLANNED--Toulouse--Whilst it has always been stated by GIE Avion de Transport Regional (Aerospatiale and Aeritalia) that it was planned, at a later date, to offer a stretched version of the ATR42 currently under development, it now appears that this may come about sooner than expected, following a recent meeting of a working group comprising representatives of the manufacturers and Finnair. Finnair has already placed an order for five ATR 42s. The new version is provisionally designated ATR ST (Stretched). The ATR ST will have 60-66 seats depending upon the configuration. It will be powered by two 2,400 shp Pratt & Whitney of Canada PW 124-2 engines which offer particularly economical performance. Direct operation costs per seat will be around 15% lower than the present ATR (with a seat pitch of 30 in.) and the DOC for a standard stage length of 200 nm will be about 15% higher than the ATR 42. The manufacturers claim that these performances will give the ATR ST an advantage over the Fokker 50 of about 20% on DOC/seat and 10% on DCO over a stage length of 200 nm. Meanwhile, final assembly of the first ATR 42 is underway at Toulouse. The wing section, built by Aerospatiale at its St. Nazaire and Nantes factories, arrived on January 28. The fuselage, constructed at Aeritalia's Naples plant, followed on February 8. The first flight remains scheduled for the beginning of September 1984. [Text] [Geneva INTERAVIA AIR LETTER in English 16 Feb 84 p 1]

CSO: 3698/325

NEW FRENCH INJECTION MOLD SOFTWARE COMPETES WITH U.S. PRODUCT

Paris L'USINE NOUVELLE in French 23 Feb 83 p 93

/Text/ Moldflow has some competitors. The undeniable success of this American system for the calculation of molds for plastics injection, marketed by General Electric Information Service could only generate competition.

At the last SICOB /Computers and Office Products International Show/ the Gould Information SA company had presented the Graphtek Simuflow program, software which is already installed in about 20 locations in the US. Now it is the turn of Microplast, developed by CISI /Compagnie Internationale de Services en Informatique/ which will allow mold-makers to compute in French! Like its predecessors, Microplast is only one link in the CAD/CAM chain which starts with the design of the plastic part to end with the numerically controlled machining of the mold cavity. The program is the simplified theology module from the PROCOOP system, still being developed, and that, because of competition, CISI decided to start marketing.

The people marketing this new software do not conceal their determination to get away from their main competitor, through their commercial policy, as well as through the design of their new product. While Moldflow is only accessible through a teleprocessing network, Microplast may be used in several ways: Also network-based (on the CISI network) for the moderate price of FF 150 to 200 for a simulation, without having to pay for a subscription as in Moldflow's case or, at a purchase price of FF 40,000, microcomputer-based on SYMAG, Logabax NX 528, and soon IBM PC, or minicomputer-based on IBM series 43, VAX, and CII-HB Mini-6. Finally, companies without any data processing system will be able to purchase the complete system (software and microcomputer) at a price of FF 80,000. Marketing is handled by CISI and by PMP Company (Lyons), which also handles technical assistance personnel training.

As with its competitors, Microplast is primarily a program simulating the flow of molten polymers in a mold. It does not claim to provide ready-made solutions, but reaches the result through successive iterations, letting the designer modify his mold and/or the injection conditions at each step. The designer must first model the material path within the cavity, and does this by "unfolding" and "flattening"

the cavity (the system operates in 1½ dimension rather than 3D). The flow is then represented using three elementary models: cylindrical, plane, and radial. At this stage, Microplast differs from Moldflow by the fact that it allows a flow with an output surface larger than the intake surface. By assembling several flows (or sections), the mold designer describes the various paths (flows) followed by the material as the cavity is being filled. He may also introduce load losses at some points (elbows, etc.). At this stage, his experience as a plastics expert obviously plays a large role. He then enters the data necessary for the computation: those concerning the material (thermal conductivity, specific heat, density, and viscosity, shear, and temperature factors), and those concerning the injection conditions: temperatures of the material and of the mold and the filling method described according to three selectable variations (mass flow or volume flow law, fill time or pressure). This is another difference with Moldflow which assumes a constant injection pressure.

The Operator Can Simulate Partial Injection at Any Time

From all this data, Microplast computes the mold fill using a thermohydraulic model. The thermal computation takes into account the self heating of the polymer as well as heat exchanges with the cavity walls whose temperature is assumed to be constant. The designer may choose the form in which the simulation results are presented. At every time-step, and for each section of every flow path, the system computes the values of a number of parameters (shear stress, pressure, temperature, pressure gradient), and the operator may, at any time, "freeze" the flow in order to "visualize" the progression of the melt front in each of the paths; in other words, simulate a partial injection (the system gives a graphic representation in the form of a tree). In another mode of operation, he may also format the results concerning each flow path in their filling order. As opposed to its predecessor, Microplast does not assume that all flow paths are filled at the same time.

From the simulation results (in data and graph form), the designer may then modify the initial parameters (geometry of the cavity and filling method) in order to reach the best molding conditions. Among other things, he will attempt to obtain a constant pressure gradient through all sections in order to minimize internal stresses, avoid shears, place weld lines in the most favorable locations, etc.

Naturally, the use of a system such as Microplast assumes the availability of a materials data base which is now being developed by CISI, in collaboration with the Center for the Study of Plastic Materials which provides a link with materials suppliers.

6445
CSO: 3698/307

NORSK DATA OF NORWAY, MATRA OF FRANCE RUMORED NEAR ACCORD

Paris ELECTRONIQUE ACTUALITES in French 24 Feb 84 p 8

/Text/ According to some rumors, Matra and Norsk Data are about to sign an agreement according to which the French manufacturer would absorb the French affiliate of the Norwegian company and would market its 32-bit computers. This accord is to take place within the general framework of a Matra direction toward technical workstations, a direction which, as Mr Lagardere, president of the company, did not conceal during a press conference held last week, fell within the thematic thinking of the group.

However, when asked about the possibility of on-going negotiations and even about the signing of a preliminary cooperation agreement, both companies refused to comment.

These rumors call for several observations.

First, their confirmation would assume an evolution at the DGT (General Direction of Telecommunications), which would allow the creation of a second French scientific data processing concern alongside Bull.

Incidentally, it should be mentioned that Bull is currently probably negotiating with three companies: Gould, Harris, and especially Ridge Computers, to add to its catalogue a 32-bit mini from one of these manufacturers, within the framework of the establishment, at Bull-Sems, of a branch specialized in technical workstations and whose objective would be to connect SM 90's to these systems. Moreover, a start-up of this cooperation is not probable this year since the DGT, which acts as sponsor, has already established its budget for the year.

Whether or not these rumors are verified, the problem of Matra's future in data processing continues to be somewhat acute.

The group continues to lose money in this area (20 million FF in 1983) and its options do not seem clear. The creation of MMS (Matra

Micro Systems) followed the failure of Matra-Datapoint. Furthermore, Matra's data processing activities include the manufacture of Tandy micro-processors, PMU terminals, adding up to a one-shot-at-a-time policy, which is disappointing from a group with a certain reputation of dynamism. It is all the more disappointing since it does not always appear to be crowned with success, as MMS' start-up problems seem to show.

6445
CSO: 3698/307

BRIEFS

CANADA-FRG COMPUTER AGREEMENTS--The Canadian Company Quantum Software Systems has signed an agreement with the Berlin (FRG) Telematic Services Company for the attachment of its WNX systems, the two companies announced in a communique. According to this agreement, Quantum Software Systems will market the German company's sytems and software in North America, and both companies will thus be able to extend their markets considerably. /Text/ /Paris AFP SCIENCES in French 23 Feb 84 p 25/ 6445

NETHERLANDS-JAPAN RESEARCH AGREEMENT--Philips Science and Industry and Akashi Seisakusho Ltd have reached an agreement for collaboration in research in the area of electronic microscopy, announced Philips in a communique published on 23 Feb in Paris. The same source adds that "in the coming months, the two companies will study the possibility of cooperation in research, development, manufacturing, and sale" in this area. /Text/ /Paris AFP SCIENCES in French 23 Feb 84 p 28/ 6445

CSO: 3698/307

INTERVIEW WITH DIRECTOR OF FRENCH ASEA ROBOTICS BRANCH

Paris MICRO ET ROBOTS in French Mar 84 pp 26-29

[Interview with E. Vassiliu, head of Asea France robotics division: "Asea: Europe's Hope"; date and place not specified]

> [Excerpts] It is said that the Swedish Asea company can, on its own, deliver a turnkey nuclear power plant... In a strong position because of its intrinsic power, it looks as if it could win the worldwide battle of industrial robots and, therefore, it represents... Europe's hope!

[Question] Asea is the European leader in this field; what trump cards does it have?

[Answer] I can even tell you that, this year, Asea has become the world leader; we are one of the three leading companies in the world, and in 1983 we sold more robots than any other company worldwide. In France, we are undeniably the leaders in robotics. The French Asea plant in Persan is the largest in the country. In 1983, we experienced a growth of over 100 percent, i.e. we sold 90 robots and we are now controlling over 50 percent of the French open market, considering that Renault sells its robots to Renault. Right here, we have a training and testing center as well as a substantial applications and service team, and we offer our clients complete technical solutions. Actually, the client comes and tells us what he wants to do, and we tell him how the robot will fit in. We can offer highly competitive prices because we have a very large production volume, and also because we have a decade of experience behind us. Asea has installed 3,000 robots throughout the world, and sold 1,200 in 1983!

[Question] Are the robots you sell in France just imported products?

[Answer] No, they are now fully assembled in France; and all electric motors used on all Asea robots are manufactured by a French company in Dijon: CEM [Electromechanical Equipment Company]. The same is true of the ball screws that equip our robots, throughout the world. We invest in France because we believe in this country; we are not just importers, we want to produce here.

[Question] Tell us about the models you are showing here.

[Answer] We have three basic models: the IRB-6 with a grabbing capacity of 6 kg, the IRB-60 and the IRB-90 (with a grabbing capacity of 60 kg along 6 axes). Our products are good, but Asea's major asset is its knowhow, its experience which we place at the disposal of French manufacturers. Therefore, Asea is an important partner for the industry, one which can provide profitable solutions to productivity problems.

[Question] Do you use these three models to do some research?

[Answer] We, in France, are not involved in product development; however, we have a data base on applications realized by Asea throughout the world, and each robot installed by Asea is the subject of an internal memo which is sent to us so that, when a manufacturer consults us, we can see whether a similar application has been realized before.

[Question] When you establish yourself in Japan, as you did last year, is it with a view to a technological association with the Japanese?

[Answer] No, we believe that our research and development must remain concentrated geographically, essentially for cost reasons, and we are very well organized so that, from the 100 countries in which we are established, we can feed back the necessary data to our research center which is in Sweden and employs 300 people.

All we want is to be in a position to adapt our products to the demand rapidly, and the Asea group is powerful enough to develop its own products; it does not need technological associations. The competitive nature of the robot market is merely a good stimulant for us. Those who do not have our means to face it may have to do so differently...

[Question] In France, what robots are in strongest demand?

[Answer] It is hard to say, for our robots meet very different types of applications: arc welding, spot welding, handling, parts finishing, etc. They are suitable for many applications and, therefore, our market is diffuse. We have large groups among our clients (Peugeot, Citroen, Talbot, Thomson, Philips, Pont-à-Mousson) but we also sell to many small firms (sometimes firms with only 20 people).

[Question] The French robotics market has been booming during the past year. What are your forecasts for next year?

[Answer] We hope to install about 150 robots in 1984 but, considering the trend that seemed to get stronger in January, we may quite well exceed this goal...

[Question] The next robot will have artificial vision; how will it fit in with Asea's product lines?

[Answer] Our robots are designed to be modular, so as to accept new sensors: one of those we have developed during the past year has vision and laser joint-detection; therefore, it is not a "new robot" but an extension of the standard robots we sell, and this will be the case for a long time, as we progressively implement new sensors.

[Question] What is your best seller?

[Answer] Last year, it was the IRB-6 that sold best, but the IRB-90, which was introduced more recently, is off to a good start and should certainly be a success in 1984.

[Question] Who are your competitors?

[Answer] I would not say that we have competitors in France. Actually, Renault is manufacturing two types of robots which are relatively specialized in spot welding and meet their internal needs quite well; but we can sense that they are eager to develop a greater variety of products. Our foreign competitors in France appear to be in a relatively difficult position compared to Asea. Apart from the quality of our products, our success is due to our excellent integration into the country. So that I believe that, in the long run, there will be only few companies on the French market: Acma (Renault) and Asea, at least.

[Question] Why is it that your robots cannot paint?

[Answer] We were the first to choose electric motors; since then, an increasing number of manufacturers appear to be doing the same, but the electric motors that equip our robots cannot operate in a deflagrating environment; however, they can do spraying jobs.

[Question] Are you planning to manufacture a teaching robot?

[Answer] We have chosen to serve the industry, but efforts must be made to prepare students and teach them robotics. I submitted the idea, but we are not certain of getting government contracts, as the slogan "Buy French" is quite the order of the day. We could manufacture teaching robots but, in that case too, the market would have to be better defined. Some schools have bought IRB-6 robots from us, on private initiatives. Yet, I do believe that this is something essential; maybe we shall get into it... But I would advise teachers to show students not only the problems involved in manufacturing and piloting a robot, but also the role and essential position that robots have and will have in manufacturing!

[Question] I noticed one thing: your assembly workshop is not robotized...

[Answer] There is no market for assembly robots yet; it is emerging in Japan, and a demand appears to be materializing in France; Asea is well aware of it. I believe that, very soon, we shall have here robots to manufacture our robots!

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CSO: 3698/321

FRENCH ROBOTICS RESEARCH AT GRENOBLE LABS

Paris MICRO ET ROBOTS in French Mar 84 pp 8-12

[Article by Jean-Claude Hanus: "Grenoble: Tomorrow Is Today"]

[Excerpts] To see what is going on in the future, all you have to do is to go to Grenoble...

On 26 January, the AFRI [French Industrial Robotics Association], headed by Mr Maes, organized a discovery tour in the Grenoble area; it was not a tour for tourists--although robots are a sight worth making a detour for--but for people interested in research and industry, and we shall try to report on this tour in two installments and a few supplements: indeed, the subject matter was very rich and exciting in many respect at a time when a certain industry is in the state of upheaval we are reading about, and when new concepts are emerging and looking for favorable ground on which they could materialize.

In this respect, the Grenoble urban area appears to be one of the leading poles, not only from the point of view of high-technology research and industry, but also from the point of view of the close and original relations that exist there between these two sectors of human activities, which traditionally do not interact very much. This situation is peculiar to Grenoble and is probably due to the exemplary "adaptability" of its industrial past and to the impetus provided by its very dynamic Chamber of Commerce and Industry which, by the way, has just created a Higher School of Commerce--it will open next fall--designed to train the men and women who will join, in particular, companies oriented toward the manufacturing and sale of advanced high-technology products.

About 30,000 students are therefore studying over there, and every year some of them join the many public or private research centers that are such exciting generators of "grey" products--grey like the grey matter--which we are now going to review, in particular through the activities of the INPG (Grenoble National Polytechnic Institute). We shall of course mention only current research in the fields of automation, robotics and artificial intelligence, which are at the heart of our present concerns.

The Teams

Robotics research began at the INPG in 1976 and since then--how could it be otherwise--it has developed to such an extent that a Robotics Center was to be created in the context of a Robotics Plan: the center was to coordinate the work of 5 or 6 different laboratories employing some 50 researchers. Considering the material and intellectual means involved, the center would be one of the very first worldwide: the balance of the past eight years of research and the many successes it has to show would be evidence of this.

Four teams are now working on robotics problems:

- The Artificial Intelligence and Robotics Team of the LIFIA (Basic Data-Processing and Artificial Intelligence Laboratory of the ENSIMAG [Grenoble National Advanced School for Data Processing and Applied Mathematics]) headed by Prof Jean-Claude Latombe. Themes: robot programming, geometric modeling, reasoning modeling, image anaylsis and interpretation, tactile perception.

- The LTIRF (Image Processing and Form-Recognition Laboratory) headed by Prof Alain Chehikian. Themes: rapid-processor algorithms and technology for image processing, optical reading, neuron simulation (simulation of neuron networks).

- The robotics team of the LAG (Grenoble Automation Laboratory) headed by Prof Marcel Nougaret. Themes: qualitative inspection (sorting), quantitative inspection (metrology), vision-control association, acquisition and restoration of color images, control and optimization of electromechanical devices.

- The Adaptive and Multivariable team of the LAG, working under the direction of Ioan Dore Landau. Themes: adaptive control of flexible manipulators, study of multivariable linear systems.

Current and Future Research

Of the many research orientations, some deal with fields that are not yet well known, for instance flexible robots, the relation between vision and touch, etc. But can we say for all that that what we know best has been solved best? Certainly not, and the field of vision for instance, with the variety of solutions it uses and enhances, appears to be assuming many shapes and to be looking for modeling rather than for an ideal sensor.

Incidentally, this reminds us that the basic project of the Robotics Plan is to develop, by 1987, "an all-purpose robotic machine which, conceptually, would be to robotics what a computer with a programming language is to data processing." This is an ambitious and systematic project in that all disciplines are involved in it, willy nilly. However, as we shall now see, such a project rests on four bases which are already strong and tested.

Control and Programming

The object of control and programming studies is to improve the performance and flexibility of the robots used not only in the industry, but also in

space or for "services" (especially maintenance). In certain cases where it is necessary to use lighter structures, original controlling modes are being developed, taking into account the compliance of lighter structures and the resulting couplings between degrees of freedom. Far from being detrimental, this "flexibility" can be used to make assembly easier, provided however that traditional controls (which would prove far too "heavy" as far as computing is concerned) are redesigned to provide controls that are adaptive with respect to position and to strength. To solve the problem of position determination (a problem which also exists in mobile robots) a spatial correlation process involving the use of a TV camera has been developed; it makes it possible to spot very quickly any configuration moving across the camera field.

As for programming studies, they led to the creation and adoption of a language specific to robotics, the LM language (Manipulation Language) which is becoming very popular with robot manufacturers (in particular, this language is marketed by ITMI--Intelligent Machine Industry and Technology--which we will discuss in greater detail later). This LM language makes it possible "to model the robot universe using a Cartesian coordinate system, to describe several types of paths directly expressed in relation to the coordinate systems attached to the objects that are being moved, to monitor asynchronically conditions depending on sensor data... and to coordinate the operation of several robots." Only three years elapsed between the initial specifications of the language and its operational stage (1982)... In addition, an environment was created for the LM language; it includes: a graphic simulator of robotized stations and an interface with a geometric model base (LM-GEO). In the near future, the LM language should be expanded, among other things for the programming of manipulators mounted on mobile supports.

Visual Perception

The intelligence of a robot could, in a way, be assessed qualitatively through its potential for interacting with its environment, or even modifying it. The same as for man, actually. Among possible mediators, vision (and vision processing) is no doubt at the top of the hierarchy. It is therefore not surprising that present research in this field is especially motivating. Until now, the INPG research has been done on three acquisition systems determined as a function of the problem to be solved (object identification and localization, determination of the spatial relations between objects, automatic control of welding or assembly operations, exploration of an environment and, in some cases, of an unknown environment, etc.):

- Real-time processor to compute a gradient image: what is involved here is the extraction of the contrast lines of an image. A GRT (Real-Time Gradient) processor using cabled logic was developed and industrialized; it makes it possible to digitize an image at the acquisition rate of a video camera (1/50th of a second per frame).

- Color image acquisition: three cards process the composite signal provided by a color video camera (in some cases, color may be one of the only criteria used to qualify objects).

- Acquisition of three-dimensional images: this uses a laser provided with a cylindrical lens. The light plane projected cuts across the objects of the scene to be analyzed along a light line that is "skeletized" in real time using a variant of the GTR system (GTR-3D). The camera is provided with a narrow-band filter focussed on the wavelength of the laser light, so that the analytical process is not affected by ambient light.

Control of the Sense of Touch

The natural complement of a vision system, a touch system is a precious help in manipulating tasks (to control the force applied, make sure that an object is grasped properly). Several types of sensors have been tested:

- Stress-gage sensors at wrist level (relation of the grip to its environment).

- Piezoelectric sensors located at the points of fixation of the jaws (to measure the effort applied by each jaw).

- "Sensitive skin" sensors to control the distribution of the gripping force (and therefore to make it possible to trigger reflexes if the object grabbed is slipping).

The ideal, of course, would be to design systems that would closely integrate the functions of an actuator and those of a detector, which would imply that a magnetic sustentation principle would have to be used to achieve finely tuned motions. A prototype of a two-dimensional actuator with effort feedback was realized and should be used as a research basis before going on to actuators with several degrees of freedom. But the future will also see the development of piezomatric sensors with integrated processing logic. In addition to this material aspect, the INPG is also working on specific software that should contribute to solving assembly problems involving strong geometric uncertainties and problems involving the handling of fragile or deformable objects.

Reasoning Modeling

As robots are becoming increasingly complex, they will also become easier to use, and their decision capabilities, on the one hand, and, on the other hand, their autonomy will increase (service robots, robots working in hostile environments). These are covered by two major current research orientations:

- The synthesis of control programs, in the context of the development of the LM language seen from the "artificial intelligence" angle (in particular, use of computer-aided design data). For instance, we can mention the problem of grabbing an object while taking its shape into account (testing for convexity, parallelism, etc.) as well as accessibility constraints.

- The generation of operating plans in a multi-agent environment, in other words man/machine or machine/machine communication, bearing in mind that each agent (man or machine) has only limited knowledge of what the other

agent knows. Let us quote the goal, as it was defined: "To a large extent, this software rests on a new formalism that makes it possible to model the knowledge which agent A has of agent B's knowledge (AB knowledge). This formalism is general enough to enable agent A to use its A knowledge to generate its own operating plans; its AB knowledge to consider agent B's plans; its ABC knowledge to consider what B is contemplating for C; its ABA knowledge to consider what B is planning for A itself, etc." We need not point out that this software is of such general strategic nature that it goes considerably beyond the context of robotics...

These artificial intelligence studies will of course lead to the design of assembly operating sequences, the automatic synthesis of assembly programs, automatic maintenance diagnostics, robot-operator decision sharing, etc.

These projects should now become the province of a Robotics Center that would privilege three orientations:

- Integration: what is at stake is the integration of the various research results obtained independently from one another.

- Computer integrated manufacturing: automation, especially automation of data-processing and electronic equipment manufacturing processes (insertion of non-standard components, handling of deformable components such as wires, tapes; realization of hybrid circuits, etc.).

- Service: in any case, research will be made to investigate the feasibility of a robot that could diagnose (and repair) a failure in a piece of equipment. This is a vast project that will have to combine manipulation capacities, reasoning, perception and locomotion.

All these INPG programs are supported by very close relations with other laboratories, in particular the LETI [Electronics and Data-Processing Technology Laboratory]), and the industry. Between research and industry, we find a pivot company, the ITMI, which we shall discuss in our next issue, as a close look at it reveals that its creation as well as its operation constitute an example at the very time when our industry is looking for new knowhow.

And if we provide adequate means for the type of research of which the INPG is giving us a glimpse--and if manufacturers seize this opportunity--we shall have a chance not to miss the robotics revolution.

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FRENCH CGE TO SELL FLEXIBLE WORKSHOPS, COMPUTERIZED FACTORIES

Paris L'USINE NOUVELLE in French 15 Mar 84 pp 40-41

[Article by Michel Defaux and Philippe Douroux]

[Text] To stay in the race, CGE (General Electricity Company) will have to act fast, which means that it must have a clear and operational structure this year. The latter is already defined. But will financing follow?

Thrill seekers will be disappointed. The CIM (computer-integrated manufacturing) plan developed by CGE and currently being discussed with the government, is inspired by pragmatism and prudence in every respect.

In conception for one year, the plan took shape with the arrival of Georges Mercadale at CGE. Leader of the CIM engineering group formed at CGE, his role will be to design and sell tomorrow's computerized plant.

It was high time. For the past three years, General Electric, Asea, or Hitachi have perfected their strategy. To design a flexible workshop, the only concept which will achieve substantial productivity gains, and to put together the pieces of the puzzle (industrial computers, robotics, automation), each one has made his choice. CGE will have to move fast to stay in the race.

"We are holding 1.3 percent of the world CIM market. To survive, we will have to hold 4-5 percent in 1990. At that time, failure to be among the first ten will be synonymous with extinction," declares Paul de Buyer, deputy director general of CGE, who since the beginning of 1983 has been directing a think tank on CIM.

One year later, these conclusions are unequivocal. Robotics and information processing are more like a photomontage than a graceful mosaic. CGE's strategy is simple: the teeming activity of the 1970's must be followed by a CIM plan for the group as a whole.

Its first link, the CIM engineering team, which consists of 140 engineers with different specialties (automation, mechanical engineering, computers), will have to assure the indispensible synergy among four industrial areas:

A robotics area, developed at Alsthom-Atlantique; a control-command area for continuous processes--with CGEE-Alsthom (General Company for Electrical Enterprises); an automation components area, around Cilas (Industrial Company for Lasers) and GSI (General Company for Computer Services); and an industrial computer area, whose leader will be CGA (General Company for Automation), subsidiary of CIT-Alcatel; all four of which will be created.

Robotics and flexible workshops will thus be handled by an eigth division created within Alsthom, the "robotics and equipment division," directed by Jean-Francois Dacier. This division, which is being organized, will have 1350 employees and will rely on existing activities: for robotics, it will be CGMS (General Company for Maintenance and Storage), specialized in automatic storage and flexible workshops. This is the company which has signed a sales agreement with the Japanese robot manufacturer Sankyo Sieki and Tosman. The second element is SCEMI (Company for the Construction and Maintenance of Industrial Equipment), which is developing a line of fitting and assembly robots, and is working with the Japanese company Yaskawa. The Brittany Shops and Heavy Assembly Yards (ACB) will remain in the mechanical division. This robotics combination was worth 250 million francs in 1983. Its five-year objective is 2 billion francs, equivalent to the sale of 1000 robots per year.

The many collaboration and marketing agreements will not be reopened; on the contrary, in the words of Mr de Buyer, "we know that we have fallen behind. The only way to catch up, is to buy second generation robots and develop at home those of the next generation."

Double R & D Effort to Be On Hand in 1988

The command control for continuous processes will be developed by CGEE-Alsthom. No internal reorganization is expected there, and that is the strong point of Comsip Enterprise and Controle Bailey. "The development of CGEE-Alsthom involves the acquisition of a North American company." The objective is to achieve 50 percent of its revenue abroad, compared to 26.8 percent in 1982.

Automation components, whether intelligent sensors/detectors or industrial lasers, will be developed by Cilas, a subsidiary of CIT-Alcatel. The leading European laser manufacturer, Cilas, just like robotics, will have to buy present generation sensors in order to develop the intelligent sensors of the future. As a sign of the times, Cilas, which covers 70 percent of the world market of laser granulometers, is finding that civilian orders are exceeding military ones. In parallel, GSI (industrial computers) will work on the development of a learning system and of expert systems.

Lastly, CGA will undertake the development of the industrial computer area of the group. For this, TITN (New Information-Processing Technology), an information processing service and engineering company which was part of the CGE-Thomson agreement, will join CGA. Moreover, an agreement has been negotiated with one of the first French SSII, which has extensive computer facilities and a good range of software for computer assisted design and computer assisted production management.

The stumbling block for such a project is its financing. "The CIM research and development budget is currently 250 million francs per year. At this rate, we will need eight years to achieve our objective. By then it will be too late. We must double our efforts to be on hand in 1988." The appeal is clear: self-financing is insufficient, and the discussions with the government are dragging on."

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FRENCH FIRM DEVELOPS NEW KIND OF CTD CAMERA FOR ROBOTS

Paris AFP SCIENCES in French 23 Feb 84 p 73

[Text] Bordeaux--A small Bordelese data-processing firm, Image Industry System (I2S), is manufacturing an "intelligent" camera--for which it has a world patent--that makes possible the analysis of images at their true speed.

Industrial robotics is currently the most widespread application for this camera invented by Mr Jean-Louis Blouin, technical director of the I2S firm which he founded in 1979 with Alain Ricros (CEO) another former SINAS engineer.

One of their clients, a German brewer, uses it on a robot-manned bottle-verification assembly line, where the Bordelese firm's camera tests 60,000 bottles an hour. It is also employed by a pharmaceutical firm in southwestern France to detect 50 micron particles in vials, and the army is also interested in the process, which makes it possible to obtain very sharp images in total darkness. The I2S firm has sold 200 cameras in 6 months, at prices ranging from 15,000 to 100,000 francs depending on the options. Its French clients include CNEXO (National Center for the Exploitation of Oceans), the DEC (Atomic Energy Commission), the SNIAS (National Industrial Aerospace Company), the CNES (National Center for Space Studies), the CNRS (National Scientific Research Center) and Matra-Optical.

In the I2S camera, the cathode tube of traditional cameras has been replaced by a CTD collector (charge transfer device) manufactured by the French firm Thomson-CSF. The CTD collector, together with an integrated calculator extracts from the image only what the user needs, allows the synchronization of the picture with the object observed. It also makes it possible to obtain a picture under uncertain lighting conditions and assembly line speeds.

This process has been made possible by the existing decoupling in the interline or network transfer collectors between the photon integration commands in the image section and read commands in the memory section. This allows a simplification of the image-processing logarithms and a corresponding improvement in system speed and performance at time constant.

I2S management assert that they are "the only CTD camera manufacturer to offer, as a standard product feature, a digital image (based on 6 bits or 64 gray levels per PEL [Expansion unknown]), not from a reconstructed video image,

but directly from the analog image supplied by the collector." A special feature which, in their estimation, brings about a "considerable gain" in precision, speed, cost and performance.

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FACTORY AUTOMATION

FRENCH CAPABILITIES IN CAD, FLEXIBLE WORKSHOPS, ROBOTS

Artificial Intelligence Laboratories

Paris LES ECHOS in French, weekly supplement to 15 Feb 84 p 10

[Article: "Fifteen Artificial Intelligence Labs"]

[Excerpts] In the next few years, computer-aided design (CAD) will be marked by the emergence of expert systems and artificial intelligence. The high-performance software required is very difficult to develop and, paradoxically, very simple to use. With it, applications specialists without any special knowledge of data processing will be able to solve exceptionally difficult design problems.

In France, some 15 laboratories are bent on developing the tools of the future, and they work on programs as well as on machines: CERT-DERI [Toulouse Study and Research Center/Data Processing Studies and Research Department], ENSEEIHT [Toulouse National Advanced School for Electrotechnology, Electronics, Data Processing and Hydraulics], Paul-Sabatier University, ENSTA [National Advanced School for Advanced Technologies], IMAG [Grenoble Data-Processing and Applied Mathematics], Claude-Bernard University, ENSET [National Advanced School for Technical Education], INSA [National Institute for Applied Sciences], Montpellier National Advanced School, etc. We should also mention the important part played by CETIM [Mechanical Industries Technical Center], MICADO [French Association for Computer-Aided Design and Computer Drawing] and ADEPA [Agency for the Development of Automated Production].

The CERT, for instance, is working on artificial intelligence and computer-aided design, data bases and specifications of technical objects. ENSTA is studying graphics, CAD work stations and the man-machine dialogue. The Paul-Sabatier University is considering graphic elements, image processing and basic tools for expert systems.

French CAD Software

Paris LES ECHOS in French, weekly supplement to 15 Feb 84 p 11

[Article by Catherine Levi: "The United States Lead by 90 to 10"]

[Text] Computer-aided design [CAD] is in the hands of U.S. companies. They own 90 percent of the French market, and of the 239 turnkey systems installed in France by the end of 1981, 165 were supplied by Computervision (United States), 40 by Applicon (United States) and 19 by Calma (United States).

Only seven systems were installed by French companies. Yet, a few companies are beginning to make a name for themselves, and are even establishing their reputation abroad: MATRA [Mechanics, Aviation and Traction Company], Dassault, CISI [International Data-Processing Consulting Company], Assigraph, SECAPA [expansion unknown], etc.

Thus, MATRA Datavision has been quite successful. It has already sold 130 Euclid software packages and its sales (37.4 million francs in 1982) are booming: + 120 percent in 1980, + 268 percent in 1981, + 362 percent in 1982.

The company has gained a foothold on many foreign markets, especially in the United States where it has already some 20 clients--companies as prestigious as Westinghouse, ITT, Gould or even the U.S. Air Force... Eighty percent of its total sales are made on export markets, especially through its British, German, U.S., Italian and Japan subsidiaries.

Euclid is a tridimensional system which works quite as well on wire structures as on complex surfaces or volumes. It can be used throughout the designing process thanks to a wide range of high-performance functions and algorithms. It can easily be enriched with additional specific functions, and it includes specialized applications software (for instance, numerical control).

Another company is experiencing strong growth: SECAPA, which specializes in graphic and alphanumeric terminals for CAD and other graphic applications (cartography, business graphics, process control, etc.). Until now, its growth has ranged from 20 to 40 percent per year. And 1983 results should be 50 percent higher than those of the previous year (29 million francs).

Exports, which already account for 15 percent of all sales, should double in 1984. To retain its technological lead, the company plans to develop so-called "intelligent" very-high-definition terminals that could fully relieve the "host" computer of graphics manipulations.

As for CISI (a subsidiary of the French Atomic Energy Commission), its strategy relies on portable software available for a very wide range of machines, and it has very ambitious projects. Its 1983 CAD sales amounted to 57 million francs, but its 1988 objective is 650 million francs! Its battle horse is the "Strim 100" system, a tridimensional system for the mechanical industry, which can design, draw and machine any industrial object, from the simplest to the most complex.

The company, which has already 50 clients in France and abroad, intends to intensify its international prospection. Finally, its software strategy is complemented by equipment sales. The first item is a graphic terminal manufactured by its engineering subsidiary (GIXI [expansion unknown]).

FMS At Renault Vehicles

Paris LES ECHOS in French, weekly supplement to 15 Feb 84 p 14

[Article: "France Is Controlling Its Domestic Market"]

[Text] We must rely on foreign suppliers to meet most of our needs for standard automation equipment. But when it comes to producing something as special and as complex as a flexible workshop, when the grey matter is coming into its own at the expense of industrial production, then our tricolor manufacturers proudly hold their heads up high.

Renault Machine Tools was chosen as prime contractor for Caterpillar's plant; Ford entrusted the realization of its workshop to Ernault-Somua; Aerospatiale worked together with SAGEM [Company for General Applications of Electricity and Mechanics] and a public laboratory, CERT-ONERA [Toulouse Studies and Research Center/National Office for Aerospace Studies and Research].

With nothing more than the help of its subsidiaires, Renault Industrial Vehicles built its own machining system for transmission gear housings in Boutheon: SMC [Corbeil Mechanical Engineering Company] was in charge of engineering and supplied 25 programmable controllers, SEIV Automation [expansion unknown] supplied 8 self-propelled carts.

All in all, the workshop includes seven numerically controlled machine-tools with automatic tool changers: four machining centers, two convertible modular machines with multiple-head changers, and one boring-facing machine. This being said, considering our natural propensities, we should face one question: when the flexible workshop is past the artisanal stage and becomes an expendable product, will French manufacturers know how to retain their positions?

Flexible Workshop Locations

Paris LES ECHOS in French, weekly supplement to 15 Feb 84 p 14

[Article: "Minimum Stakes: 10 Million Francs"]

[Text] A 40 percent reduction of production times, a 30 percent increase in machine operation times, a reduction of at least 10 percent in product costs, such are the dream performances that we can hope to obtain with flexible workshops. They are ideal to manufacture small and medium-size series of different parts belonging to families of similar shapes and dimensions. Yet, flexible workshops will remain the privilege of a happy few for a few more years.

There are now about 10 of them in France, all belonging to "big" companies: Renault (machining of transmission gear housings), Citroen (machining of

prototype parts), Caterpillar (machining of mechanically welded superstructures), ACEO UNELEC [expansion unknown] (machining of AC generator frames and bearings), Jaeger (automatic assembly of control panels), PPM [Potain Poclain Equipment] (mechanical welding of crane bodies), Aerospatiale (mechanical machining of propulsion unit bodies and equipment), Peugeot Cycles (machining of geared-motor housings), Ford (machining of transmission input shafts), Thomson-CSF (insertion of electronic components), Telemecanique (testing, distribution and shipping of programmable controllers).

We are appreciably behind our competitors: in 1981, Japan already had 50 flexible workshops and the United States 33.

Robotics Research Institutes

Paris LES ECHOS in French, weekly supplement to 15 Feb 84 p 12

[Article: "A Proliferation"]

[Text] France has many research laboratories that specialize in robotics. Their work is of recognized international level. The LAAS [Automation and Systems Analysis Laboratory], CERT [Toulouse Studies and Research Center], IMAG [Grenoble Data Processing and Applied Mathematics], the National Polytechnic Institute [INP], the Besancon automation laboratory, INRIA [National Institute of Data-Processing and Automation Research]... there are so many teams which are now developing tomorrow's robots, the so-called intelligent robots. They are also working on sensors, programming languages, expert systems, as well as mechanical structures and the part to be played by robotics in the workshops of the future.

Robot programming through CAD work stations and their integration into flexible cells, in particular, are topics of current interest. All this research will soon yield more flexible manipulators capable of handling parts with variable dimensions or presented in random positions. The machines will also become more accessible to computer illiterates, and more autonomous.

We should also expect to see a broadening of the application range of robotics. The LAAS, for instance, is developing a multi-robot flexible workshop for automatic assembly. The INRIA is working on a tridimensional perception system using both a camera and a laser.

The CERT is studying robot controls. The Toulouse INP is studying the part played by expert systems in advanced robotics. Several manufacturers are working in close cooperation with research centers, especially under the Advanced Automation and Robotics program: Renault, Peugeot, SCEMI [expansion unknown], SOLAS [Lorraine Alloy-Steel Company], MATRA [Mechanics, Aviation and Traction Company], Telemecanique, AKR [expansion unknown].

Domestic Robotics Market

Paris LES ECHOS in French, weekly supplement to 15 Feb 84 p 12

[Article: "Still Only For the Elite"]

[Text] The domestic market is opening itself very slowly. In 1982, there were less than 950 programmable robots in operation in France. We are far behind Japan (13,000), the United States (6,250), Germany (3,500) and even Sweden (1,300) or Great-Britain (1,150). While robotics is gaining ground in large groups, small and medium-size enterprises are not yet interested.

Lack of information, reluctance to call on consulting companies (when such companies exist), inadequate data-processing knowledge, limited financing capacity, these are as many handicaps to which we should also add psychological reluctance toward a mythical technology which is often equated with workers' layoffs. Certainly, the use of this technology is not indifferent and relieves man of many tasks, most of which are dangerous and repetitive. In addition, it is an indispensable tool for the automation of small or medium-size series production which now represents 70 percent of all industrial production.

In many cases, when enterprises have added a robot to their workshops, their productivity has improved enough to enable them to create new jobs. But these are not necessarily given to the personnel already hired, which is usually not qualified enough. For all these reasons, small and medium-size enterprises find it difficult to go ahead.

Besides, robotics is of a markedly elitist nature. In many cases, the price of equipment is such that only large companies can take the risk to buy it. Not to mention the fact that the technology involved is not yet flexible enough to take into account all the constraints existing in small enterprises. However, trends in equipment go toward greater flexibility. That is fortunate for small and medium-size enterprises, as long as they have adequate means.

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MATRA, RENAULT-FRANCE COLLABORATE ON CAD-CAM MARKETING

R&D Plan Being Developed

Paris ELECTRONIQUE ACTUALITES in French 9 Mar 84 pp 1, 3

[Article by H. Pradenc: "Prelude to a Broader Agreement on Computer-Integrated Manufacturing? MATRA and Renault Are Joining Forces in CAD-CAM"]

[Text] To announce officially two agreements involving his company, Mr Alain Nicolaidis, chief executive officer of MATRA-Datavision [Mechanics, Aviation and Traction Company], chose the time during which the MICAD 84 [expansion unknown] Show, where his company is not represented, was being held. The first agreement is of the VAR [expansion unknown] type and was signed with IBM; the other will soon be signed with Renault and covers the joint development and marketing of CAD-CAM [computer-aided design and manufacturing] systems. Whereas, according to the chief executive officer, the first agreement involved securing IBM's "benevolent neutrality," will the scope of the second agreement go beyond CAD-CAM and is it heralding a closer Renault-MATRA cooperation in computer-integrated manufacturing?

Roughly, the agreement with Renault-Automation will enable MATRA-Datavision to introduce its Euclid tridimensional mechanical design system into the Renault group as a whole, as well as into certain companies that maintain privileged relations with that group. This represents a market of 600 work stations to be equipped over 5 years. Fot its part, MATRA-Datavision will market and provide technical support for Renault-Automation's Unisurf and Surfapt on the French, West German, British, Italian, Japanese and U.S. markets.

After pooling their respective capabilities, the partners will develop a research and development plan to coordinate the work of the two teams. Renault will supply its experience of complex surfaces and its machining capacities. MATRA, its experience of systems algorithms. In a first stage, Unisurf will be integrated into the Euclid environment. Different trade modules will enrich the tridimensional mechanical system of MATRA-Datavision. In the more distant future, a successor to Euclid should be created. One illustration of the Renault-MATRA illustration will be the fact that the automobile manufacturer will market the future MATRA car, whose body was designed by the so-called "Bezier" surface representation mode which is also found in Euclid, Unisurf and Surfapt.

To stress the strategic character of the MATRA-Renault agreement, Renault-Automation will acquire a significant interest in MATRA-Datavision, through a holding company called MATRA Renault-Automation Financial Company. The latter will have a 51 percent interest in MATRA-Datavision; MATRA will contribute 65 percent of its capital, and Renault-Automation 35 percent.

Does this association mark a first step toward a closer cooperation of the two partners in computer-integrated manufacturing? MATRA appears to be open to any participation, including from foreign companies. Besides, Mr Nicolaidis indicated that investors are interested in his company's U.S. subsidiary. As for a MATRA-Renault association to manufacture flexible workshops, it may still be too soon to think of it, considering that MATRA-Automation inherited the MATRA-Manurhin division which is still suffering from Manhurin's downfall and whose calling would be precisely to manufacture flexible workshops.

Restricted to the U.S. Market

The VAR agreement signed by the U.S. subsidiary of MATRA-Datavision and IBM United States is restricted to the U.S. market. "We have secured IBM's benevolent neutrality, and thanks to this agreement we shall receive technical cooperation from this company," Mr Nicolaidis told us, adding that the agreement would enable his company to optimize Euclid on 43XX central processing units and 5080 graphic terminals. As far as marketing is concerned, Euclid will be available on IBM products, but with IBM instead of against it as was the case until now. The MATRA-Datavision chief executive officer insisted that his company does not intend to inflate its sales artificially by reselling computers, but through the sale of software and work stations for which the company has an added value that is technologically its own. Therefore, Mr Nicolaidis is willing to pay the $ 8,000 penalty should his U.S. subsidiary fail to sell within 18 months the 15 IBM machines covered by the agreement.

Although it is a member of MICADO [French Association for Computer-Aided Design and Computer Drawing] and the leading French CAD-CAM company, MATRA-Datavision was conspicuous by its absence at the MICAD 84 Show. According to Mr Nicolaidis, the MICAD Show has nothing to offer to a French company, 70 percent of whose customers are foreign companies.

We should recall that MATRA-Datavision achieved sales of 80 million francs in 1984 and registered a loss of 6.3 million at the end of the year. According to the chief executive officer, the company will break even in 1984 and make a profit in 1985. Considering the number of mechanical design systems it has installed, MATRA-Datavision claims to rank sixth worldwide, and second in France, behind Computervision.

Background on MATRA-Datavision

Paris AFP SCIENCES in French 8 Mar 84 p 38

[Article: "Renault-MATRA CAD Association"]

[Excerpts] MATRA-Datavision, which was created in 1978, continued in 1983 its strong growth of previous years; its sales doubled to reach 80 million francs, including 70 percent on export markets. The company, the sixth in the world in its specialty--mechanics--has already equipped 150 enterprises worldwide, including 61 in France and 30 in the United States.

The company, which employs 120 people and spent 9.5 million francs on research in 1983, registered a net loss of 6.3 million francs and hopes to show a profit in 1985. The French CAD [computer-aided design] market can be estimated at 400-600 million francs, depending on whether or not the equipment associated to the software is included. MATRA ranks second in this field, behind the world leader, the U.S. Computervision.

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BRIEFS

ALSTHOM-ATLANTIQUE ROBOT DIVISION--With the recovery of the CEM (Electro-Mechanic Company), Alsthom-Atlantique is going to create an eighth division to "gain a significant foothold in the robotic and composite materials sectors", Mr Jean-Pierre Desgeorges, Alsthom chairman, writes in a letter to stockholders. This document lists the consolidated results of the group for 1983, which "were on the same order of magnitude as 1982's", despite CEM's recovery. Revenues came to 21.6 billion francs. In 1982, without CEM and Dubigeon, revenues came to 16.6 billion and the net profit was 250 MF. After an exceptionally good year for orders in 1982, volume was down in 1983. Mr Desgeorges assured stockholders, however, that Alsthom still has a hefty orderbook, worth three times the revenue projected for 1984. [Text] [Paris ELECTRONIQUE ACTUALITES in French 24 Feb 84 p 4] 9825

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SMALLER FRENCH HIGH-TECH FIRMS IMPORT MOST COMPONENTS

Domestic Suppliers 'Uninterested'

Paris LES ECHOS in French, weekly supplement to 8 Feb 84 p 9

[Article by Jean Deflaceliere and Catherine Levi: "To Remain Competitive in High Technologies, Small and Medium-Size Enterprises Are Almost Forced To Import Components"]

[Excerpt] Thus, in spite of all the administrative and financial obstacles placed on their way, a few dozens of French small and medium-size enterprises have engaged into high technologies. They designed a robot, or a microcomputer, or an industrial vision device. Very well. Now, to make a name for themselves against foreign competition, to establish themselves in foreign countries, to continue innovating, they must sell a quality product at the lowest possible price. To do so, they need quality components--motors, jacks, microprocessors, electronic boards--purchased at the lowest possible price. And this is something they cannot find in France.

The enterprises we surveyed all made the same charges: French component manufacturers do not take them seriously, are not interested in small orders or in special parts. They will not negotiate favorable conditions, these are reserved to large customers.

Worse still: our small and medium-size enterprises charge domestic suppliers with a total lack of professionalism: they do not meet specifications and do not deliver in time, their technological expertise is outdated, and the quality of their products is more than questionable. Under these conditions, it does not come as a surprise that, in spite of practical difficulties and although they are undeniably nationally minded, the best among our small enterprises are turning to Japanese and U.S. manufacturers.

The "defendants" put forward the sacrosanct economic laws. Their reasoning is as follows: if small and medium-size enterprises would export more, they would buy more components from us and we could give them lower prices. Of course, this is quite logical, but this logic consecrates the selfishness of larger companies at the expense of the general interest of our industry. The result is well known: we import half of our robots and our robot manufacturers import half the components required for their products.

Are there solutions? Certain experiments--users' clubs, purchasing groups--are now in progress and many proposals are being considered. The "components" working group at the Ministry of Industry issued a series of recommendations which have been shelved for lack of means. In this respect, everybody--including high ministry officials--appears to agree: public funds are not used well.

Until remedies are found and applied, most small and medium-size enterprises have adopted the most reasonable approach. They are buying their components abroad, with much regret.

Opinion of Nationalized Firm

Paris LES ECHOS in French, weekly supplement to 8 Feb 84 p 11

[Article: "Mr X, a Nationalized Group: 'The State Is Not Aware of Facts'"]

[Text] The point of view of a very large nationalized group, which prefers not to be identified: "Small and medium-size enterprises are blaming us for not being competitive enough, but this is characteristic of French industry as a whole. When you are competitive, you already sell more. But French companies are fighting a trench war instead of attacking foreign markets. If we, the manufacturers, want to export, we must slash prices, and to do that we must be carried by domestic sales. But we are not."

"Indeed, small enterprises, our major customers, also find that the market is too narrow. We lack financial means, and this places us at a disadvantage in developing high-performance products. As far as computer-integrated manufacturing is concerned, the State is too readily satisfied with large programs and does not take the daily facts of life sufficiently into account."

"The money earmarked for industry is never available quickly. The authorities should also focus on well-defined objectives instead of sprinkling their resources."

"Also, it is not always easy to work with small and medium-size enterprises, because they often require special parts within a very short time. Under these conditions, how could we give them lower prices? Take the case of the company that wanted 16 special motors, all different, to equip a manipulator, when a single model would have done the job. We must improve standardization; Japanese small and medium-size enterprises, for their part, have understood that."

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BRIEFS

BULL, MATRA IC AGREEMENT--Paris--Bull has selected Matra Harris Semiconducteurs as its supplier of VLSI (very large-scale integration) integrated circuits (IC), the two computer companies indicated in a joint announcement on 6 March in Paris. The agreement, which is part of a long-term cooperation, will provide the leading French computer manufacturer with a production source in France for the C-MOS VLSI circuits which it is developing for some of its future computers. In turn, Matra Harris Semiconducteurs, which has a plant in Nantes, will have access to design tools made by Bull. [Text] [Paris AFP SCIENCES in French 8 March 84 p 41] 11,023

AUSTRIAN MICROELECTRONICS PROGRAM FUNDING--In January the APA reported that in a joint press conference addressed to representatives of science, education and transport Dr Heinz Fischer, the minister of science, announced a concentrated microelectronics program. Under this program significant funds are being made available for research studies and their subsequent application in 10 areas: semiconductor technology, sensors, microprocessor technology, communications technology, data processing, digital picture processing, artificial intelligence, advanced robot technology, flexible automation and evaluation of the effects of new technologies. Responsibility for each of these areas is being assigned in each case to a particular research institute. For this, in the year 1985 the institutes are to receive an additional 30 million Austrian shillings to be followed in 1986 by 75 million Austrian shillings. Up to 250 million Austrian shillings are provided annually for conversion of the results obtained into practice. These funds are limited to 10 million Austrian shillings per contractor per year in order to make the subsidies also available to small-sized and middle-sized operations. [Text] [Vienna ELEKTRONIK REPORT in German Jan-Feb 84 p 16] 8008

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FRANCE ADOPTS MEASURES TO PROMOTE INDUSTRIAL RESEARCH

Paris AFP SCIENCES in French 23 Feb 84 pp 1-2

[Text] The Council of Ministers of the French Government on 22 February adopted 10 measures designed to relaunch industrial research "which is at the heart of the effort to renew our industry, and determines its capacity to adapt to technological changes," said Mr Laurent Fabius when presenting this program, essential to modernizing the industrial fabric of France.

The Minister of Industry and Research emphasized that, despite a sustained effort by industry and government, industrial research in France is still inadequate by comparison with major competitors such as the United States, Japan, and West Germany.

The proportion of companies in research and development in our country is about 43 percent, as compared to 48 percent in the United States, 55 percent in West Germany, and 59 percent in Japan. The proportion of research financing by companies referred to the gross domestic product shows France's inferiority in this area even more strikingly: 1.4 percent in Japan, 1.2 percent in the U.S.A., and 0.8 percent in France, according to 1981 statistics.

It is to remedy this situation that these 10 measures were taken, added the Minister.

To improve engineer and technician training, the government decided:

1) To double the number of scholarships (360) granted to researchers working on topics of interest to companies--in particular small and medium-sized businesses--and who could be hired by the latter.

2) and 3) To give better training in research and advanced techniques to engineers by giving a bigger place to industrial research in university programs, by increasing the number of engineers, by providing information and retraining in research organizations, by bringing the ANVAR (National Agency for the Implementation of Research) into innovation programs developed in engineering schools, and by encouraging their students to set up businesses immediately on graduation.

4) To encourage in the universities doctoral theses of a technological nature.

To facilitate a better link between research and industry, it was decided that:

5) Aid to industrial research by the Ministry will be doubled, amounting to 600 million francs, to assist: small and medium-sized businesses and industries, cooperation between large groups and small companies, cooperation between companies and between professional technical centers and research organizations.

6) Creation of four multi-year technical research programs to develop new materials (plastics, composites, ceramics, etc.), to study metal corrosion, to acquire new welding and adhesion techniques, and to master industrial laser techniques.

While maintaining the research tax credit and to make public industrial research incentives more effective, the government has decided to:

7) Increase support of research companies under contract (such as Bertin) and of professional technical centers. More money could, for example, be put into textile, mechanical, etc., research.

8) Seventy percent of AFME research credits (250 million francs) will be spent on developing, for example, vehicles with better gas mileage, alternative fuels, etc.

9) Researchers in public organizations will be encouraged to implement their research and to give scientific advice to companies. ANVAR will pay the costs linked to "technological vacations" benefitting small business.

10) Finally, expenses for R & D and software created by companies could be depreciated for tax purposes within 1 year, and national companies will be invited to reinforce the research they are self-financing.

Foreign companies or their French subsidiaries can benefit from the same advantages as French companies, concluded Mr Fabius.

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BRIEFS

FRG'S HUELS TRAINS SOVIET CHEMISTS--A group of nine staff members from the Soviet chemical combine Sima, which is located in the Irkutsk Region (Central Siberia), accompanied by a lady interpreter, is presently spending 6 weeks at the Marl Plant of the Huels Chemical Works, Incorporated, to go through a training program in the field of large-scale PVC reactors. The first out of a total of seven large reactors--, built according to Huels knowhow--was placed in operation at the PVC plant in Sima in June 1983. The job of building the PVC suspension plant in Sima, which works according to the Huels method, was awarded in 1974 to "KHD-Pritchard GmbH" [Incorporated], Cologne, together with "Kloeckner Industrieanlagen GmbH," Duisburg, by the Soviet Foreign Trade Company "Tekhmashimport." With a capacity of 250,000 tons per year of S-PVC, it was considered the biggest in the world at that time. In 1974 likewise, "Uhde GmbH," Dortmund, was given the job of building a vinylchloride monomer plant according to the Hoechst/Goodrich process which was likewise erected in Sima with a capacity of 270,000 tons per year of VCM. [Text] [Duesseldorf EUROPA CHEMIE in German 15 Feb 84 p 70] 5058

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