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SPACE FOR MICROGRAVITY TESTS TO BE SOLD ON FRG'S 'TEXUS' ROCKET

36980599 Frankfurt/Main FRANKFURTER ZEITUNG/BLICK DURCH DIE WIRTSCHAFT in German 20 July 87 p 8

[Excerpts] Texus stands for Technological Experiments Under Conditions of Weightlessness and means that a scientific payload is lifted to an altitude of 250 km with a small rocket, where it is exposed to almost absolute weightlessness for between 5 and 6 minutes in a free fall. The experiments return to earth and are prepared for new tests.

Participating experts see the great advantage of the Texus program in the relatively low costs of DM 6 million for a "shot" of this kind, of which the estimate for the rocket itself is only about DM 1 million. The remaining DM 5 million are consumed in the costly development of the experiments, which then require only minor changes for the following Spacelab mission. So far a total of about DM 100 million has been spent on the Texus program. Additional benefits of these rocket tests are the relatively short preparation time for a launch and the immediate availability of the results. Scientists from the United States and Japan are now participating in the Texus program along with the Germans and, of course, numerous experts from other European nations.

The nucleus of a Texus payload comprises the experimental modules, developed by MBB/Erno. Their circular shape, 40 cm in diameter, is determined by the dimensions of the rocket's nosecone. The length of the module for an experiment varies between 25 and 100 cm, the weight from 40 to 80 kg. On one flight, between four and six experiments, with all the necessary service equipment, can be accommodated in the payload section, which can weigh up to a total of 270 kg, with a length of 4.5 ms. Each experiment module has its own battery power supply, data transmission and electronic control system. Standard equipment on a module of this kind includes motion and still cameras as well as video cameras, with whose help scientists at the ground station are able to observe the experiments directly during flight and, if necessary, intervene in their progress. A typical string of orders consists of 48 different commands. So far 17 different modules have been developed and used in several launches.

The British Skylark rocket which was chosen for the Texus program has an overall length of 13 ms and weighs 2 tons. Solid fuel is burned in both stages, which simplifies handling. The Skylark is launched from a metal scaffold,

which is protected from the weather by a concrete dome. After 70 seconds the rocket has reached an altitude of 100 km. The payload is detached using explosive charges and brought into a position where there are only minimal residual accelerative forces of 0.0001g. Now comes the free fall phase, which can last for a maximum of 360 seconds, when the capsule climbs to an altitude of 250 km and then falls again rapidly. A parachute opens before it hits the ground, and the payload floats to earth.

In the next few years the Texus program will be industrialized. MBB/Erno is assuming the entire responsibility and expanding the circle of users. German experimenters from universities and institutes will continue to receive financing from the Ministry of Research so that they can participate in the rocket program. Industrial users can apply to the Introspace enterprise in Hannover, which can provide information about the scientific and financial conditions for participating in Texus missions and advise them on the technical implementation of the experiment.

On the Texus flights studies are conducted on how weightlessness affects certain materials and processes in order to develop methods using these findings which might one day result in better or new materials and methods. Although conditions of weightlessness have existed on all the Texus flights so far for only about 1 hour, a great deal of basic experience has been gained with respect to the planned Spacelab experiments in the many cleverly designed experiments. However, many premature expectations attached to materials research under conditions of microgravity have been stifled in the process. The objective of these experiments is not the large-scale production of new materials in space, but initially a better understanding of specific processes that take place on earth.

For example, the Texus program is investigating how metals can be processed in the absence of gravity without coming into contact with the smelter and becoming contaminated. In other Texus experiments, the investigation centers on whether it is possible to produce more homogenous mixtures of different substances which cannot otherwise be combined.

Biological experiments are relatively new in the Texus program, for example, the fusion of cells with different characteristics, which one day could open up new possibilities in plant propagation or in medical diagnostics and therapy.

Unfortunately the 15th Texus launch on 9 May 1987 was unsuccessful, the payload disintegrated and did not transmit any readings; it was the 3rd failure in a total of 17 launches to date. Nevertheless, the future of the Texus program looks good, because the number of launches each year is to be increased from two to four. Thought is also being given to switching to a larger rocket, which can reach an altitude of 1,000 km and expand the time for experiments to 20 minutes. Project director Burkhard Franke from MBB/Erno explained: "The Texus program is proving to be a highly desirable opportunity right now after the failure of the U.S. space shuttle and during the long waiting period until the next Spacelab flight. We are offering scientists the only chance to continue their research into conditions of weightlessness."

TESTS BEGIN AT FRG'S NEW CRYOGENIC WIND TUNNEL

36980604 Duesseldorf VDI-NACHRICHTEN in German 17 July 87 p 20

[Text] Cologne, 17 July--"Europe's most modern wind tunnel" started up on 9 July at the German Institute for Testing and Research at the Cologne-Porz research center. With the help of liquid nitrogen, the air, which flows in a closed circuit in the cryogenic tunnel, is cooled to a temperature of -173° C.

After taking 5 years to build and involving construction costs of DM 11.4 million, the German Institute for Testing and Research [DFVLR] began operation of the Cologne cryogenic tunnel on 9 July, which it describes as "the most modern wind tunnel in Europe." The cryogenic tunnel in Cologne differs from conventional wind tunnels in that it uses low-temperature technology. The circulating gas is cooled to a temperature of -173° C using liquid nitrogen.

The use of cryogenic technology offers the aircraft industry in particular the opportunity of obtaining Reynolds numbers during model testing that for the most part correspond to the matching readings from a later full-scale version of an aircraft. The Reynold number is one of the most important readings in wind tunnel tests. It is an analogy of the parameter between the inertial and frictional forces of the medium flowing over and past the aircraft.

A nitrogen injection system, adequate ventilation and exhaust equipment and measurement and control systems that are precisely coordinated are special features of this new wind tunnel technology. In addition, extensive structural steps--the Cologne cryogenic tunnel was built from a conventional low-speed tunnel--were required for the internal insulation of the concrete tunnel walls as part of the conversion work. The DFVLR developed its own insulation system for this purpose.

It is primarily in the measured section that the Cologne cryogenic tunnel demonstrates substantial differences from conventional wind tunnels. To change models or to carry out any alterations on the test layout, the model first has to be brought into an airlock, in which the necessary changes in gas and temperature that produce normal ambient conditions are performed.

The process takes from 3 to 4 hours. Smaller changes to the model can be carried out at a later phase of development, even at low temperatures, with the help of remote manipulating arms in a model climatic chamber.

Wind tunnel models for use in the cryogenic tunnel have to meet the strictest requirements. The makeup of the material and the finish of the model must not permit any surface or structural changes, even in the low temperature range.

At present, these special wind tunnel models are about twice as expensive as conventional models. In a few years the cost will be only about 3 percent higher than that for conventional models, in the opinion of German and U.S. wind tunnel experts.

Numerous calibration measurements to fine tune the flow mechanics preceded the start of operations. Initial operational runs are planned for 1988. For example, the Cologne cryogenic tunnel will be involved in comparative measurements of a cryogenic model of the Alpha jet. This project, which is being conducted jointly with American wind tunnel experts, is of great interest because the Alpha jet fighter has already been measured "aerodynamically" in a full-size version during test flights. Comparative measurements in the NASA cryogenic wind tunnel were almost identical to the figures obtained in flight.

Following these tests, studies will be conducted on a laminar wing section. For the more distant future DFVLR scientists are hoping that they can participate in the extensive wind tunnel testing for the new Airbus models A330 and A340.

The Cologne cryogenic tunnel is performing an important pilot function for the planned European Transsonic Wind Tunnel (ETW), which is to be built in the next few years on the DFVLR grounds in Cologne. Until this wind tunnel starts to operate in the 1990's, DFVLR scientists will be able to familiarize themselves with the operation of complicated low-temperature technology.

Technical Data of the New Cologne Cryogenic Tunnel

Cross section for measurement	m ²	2.4 x 2.4
Model wing span	m	1.5 maximum
Speed range	ms/sec	5 to 100
Temperature range	°C	+20 to -173
Generated power	kW	1,000

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FIAT'S FINANCIAL PERFORMANCE FOR 1986

Milan INDUSTRIA OGGI in Italian Mar 87 p 40

[TEXT] The year 1986 was particularly brilliant for the FIAT Group. Volume and quality of both operations and economic management strengthened the earnings and financial balance of the group. More than 2 trillion in earnings, and a significant reduction in the financial indebtedness reflect the acquisition of world-reputation management capabilities. Let us review only a few of the most important categories of the provisional balance-sheet. Total net sales volume increased from 27.101 trillion in 1985 to 29.020 trillion in 1986.

Overall investments reached the figure of 2.78 trillion lira in a strategic move toward modernizing products and processes. Expenditures for research and development increased in the same year to 920 billion, compared to 820 billion the preceding year. New technologies for processes, computers and electronics have appeared in every factory sector, absorbing more than 3 percent of the group's turnover. Also increased is productivity at the level of operational result, with a major impact on turnover. In 1985, operating profit was 2.267 trillion, while in the following year it increased to 2.550 trillion. The self-financing figures were also substantial: + 25 percent compared to 1985. For FIAT S.p.a., the economic trend for the 1986 year was clearly positive, thanks in part to the contribution of the higher dividends issued by the participating companies, which increased by 32 percent, and to the high yield resulting from management of the financial resources. The assets balance of the financial status of the head company: 1.016 trillion lira.

Let us now turn to the group budget for 1987: anticipated turnover will increase significantly. This forecast is backed up by the board of directors, which has thereby anticipated the effect of the acquisition operations, the restructuring, and the agreements undertaken in 1986. Among the various operations carried out by FIAT during the past year we should recall the establishment with Matra of a company, with FIAT majority, aimed at achieving greater competitiveness in the auto vehicle components sector. Also, acquisition of control of SNIA BPD for activities in the bioengineering sector, and the agreement with Hitachi in the field of earthmoving equipment. Finally, two other major agreements: the agreement with the PRC and the acquisition of Alfa Romeo. The first opened new market prospects in the Far East, and the second shifted in favor of FIAT Auto the balance of the European auto industry. Finally, as maintained by Gianni Agnelli: "We must inevitably compete with the Europe horizon to open new fronts toward high-potential worlds such as China and the Eastern countries."

Dimensions of FIAT Group as of 31 December 1986

	<u>Turnover</u>			<u>Employees</u>			<u>Investments</u>		
	<u>Dec 86</u>	<u>Dec 85</u>	<u>%</u>	<u>Dec 86</u>	<u>Dec 85</u>	<u>Var.</u>	<u>Dec 86</u>	<u>Dec 85</u>	<u>Var.</u>
Automobiles	16,400	14,392	+14.0	99,162	99,764	- 602	2,008	758	+1,250
Industrial vehicles	5,450	5,394	+ 1.0	33,500	34,585	-1,085	130	118	+ 12
Agricultural tractors	1,800	2,149	-16.3	10,780	11,143	- 363	73	66	+ 7
Earthmoving equipment	911	949	- 4.0	5,615	5,606	+ 9	18	44	- 26
Metallurgical products	1,153	973	+18.5	11,767	11,280	+ 487	90	54	+ 36
Components	3,679	3,319	+10.8	39,168	36,893	+2,275	274	190	+ 84
Production equipment, systems	800	745	+ 7.4	4,388	4,274	+ 114	25	14	+ 11
Civil engineering	495	369	+34.1	2,489	3,253	- 764	17	21	- 4
Railway products, systems	171	158	+ 8.2	1,155	1,201	- 46	6	6	-
Aviation	606	462	+31.2	4,528	3,604	+ 924	42	50	- 8
Thermal mechanics	-	180	n.s.	-	1,357	-1,357	-	1	- 1
Telecommunications	540	497	+ 8.7	4,942	4,809	+ 133	37	32	+ 5
Bioengineering	-	149	n.s.	-	965	- 965	-	10	- 10
Publishing	270	213	+26.8	1,320	1,282	+ 38	12	11	+ 1
Tourism & transport	219	267	-18.0	2,333	2,596	- 263	13	30	- 17
Miscellaneous	449	345	+30.1	7,303	3,610	+3,693	35	28	+ 7
<hr/>									
Total	32,945	30,561	+ 7.8	226,450	226,222	+2,228	2,780	1,433	+1,347
Exchange	(3,923)	(3,460)							
<hr/>									
Total Group	29,020	27,101	+ 7.1	226,450	226,222	+2,228	2,780	1,433	+1,347

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CS0: 3698/559

FRG FUNDS R&D FOR GENETIC ENGINEERING SAFETY

Frankfurt/Main FRANKFURTER ALLEMEINE ZEITUNG in German 21 July p 8

[Text] Bonn, 20 July--Before there is widespread application of genetic engineering methods, the potential risks and effects connected with them are to be researched. The Federal Ministry for Research has now published its long awaited concept for promoting safe biological research. The most important part deals with ecological behavior and safe use of genetically altered microorganisms in open country. Furthermore, special additional safety considerations are necessary for large-scale industrial production of medicines and other products. Fundamental studies of the occurrence and change of pathogenic agents, of the handling of tissue cultures and of the biology of viruses are planned for safety in genetic engineering laboratories. Before using genetic engineering methods on humans as therapy for hereditary diseases, provision will be made so that genetic information transferred to body cells will remain in the place where it is to take effect and not cause unwanted changes in other places. Over the next 3 years a total of DM 20 million has been designated for the promotion of such projects, with 10 percent of the expenditures going to genetic engineering research.

In addition to the Central Commission for Biological Safety and the registration office at the Federal Ministry of Health for certain experiments and projects in genetic engineering, a working group will be established at the Federal Institute of Biology in Braunschweig. With special exemptions for the release of altered organisms, the working group will participate in and study biological safety issues in particular for viruses and microorganisms. The results and effects of biotechnological methods are to be assessed and evaluated in studies which will not be planned far in advance but are to be the result of the progress of the research.

Research Minister Riesenhuber said that a high standard of safety has already been achieved today in biotechnology. The risks can be evaluated on a scientific basis. The present safety guidelines have proven successful, but new questions arise with broad application, the beginnings of which only now begin to be visible. Meanwhile, the Federal Ministry of Health is working on legal foundations for certain portions of the safety guidelines.

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CSO: 3698/603

FRG OFFICIALS URGE LEGAL GUIDELINES FOR GENETIC ENGINEERING

Duesseldorf HANDELSBLATT in German 24-25 July 87 p 6

[Text] Bonn--The CDU/CSU parliamentary group has called on the federal government at once to present a total concept for legal measures in order to regulate matters of reproductive medicine and applications of genetic engineering methods on humans.

In the opinion of the CDU/CSU, legal regulations should be aimed at the following principles, among others:

-- Human life is entitled to and requires protection even at the stage of fusion of the egg and the sperm cell.

-- Artificial fertilization can be a justifiable therapy for overcoming infertility, but should only be contemplated when other possibilities of fulfilling the wish for a child cannot be considered.

-- Artificial fertilization should only be done when the reproductive cells originate from the married partners. The use of medical reproduction methods should therefore be limited to married partners. Artificial fertilization after the death of a spouse should be prohibited.

-- The various forms of surrogate motherhood are not acceptable, because the welfare of the child is seriously jeopardized.

-- Extracorporeal fertilization may only take place in special medical facilities in order to prevent possibilities of manipulation. Only as many cells may be fertilized as are necessary for a one-time implantation. The production of embryos for research or other purposes should be rejected, regardless of whether there are important scientific interests or whether the embryos have a chance of survival or not.

In general, the two delegates of the party union emphasized, experiments which deprive the human being of individuality and make him into an object of breeding methods constitute a serious violation of human dignity.

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CSO: 3698/603

NIXDORF OF FRG PURSUES CLIENT-ORIENTED STRATEGY

Paris ZERO UN INFORMATIQUE in French 16 Mar 87 p 4

[Article by Philippe Moins: "Klaus Luft, president of Nixdorf: A Successful 1986 Fiscal Year"; first paragraph is ZERO UN INFORMATIQUE introduction]

[Text] Complete optimism for Klaus Luft, who hopes to double Nixdorf's turnover in 4 or 5 years. His method is an active policy of partnership and a steady integration of telecommunications and computer science.

In the light of 1987's CEBIT, Klaus Luft's speech on the first day of the conference was intended to place special emphasis on telecommunications straightaway. "Nowadays the telecommunications industry is aware of the importance of digitalization. Stall 17 of this exposition is there to prove it, where one can see that the combination of the computer science and telecommunications sectors leads to new solutions which go beyond mere technology."

Nixdorf is quite in step with this outcome. Klaus Luft said "We will follow a path of integrated solutions."

Nixdorf's president expressed satisfaction with the 1986 revenue, "a successful fiscal year," which he supports citing a 15 percent increase in revenue, reaching DM4.5 billion. Among the positive factors are a high level of investment, strong shareholding at the outset and order books of 13 percent and up.

While Nixdorf's 600 million investment last year went mainly to increasing means of production (particularly in Paderborn, in Ireland and Singapore), the package set aside for this year will go instead to the service allocations department.

The German maker is expecting to create 2,000 new jobs, and even in the straitened economic circumstances is optimistic to the extent that he predicts that the revenue will double in 4 or 5 years. Such ambitions are founded on a "solution" strategy as opposed to seeking maximum production.

Luft explained that unlike makers like Olivetti, "we are not counting on mass production. In the long term, that will be borne by the Asian countries. We believe rather in an applied orientation, towards solution."

This desire to stick to the customer's needs is reflected in Nixdorf's own organization. The business' own distribution network generates 97 percent of the turnover, while only 3 percent is produced by partners. In 1986, the banking sector remained Nixdorf's principal source of revenue for telecommunications, distribution and industry.

As Horst Nasko, Nixdorf's telecommunications director, emphasized, "Telecommunications saw a sharp rise in 1986. We are now first in Germany for numbered subscribers. In the wide-band transmissions area, we received an order last week from the German Federal PTT."

The distribution sector also turned in fine performances, especially in the United States where Nixdorf makes 5 or 6 percent of its consolidated revenue. Its directors claim that "in 1987 we will have a record growth in the United States. In the distributing area we have become involved with Sears and scores of others."

According to Luft, "Nixdorf especially managed to stay in touch with its clientele while other manufacturers have created more middle-men and distributors." Appropriately enough, every one of their stands, totaling 3,500 square meters scattered throughout the various CEBIT halls, bore the company's slogan, "Partnership 87."

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NEW EUROPEAN OPTICAL BISTABILITY PROJECT AT HERIOT-WATT

Paris ELECTRONIQUE ACTUALITES in French 20 Mar 87 p 13

[Article: "Edinburgh Instruments Directs an EEC Light Modulator Project"]

[Text] Following the EJOB I project which was completed 2 years ago which may be considered a truly stimulating development in the field of optical bistability, EJOB II is being set in motion under the Heriot-Watt University of Edinburgh.

Two million ECU's (approximately 14 million francs) will be devoted to the project, while allotment to the various participants (English, French and German) is being discussed.

The Scottish company, Edinburgh Instruments, is heading the EEC project to develop spatial light modulators and display modulators which could make the cathode ray tube obsolete, and is using 5 million francs from the EEC. An operational 1,000 x 1,000 pixel demonstration system is expected by 1989.

The company's partners for the project are the Heriot-Watt University Physics Department, the German opto-electronic company Muetek GmbH in Munich, and a group specializing in optical signal processing, GESI, from Toulon University.

By turning the responsibility for the project over to a private company, albeit one with close university ties, the EEC has underscored its goal of perfecting the prototype for an industrial product by the end of the research program.

A spatial light modulator is a device which controls the intensity of light crossing it in variable quantities at different points on its surface, either by means of electronic digital signals or laser signals. The images can be recorded centrally for transmission to light modulation "projectors" via telecommunications, cables, or optically.

Most spatial light modulators developed in recent years, which have been applied to such things as projection display, graphic processing, optical memories and laser printing have performance limitations, and only one or two modulators have been produced industrially (Soro, Thomson).

It is to be noted that the ultimate goal pursued by the research program is the design and production of optical computers. EJOB II's participants should be the same as for EJOB I, although this has not yet been definitely settled. Among them can be mentioned the Orsay Institute representing France, which shall see her overall part in the project increasing.

ITALY'S OLIVETTI ACQUIRES NEW FIRMS

Milan INDUSTRIA OGGI in Italian Apr 87 p 2

[Text] The Olivetti Group, continuing the policy of seeking alliances, has completed new agreements, purchased additional participations, and established further companies. These initiatives involve various sectors: office products, personal computers, software, data transmission, and security systems.

Participation in Pelikan

Through an agreement with the Swiss financial group Overpart, Olivetto has acquired 22.5 percent of the capital of Pelikan, known to everyone for its fountain pens, and which operates mainly in the field of technical products for the office, in particular, accessories for typewriters and printers.

Pelikan includes 28 operating companies in 25 countries, with 24 production enterprises and more than 8,000 employees. The overall turnover in 1986 exceeded 900 million Swiss francs, about 740 billion lira.

The company is quoted on the Frankfurt and Zurich stock exchanges.

Personal Computers in India

A joint venture agreement to produce and sell personal computers in India was reached with the Modi group. The agreement provides for establishment of a new company, Modi Olivetti Ltd., with 40-percent financial participation by each partner, with the remaining 20 percent offered to public subscribers.

The Modi group, which had a turnover of \$1.2 billion in 1985, ranks among the top five Indian industrial firms, and operates in various sectors (tires, textiles, cement, engineering, chemical products and electronics).

The agreement reached provides for construction of a factory at Rampur, Uttar Pradesh state, in which 1,500 to 2,000 will be employed within 5 years. In the same period, the company is expected to achieve a turnover of \$100 million per year.

Agreement with Microsoft for "Windows"

By agreement with Microsoft, the American company whose products include MS-DOS (the operating system used today by over 20 million personal computer professionals), the Ivrea company will distribute through its own marketing organization the "Windows" program for personal computers.

Windows feature divides the screen into two or more windows that simultaneously display information relating to the different applications, and, as needed, enable linking these applications. The program puts at the disposal of the MS-DOS personal computer user the facilities provided by Macintosh with the Apple.

Under the agreement, which envisions further forms of cooperation, the Italian company will also promote development of graphic applications based on "Windows."

Olinet

In the framework of the group, Olinet has been established, a company operating in the area of **data processing** and transmission services, and management of data banks.

The company, with entirely Olivetti capital, was born of a preceding joint venture between the same Ivrea establishment and Ge Da, an Italian computer services company.

The services offered by Olinet are based on use of Infonet, a worldwide network of data transmission services with processing centers throughout the world, and for which Olinet has the exclusive license for Italy. The main applications are information systems of factories, such as transmission of statistics and reports between the outlying locations and the center, electronic mail, and management of orders.

Three Acquisitions for Tecnost

Tecnost, one of the group's companies that operates in the sector of specialized computer systems, has purchased control of three companies: Lart and Sipol, which specialize in production of systems to combat theft, breaking in, and fire for industries and public organizations, and CIS, which operates in the field of bank security. This company, along with BTR Elettronica acquired previously, are recombined in Tecnosafe, which thus becomes the Tecnost focal point for security.

In 1985, Tecnost had a turnover of over 129 billion, and in the first quarter of 1986 exceeded 74 billion, a figure that is bound to increase in the second quarter due partly to the contribution of the acquired companies.

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CSO: 3698/559

FIAT/IBM FORM DATA PROCESSING FIRM

Turin ILLUSTROFIAT in Italian Apr 87 p 2

[Text] A new company, the first of its kind in Europe -- whose shares are held 50 percent by FIAT and 50 percent IBM Italy--is preparing to go into operation in "value added" data processing services provided through telecommunications networks. Intesa (Iniziativa Telematiche per Servizi Applicativi [Telematic Initiatives for Application Services]: this is the name of the company) will have its headquarters in Turin, at Lingotto, with an initial capital of 5 billion, and it will invest an additional 60 billion in the launching phase.

Franco Bernardi, deputy director general for external relations of IBM Italy, has been named president of the new company, while the director general is Mario Galizia, till now assistant to the director general of FIAT. The board of directors will be composed of five members named by FIAT and five from IBM Italy. The planned staff as of the end of 1987 is 80, originating equally from the two share companies and from outside.

In the initial phase, Intesa's activity is oriented toward logistics. Thus, the objective of the services developed is to improve the flow of materials between the production or distribution industries, their suppliers, their marketing networks, forwarding agents, transporters, and the logistical infrastructures. All these operators will be able to access centralized data banks, into which the information on movement of goods will flow: it will thus be possible to exercise continuous control of the processes, and maintain timely communication among the various firms involved in a particular flow of materials.

FIAT and IBM Italy maintain that the offering of this type of telematic services responds to a widespread need of firms, and can result in greater overall efficiency of the entire logistics sector, enabling significant savings in the inventory costs of industries and optimizing the activity of transport operators. In this context, alongside the experience acquired by FIAT in the logistics area there is the experience of IBM Italy in the sector of complex systems and the architectures of communication.

In the presentation press conference held at Lingotto on 5 March, Cesare Romiti, director general of FIAT, explained the reasons why the company regards it as opportune to launch this initiative with IBM Italy.

"The first reason is to take advantage of the opportunity provided by a market that is barely beginning in Italy but that has significant development prospects. A market linked to the increasing need of companies to have comprehensive information for management. Like FIAT, we have had to deal with these needs very quickly. Our direct experience has fully convinced us of the importance of the value-added telematic services and their potential for development."

Just from the logistics aspect, leaving aside other equally important application areas such as finance and large-scale marketing, the experts estimate the Italian market at about 500 billion lira in the early 1990's.

"The second reason," continued Romiti, "is to benefit within the FIAT system from the innovation stimulus that this type of service can generate. Telematics is in fact one of the most effective combinations among the applications of telecommunications and data processing. These are two areas whose simultaneous development can produce great fall-out in all the activities in which FIAT is involved."

The third reason is to provide an important basic service to the entire Italian industrial system. In this connection, the FIAT director general gave some figures: "Analysis of a sample of 88 Italian firms revealed that for an overall turnover of 80 trillion about 17 trillion was immobilized in stock, with all the resulting burdens of a logistics, financial and administrative nature. Also, reducing these costs means improving competitiveness."

Romiti concluded the interview by emphasizing that the FIAT-IBM Italy agreement is not exclusive: "In fact, we are open, once the activity is underway, to any proposal for cooperation and participation by others. FIAT, as is its custom and practice, is undertaking this initiative with the intention to add new fields of development to its factory activities, to expand its presence in the now basic field of advanced services, with the ambition to increase, also by this route, its contribution to the development of the country."

Ennio Presutti, the president of IBM Italy, recalled that his company had joined the agreement because "this sector is tending to diversify and enter other sectors in such a way as to make necessary an integration of skills, technology and industrial resources. The maximum efficiency can only be achieved through the maximum of synergy. This is why IBM Italy is seriously seeking partners complementary to it in order to undertake initiatives matching the innovation challenges of this decade."

Turning to the reasons for choosing the Turin firm, Resutti said that "FIAT is a complete industrial world in which the complexities and diversification of products, technologies and markets are managed with a strong innovative commitment. It is an environment in which technological innovation has the possibility for optimum development.

BRIEFS

MBB 'PHOTOTRONICS' JOINT VENTURE BID FAILS--Negotiations between the Hanau nuclear firm Nukem GmbH and the Munich firm of Messerschmitt-Boelkow-Blohm GmbH (MBB) regarding a planned new company for solar technology--supposed to combine the solar technology activities of both firms under the name of "Phototronics"--have failed. This means further, that the efforts towards merging with the French firm Solems near Paris also fell through. Here the purpose was to obtain a central position in the field of photovoltaics in Europe, Northern Africa, and Asia Minor. According to an MBB spokesman MBB will continue to pursue the project with the French partner alone under the European research initiative EUREKA. [Unattributed article: "Negotiations between MBB and Nukem Failed"] [Text] [Bonn TECHNOLOGIE NACHRICHTEN-MANAGEMENT INFORMATIONEN in German No 458, 29 Jun 87 pp 12-13] 12831

CSO: 3698/M356

FRENCH CUSTOMIZED ION IMPLANTATION

Paris ELECTRONIQUE ACTUALITES 20 Mar 87 p 11

[Article: "Project Designing a Special-Order Ionic Implantation Firm"]

[Text] A French firm whose purpose would be to perform ionic implantation orders is being planned. A detailed market study is under way and company statutes should be filed during the month of April.

Mr Laurent Roux initiated the project and has come to take the helm, explaining that the original idea was based on the fact that this type of company works quite well in the United States, and that three large companies that are specialized in this area as well as several smaller ones exist there.

First the company will seek to cater to the "in extremis" sub-contracting market, that is to say companies experiencing a failure in their own implanter, or those wishing to avoid the purchase of a second implanter. The company will also try to meet the needs of companies that wish to undertake ionic implantation processes but are not yet equipped, high-power semiconductor makers for example.

The company will be equipped with a medium-current implanter, and ideally should also have a weak-current implanter. It would start by offering arsenic, boron and phosphorous implantations at 20 to 200 KeV at doses of up to 10^{15} . Later, it is expected to perform more versatile implantations, with iron for example.

The company is to be dubbed IBS (Ion Beam Service). It should be installed in the Marseilles area, perhaps on the Rousset site. The financial set-up has not been completed. The legal form is that of a joint stock company with 1.4 to 2 million francs, of which 700,000 would come from individuals.

Mr Roux worked as a process engineer at Thomson's and has worked for over 2 years in a research services administration. His five associates also have technical competencies in different parts of the field.

The company is expected to be operational by the end of the year.

13161/12859

CSO: 3698/417

FINNISH FIRMS TO PARTICIPATE IN ESPRIT II PROJECTS

Helsinki HELSINGIN SANOMAT in Finnish 24 Jul 87 p 24

[Article: "Finns to Join ESPRIT in Second Phase"]

[Text] The second phase of ESPRIT, the information technology program of the EC, is getting under way. At the same time this means that the EFTA countries, and thus also Finland, are able to participate in ESPRIT. Previously the research program was closed to all but the enterprises and institutions of the participating countries.

Heikki Kotilainen, research director of the technological development center, Tekes, says the possibility of participating in ESPRIT is a "quantum leap." Of the Finnish enterprises Nokia, Vaisala and Lohja, among others, had already earlier expressed their interest in participating in joint ESPRIT work. Of the state institutions at least the State Research Institute, VTT, will participate both directly and as a background influence with the enterprises.

The EC commission has not yet officially inaugurated the second phase of ESPRIT, but is expected to do so this fall. After that the Finnish enterprises, as coordinated by Tekes, can inform the commission in which kinds of research plans they are interested.

The possibility of participating in ESPRIT and other EC technology programs was confirmed about a year and a half ago. Finland then signed a general agreement with EC, without which an EFTA country cannot take part in research and development work.

The progress of ESPRIT, and at the same time Finnish participation halted, as ESPRIT argued for nearly a year about the funding of its entire research budget.

Last week EC solved its differences over research funding. It has now decided to allocate 5.2 billion currency units or ECUs for research for the years 1987-91. In Finnmarks the sum would be about 28 billion. Originally a 10 billion ECU level was considered in the general agreement, but most EC member countries thought this was too large a sum.

The research budget calls for a unanimous decision by the EC ministers. Great Britain held up the approval for a long time, but withdrew its veto last week. About 1.6 billion ECUs, or 8 billion markkas of the budget, are earmarked for funding the second phase of ESPRIT. EC commission thus will allocate twice as much money as before.

Funding for Finns From Tekes

The EC ESPRIT research program is not a unified entity, but composed of several projects. What the enterprises and institutions supported by ESPRIT do have in common is that they carry out long term research in information technology.

ESPRIT has numerous sectors under which individual projects may be undertaken. These sectors include, among others, data processing, office automation, microelectronics, software technology and computer guided production systems.

If a project originating from an EC member nation is approved under ESPRIT it will receive half of its funding from the EC budget; the rest it will have to pay itself.

A Finnish enterprise can not get funding for a research project from EC. In addition to their own investment the enterprises can probably get public funds from the product development funds of Tekes.

More detailed funding plans have not been worked out due to the delays of ESPRIT's second phase.

Finnish enterprises must have a partner from an EC country in order to take part in the ESPRIT program.

"During the first phase Finnish enterprises express their interests, in which kind of program they would like to participate. This interest phase does not yet involve naming a collaborator. The phase can also act as a kind of search for a partner; through it a Finnish enterprise may be able to find a suitable companion from some EC country," says Heikki Kotilainen.

According to Kotilainen numerous advantages will accrue to the enterprises from ESPRIT collaboration. The enterprise will get a larger database and better resources for its research.

BRITE and RACE Already Available

Other EC research programs already earlier available for Finnish enterprises are BRITE and RACE. The BRITE project applications had to be in already in mid-May. According to Heikki Kotilainen VTT and Outokumpu, among others, have already submitted their applications.

BRITE studies the manufacturing technology of traditional industry. Kotilainen describes the program as very broad and, in part, overlapping with ESPRIT.

BRITE received about a 300 million markka additional grant from EC this week. BRITE is only in its first phase, but the additional funding makes possible the beginning of planning for the second phase. Some plans associated with BRITE had to be canceled due to lack of funds.

RACE's area of research is in telecommunications. Finns will leave their applications for this by the beginning of October. For now, Nokia and VTT, among others, have expressed interest.

EC is attempting to help Europe, with limited research programs, to compete more efficiently with the U.S. and Japan. The goal is thus the same as in the broader Eureka venture which includes 19 European countries.

12989

CSO: 3698/597

ITALY'S CNR, IBM UNDERTAKE JOINT RESEARCH PROJECTS

Milan INDUSTRIA OGGI in Italian Jan 87 p 40

[Text] The National Research Council (CNR) and IBM Italy have signed a 3-year agreement to carry out projects relating to research activities, strengthening the data processing infrastructure of the CNR, and training researchers and administrative personnel.

In the context of research activities, the cooperation between the CNR and IBM involves various areas: from astrophysics, experimenting with techniques for processing images for analysis of data provided by space missions; to mathematics and chemistry, and developing features of data processing work stations for researchers in these disciplines.

In the field of solid state physics, CNR researchers will work directly with the IBM Research Laboratory in Yorktown Heights, N.Y., on further developing the basic processes for producing microcircuits. Of particular importance, among the activities already underway, is the cooperation in the OSIRIDE project, devoted to development of software conforming to the OSI (Open Systems Interconnection) standard and that will thus enable communication between computers of different kinds, that is, products of different manufacturers.

Other projects being developed concern use in a research environment of "token ring" local networks, and, in the context of the Approved Project "Data Processing Systems and Parallel Computing," development and publicizing of the methods of "parallel computing," being carried out together with IBM's European Center for Scientific and Technical Computing (ECSEC), with headquarters in Rome.

In regard to the CNR's computer systems, the objective, in accordance with the CNR's strategic plans in the networks sector (OSIRIDE project), is to design, with the specialist assistance of IBM Italy, an infrastructure capable of providing the CNR structure with advanced functions for scientific communications and additional computing services for research activities. As of now, half of the branches have already been linked in network.

After an initial study phase, the project will be implemented gradually, first completing the trunk line of the network (Milan-Pisa-Rome-Frascati-Palermo),

and subsequently upgrading (or starting, where they do not already exist) the links to the trunk line of the other CNR computer centers.

In this infrastructural context, the Italian center of the EARN (European Academic and Research Network), now located in Rome at IBM Italy's Scientific Research Department, will be transferred to the CNUCE Institute of the CNR in Pisa.

The EARN, established by IBM in cooperation with the European academic community, facilitates exchange of information among university and research institutions: in Europe it links about 250 centers, 16 of them in Italy, and provides access to BITNET, which includes 130 computers located at major American universities and research centers.

Through the CNUCE of Pisa the CNR will deliver to the National Scientific Community--via this network--the services offered.

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CSO: 3698/559

NORDIC INDUSTRIAL FUND SUPPORT FOR 128 PROJECTS

Helsinki HELSINGIN SANOMAT in Finnish 24 Jul 87 p 24

[Article: "Nordic Industry Fund Supported 128 Ventures"]

[Text] Nordisk Industrifond supported 128 ventures last year. The monetary value of this support was altogether 122 million Norwegian kroner or about 80 million markkas.

The purpose of the industrial fund is to support Nordic industrial cooperation in the areas of research and technology. The fund was founded in 1973. Its activities began six years later. The secretariat of the foundation is presently in Oslo.

Altogether 250 million Norwegian kroner were requested from the fund last year, or the equivalent of 166 million markkas.

Currently significant areas are biotechnology and materials technology. In the area of biotechnology the foundation is supporting seven, and in materials technology, twenty ventures.

The foundation also funded 37 so-called first projects last year.

Last year Sweden received 37 percent, Norway and Finland more than one fifth, Denmark 16 and Iceland four percent of project support. At least two countries have to participate in a project supported by the foundation. The foundation also supports international ventures, which are of interest to member nations.

The share of the foundation in funding ventures was 42 percent last year. Industry's share of the funding was one third, that of the public sector one fifth and of the research institutions less than ten percent.

The support of the foundation for a single project cannot exceed half of its expenses.

12989

CSO: 3698/597

HUNGARY: MEDICOR FIRM PRODUCES SOFTWARE

Budapest COMPUTERWORLD/SZAMITASTECHNIKA in Hungarian No 15, 22 Jul 87 p 3

[Article by Marton Vargha: "A Medicor Software House?"]

[Text] In March a brief announcement called attention to a Medicor software exhibit for computer users working in health affairs.

And the exhibit took place. For 3 days the Medicor headquarters on Vaci Street hummed with the voices of programmers, physicians and those interested in using the achievements of others.

They also convened a social jury to evaluate the programs shown and select the most interesting of them. The plenty--they had to become acquainted with about 70 programs in 3 days--confused the jury and they postponed a decision. Finally they had to invite the authors of the programs judged to have a chance to demonstrate their creations individually under more tranquil circumstances.

On 25 May Istvan Biro, technical deputy director general, awarded the prize to Gabor Gyorgy Nagy and Attila Naszlady. The winning program displays a perspective image of a so-called vector cardiogram on an IBM AT or compatible personal computer with a color screen.

The question justly arises, What is a vector cardiogram? The electrical phenomena accompanying the functioning of the heart take place in a space and so the customary electrocardiogram provides only fragmentary information about them. But with a number of precisely placed electrodes one can follow changes in the electric field around the heart. As the heart beats the electrical field strength vector revolves--following the contraction and relaxation of the heart muscles. Evaluation of the vector cardiogram pictures takes place on the basis of two-dimensional projections of the vector; physicians have detailed atlases for this. Since what is involved is a process taking place in time and space the evaluation is not easy; many representations must be identified to put together a diagnosis. The perspective display on a screen of the course and movement of the field strength vector aids and simplifies this. Interpretation is facilitated by the fact that the color of the vector is different for each eighth of the field. One deficiency of the program is that the digitization must be done separately; then the data can be given from the keyboard.

The prize--what luck!--was itself an electrocardiograph, a Minigran, a new product of Medicor shown at the Budapest International Fair. It is true that it has only one channel and one dimension, and the one-dimensional signal is displayed on a liquid crystal display; it computes statistics and can store a total of 50 seconds worth of signals. One can also connect a printer to write out the results and the electrocardiogram. The designer, Endre Devai, explained the use of the Minigran--briefly--to the winners.

The software exhibit and the prize are the first, very striking, steps in a new effort by Medicor aimed at building up the supply of medical software. I talked about this after the awarding of the prize with Miklos Kiss, chief of the microprocessor applications department. "The exhibit and developing the supply of medical and health affairs programs was the idea of one of the workers in the department, Gyorgy Sipos," he began. "Although potential buyers and users did not flock to the exhibit the results surpassed our expectations. We began talks with authors of more than 30 programs about joint marketing."

Medicor is not trying to get exclusive use rights for the programs. They sign a separate contract with the author of every program which interests them, either to offer it to their own customers or to jointly develop it further. "We do not want to grasp too much, we are progressing by small steps," Miklos Kiss explained the strategy.

At first they will have an offering of eleven programs, then they will gradually bring in others. They are thinking not only of the programs at the exhibit; they are also counting on new partners.

But the ultimate goal is not to handle and sell independent programs but rather to develop a modular program system from which they can build custom, complex computer systems suiting various institutions.

Since Medicor exports medical equipment to many countries in the world and has well developed business contacts it may become possible for it to export medical software as well. The recently formed Hungarian-Soviet mixed enterprise, Mikromed, offers a good possibility for export; one of its founders is Medicor and it will manufacture microelectronic equipment, primarily for health screening stations. And a modern screening station has computerized patient record keeping and computerized evaluation.

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HUNGARY: RESEARCH WORK ON ADA SOFTWARE

Budapest COMPUTERWORLD/SZAMITASTECHNIKA in Hungarian No 15, 22 Jul 87 pp 20-23

[A roundtable discussion: "Ada in Hungary II; A Conversation With Hungarian Experts, or The Hulking Monster"]

[Text] We invited a few of the experts who have participated or are participating in preparing a Hungarian Ada compiler in order to learn their opinion about the language and the prospects for its spread, after about 8 years of joint work. We also tried to expand the circle to include potential users. Unfortunately this did not succeed, so the abbreviated minutes of the meeting which can be read here, the first part of which appeared in our previous issue, reflect the opinions of those who cannot be objective, because all of them have been "infected with Ada."

Those participating were Ivan Bach (MTA SZTAKI [Computer Technology and Automation Research Institute of the Hungarian Academy of Sciences]), Balint Domolki (SZKI [Computer Technology Research Institute and Innovation Center]), Erno Farkas (MTA SZTAKI), Miklos Pap (MTA KFKI [Central Physics Research Institute of the MTA]), Laszlo Szoke (Videoton) and Laszlo Zajki (SZKI). Our journal was represented by Marton Vargha.

[Domolki] In connection with an evaluation of Ada everyone agrees that many programming theory results are integrated in it which arose during past years and if someone wants to teach these to somebody then Ada is certainly suitable as an example--whether we regard it as a good example or a bad one.

[Bach] By and large this is true. But I do not agree with Marton Vargha's characterizations, although I have heard them from more competent people too, when I participated in the UK sessions on Ada. There was always somebody there from NATO and the English defense ministry. Two elegant gentlemen who obviously were not very deeply versed in software, but neither were they completely illiterate, and both of them talked about Ada as the language for the Twentyfirst Century, which I do not believe.

[Domolki] You do not believe it will be in the Twentyfirst Century or that it will not yet be in the Twentieth Century?

[Bach] I do not believe that this is the proof of languages. I am certain that the Darwinian evolution does not end with the Ada language. It has too many deficiencies not to have a better language be born later.

[Domolki] It can be brought into harmony with the evolution analogy because there also huge organisms appeared which represented the peak of some branch, and then development went on by another branch. There are those who compare Ada to such things.

[Farkas] Yes, it has certainly occurred to me and to others too that Ada is the peak of a certain development, from which one cannot go on and it will be from elsewhere that....

[Domolki] This is not exactly a positive observation.

[Zajki] But neither is it exactly negative. Such a hulking monster can rule a given epoch, it can even help, but it can't spread too far into the future.

[Bach] A hulking monster, we are always saying that. It is true that Ada is big, maybe too big, but when we began this at the beginning of the 1980's and it turned out that there could not be a compiler under two megabytes we said, "My God, what computers these will be!" and now it is not unusual to find four megabytes on a PC. In this respect the "Adaites" estimated well, had good foresight. It is true that it is a monster, but now it has gotten into a medium in which it can move more quickly than when it was developed.

[Zajki] Machines develop easily; unfortunately the capacity of our brains is not keeping up, our ability to take something in and see through it is limited. Ada as a whole, its hidden contradictions, is constantly posing more and more questions. It is in this sense that I called it a hulking monster.

[Bach] A significant number of users, whatever language they're programming in, always use only a subset. They like a certain style, a certain system of instructions, and they program in that, not in the entire language. Actually you, whom the blessing or buffeting hand of God has made into a compiler writer who nolens volens is forced to deal with the whole language, you cannot say that you do not like these properties and will not make a compiler for them. You think in the entire language, but the users do not.

[Question] If one can work in subsets then it is sufficient to take out of Ada as a uniform system which a person learns only superficially a subsystem for a given job with which the work can be done. And if another job comes up then one need not learn the principles but only switch to another subset. Isn't this better than having to learn COBOL, FORTRAN, C or Pascal depending on what one is working on?

[Bach] I believe, unfortunately, that it is not. You know, if a person is writing a program in a well structured language and you read it then by and large you will know what will happen when the program runs. In this respect Ada is advanced in that it is a language where whether you know it or not something entirely different than what you read will happen.

[Domolki] This is true. This is not characteristic in the case of programs intended for general consumption but it is for the language specialist, for the "punchies" writing compilers.

[Bach] I am really irritated by the idea that in connection with type derivation the compiler does not translate what is written but rather an entirely different text. One can easily imagine that since it does not translate the text written but rather the text as re-typed then something could get in which does not appear from reading the program, and only the best can read between the lines.

[Question] This could be solved if the compiler gave an explanation there; what you put in should be written into the list. Wouldn't that work?

[Bach] No, not in my opinion.

[Farkas] But this would be needed, there are such ideas. Nevertheless, I do not feel this problem to be so dangerous. I have seen Ada programmers who stick with their own primitive concepts and so do not fall into the trap. There are different kinds of programmers. Judit Laufer once said that there are idiot programmers and crazy programmers. There is no problem with the idiot programmer because he only ruins his program. There is a problem with the crazy programmer because he wants to use every possibility in the language.

[Zajki] A tool is either foolproof or it is dangerous. It is foolproof if the possibilities are so limited that one cannot misuse them. But in this case we have made the real practical utility of the language impossible. As for whether the tools of Ada--in certain cases dangerous--can be used well by a person or group having a good programming concept in order to facilitate their own work, well I know from experience that they can. To completely polarize matters we might say that one can work well in the Ada language to the extent that the developmental tools being used by the group--I deliberately did not say compiler program--offer intelligent and agreeable support. If someone wants to misuse the tools that is possible, but practice shows that these problems do not really come up during work.

We started from the idea of whether a programmer might use Ada for various tasks instead of other different languages. I would change this question a little. When several programmers are working together and they must solve different types of tasks, does Ada help in the integration? My experience is that it does, it helps very much. I have not yet met with a language where the semantic analysis was so difficult. Bitter agony. But if it succeeds then in a good number of cases we get a program which works virtually without error. Certainly one must say this for Ada.

But I believe we have slipped into the depths of linguistic criticism, and it is not certain that it is useful to start from here.

[Question] This is certainly related to my superlatives.

[Bach] When I said that people more competent than you had said something similar I meant that it had been said by people who have substantially more money than you. It certainly appears that the Pentagon will continue to push Ada. So this will decide whether it spreads or not.

[Question] If this is so--and I read that it is, for Weinberger recently made a statement that he would have programming done in Ada--then to what extent can we expect the development of an Ada culture in the world, from which we should not be left out?

[Bach] Let us be clear about the fact that there is an Ada description, but it contains contradictions, even today. They are trying to resolve these by interpreting them suitably. When will there be a moratorium on the redefinition of the language?

[Domolki] Next year.

[Bach] Will those responsible be willing to change these not too sympathetic properties or will they stick to them rigidly for the sake of the regiment? Much depends on this. On the basis of the tendency thus far the main thing will be the honor and defense of the regiment.

[Domolki] Defense of the existing compilers and programs.

[Szoke] Some academy will decide--this is permitted, this is not permitted, this should be changed, this not, and so it will be done.

[Zajki] I know of two things which contradict this.

[Bach] Contradict the regiment?

[Zajki] Contradict the regiment.... One is that a preliminary formal definition is already before a committee of the ISO, it is intended to make the verbal formulations explicit where possible and to point out the obvious contradictions where not possible. Another work is going on also--we might say crudely that it is the production of a new standard text--which is trying to be conservative in form and structure but which intends to remove at least a large part of the contradictions and imprecision in regard to internal content. So it is not only our opinion that this must be done. The question comes up in a different way. There is an Ada which is beginning to pass into the world. If the world becomes acquainted with it at some level should it then be changed too frequently? At this moment we are not using even ten percent of the possibilities of the language, but the ten percent is a relatively sure, respectable base. Now, when we are at the beginning of the spread, making the language completely clear is not the central question. If this happens too soon I believe it will cause more confusion than it is worth.

So far we have not talked about the parallel possibilities of Ada. I suspect that this is the least clear area of the language, but it is my feeling that the lack of clarity concerning the parallelism in Ada is simply a reflection of the lack of clarity concerning it in computer science. If anything is dangerous it is the parallel tools of the Ada language.

[Bach] In my opinion this is a consequence of the fact that this organ is still a relatively new achievement of the basic development of languages, it could not develop yet. In everything else there were some prior studies in various languages from which one might determine what was good and what was bad. There were no prior studies of the parallel properties, or if there were there were very few. Here Ada had to make a standing jump, and it did not succeed.

[Farkas] I do not agree with that, there have been parallel languages. Concurrent Pascal is something even today.

[Zajki] The dangers of parallel programming which exist in Ada also exist, in my opinion, in parallel Pascal, extended FORTRAN and in very many other places.

[Bach] Parallel Pascal handles a much smaller task; it is an air rifle, but an air rifle easy to aim.

[Farkas] While Ada is a rocket, about which we do not know where it will go.

[Zajki] It is virtually irresponsible to make full use of these tools in Ada, because they are so impossible to survey. If there is a need anyplace for internal limits, for sober peasant reason, it is precisely the country of parallelism, because it is less possible to rely on the language to actually do what a person thinks.

[Question] Can we expect Ada to be used in Hungary? What should we look for, where should we look for a market?

[Domolki] As in other areas of computer technology this depends on how this culture comes in from abroad, from where programs written in Ada appear on the market. First they will bring in programs written in Ada and then using these as models they will write new ones--changing them. This could be one source. The other would be the result of teaching it at the university; students who had learned it would get access to an Ada compiler and then one can imagine that they will write programs. I believe we can count with rather great certainty on having compilers within one or two years, partly from domestic and partly from foreign sources.

[Bach] The fact that they have switched to Pascal and MODULA-2 in many places already is good for Ada, because in many respects Ada follows Pascal. It is much more difficult to learn on the basis of FORTRAN but Pascal will certainly be the mother tongue of the new generation.

[Farkas] In a word, if we conceive of Ada as a more convenient Pascal then everyone will be happy?

[Bach] That's right.

[Pap] Pascal is spreading vigorously not only in Hungary but abroad as well. These Pascals are substantially more than the Pascal defined by Wirth. What

Ivan Bach said, about it being easy to shift from Pascal to Ada, might be posed differently, whether it is worth shifting to Ada.

[Farkas] True, but nevertheless, if I had an Ada today I would give serious consideration to whether I should not shift to Ada. I worked in Pascal, in various Pascals, for two years. It was tiresome work to rewrite programs from one to another. The Wirth type Pascal is in each of them, but one cannot program in that. The MODULA languages are everywhere the same, but the MODULA-2 is not much more than a Wirth type Pascal.

[Pap] I posed the question of whether it was worth it to the user--who is already used to Pascal--to switch to a new language, which always involves awful work.

[Bach] In a certain sense Ada is not new.

[Domolki] As a language it is not new but as an environment it is entirely new.

[Farkas] The Ada environments, the APSE's (Ada Programming Support Environment), are in large perhaps what Turbo Pascal is in small. There is an easy transition from compiler to text editor and from there back to the compiler, or to take things out of or put them into the library.

[Question] To what extent does Ada support industrial type software manufacture?

[Zajki] We should try to add up what quantitative and qualitative conditions are needed in order to talk about industrial type software production. By a quantitative condition I mean such things as what sort of machines it is written on, how many times it must be rewritten, for how long must it be maintained and supported--while the original programmers have gotten out from under it, personnel, institutions, everything has changed, and only the program remains as of old. By quality I am thinking of such things as the planning, organizing, documenting tools and methods, which are also on a computer, and which are used to develop a program product. The latter is very much in baby shoes here. And the first group of questions is coming up already. There are programs which are used for 5-10 years, or should be, possibly on new machines and under new operating systems. Developmental environments are very little transferable today. Every machine has its own environment, which did not develop by chance, but there really is no culture of transfer between machines. I would guess that Ada could facilitate programming for a long time, on many machines.

[Question] Can we expect Ada to spread some sort of uniform developmental culture, or might smaller groups and areas develop for Ada also their own....

[Zajki] Various cultures will certainly develop.

[Pap] I see only one Ada programming environment, on VAX, under the VMS operating system. I have found that DEC had the philosophy that Ada should be eade into a compiler such that all sorts of languages could be called from

Ada, and Ada routines could be called from all sorts of languages. It is my feeling that Ada will be in the language repertoire just like Pascal and FORTRAN.

[Farkas] I don't see it exactly that way. All the other firms have either made an environment for Ada or are aiming at something which has Ada as one of the components. SYMBOLICS prepared a system for LISP machines which has four components: Ada, LISP, PROLOG and FORTRAN 77. There is a kernel for these, as described by APSE, and around it are the compilers, editors, graphic aids, everything. There is also a similar system for the SUN work stations.

[Bach] It is a remarkable thing, everything has changed in computer technology over the years, and FORTRAN is still there, although it was written in 1954. In 1954, 33 years ago!

[Pap] There must be something in it that despite....

[Bach] It's IBM!

[Pap] It's probably also that it can be learned relatively simply, and it can be used well for a very broad sphere of tasks. One of my colleagues said something interesting. He is just back from CERN (the European particle physics research center in Geneva). They have taken up Ada and would have very strongly supported its use at the institute. Despite this even the dog doesn't use it. But there are certainly tasks, measurement data collection, process control, for which Ada would be optimal, but they still don't. Basically because the physicists once learned FORTRAN, they are well acquainted with it, and it is easy to access various services from FORTRAN. I do not say that this is characteristic, but it is an example of a place where they have Ada, everyone could use it, and nobody does.

[Bach] I know a graduate of a technical university, who remained an engineer and did not get christened a software expert, who said he wrote programs in FORTRAN as long as he was taught that. Now they have taught him Pascal and he says, "Of course, I am writing in Pascal!" If they should teach him Ada, I do not say that would be optimal, but then he would program in Ada.

[Farkas] Pyle and others, Hoare and Dijkstra, write high-soaring philosophical books on how one should program. We sitting here, and certainly others, are all clear on this. But this does not reach everyone. The philosophy has no effect on them. What they see is, here is BASIC and here is FORTRAN and we have to write programs in them. If someone should give them something different, and there is something in it which they could easily use, they would be happy. Those who could switch to them from BASIC are happy with LOGO and they are happy with FORTH, because they have gotten so far. The philosophy does not influence the great masses of people, those who do not earn their bread by scientific software writing.

[Question] I read an article according to which bankers in Europe are beginning to switch to Ada.

[Farkas] I am well able to imagine that Ada would be good for bankers, because as I understand it what has been done in Ada, the military applications let us say, logistics, is essentially bookkeeping--as far as I understand it. What to ship, where to ship it, in what quantity and so forth.

[Zajki] I see two areas which will aid or force its spread. One is a movement from below, when programmers try out Ada because of the deficiencies of the existing languages and find there what they need. The other is an entirely different concept, and most alien to us. This is economicalness. For projects of a certain size, if it is proven what has been stated, that it is cheaper in Ada, then there will be no great arguments....

[Bach] A program of a hundred thousand words....

[Zajki] I would put this limit at one million. This is the limit above which I can no longer think of another language. Between a hundred thousand and one million a great influence is exerted by tradition, what people are used to, the internal rules, customs and work methods of the firm involved. So the actual numbers have no significance.

[Farkas] Even a hundred thousand is too much. What is involved is simply that if, let us say, seven people must do the work--this already means serious problems. One person can do a program, sure. Two can work together, there are many examples of that. But more than two people? We can see from the Ada project what difficulties that has.

[Zajki] We have now gone beyond a hundred thousand lines in Ada, and one of our surprises was that the programming tasks were divided up automatically, without problems. So the unit, subunit concept of Ada made cooperation in programming practically free of friction. We have had surprisingly good experiences with the distributive properties of Ada too in regard to how much corrections by individual people, independent of one another, interfere with one another. Very little. It is true that if a conceptual blunder is made then there must be a change at some high level, at a place used by many, which means virtually a complete retranslation of the system.

[Bach] This is true of other tools as well, but as long as we have mentioned it, if you have the courage, tell us what we can hope for!

[Pap] We have heard that there are already a hundred thousand lines.

[Zajki] We would like to be finished with the final version by the end of the year.

[Szoke] It was not worth it to do it in Ada, because it begins above one million!

[Pap] Will the speed of the Hungarian Ada be competitive in any sense with compilers which can be obtained on the market or can it compensate in some way for the possible disadvantage in speed?

[Zajki] The latter is the key, because I do not believe we can get into the world front rank in speed. The known data are around 1,600 source lines per central unit minute, which is unrealistic for us in every respect. It is true that these data apply to a 16 megabyte VAX computer, and the speed was only one quarter of this on the 9 megabyte machine I tested it on. So in the advertising they emphasize how fast they are, but the real content is uncertain. Certainly we had to take into consideration the resources available. In this sense we may already be competitive, because not every large Western compiler can be shoehorned into our machines. The other thing is--this could be debated--that we should try to place the emphasis on the environment, on project development, and not on the compiler itself. Our environment tries to help projects consisting of many people, presuming rather complicated contacts among them, tries to help the development of cooperating components. Even so we would not like to fall below 300 lines per minute on a machine the size of the VAX/750. It will be slower on an IBM because of the architecture. We have also developed for super machines, with many processors and a special architecture. What we hope from this is that the parallel ability of the compiler will be shown, but this means only the existing parallelism, it does not mean writing a new compiler expressly designed to be parallel. Under our conditions this will be the first true test of parallelism.

[Question] How much has the Hungarian Ada cost so far?

[Zajki] It is difficult to say from exactly what our losses, in money, in nervous systems, on the technical and human side, derived. It is certain that Ada was too big a mouthful to be measured by customary project sizes. Little by little the 10 years already has used people to such an extent that the time can be ignored. It is a question whether these exhausting and overburdening mechanisms would have appeared, and if so to what degree, in the event of a better concentrated, better led project. The fact is that substantially more energy was used up in this project than should have been devoted to it--or so we feel.

[Question] There was an article which said billions of dollars will still be spent on Ada, and it will go up in smoke.

[Zajki] I believe that if we calculate in forints and transferable rubles then millions have been spent here too. But there are ten people in Hungary who represent a very, very real Ada knowledge potential; they had to overcome many internal stumbling blocks. Even now hidden interdependencies are appearing which we had not thought of....

[Bach] Not even the creators of the language thought of them.

[Zajki] The experience of these ten people represents a sort of power, the question is whether this power will go up in smoke in the future, whether the group will fall apart. Whether Ada will come to an end in Hungary is a central question--in this circle--or can this expertise be saved until Ada begins to spread.

[Bach] When we began the project rather many smart people sat down together who had not the least experience in "how to make a compiler." The surprise was that we read Ada and saw that it was a bigger language but somehow we did not sense--although we had studied ideology--that quantitative change converts into quality. The money, now we say after the fact that the expense could have been avoided, was spent in no small measure because we did not realize that this was a different task qualitatively too.

[Question] How can this experience be transferred to other jobs and other people?

[Farkas] In many ways. For example, I share the position of Professor Buxton who said to me: "I learned one thing from this--I will never get into something like it again."

[Zajki] There are tasks in life which cannot be oversimplified at a certain level. I am afraid that very many from the generation now moving in the world of computer technology will view the problem the same way. They will run away from the task. I do not see where it will lead. We cannot reduce the tasks, people's approach being what it is. The question is whether there will be the strength to help set up projects which can deal with these tasks, or will we continue to try to import finished solutions, by more or less legal means.

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DEVELOPMENT OF OPTOELECTRONICS IN CZECHOSLOVAKIA

Prague RUDE PRAVO in Czech 16 Mar 87 p 5

[Interview with Vaclav Zima, director of the Radio and Electronics Institute, Czechoslovak Academy of Sciences, by reporter Michal Strida, date and place not given]

[Text] "The Radio and Electronics Institute of the Czechoslovak Academy of Sciences has gained a solid reputation and authority among the Czechoslovak and foreign public during its 32-year existence, mainly as a result of constant effort to accelerate scientific and technical development by utilizing results of research in the industrial practice. Research and development tasks accomplished here could have brought billions to the national economy and a higher status within CEMA, to the [Czechoslovak] electronics industry. To the detriment of society and disappointment of the research community an appropriate climate for socialist entrepreneurship did not exist" notes the institute director, corresponding member of the Czechoslovak Academy of Sciences Vaclav Zima. We asked him about some related problems.

[Question] What do you regard as the main cause of our backwardness in the fields of electronics and optoelectronics?

[Answer] Our current dependence on imports of technology and hardware from non-socialist countries.

[Question] How do you cope with it?

[Answer] By work and cooperation. We developed the first generation of control systems for the production of silicon fibers used in optical communications. We are now preparing the second generation, delivery of which is impatiently awaited in the USSR. In a complex program we are developing an original holographic laser system DIAMETR, intended for measuring the diameters of optical fibers, molds and other cylindrical bodies manufactured in the machinery and electrical industries. We overcame temporary failures in research on semiconductor lasers and non-coherent radiation diodes emitting in a wave zone of 1.3 μm [as published, may mean 'micrometer'], predominantly used in the world today for optical communications. We efficiently cooperate with an outstanding Polish institute ITE CEMI [as published] and we are turning over research results to Czechoslovak and Polish industries within the agreed time and of the agreed quality for utilization.

[Question] To what extent do we compare to the state of the art?

[Answer] If I blindly copy a system produced successfully and in gigantic quantities elsewhere, at best I can come close to the state of the art some day. And, that is still contingent on intelligent selection and respect for traditions in fields of science developed in the past. I can more likely reach the state of the art by introducing original systems or technological processes into modern industrial production. We have been successful with such undertakings in the past. Our system of time data transmission utilizing television relay routes is used in the USA and all of Western Europe. It became the basis for the international recognition enjoyed by our time-base metrology service, but it had no economic effect.

During the sixties we had the leadership in luminescent lamps and numerals, which after a few years were sold in volume of billions on the world market of electronic components. Here, they are still an item in short supply.

In the seventies we developed radio-controlled street clocks, which became a temporary and fading attraction in the capital city of Prague. We did not succeed, though, in meeting quite basic demands on operability in ordinary climatic conditions, despite our otherwise exemplary cooperation with the manufacturer ZPA Pragotron. We consequently lost world leadership.

At the same time we also developed ARB 1 and ARB 2 frequency synthesizers, which were successfully manufactured by Tesla Hloubetin and our application center. They are used to this day in the majority of Czechoslovak AM radio broadcast stations. We suggested to Tesla Hloubetin at the time the founding of a scientific-manufacturing association. We have not received an answer yet. Consequently, the pace of innovation in this Prague manufacturing plant declined.

We are certain that all systems being developed by our institute during this 5-year plan can stand strict criteria of technical parameters comparison. This is true of not only technological hardware systems for optoelectronics, but also instruments for metrology of fiber optic lines, radio-frequency signal spectrum analyzers, capacitance sensors and systems for language analysis and synthesis.

[Question] What is in the way of getting greater benefit from your work?

[Answer] In the fifties, we in the CSSR reacted to the discovery of transistors with willingness, readiness and foresight. We founded the production of semiconductor components in Tesla Roznov and in CKD Polovodice. It was a bold and fortunate decision. However, the reaction to the discovery of a new communication medium, such as the fiber optic cable, was more hesitant. This branch [of science or technology] is firmly anchored in state goal programs, unfortunately, only on paper. To achieve economically significant results, we need first of all a production base, a new manufacturing facility of technological hardware for optoelectronics. If we built one in short time, we could substantiate the strategy of acceleration with a tangible deed enriching our socialist state and its economy.

[Question] What theoretical stimuli are influencing the development of your scientific field?

[Answer] Electronics, microelectronics, robotics,, optoelectronics are scientific and industrial branches, that have become the symbols of scientific/technical revolution. Theoretical foundations of these are based on mathematics and physics. Even the great figures of world science, Nobel Prize winners, are proud of the fact, that they contributed to the flourishing of electronics. We observed such a trend in prominent institutes of the USSR Academy of Sciences. It is substantiated by programs designed to retain or to attain the state of the art in laser technics and technology. As yet, we do not see a similar strategy n current Czechoslovak mathematics and physics. These days, seeing only the inner beauty of science does not suffice any more.

[Question] Does it seem that everything is heading toward redistribution of manpower and resources away from unpromising research, to those specialized sections and branches where we are achieving top level.

[Answer] This is the decisive condition for the revival of the base of Czechoslovak scientific research. This condition will not be realized without conflicts, without clashes between the interests of groups and society as a whole. It requires a thoughtful and prudent approach followed by decisive, and, better yet speedy action. We, in our institute, discontinued unrealistic and unpromising research long ago. This has had an educational influence on the research teams. If some individuals or groups do not comply, we gradually part with them. They all have to know, that the security of a job in favorable conditions within the institutes of the Czechoslovak Academy of Sciences depends on the results of their work for the future needs of the Czechoslovak electrotechnical industry and for the scientific progress of the countries of the socialist community.

[Interviewer] Our thanks for the interview.

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On Our Cover

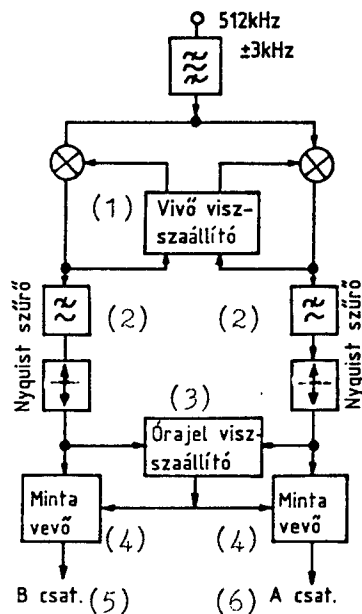
On our cover one can see the parabolic antenna of equipment suitable for artificial satellite television reception, made by COMPUTEXT. The new developments of the firm make possible the export of this type of equipment, which is much sought after throughout the world at this time. The young developmental staff is trying to produce the equipment with as many domestic parts as possible; the price and technical level of the equipment make it

possible for it to be competitive on the market. They are also preparing for the domestic spread of artificial satellite reception technology, which can be expected after launch of the DBS satellites. The article by Tamas Egri and Erno Gardai provides a summary of the technical solutions in the equipment.

Space Telecommunications

In our space telecommunications section we have collected a few articles about domestic developments in this area. Gabor Hegyi, of the Hungarian Post Office, describes the manifold nature, development and applications possibilities of space telecommunications. The concluding part in the series by Janos Csernoch gives a summary of the practical realization of satellite radio and TV reception. As an example Tamas Egri and Erno Gardai describe the equipment of COMPUTEXT. Laszlo Hinsenkamp and his colleagues describe the work being done at the TKI [Telecommunications Research Institute] and the development of the INTERCSAT telecommunications transmission technology equipment.

The PSK Demodulator of the INTERCSAT Receiver



Key:

1. Carrier restoration
2. Nyquist Filter
3. Clock signal restoration
4. Sampler
5. Channel B
6. Channel A

Further Training

Education is a basic condition for development. Experts dealing with the spread of electronics have recognized the significance of this fact. Education and further training have become parts of the government program. Our journal continues to consider participation in this work, with its own unique tools, to be its task. We hope that the series by Laszlo Csebe, now coming to an end, has contributed to expanding or deepening the knowledge of many.

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CZECHOSLOVAKIA: APPLICATION OF RESEARCH TO PRODUCTION

Prague RUDE PRAVO 2 Mar 87 p 5

[Text] Physics forms the basis of the material understanding of the contemporary world and determines the rise and application of new technologies. We discussed the state of affairs in our physical research, and the problems we encounter, with Dr Ales Triska, director of the Physics Institute of the Czechoslovak Academy of Science.

[Question] What must be done for the smoother conversion of research information into production?

[Answer] Almost all the innovations in industry which derive from the results of the physical and technical sciences involve substantial investments. Therefore it is necessary, if we do not want to end up with results which will never find any application, to steer basic research into those directions and areas which are the most promising from the viewpoint of the national economy's development.

The scientific workplace must also be in close contact with workplaces which will "pull" the knowledge obtained through studying physical processes toward realizable stages, usable in industrial practice.

The fundamental requirement for accelerating scientific-technological development, in my view, is to meet the need for pertinent industrial workplaces to initiate production while still in the stage of research and development. The attempt to introduce innovations which will mean a qualitative leap in production will remain an illusion until there are created production preconditions necessary for a product to be made at all.

As an example, I can cite the field of plasma technologies dealing with low pressure. their use is limited by the level of attainable vacuum and the availability of various vacuum parts and components necessary for industrial production. Although this method will be significant for the electronics industry in the very near future, it requires apparatus having parameters not industrially attainable in the Czechoslovak Socialist Republic.

Laser technology, and in particular automated production systems using laser techniques, and robotization as such, are again limited by the availability of optics and optics systems working particularly in the infrared region of the spectrum. For optics we need to find not only new materials, but also new methods of their processing and so forth.

I think that, just as it is necessary to consider the effectiveness and direction of research, it is equally necessary to consider, both old and new directions in industry. Both these considerations ought to merge with each other, and mutually influence each other. But I must repeat that without development of the vacuum and optical industries the field of new technologies employing our basic physical research will remain on the level of interesting but relatively simple applications.

Effective and in particular accelerated progress of research work would be helped considerably by giving priority to supplying R&D centers with electronic components and devices from domestic sources, and from the other socialist countries.

Innovation of industrial production which would mean a qualitative leap in production, must be accompanied by careful training of personnel. Already today it is necessary to consider new fields of study in the secondary and higher schools. Already today there are [production] operations which blue-collar positions require an engineering degree. Qualification requirements for workers are constantly growing. The time is not far off when complex production processes must be mastered and directed by a worker who has completed scientific training at the candidate of science level.

[Question] How can we attain the necessary creative climate at the workplace?

[Answer] I think the most important thing is the scientific program of the institute, which must establish demanding but realistic goals, reachable by methods and means which are or will be at the disposition of the institute. all the workers at the institute must be convinced of the correctness and attainability of the goals.

Further it is a matter of raising the quality and level of scientific research, which depends on the constant growth of the specialized and political level of every creative workers. Training and improvement of qualifications must be subordinated to long-term prospects of scientific work. It is necessary to create a natural mechanism whereby scientific workers who demonstrate unsuitability for research would leave the workplace while still at a productive age in life when they could still be very useful elsewhere.

It is equally necessary to create conditions for using young, promising scientific workers, to ensure the further development of their personalities. To make it possible to improve their qualifications by extended study at leading foreign workplaces and to entrust them with management and organizational tasks and political assignments.

It is important to develop a creative atmosphere at the workplace. I am convinced that the entire collective of workers must have the opportunity to express themselves concerning the conceptual aims of the institute and branch while still in training. It is further necessary to increase the overall awareness of all workers of the institute of the goals of the workplace. It is equally necessary to increase the authority of the supervisors and their responsibility for solving established tasks.

Scientific personnel are overburdened with various administrative activities. In the Physics Institute these are estimated to average 40 percent of working time. The higher the qualifications and functional obligations, the greater the administrative duties. To raise the efficiency of scientific work and form a creative atmosphere it is necessary to limit administrative activity of a degree which can be handled by a specifically designated and qualified staff. Fulfilling this condition, however, is outside the competency of the scientific workplace.

Particularly, it is necessary to have sufficient material and technical support research.

[Question] What does the Complex Program of Science and Technology Progress of the CEMA countries mean to you?

[Answer] Its significance is quite exceptional, and therefore, it also finds among scientific and specialized workers a corresponding response. But it will be necessary to concentrate all efforts not only on its fulfillment, but also on a significant over-fulfillment, since even today it is obvious that some shared goals are set too low in our country.

Additionally it is necessary to consider those areas which are not directly involved with it, but which can give it considerable support, above all by offering very high quality products which are needed for its fulfillment. In physical research that means, above all, as I have already noted, vacuum technology and optics. The Physics Institute of the Czechoslovak Academy of Sciences, in addition, is involved in several tasks which are connected with the program. Most important here are plasma and laser technology. The influence of the complex program, however, also affects the direction of further research activity of institute. We understand the complex program as a momentous task and a guideline which directs basic research so that its results might become an outstanding source of innovation of our economy.

[Question] Thank you for the interview.

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PROJECTS OF HUNGARIAN ACADEMY OF SCIENCES NATURAL SCIENCE LABS DESCRIBED

Budapest UJ IMPULZUS in Hungarian No 15, 25 Jul 87 pp 44-45

[Unsigned article: "Academy Workshops; Science and Practice"]

[Text] The institution bearing the name Natural Science Research Laboratories of the MTA [Hungarian Academy of Sciences] was created in 1976 out of university and other research groups working in various areas of science. The organization works as a research center, which means that the research laboratories gathered into a single economic unit enjoy independence in their scientific work.

Four independent scientific directors lead the four research laboratories--Biophysics, Crystal Physics, Geochemistry and Inorganic Chemistry. One of the scientific directors, Tamas Szekely, takes care of joint matters with a commission for a definite time, in the quality of director.

The basic conception of the Biophysics Research Laboratory is discovery of the connection between structure and function. Every tiny change in the structure of DNA and RNA can have dramatic consequences. Professor Imre Tarjan brought the views of solid body physics into this research, one of the outstanding results of which is an instrument suitable for measuring mutagenicity. The principle of its operation is that whenever chemical damage affects DNA the material carrying genetic information is damaged or destroyed. Each of the chemical materials acts like ultraviolet light, so the effect of any mutagenic material can be expressed in a photo equivalent. The Tarjan school recognized this fact at the level of basic research long ago, but for this to lead to an instrument required that the university theoretical atmosphere should meet with the practical spirit of the institute. Finally the Radelkis Cooperative made the instrument, and it is on the threshold of series manufacture. The cancer research organization created by Albert Szent-Gyorgyi in the United States and other foreign organizations, such as a research laboratory in France, are interested in it.

The Crystal Physics Research Laboratory does basic research in solid body physics on monocrystals which can be used in practice. The automatic equipment they developed to grow monocrystals, for example to produce tellurium dioxide, lithium niobate and zinc tungstate monocrystals, satisfies the needs of basic research and the needs for device development in other institutions. In

addition to cooperation with domestic enterprises there was an outstandingly successful project with the Material Sciences Institute of Connecticut University in the United States. Their 3 year contract was to study point faults in optical monocrystals, for which the monocrystals were produced in the laboratory.

At the Geochemistry Research Laboratory they study the conditions under which a few of the most important useful mineral raw materials of our country are produced in order to better understand the geological conditions of the country, thus laying a scientific foundation for raw material prospecting and working out more many-sided exploitation courses.

At the Inorganic Chemistry Research Laboratory they are studying, among other things, processes in which transformations take place on the surface of solid bodies or in which thermal decomposition takes place within them. It is generally thought that chemical reactions take place primarily in a homogeneous medium, that is in a solution or gas. In reality, however, this is the most rare, because a solid phase is virtually always present. It was primarily organic reactions which made this "homogeneous" view the general one. In industry--in metallurgy, the machine industry, light industry, the construction industry--the transformations are always heterogeneous. The boundary phase reactions studied at the institute are actually basic research themes.

But, for example, a study of burning or of the ash and slag produced is a very practical theme, for both are potentially valuable. The valuable materials in them and in other wastes can be saved with chlorine volatilization. The quantity of titanium, vanadium and rare earth metals on our Earth is constantly decreasing. The titanium sources of the socialist camp are quite limited. But with this procedure--chlorine volatilization--one can extract, for example, the titanium occurring in bauxite. In the course of research on this theme the researchers learned how to handle aggressive gases, and this in itself proved to be a fruitful area.

The materials science basic research being done at the laboratory is aimed at developing peak technologies and enjoys the support of the OMFb [National Technical Development Committee]. Special ceramics is one of the more outstanding themes here. It is an interesting feature of the history of science that civilization left its first traces in ceramics, and today ceramics are the new material of the peak technologies.

Good basic research makes possible flexible conversion to a new theme. They were able to convert very quickly to a theme of truly great significance, the study of special ceramics, because they had experience in the reactions of solid bodies. Oriented basic research connected with the physics and chemistry of solid bodies is very important in the interest of modernizing industry. According to a widespread erroneous view the ion state of the materials is regarded as fairly general in the area of inorganic materials and attention is hardly paid to the fundamental macromolecular state. For the most part traditional chemistry also deals with a water solution of ions. In the leading scientific countries, already in the 1950's, inorganic polymer chemistry was generally known and studied. Thermal stability is one of the important

properties of silicates. At the institute they have discovered fundamental interdependencies in this area. This made possible generalizations to pyrolytic (thermal decomposition) processes. It indicates the growing significance of the science of pyrolysis that a few years ago Elsevier began publishing the JOURNAL OF ANALYTICAL AND APPLIED PYROLYSIS which already boasts a significant impact factor. The basic interdependencies discovered in connection with pyrolysis were only basic research ideas but they gave great impetus to basic research being done in other areas as well since pyrolysis can be used well when studying materials with unknown structure. For example, if a giant molecule receives a thermal shock then it falls apart into thermal splinters (several hundred fragments) and these retain the original properties or structural elements of the material. Analyzing the thermal splinters requires precise measurement technology conditions but also good chemical intuition. A significant volume of Hungarian-Soviet and Hungarian-American project type joint research is being done in this area. This was made possible primarily by the high level instrument design potential and achievements of the laboratory. The special equipment of scientific department chief Ferenc Till could be created as a result of this.

In general the inventions made in the Natural Science Research Laboratories of the MTA are introduced within one year, one condition for which is that they work with permanent patent agents. They regard innovation as a profession which has its rules and techniques. Organization is not an activity to be scorned; it is nothing other than the efforts of modest men to cooperate in a modern way. The task of their Applications Technology and Coordination Office is management of the technologies developed jointly with industry, the development of "engineering." At present about 15 of their patents are in production.

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MANAGER OF HUNGARIAN ACADEMY NATURAL SCIENCE RESEARCH LABS INTERVIEWED

Budapest UJ IMPULZUS in Hungarian No 15, 25 Jul 87 pp 45-46

[Interview with Dr Tamas Szekely, director of the Natural Science Research Laboratories of the MTA (Hungarian Academy of Sciences) and leader of the Applications Technology and Coordination Office created by the institute, by "Gabor": "Managing Science"]

[Text] [Question] What is the secret of a well running, prospering management office?

[Answer] Relatively few personnel, versatility, flexibility and adaptability--these are perhaps the most important requirements. Today research and enterprise are closely interdependent concepts which presume one another.

[Question] When and for what purpose was the Office formed?

[Answer] In the fall of last year the directing council decided that we should solve practical utilization of research results within our own frameworks. Creation of the office was also encouraged by the fact that we had succeeded in developing a research staff which, in addition to sensitivity to practical problems, was publishing scientific works which were eliciting a significant international response. So industry can make good use of these results. We have developed a number of management systems. For example, as subcontractor the office entrusts a researcher with development of a theme; in other cases it is the other way round, the researcher undertakes a task and calls on the management office for help with industrial utilization of the result. There is such a bidirectional link even in internal institute administration--which shows up in the flow of money too. We would like to use the research apparatus for something still rare in Hungary--the synthesis of information. At present the collection and compilation of information is at a substantially higher level than its use. Frequently, however, a query extends to only part of the information and since this is what goes to the authorities making decisions and proposals they have only a mosaic, a deficient picture of the given area. What is lacking today is information about information, which would translate into the language of decision making the otherwise correct, modern and current national level information. We are seeking colleagues for this new activity of ours, but it is difficult to find on the Hungarian labor market agile researchers willing to undertake a many-sided task and having operational

expertise in many areas. We pigeonhole people, we don't let them develop enough, so they are afraid of more complicated, unknown tasks in advance.

[Question] Do you see any chance that scientific parks will spread here in larger numbers?

[Answer] In principle yes, although I am a little skeptical in this area. At the moment what I see is that there is very little of the hardware needed to create them, so it is not possible to completely exploit the university software. In the United States what essentially happened was a meeting of interest on the part of industry and university interestedness, and there was plenty of capital available for it. For the time being I do not sense here these conditions or the development of a common language. It is as if I were to seek what is needed for the parks and not organize the parks for the needs. I believe that the ideology has come before that about which the ideology could conceptualize.

[Question] You are chairman of the research business policy council of the Hungarian Credit Bank. To what extent might the new banking system give a boost to the practice of research and development thus far?

[Answer] For the time being we are in a stage of organization and building contacts, but a few problems can be outlined already. In general the researchers have gotten used to having financing come from state sources. It represents a change of gigantic significance that hereafter the banks will take over this role to a significant extent. State support may supplement this at most. At present most of the researchers turn to banks as sources of credit, at most; they are unaware of the possibilities of joint financing, joint stock companies or the founding of joint enterprises. So they are unaware of those advantageous forms which might be harmonized with the needs of a managing unit. And the banks--I believe--are not sufficiently aware of the possibilities hiding in the research base. And the greatest deficiency is that complex forms in which researchers, developers, banks, state organs and managing units could participate jointly have not developed and are not even starting to develop--although for the time being this is not yet a realistic requirement.

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