JPRS L/9874

29 July 1981

Japan Report

(FOUO 44/81)

FBIS FOREIGN BROADCAST INFORMATION SERVICE

NOTE

JPRS publications contain information primarily from foreign newspapers, periodicals and books, but also from news agency transmissions and broadcasts. Materials from foreign-language sources are translated; those from English-language sources are transcribed or reprinted, with the original phrasing and other characteristics retained.

Headlines, editorial reports, and material enclosed in brackets [] are supplied by JPRS. Processing indicators such as [Text] or [Excerpt] in the first line of each item, or following the last line of a brief, indicate how the original information was processed. Where no processing indicator is given, the information was summarized or extracted.

Unfamiliar names rendered phonetically or transliterated are enclosed in parentheses. Words or names preceded by a question mark and enclosed in parentheses were not clear in the original but have been supplied as appropriate in context. Other unattributed parenthetical notes within the body of an item originate with the source. Times within items are as given by source.

The contents of this publication in no way represent the policies, views or attitudes of the U.S. Government.

APPROVED FOR RELEASE: 2007/02/09: CIA-RDP82-00850R000400030055-4

JPRS L/9874

29 July 1981

JAPAN REPORT

(FOUO 44/81)

CONTENTS

SCIENCE AND TECHNOLOGY

U.S. URGES JAPAN JOINTLY TO DEVELOP, MAKE ARMS

Tokyo JAPAN ECONOMIC JOURNAL in English Vol 19, No 961, 30 Jun 81 pp 1,3

[Article by Fumio Tateiwa]

[Text] The United States recently asked Japan to jointly develop arms and supply the U.S. Army with electronics and other goods in an attempt to strengthen bilateral defense ties, it was revealed last week.

On this U.S. request, informed sources said, opinions within the Government are split and the Suzuki Cabinet will soon face with a very difficult political decision whether to accept the request or not. The pros argue that Japan should accept such a U.S. request from the standpoint of further promoting Japan-U.S. cooperation and modernizing weaponry of the Japanese Self-Defense Forces. The cons say that the supply of parts and jointly developed arms will violate the well-kept "three principles on arms export" and inevitably invite sharp criticisms from Opposition parties.

At present, sources said, the Japan-U.S. Equipment Technology Consultative Committee is the organ for exchanging defense technologies between the two countries and is managed mainly by the Defence Agency's Bureau of Equipment. But this committee's function is limited to basic research into defense technology and an exchange of defense-related information and does not go into the joint development or production of arms.

Thus the recent U.S. request is designed to go beyond the present setup to jointly develop and produce practical weaponry, utilizing Japan's highly-sophisticated technologies, sources said. The U.S. is also asking Japan to provide electronics and other Japanese goods with high reliability for its army.

Informed sources said this request is based on U.S. world strategy to counter the Soviet military threat with the U.S., West Europe and Japan together and is closely related to U.S. demands for Japan to share a greater defense burden in the future. Also, legally the request is founded on the Japan-U.S. Mutual Defense Assistance Agreement which stipulates that Japan will supply the U.S. with necessary materials and semi-finished goods.

Details on specific arms to be jointly developed are not disclosed yet, but the U.S. has long expressed its intention to utilize high-quality Japanese products. In March, 1980 former Undersecretary of State George Ball proposed that Japan build an aircraft carrier and loan it to the U.S. Navy.

Previously, Japan had been studying the possibility of joint development and production of arms in a bid to standardize weaponry between the two nations. It has already informed the U.S. of the study. The Defense Agency is willing to accept the recent U.S. request because the joint arms development will contribute to the modernization of SDF weaponry. But some officials said the joint arms production might violate the "three principles on arms export" and hold that Japan should be cautious in talking about joint production of arms and the talks should be limited only to the joint development of arms, not production.

Japan's "three principles on arms export" were first disclosed in the Diet by former Prime Minister Eisaku Sato in 1967 and stipulated that Japan would not export to: 1) Communist nations, (2) nations to which the United Nations had forbidden arms exports and (3) nations in dispute or likely to be in dispute.

Later, the Government elaborated on these three principles, and former Prime Minister Takeo Miki said in the Diet in 1976 that Japan will refrain from export of arms not only to those countries of said three categories, but also to any area, observing the spirit of the Japanese Constitution and the Foreign Exchange and Foreign Trade Control Law, and treat equipment for arms production also as arms.

CSO: 4120/272

SCIENCE AND TECHNOLOGY

1981 GOVERNMENT-SPONSORED ELECTRONICS PROJECTS DETAILED

Tokyo NIKKEI ELECTRONICS in Japanese 27 Apr, 11 May, 25 May 81

[27 Apr 81 pp 253-257]

[Text] Part 1. Beginning with this issue we will be introducing the 1981 government budget for electronics-related projects in three parts. Despite the tight budget, electronics-related projects have received special consideration. For example, MITI, whose projects we cover in this issue, has started a number of basic technology development projects aiming at the 1990's. It would seem that the importance of electronics as a major industry has been recognized. In the ensuing issues, we plan to present the budgets of the Science and Technology Agency, Defense Agency, Ministry of Transport, Ministry of Posts and Telecommunications, and Telegram and Telephone Public Corporation.

MITI: Introduces Various New Themes Aiming at the 1990's

As of fiscal 1981, MITI will begin three large-scale electronics-related research and development projects under the slogan, "aim for a technology based nation by the 1990's." Two projects deal with computers: "R & D of High-Speed Computation System for Science and Technology" and "R & D of 5th Generation Computers." The third, a device related project, is the "R & D of New Function Elements (R & D of Basic Industrial Technology for the Next Generation)."

One characteristic of the fiscal 1981 budget, in addition to these new large-scale projects, is the inclusion of the "Development of Fuel Battery Generating Technology" under the comprehensive energy-related Moonlight Plan; the other is the budget for the "R & D of Solar Energy Generation" under the Sunshine Plan, which has increased approximately 2.5 times from the previous year. (Table 1)

Two Computer Projects and R & D of New Function Elements To Start

Of the two computer related projects, the "High-speed Computation System for Science and Technology Computation" will aim at reaching a high-speed performance level of 10^4MFLOPS (million floating point operations per second). This would be done through utilization of devices faster than conventional ones and by parallel processing of multiple basic processors, without altering the system's architecture. The target value is about 100 times faster than the Crayl, the fastest system available today. In contrast, the "5th Generation Computers" will develop all-purpose, easy to handle computers. This will be achieved by actualization of non-Newmann type new architecture, such as data flow, and by enabling them to accept verbal instructions.

Table 1. MITI's Major Electronics Development Related Projects (unit: 1 million yen)

Item	Agency in charge, classification	Fiscal 1980	Fiscal 1981	Remarks
• Development and promotion of basic technology for next generation of electric computers	MITI, subsidy	5,785	6,200	Fiscal 1979-83, Total 23,500
* Basic software (OS) technology		4,910	5,150	Fiscal 1979-83, Total 20,000
* New peripheral terminal systems technology		875	1,050	Fiscal 1979-83, Total 3,500
• Survey of R & D of 5th generation computers	MITI	0	15	New. Fiscal 1981-90
• R & D of next generation's basic industry technology	Agency of Industrial Science and Technology	0	2,714	New. Fiscal 1981-90, total 100,000 (based on request)
* R & D of new function elements		0	673	New. Fiscal 1981-90, total 31,000 (")
• R & D of high-speed computation system for science and technology	Agency of Industrial Science and Technology, large project	0	30	New. Fiscal 1981-88, total 31,000 (based on request)
• Development of light applied measuring control system	" " "	927	2,418	Fiscal 1979-86, total 21,000
• Development of super high-performance laser applied compound production system	" " "	2,825	2,745	Fiscal 1977-83, total 13,000
• Solar energy technology development	Agency of Industrial Science and Technology, Sunshine Plan	9,544	7,961	From fiscal 1974. Including 5,639 special account
* R & D of solar generation		2,288	5,811	" 4,300 " "
• R & D of large-scale energy-saving technology	Agency of Industrial Science and Technology, Moonlight Plan	6,929	8,316	From fiscal 1978. Including 6,196 special account
* Development of technology for new battery storage system		352	646	Including 404 special account fiscal 1980-90
* Development of fuel battery generation technology		0	239	New. Fiscal 1981-86. Including 80 special account
• Subsidy for major R & D expenses	" " " , subsidy	2,759	2,600	
* R & D themes in major technology		1,583	1,583	In fiscal 1979, electronics related targets totaled 19
* R & D themes in unexplored revolutionary technology		355	355	
* R & D themes in energy-saving technology		358	391	
• Development of health-care network system	MITI	222	222	Fiscal 1978-83
• Operating expenses for Association for Promotion of Data Processing	MITI	3,376	3,373	Including 595 self-capital
* Promotion of development plans for software production technology		1,672	970	Fiscal 1976-81
* Promotion of development plans for software preventive maintenance technology		0	140	New. Fiscal 1981-85, total approx. 5,000
*Development and promotion of advanced data processing technology		395	32	New
* Expansion of special program development		1,351	1,201	

FOR OFFICIAL USE ONLY

APPROVED FOR RELEASE: 2007/02/09: CIA-RDP82-00850R000400030055-4

The "Computation System for Science and Technology" is a large project of the Agency of Industrial Science and Technology. For this it has asked the Ministry of Finance for a total of about 31 billion yen for 8 years until fiscal 1988. In fiscal 1981, the Agency will use 30 million yen to organize the entire project; in 1982, a general concept design will be completed. Whether or not to establish a research organization will be determined in 1981. It is expected that for high-speed elements, Josephson joining elements, excluding Si, and Fujitsu's high electronic transfer rate transistors (GaAlAs/GaAs) and GaAs electric field effective transistors, will be used (Table 2). The Josephson and high electronic transfer rate elements can function at super low temperatures of -269°C and -196°C, respectively. For parallel processing, the plans include mobilizing about 1,000 4 MFLOPS level processors in parallel position.

(1) 表2 [illegible]

		(2) ジョセフソン素子	(3) 新電子移動度トランジスタ	(4) GaAs 電界トランジスタ
(5) 動作温度		(6) 液体ヘリウム温度 (−269°C)	(7) 液体窒素温度 (−196°C)	(8) 常温
(9) 論理素子	(10) 集積度 (1チップ当たり)	[illegible] (11)	[illegible] (11)	[illegible] (11)
	(12) 速度 (1ゲート当たり)	[illegible] ps	10 ~ 20 ps	20 ~ 50 ps
(13) 記憶素子	(10) 集積度 (1チップ当たり)	16 ~ 64 K [illegible] (14)	16 ~ 64 K [illegible] (14)	16 ~ 64 K [illegible] (14)

Key: (1) Table 2. Performance Targets of Devices (candidates) Used for High-Speed Computation System for Science and Technology
(2) Josephson elements
(3) High electronic transfer rate transistors
(4) GaAs electric field transistors
(5) Operating temperature
(6) Liquid helium temperature
(7) Liquid nitrogen temperature
(8) Normal temperature
(9) Logical elements
(10) Integrated degree (per 1 chip)
(11) Gate
(12) Speed (per gate)
(13) Memory elements
(14) Bit

R & D of the "5th Generation Computers" is expected to last 10 years until fiscal 1990. In 1981, a survey will be conducted to determine the disbursement of 15 million yen, and the scale of the project will also be determined.

It is said that the second large-scale project, "R & D of New Function Elements" will "search for elements which will become a major force in the 21st century." This theme is a part of the project, "R & D of Basic Industrial Technology for the Next Generation," taken up by the Agency of Industrial Science and Technology.

The last project deals with three major items: "new function elements," "new materials," and "biotechnolcgy." The Agency has asked the Ministry of Finance for a total of 10 billion yen for 10 years until fiscal 1990. The "new function elements" will require 31 billion yen; it will use 673 million yen in fiscal 1981.

Under the "new function elements," there are four themes: 1) biochemical detecting elements; 2) super grid elements; 3) three dimensional circuit elements; and 4) environmentally durable reinforced elements. By 1981, the Agency will complete the plans, determine the manufacturer, and begin research.

The goals are: the 1) "biochemical detecting elements" will analyze chemical sensory mechanism of an organism to create a sensor capable of detecting scents, tastes, etc; under 2) "super grid elements," there will be a search for [new] materials, a development of growth control technology of extremely thin membranes, and development of interfacial physical properties control and evaluation technology; the goal is to realize super high-speed elements by means of crystal structure control at the level of atoms; 3) "three dimensional circuit elements" aims at integration of several layers of elements vertically; this is in contrast to the present LSI arrangement, where elements, such as transistors are integrated two-dimensionally. Items requiring development include a crystal formation technology such as that used in laser anneal, a design of a three-dimensional circuit, a multi-level signal unifying technology, a compounding of various functions, etc; 4) "environmentally durable reinforced elements" aims at establishing a highly reliable technology that will enable elements to function under special conditions such as radiation, high temperature, vibration, shock, etc; The development of 4) alone is 8 years, ending in 1988.

The "new materials" project is classified into two fields, the "fine ceramics" and the "high function high particles." Of these, the "high function high particles" include a theme related to electronics, viz, that of "electric conductive high particle materials." The target is to develop a material with a rate of $10^6 \Omega^{-1} \cdot cm^{-1}$, which is equivalent to conductivity of Cu and Ag; the material will be used principally for producing high temperature super electric conductive materials, organic semiconductors, and high anticorrosion electrodes.

In addition to these long-term large-scale projects, two new themes related to computer software will begin in fiscal 1981. The Association for Promotion of Data Processing is involved in "making changes in, adding functions to and improving the efficiency of software preventive maintenance" and in "development of advanced data processing." The former will require a total of approximately 5 billion yen for 5 years until 1985. For the latter, a "Center for Software Technology" (tentative) will be established to carry out research.

Construction of Solar Generation Plant To Start

The "Development of Fuel Battery Generation Technology," a new energy-related project, will develop four systems: the phosphoric acid type, alkali type, fusion carbonate type, and solid electrolyte type; it will also develop the application technology of these systems. The development of application of

phosphoric acid type, whose basic technology has already been established in United States and other countries, will be completed by fiscal 1986; it is hoped that this system will be commercially available by fiscal 1987. [The project coordinators] expect to complete the construction of a 1,000 kW test plant in 2 years between fiscal 1985 and 1986. Except for phosphoric acid type, interim evaluation for all others will be made in 5 years. The "fuel battery" project is a part of the Moonlight Plan being promoted by the Agency of Industrial Science and Technology. The Moonlight Plan originally started in 1976 for the purpose of developing energy-saving technology.

The Sunshine Plan, on the other hand, started in 1974 to develop alternative energy sources. The 1981 budget for one of its projects, the "R & D of Solar Generation Technology," is 5.6 billion yen, which is 2.5 times greater than that of the previous year. The budget growth rate for this project is outstanding in comparison to other MITI electronics development projects. This is due to the start of construction of pilot plants and a demonstration system. (Table 3)

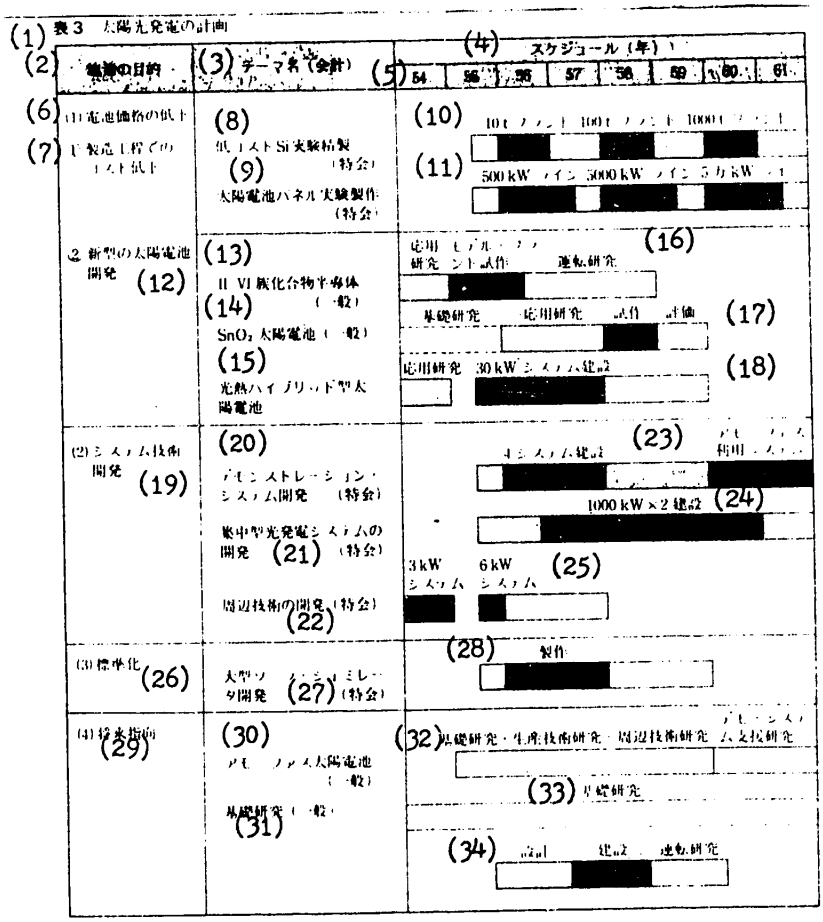
The construction of pilot plants includes one for a low-cost Si testing refinery (10t/year) and a solar battery panel test-manufacturing plant (500kW/year). The solar plant will be constructed for multi-crystal and ribbon crystal solar battery generations, both capable of producing 250 kW/year. As for the demonstration system, [solar generators] will be installed in private residences (generation capacity 3kW), apartment complex (60 kW), schools (200 kW), and factories (100 kW) by the end of fiscal 1982.

Of the approximately 5.8 billion yen budgeted for solar generation, 4.3 billion yen (special account) will be used for test plants, such as the pilot plants (approximately 2.1 billion yen) and for the demonstration system (approximately 1 billion yen). The greater part (about 1.3 billion yen) of the balance of 1.5 billion yen (general account) will be appropriated for R & D of amorphous Si solar battery. The goal of solar generation is to achieve the level of 50 yen/W in 10 years. According to a project spokesman, the most promising element in achieving this goal is "amorphous Si."

However, the departments in charge of these projects are unwilling to reveal the details of various projects or the names of commissioned manufacturers.

On the other hand, the "Major Technology Development Subsidy" (Agency of Industrial Science and Technology), granted to private industries for R & D projects, is 2.6 billion yen for fiscal 1981, a drop of about 6 percent from the previous year. New themes for fiscal 1981 will be determined in June, but the electronics-related themes continued from fiscal 1980 are as follows:

The "core technologies" include 1) applied research in recording medium for high density magnetic recording (Tokyo Shibaura Electric, Nichiden Anelba [phonetic], fiscal 1980-81); 2) research and testing of LSI applied intelligent multiple automatic measuring system (Automatic Measuring Technology Research Association, fiscal 1980-82); 3) applied research in two-dimensional minimum light measurement (Hamamatsu Television, fiscal 1980-81); 4) applied research in color liquid crystal matrix display (Hoshi Electric, fiscal 1980-81).



Key:
(1) Table 3. Solar Generation Plan
(2) Purposes
(3) Themes (Account)
(4) Schedules (year)
(5) 1979, 1980, 1981, 1982, 1983, 1984, 1985, 1986
(6) (1) Cost reduction of battery
(7) 1) Cost reduction in manufacturing process
(8) Low cost Si Test refining (special account)
(9) Solar battery panel test manufacturing (special account)
(10) 10t plant 100t plant 1000t plant
(11) 500kW line 5000kW line 50,000kW line
(12) 2) Development of new type of solar battery
(13) II-VI group compound semiconductors (general account)
(14) SnOs Solar battery (general account)
(15) Light and heat hybrid type solar battery

[key continued]

[Table 3 Key continued]

(16) Applied research Test running of model plants Operation research
(17) Basic research Applied research Test Evaluation
(18) Applied research Construction of 30kW system
(19) (2) Development of system technology
(20) Development of demonstration system (special account)
(21) Development of concentrated solar generation system (special account)
(22) Development of peripheral technology (special account)
(23) Construction of 4 systems Amorphous system
(24) 100kW x 2 constructions
(25) 3kW system 6kW system
(26) (3) Standardization
(27) Development of large solar simulators (special account)
(28) Manufacturing
(29) (4) Future Trends
(30) Amorphous solar battery (general account)
(31) Basic research (general account)
(32) Basic research · Production technology research · Peripheral technology research · Demonstration system support study
(33) Basic research
(34) Designing Construction Operation research

The "unexplored revolutionary technologies" include 1) research in light memory materials (Oki Electric, fiscal 1980-82); 2) research in the method of measuring internal temperature of organism (Human Well-being Equipment Research Center of the Technology and Research Association, fiscal 1980-82); 3) research in Josephson integrated circuit (Nippon Electric, Hitachi Ltd, Fujitsu, and Mitsubishi Electric, 1980-83).

The "energy conservation technologies" include applied research in the development of image indicating system using low power consuming CRT. (Sanyo Electric, 1980-82)

[11 May 81 pp 254-260]

[Text] Part 2

Ministry of Transport: Digitalization of Meteorological Radar Images To Begin

The fiscal 1981 electronics-related projects of the Ministry of Transport are mostly carryovers from last year; there are few changes.

The Meteorological Agency of the Ministry, however, will begin digitalization of meteorological radar images. The digitalization will make easy computer processing of such data gathered by radar as rainfall by fixing the volume of data, and, at the same time, will increase the reliability of forecast by externally inserting the movement of rain.

This is done in five stages: 1) First, reflected waves are converted into digitals (two advancements). 2) Secondly, such data as mountains and buildings are eliminated through processing. This is done by taking advantage of the fact that rain, snow and hail have the significant characteristic of fluctuating greatly against time, whereas mountains and buildings remain still. 3) In order to filter out noise, measurements are made 8 times per 1/100 second and an average is taken. 4) Emitted signals are then converted along the X-Y coordinates from the radar's polar coordinates. Because these signals can be indicated in the CRT (cathode-ray tube) of a luster scanner and because intensity distribution can be indicated in color, the readings can be made easily even in bright areas. In addition, the data can be put into the L ADDESS (meteorological data automatic data editing station system) via communication circuits so as to make them available throughout the country. It will be installed in Fukui and Nagoya in 1981. (About 160 million yen)

In addition, as a part of its "Promotion of Earthquake Warning Plan," the Meteorological Agency will begin a survey on the installation of a permanent submarine earthquake observation system off the coast of Boso. (3.2 million yen)

The Civil Aviation Bureau, as part of its "control tower consolidation" program, will install flight observation radar in Amami. Furthermore, it will improve the program of flight data plan processing system (FDP). This is because the number of troubles has increased annually due to the increased number of flights. The RDP (radar data processing system) will enter the final stage in fiscal 1981.

Defense Agency: New Large-Scale Projects To Start

The fiscal 1981 budget for the Defense Agency is 2.4 trillion yen, an increase of 7.6 percent from the previous year. The rate of increase is comparable to that of last year. It has dropped below the 10 percent level for 2 years in succession. The amount represents 0.91 percent of the GNP, which means a slight increase over the 0.90 percent level of the past 3 years. In the area of R & D, the budget of the Technological Research and Development Institute (Tech-Institute) is 31.711 billion yen, an increase of 10.2 percent from the previous year (which recorded a 7.2 percent increase).

For fiscal 1981, what is noticeable are the new large-scale projects. They include the development of next-generation intermediate trainers (MTX), the decision on a system (BADGE X) to replace automatic alert control system, and the building of missile escorts

Development of MTX To Cost 38 Billion Yen

Among the R & D items of the Defense Agency's Tech-Institute, the MTX, which will begin in fiscal 1981, represents the first military aircraft to be produced in Japan in years. This project will manufacture training craft that will replace the present T-1 and T-33. The development period is about 7 years; four flight and two fatigue test craft will be manufactured on a trial basis with an estimated total cost of 38 billion yen (based on fiscal 1980 cost). For fiscal 1981, 1.596 billion yen has been set aside for basic design and draft related tests and research (for 2 years; of which 1.267 billion yen is allocated for fiscal 1982). Later on, more detailed designs and trial manufacture will follow, and the first flight is expected to take place in the summer of 1985. It is said that after the completion of the development, about 150-200 planes will be purchased in 10 years beginning the first half of the 1985-1995 decade at a total cost of 250 billion yen. Manufacturers have already begun competing for orders, among them Fuji Heavy Industries which manufactured T-1 and Kawasaki Heavy Industries which manufactured T-33. It is anticipated that major contractors for the development will be selected in fiscal 1982.

Research and trial manufacture of small turbo fan engines (F-3), destined for MTX will also move ahead. As in last year, five units will be trial manufactured. The fiscal 1981 budget is 3.259 billion yen (for 2 years; of which 2.588 billion yen is for fiscal 1982). The development period is expected to last until fiscal 1983.

Regarding aircraft, research and trial manufacture (Tech-Institute's own research proposition) of CCV (motion capacity improvement system) continues to outshine others. During the last fiscal year, segmented trial manufacture was conducted; however, this year's goal is to assemble the system into the aircraft body (T-2) and fly it. The fiscal 1981 budget is 2.513 billion yen (for 3 years; 158 million yen for fiscal 1982, 1.996 billion yen for fiscal 1983). The virgin flight is expected to take place in 1982. It is anticipated that the Defense Agency will use CCV extensively in the next generation of support fighters (FSX) (in the mid 1985-1995 decade).

As a new research proposition, there is the future fire control system. It is to be developed for use in combat planes replacing F-15 and F-4. In fiscal 1981, 168 million yen (for 2 years; 134 million yen for fiscal 1982) will be used to trial manufacture phased alley antennas.

A budget has also been approved for ECM (Electronic Counter Measure) system (ALQ-8) to be installed in F-15. Antennas were trial manufactured last year. In 1981, 464 million yen (for 2 years; 169 million yen for 1982) will be spent to trial manufacture transmitting and modulation units. ALQ-8 is a system which jams signals from firearm control systems of enemy craft and surface-to-air guided missiles. It is expected to be completed by fiscal 1983.

Among the continuing research projects, one proposition just as significant as the CCV is the research and trial manufacture of portable surface-to-air guided missiles (portable SAM) (SAM-1). The fiscal 1981 budget is 1.794 billion yen (for 3 years; 390 million yen for fiscal 1982, 1.217 billion yen for fiscal 1983). This is a portable guided missile. It employs an image homing method and utilizes a CCD (Charge Coupled Device) image sensor in the homing system. Two groups, Tokyo Shibaura Electric and Kawasaki Heavy Industries--Nippon Electric, are manufacturing the first trial products. In addition, air-to-air guided missiles, medium range anti-tank guided missiles (Medium MAT), and surface-to-ship guided missiles (SSM) are being developed.

The budget for high-speed homing torpedo is also large. It is 4.12 billion yen (for 3 years; 2.356 billion yen for fiscal 1982, 1.341 billion yen for fiscal 1983). Seven torpedoes will be trial manufactured. This plan has been in effect since fiscal 1970 and every aspect of it will finally enter the trial manufacture stage. Mitsubishi Heavy Industries is in charge.

There are new projects in radar and communications areas. First, there is a new radar for battle field observation. This is a medium-range land radar capable of catching even human movements. The budget is for 267 million yen (for 2 years; 213 million yen for fiscal 1982). There will be only one trial manufacture. Secondly, there is new outdoor radio equipment which will be used to form mobile radio communications networks. A total of 460 million yen (for 2 years; 367 million yen for fiscal 1982) will be used to trial manufacture radio equipment for search planes, land vehicle radios, relay radios, and portable radios. As a continuing project, 369 million yen (for 2 years; 294 million yen for fiscal 1982) has been appropriated for army corps' electronic switchboard.

As an unusual item, there is the research and trial manufacture of ultra-red ray sensor. Up to this year semiconductors were hardly treated independently. Ultra-red CCD exceeding 200 elements will be developed at a cost of 154 million yen.

A Decision on Next-Term BADGE System Is Expected

Among purchase and operations, the next-term automatic air defense alert control system (BADGE X) is attracting much attention. For fiscal 1981, only survey expenses have been approved; however, it is expected that system design

and choice of major contractors will be completed within the year. It is anticipated that purchases will begin as of fiscal 1983, expending a total of 230 billion yen. Japanese computers will be used and software will be developed in Japan with the help of the United States. For this reason, major electronics manufacturers such as Fujitsu, Hitachi, Mitsubishi Electric, Nippon Electric, and Tokyo Shibaura Electric are fiercely competing for orders.

In the area of aircraft, four early warning crafts (E-2C) will be purchased. Three anti-submarine patrol planes (P-3C) will be purchased for the first time, and eight interceptors (F-15J, F-15DJ) will be obtained but no orders will be placed in fiscal 1981. In addition, a total of 43 planes (about half of 1980 purchases), will be purchased, including 2 transports (C-130H).

For surface-to-air guided missiles, 6 sets of short-range surface-to-air guided missiles (Short SAM) and 20 sets of portable surface-to-air guided missiles (Carry-on SAM) will be purchased for the first time in years. The short SAM is a guided missile developed by Tech-Institute between fiscal 1971 and 1979. Tokyo Shibaura was in charge of development. The portable SAM will be the U.S. made Stinger. It is said that U.S. made SAMs will be replaced by those developed by Tech-Institute in the future. Also, nine anti-ship and anti-tank guided missile launchers will be purchased. In addition, the practice of converting one anti-aircraft technical group unit to improved Hawk will continue.

Another notable feature of fiscal 1981 is the construction of new warships. These include seven guided missile (Tartar) equipped naval escorts, totalling 16,980 tons. As in the past, guided missiles will be installed for ship-to-ship and ship-to-air capabilities on the escort "Takatsuki."

In communications, consolidation of a new control command system will start. Installation of defense micro circuit will continue; in fiscal 1981, it will be installed between Fukuoka and Sasebo. In order to reinforce anti-submarine command communications capability, a survey on the consolidation of super-long wave transmitting station will continue. Also, an electronics corps will be newly organized under the northern army corps (Higashi Chitose) of Ground Self-Defense Force and an electronics operations support corps (Yokosuka) under the Maritime Self Defense Force.

So far, an outline of the items mostly utilizing electronics equipment has been presented. Beginning this April, "mid-term operation estimates for fiscal 1981" (plans for fiscal 1983-87) will be compiled. As seen in the BADGE X projects, there will be even greater opportunities for electronics manufacturers to participate.

Science and Technology Agency and Ministry of Education: Numerous Satellite Plans in Order

The rate of increase for the entire space related budget has been less than 3 percent for the past several years. The 1981 [budget] is 105 billion yen, a 2.9 percent increase from the previous year. However, there are many new projects. There are numerous satellite launch and development plans. The development of a prototype H-1 rocket will start.

According to the National Space Development Agency, it plans to launch Stationary Meteorological Satellite No 2 in summer 1981; this will be followed by the launching of Communications Satellite No 2 in fiscal 1982 and 1983, Broadcast Satellite No 2 in fiscal 1983 and 1985, Marine Observation Satellite No 1 in winter 1984 (the above satellites will be launched by N-II rockets), and Geodetic Satellite No 1 around fiscal 1985 (by H-1 rocket). In addition, there are plans for Earth Observation Satellite (ERS-1) and Aviation-Marine Engineering Satellite (AMES).

The ERS-1 will conduct observations to secure data on energy resources, minerals, forestry, agricultural product conditions, land and its usage, and environmental protection. It will weigh 1.2 tons and circle along the solar orbit at an altitude of 500-700 km; its life-expectancy is about 2 years. It will maintain its position by a three axis-control system. The 1981 budget applies not to the development of the main body but to that of sensors. It will be used to trial manufacture a synthetic open-mouth radar, a visual near ultra-red radiation gauge, and a visual thermal ultra-red radiation gauge. The AMES is a multipurpose nonstationary communications satellite and its targets are to establish communications engineering between aircraft and vessels, experiment with evaluation of flight control, and conduct basic experiments on marine satellites. It will weigh about 350 kg, will have a stationary orbit and life-expectancy of about 1.5 years. The AMES budget is shown in Table 3 under "technological survey and research on stationary spin-type mobile communications engineering satellite." In 1981, the system will be studied, antennas developed, etc.

The Ministry of Education will launch No 10 Science Satellite in winter 1984 and No 11 Science Satellite in winter 1985. No 10 will analyze the structure of Halley's Comet. It will weigh 125 kg. No 11 will measure X-rays from distant celestial bodies. It will weigh about 400 kg. Both satellites will use M-3S Revised I Rocket.

In the area of rockets, the National Space Development Agency will develop a prototype H-1 rocket. It will conduct basic designing, trial manufacture and experiment of second stage liquid oxygen and liquid hydrogen engines as well as inertia induction device. H-1 will launch satellites weighing about 100 kg. In comparison to the conventional N-I and N-II rockets, the ratio of the Japanese-made parts in H-1 will double to 90 percent. For example, the inertia induction device will be developed domestically, using a stable platform system. Computers and programs for inertia induction are being developed now.

The Ministry of Education will also develop a new M-3S Revised I Rocket that uses solid fuel only. It is expected to be launched in summer 1984.

In addition, in the aerospace area, R & D of fan-jet STOL is significant (National Aerospace Laboratory). This is an aircraft whose take-off and landing distances are short. The Laboratory hopes to complete it by fiscal 1983. In 1981, manufacturing of aircraft body and engine will begin (4.385 billion yen; amount born by national liability action is 3.9 billion yen).

Table 1. Ministry of Transport's Electronics-Related Projects (unit: 1 million yen)

Item	Agency in charge, classification	Fiscal 1980	Fiscal 1981	Remarks
• Reinforcement of Earthquake and Volcano Policy	Meteorological Agency	2,312 (40)	2,082	
* Promotion of earthquake forecast plan		2,152 (40)	1,984	Consolidation of permanent submarine earthquake observation system (including survey on the new facility off Boso), etc.
* Promotion of volcano eruption forecast plan		160	98	Installation of volcanic vibration observation system, etc.
• Reinforcement of typhoon, rain and snow storm observation system	Meteorological Agency	2,304 (168)	2,649	
* Consolidation of regional meteorological observation network		88	88	Installation of snow gauges in 30 locations, repeated from last year
* Consolidation of meteorological radar observation operations		355	400	Begin digitalization of meteorological radar images. New installation in Fukui and Nagoya
* Consolidation of meteorological data transmitting network		1,605 (40)	1,581	Sapporo, Sendai, Niigata
* Consolidation of core forecast analysis		95 (128)	360	Increase and replacement of electronic computers for forecast analysis
• Consolidation of marine meteorological observation system	Meteorological Agency	61	185	
* Consolidation of tidal and wave observation facilities on shore		61	62	Satamisaki
* Consolidation of marine meteorological buoy robots		0	122	To be newly installed in southern waters. Reinforcement and replacement of receiving controls at (Kiyose) station
• Consolidation of stationary meteorological satellite operations	Meteorological Agency	792 (207)	869	Consolidation of a ground facility accompanying the launching of stationary meteorological satellite No 2 (summer)
• Consolidation of air route facility	Civil Aviation Bureau	8,448 (3,889)	9,588 (1,872)	
* Consolidation of control facility		6,358 (3,748)	7,983 (1,872)	Consolidation of air route observation radar (to be newly installed in Amami), etc.
* Consolidation of aviation safety radio facility		1,295	345	New and existing installations in Iki, Miyazu
* Consolidation of communications facility		137 (141)	601	Consolidation of domestic electronic relay system (Chitose, Fukuoka), etc.
* Survey of air route consolidation		485	476	
* Others		173	183	
• Expansion and reinforcement of marine surveys	Martime Safety Agency	737 (470)	1,979 (5,294)	
* Consolidation of marine geodetic network		206 (470)	401	A set of laser distance measurement system included

Figures in *( ) represent National Liability Action

(1) 表2 防衛庁関係予算 単位：100万円

(2) 項目	(3) 担当機関	(4) 55年度	(5) 56年度	(6) 後年度負担額	(7) その他
(8) (a)研究・開発関係					
(9) ●新規研究開発費等	(10) 防衛庁技本	16,597	13,276	15,957	
(11) ▷誘導武器関係	(10) 防衛庁技本	1,099	1,022	2,446.	6件 (12)
(13) ▷電子機器関係	(10) 防衛庁技本	2,476	1,440	2,389.	11件 (12)
(14) ▷火器・車両関係	(10) 防衛庁技本	2,375	984	846.	7件 (12)
(15) ▷艦艇・水中武器関係	(10) 防衛庁技本	1,706	1,134	4,040.	7件 (12)
(16) ▷航空機関係	(10) 防衛庁技本	1,142	1,319	6,110.	4件 (12)
(17) (b)事業・調達関係					
(18) ●装備の充実	防衛本庁 (19)				
(20) ▷甲類	防衛本庁 (19)	0	104	41,051	
(21) 79式対舶艦対戦車誘導弾発射装置	防衛本庁 (19)	0	0	562.	9セット (22)
(23) 74式戦車	防衛本庁 (19)	0	0	24,960.	72両 (24)
(25) ▷地対空誘導弾	(19) 防衛本庁	2,183	3,029	44,967	
(26) ホーク	(19) 防衛本庁	…	1,931	28,846	
(27) 短SAM	(19) 防衛本庁		829	15,852	
(28) 携帯SAM	(19) 防衛本庁	…	270	270	
(29) ▷航空機	(19) 防衛本庁	5,599	5,985	101,133	
(30) 早期警戒機(E-2C)	(19) 防衛本庁		1,646	47,500.	4機 (31)
(32) ▷艦船	(19) 防衛本庁	3,853	7,335	187,566.	9隻，1万7191t (33)
(34) ●防衛マイクロ回線の建設と中央指揮所の設置	防衛本庁 (19)	3,140	5,727	2,104	
(35) ▷防衛マイクロ回線	(19) 防衛本庁	3,120	5,125	701	
(36) ▷中央指揮所	(19) 防衛本庁	20	601	1,403	

Key:
(1) Table 2. Defense Agency Budget (unit: 1 million yen)
(2) Item
(3) Agency in charge
(4) Fiscal 1980
(5) Fiscal 1981
(6) Amount to be shared in later years
(7) Others
(8) (a) Research and Development
(9) • New R & D expenses, etc.
(10) Technological Research and Development Institute, Defense Agency
(11) * Guided weaponry
(12) Items
(13) * Electronic equipment
(14) * Firearms and vehicles
(15) * Warships and underwater weaponry

[key continued]

[Table 2 Key continued]

(16) *Aircraft
(17) (b) Projects and Purchases
(18) • Consolidation of military ware
(19) * Defense Agency
(20) * Classification A
(21) Type 79 anti-ship and anti-tank guided missile launchers
(22) Sets
(23) Type 74 tanks
(24) Vehicles
(25) * Surface-to-air guided missiles
(26) Hawk
(27) Short SAM
(28) Carry-on SAM
(29) * Aircraft
(39) Early warning craft (E-2C)
(31) Units
(32) * Warships
(33) Vessels, 17, 191 t
(34) • Construction of defense micro circuits and establishment of central command office
(35) * Defense micro circuits
(36) * Central command office

(1) 表3 [illegible]

(2)	(3)	(4) 55年度	(5) 56年度	(6) 国庫債務負担行為 56年度
(7) ●静止気象衛星2号（GMS-2）の開発	(8) 宇宙開発事業団	13,762	10,409	267
(9) ●通信衛星2号（CS-2）の開発	(8) 宇宙開発事業団	2,841	5,221	221
(10) ●放送衛星2号（BS-2）の開発	(8) 宇宙開発事業団	560	3,154	935
(11) ●海洋観測衛星1号（MOS-1）の開発	(8) 宇宙開発事業団	3,719	8,354	16,018
(12) ●測地衛星1号（GS-1）の開発研究	(8) 宇宙開発事業団	100	100	776
(13) ●合成開口レーダーなどの地球観測機器（センサー）の試作試験	(8) 宇宙開発事業団	134	702	665
(14) ●静止3軸型移動体通信技術衛星に関する技術調査研究	(8) 宇宙開発事業団	140	189	557
(15) ●地球観測情報の処理	(8) 宇宙開発事業団	1,073	1,845	1,675
(16) ●衛星基礎技術に関する研究	(17) 航空宇宙技研	18	36	
(18) ●科学衛星研究経費	(19) 宇宙科学研究所	4,113	3,153	3,933
(20) ・第10号科学衛星の開発	(19) 宇宙科学研究所	371	400	
(21) ・第11号科学衛星の開発	(19) 宇宙科学研究所	0	200	
(22) ●H-Iロケットの開発	(8) 宇宙開発事業団	9,321	16,022	11,764
(23) ・実機型開発分	(8) 宇宙開発事業団	0	2,000	9,285
(24) ●液酸・液水ロケットエンジン要素の研究	(17) 航空宇宙技研	41	106	
(25) ●Mロケット開発費	(19) 宇宙科学研究所	1,162	2,223	
(26) ・M-3S改Iロケットの開発	(19) 宇宙科学研究所	0	1,623	
(27) ●液水エンジン開発の基礎研究経費	(19) 宇宙科学研究所	344	344	
(28) ●宇宙利用材料実験システムの調査研究	(8) 宇宙開発事業団	108	369	
(29) ●スペース・シャトル計画（SEPAC）に関する参加経費	(19) 宇宙科学研究所	437	374	

Key:
(1) Table 3. Space Development Budget of Science and Technology Agency and Ministry of Education (unit: 1 million yen)
(2) Items (major projects)
(3) Agency in charge
(4) Fiscal 1980
(5) Fiscal 1981
(6) Amount born by National Liability Action (Fiscal 1981)
(7) • Development of Stationary Meteorological Satellite No 2 (GMS-2)
(8) National Space Development Agency
(9) • Development of Communications Satellite No 2 (CS-2)
(10) • Development of Broadcasting Satellite No 2 (BS-2)
(11) • Development of Marine Observation Satellite No 1 (MOS-1)
(12) • R & D of Geodetic Satellite No 1 (GS-1)
(13) • Trial testing of earth observation equipment (sensors) such as synthetic open-mouth radar

[key continued]

[Table 3 Key continued]

(14) • Technological survey and research in stationary spin-type mobile communications engineering satellite
(15) • Receiving and processing of earth observation data
(16) • Research in basic satellite technology
(17) National Aerospace Laboratory
(18) • Research expenses for Science Satellites
(19) Space Science Research Institute
(20) * Development of No 10 Science Satellite
(21) * Development of No 11 Science Satellite
(22) • Development of H-1 Rocket
(23) * For development of practical model
(24) • Research in liquid oxygen-liquid hydrogen rocket engine elements
(25) • Development expenses for M Rockets
(26) * Development of M-3S Revised I Rocket
(27) • Basic research expenses for development of liquid hydrogen engine
(28) • Survey and research in space material testing system
(29) • Expenses for participating in Space Shuttle Plan (SEPAC)

[25 May 81 pp 233-236]

[Text] Part 3

Ministry of Posts and Telecommunications: Concentrates on Satellite Application Technology

Fiscal 1981 general account budget of the Ministry of Posts and Telecommunications is 24.03 billion yen, which is an increase of 1.4 percent from the previous year. Its major projects are shown in Table 1. Again this year, in addition to 1981 estimated expenditure, a national liability action (fiscal expenditures take effect after the following year, but contracts should be made in advance) in the amount of 949 million yen has been appropriated for space-related projects. The main research topic is the development of satellite application technology. Also important is highly precise land measurements utilizing space radio waves (waves transmitted from radio stars).

In the space-related budget, 821 million yen, which is nearly half the budget, will be used by the "Organization of Communications and Broadcasting Satellites." This organization controls and manages orbiting communications and broadcasting satellites; it was established in August, 1979. This year, it plans to construct in Kimizu, Chiba prefecture, a radio station which controls stationary satellites.

The "Experimental Research in Communications and Broadcasting Satellites" (840 million yen) deals mainly in experiments using satellites launched by NASA (National Aeronautics and Space Administration) and commissioned by Japan. The communications satellite (CS) was launched in December, 1977, and the broadcasting satellite (BSO) in April, 1978. Both weigh about 350 kg and life-expectancy is about 3 years. The BS broadcasting functions based on 12 GHz band have stopped since June 1980, but other experiments are continuing. In terms of telephone conversion (4KHz), the communications capacity of CS is about 4,000 circuits; communications experiments are still continuing. It has six systems under 30 GHz (ascending)/20GHz (descending), and two under 6GHz (ascending)/ 4GHz (descending).

Launching of stationary communications testing satellites (about 130 kg) by Japanese made N-Rockets failed twice; the plan has been scrapped. Because of this, communications experiment of millimeter wave band (32/35 GHz), which had been a part of the above plan, will be continued on land.

However, practical satellites (about 350 kg), which are extensions of present CS and BS, are expected to be launched by Japanese made N-II Rockets. According to the present plan, CS-2a will be launched in February, 1983; CS-2b in September, 1983; BS-2a in February, 1984; and BS-2b in August, 1985.

Satellites utilizing mobile marine communications (21 million yen) allow communications with vessels and aircraft. It uses both L-band (1.5/1.6 GHz) and C-band (5GHz); its communications capacity based on telephone conversion is 10 circuits. The satellite will weigh 40-60 kg with life-expectancy of 1.5 years. The target launch year is 1985.

(1) 表1 郵政省関係のエレクトロニクス関連プロジェクト（単位：100万円）

(2) 項目	(3) 担当機関	(4) 55年度	(5) 56年度	(6) 期間(年度)・その他
(7) (a) 研究・開発関係				
(8) ●宇宙の開発と利用の推進		2,077	1,935	(9) 債56 = 949
(10) ▷実用衛星の利用推進	(11) 通信・放送衛星機構	480	821	(12) 54～58, 債56 = 800
(13) ▷通信衛星および放送衛星の実験研究等	(14) 電波研究所	1,324	840	(15) 53～56
(16) ▷衛星を利用した航空・海上通信技術の研究開発	(14) 電波研究所	57	21	
(17) ▷衛星用マルチビーム・アンテナの研究開発	(14) 電波研究所	15	18	
(18) ▷宇宙電波による高精度測位技術の研究開発	(14) 電波研究所	86	208	(19) 債56 = 149
(20) ▷衛星搭載用能動型電波リモート・センサの研究開発	(14) 電波研究所	100	10	
(21) ▷第二世代の実用衛星の利用と開発	(22) 電波監理局	15	17	
(23) ●電気通信政策の推進		282	319	
(24) ▷データ通信の高度化を図るための開発調査	(25) 電気通信政策局	214	210	
(26) ▷電気通信応用システムに関する調査	(25) 電気通信政策局	68	57	
(27) ▷高度総合情報通信システム開発実験調査	(25) 電気通信政策局	——	31	(28) 新規
(29) ▷通信行政に関する長期的展望策定のための調査研究	(25) 電気通信政策局	——	21	(28) 新規
(30) (b) 事業・調達関係				
(31) ●放送行政の推進		1,195	1,242	
(32) ▷国際放送の充実	(22) 電波監理局	943	998	
(33) ▷テレビジョン放送の難視聴解消促進	(22) 電波監理局	252	244	
(34) ●電波資源の開発と利用秩序の維持		211	248	
(35) ▷周波数資源の開発	(14) 電波研究所	149	189	
(36) ▷放送波妨害など監視施設の整備強化	(22) 電波監理局	62	59	
(37) ●国際協力の推進	(38) 国際協力課	35	37	

Key:
(1) Table 1. Ministry of Posts and Telecommunications' Electronics Related Projects (unit: 1 million yen)
(2) Items
(3) Agency in charge
(4) Fiscal 1980
(5) Fiscal 1981
(6) Period (fiscal year), others
(7) (a) Research and Development
(8) ● Promotion of space development and utilization
(9) 1981 liability= 949
(10) * Promotion of utilization of satellites
(11) Organization of Communications and Broadcast Satellites
(12) 1979-83, 1981 liability= 800
(13) * Experimental research of communications and broadcast satellites
(14) Radio Research Laboratory
(15) 1978-81

(16) * R & D of aviation and marine communications technology utilizing satellites
(17) * R & D of multi-beam antenna for satellite use
(18) * R & D of high precision position measuring technology by space signals
(19) 1981 liability= 149
(20) * R & D of active-type radio remote sensor installed in satellites
(21) * Utilization and development of second-generation satellites
(22) Radio Regulatory Bureau
(23) • Promotion of electrical communications policy
(24) * Development and survey for enhancing data communications
(25) Electrical Communications Policy Bureau
(26) * Survey on electrical communications applied systems
(27) * Development, experiment and survey on high-level comprehensive data communication system
(28) New
(29) * Survey and research to determine long-term prospects on communications administration
(30) (b) Projects and purchases
(31) • Promotion of broadcast administration
(32) * Consolidation of international broadcast
(33) * Promotion of elimination of audio-visual problems in television broadcast
(34) • Development of signal resources and maintenance of order in utilization
(35) * Development of frequency resources
(36) * Consolidation and reinforcement of control facilities for detecting signal interferences
(37) • Promotion of international cooperation
(38) International Cooperation Division

As a part of basic research, there is the study of multi-beam antenna (18 million yen) for satellite-use. The antenna is capable of emitting several independent beams.

The Distance Between Japan-U.S. Will Be Measured With an Error of Only Several CM

One attention-getting project is the research in geodetic technology using space radio waves (208 million yen). Under this method, weak noise waves from radio stars or satellites are received at two distant locations (more than 100 km apart); an accurate measurement of the distance between these two points can be calculated from the time difference in reception of signals.

The crucial technological point lies in accurate recording of times and in correlation of two radio waves. It is expected that the distance between the United States and Japan can be measured within the accuracy of several cm. As a result, it is said that this technology will be useful in measuring land movements and predicting earthquakes.

Noticeable Interest in Electrical Communications Policy

With the establishment of the Electrical Communications Policy Bureau, some interest in electrical communications policy has appeared. The standardization for the purpose of enhancing data communications (210 million yen) will be more or less complete by 1981. As in 1980, it is likely that the research will be commissioned to Data Communications Association and Joint System Development. The details are: 1) proving system to check the appropriateness to the standard protocol (92 million yen); 2) access method for data base (38 million yen); and 3) codifying method for data protection (27 million yen).

The "Electrical Communications Application System" (57 million yen) refers to the so-called Captain system (information service using telephone and television set); the Ministry of Posts and Telecommunications is responsible for data input and system's software. In 1981, terminals will be increased and testing will enter a second stage. The target for commercialization is fiscal 1983. In addition, approval has been given to such new projects as actualization of home information system at Tsukuba Academic Community (31 million yen) and to survey of long-term communications policies (21 million yen).

Telegraph and Telephone Public Corporation: 3.5 Percent Increase in Construction Investment; Development Expenses To Reach 80.2 Billion Yen

The fiscal 1981 budget of the Telegraph and Telephone Public Corporation shows 3,919,900,000 yen for operating revenue, an increase of 1.4 percent, and 3,826,100,000 yen for operating expenditure, an increase of 6.5 percent. The reason for the small increase in operating revenue is the 191.8 billion yen drop in revenue, due to price reduction in night and long-distance calls.

Electronics projects sponsored by Telegraph and Telephone Public Corporation are shown in Tables 2 and 3. The general telephone subscription rate continues to decline; it is down to 1.4 million subscribers. But the construction

Table 2. Electronics Related Projects of Telegraph and Telephone Public Corporation (unit: 1000 million yen)

Items		Fiscal 1980	Fiscal 1981	Increase over previous year (- indicates decrease)
(a)	Research and Development			
•	Data processing technology	124	131	7
•	Switchboard technology	74	79	5
•	Transmitting technology	49	53	4
•	LSI technology	66	70	4
(b)	Operations and Purchases			
•	General construction projects	12,660	13,194	534
	Services	2,511	2,834	323
	Groundwork	6,169	6,080	-89
	Disaster prevention plans	450	500	50
	Expansion of subscribing areas	310	200	-110
	Consolidation and replacement	3,220	3,580	360
•	Data communications	980	999	19
•	Telephone popularization plan for remote farming, mountain, and fishing villages	320	240	-80

investment is 1,770,000,000 yen, an increase of 3.5 percent from the previous year. This is because of increased replacement work and popularity of such telephone terminals as push-phones. In addition, R & D expenses of 80.2 billion yen represents 2.05 percent of the operating revenue, reaching again the 2 percent level.

Since the rate of telephone distribution continues to drop, the construction pace of basic facilities has also dropped. A total of 225 new telephone offices will be constructed (52 less than the previous year); coaxial cable for 102 areas (minus 14); microwave for 203 areas (minus 41). There is a push to install electronic switchboards in new telephone offices; in fiscal 1981, new services will begin at 170 telephone offices (176 units) including Akasaka, Tokyo and No 2 Sakata, Yamagata prefecture. By the end of fiscal 1981, electronic switchboards would constitute 15 percent of all terminals nationwide, step-by-step switchboards, 5 percent. These figures are exactly opposite of those obtained in fiscal 1977. In addition, the Otemachi Office in Tokyo will install a digital electronic switchboard for the first time.

Table 3. Operation and Purchase Schedule of Telegraph and Telephone Public Corporation

Items	Fiscal 1980	Fiscal 1981	Increase over previous year (-indicates decrease)
(a) Service schedule			
• General subscription telephones	1,350,000 subscribers	1,300,000 subscribers	-50,000 subscribers
• Telephones installed in buildings	43,000 "	40,000 "	- 3,000 subscribers
• Business phones	650,000 units	700,000 units	50,000 units
• Home telephones	180,000 sets	220,000 sets	40,000 sets
• Push-phones	530,000 units	630,000 units	100,000 units
• Public telephone (replacements included)	70,000 units	74,000 units	4,000 units
• Automobile telephones	4,400 terminals	6,200 terminals	1,800 terminals
• Facsimile	11,800 terminals	14,700 terminals	2,900 terminals
• Telephone for public welfare	45,000 units	45,500 units	500 units
• Data communications facility	32 systems	25 systems	- 7 systems
• Data communications circuits	22,200 circuits	24,600 circuits	2,400 circuits
(b) Groundwork			
• Construction of new telephone offices	277 offices	225 offices	-52 offices
• Coaxial cables	116 areas	102 areas	-14 areas
• Microwave	244 areas	203 areas	-41 areas

FOR OFFICIAL USE ONLY

APPROVED FOR RELEASE: 2007/02/09: CIA-RDP82-00850R000400030055-4

Furthermore, optical fiber system will finally be commercialized. Commercialization will apply to 12 areas: Otemachiand Aoyama, Kyoto-Sanjo and Kanao, Kanmoku and Kadoma, Kurashiki and Kurashiki-Mizushima, Nagasaki and Nagasaki-Uragami and Nagayo, Sendai-Tameoka and Sendai-Aramaki, Tomakomai and Tomakomai-Higashi. The construction expenses for fiscal 1981 is about 1.8 billion yen (an increase of 1.2 billion yen from last year). The cost of coaxial cable for fiscal 1981 is about 70 billion yen.

Facsimile and Automobile Telephone, Also Popular

According to service schedule, the following phones, continuing from last year, have shown steady growth: business phones, 700,000 units (650,000 units last year); push-phones, 630,000 units (530,000 units); home telephones, 220,000 sets (180,000 sets). Facsimile is also doing extremely well with 14,700 terminals (8,050 terminals in fiscal 1979, 11,800 terminals in fiscal 1980). Automobile telephone shows steady increase: 2,000 terminals in the first year (fiscal 1979), 4,400 terminals in fiscal 1980, 6,200 terminals in fiscal 1981. In fiscal 1981, 9.8 billion yen will be invested to expand services in Osaka and to start new services in Nagoya.

R & D expenses will amount to 80.2 billion yen, if loss and gain account is added to research facility expenses. Distribution according to major research categories is as follows: 13.1 billion yen for data processing system, 7.9 billion yen for switchboard technology, 5.3 billion yen for signal transmitting technology, 4.8 billion yen for optical cable system (partially overlapping with transmitting technology), 7 billion yen for LSI technology, 2.6 billion yen for input-output equipment, 2.5 billion yen for image communications system, and 1 billion yen for mobile communications system.

In the area of data processing system, the development is under way for model series 5, 15, 25 and 35, which will replace 64K RAM adopted DIPS-11 model series 10, 20, and 30. The central focus of research in switchboard technology is shifting from electronic switchboards of space allocation type to those with time allocation type (digital).

In LSI technology, application to DIPS-11 of 64 k RAM and to other electronic switchboard will be considered. There are other significant themes, such as manufacturing technology of various types of small volume LSI and development of high density LSI. In the area of optical fiber application, a medium capacity system (32 M bit/second and 100 M bit/second) between [telephone] offices will be put into practical use. The focal points of future research include a long-distance (2,500 km) system using long wave-long bands (1.5-1.6 μm band), a large capacity (400 M bit/second) system, and application of the same to the subscribers.

9710
CSO: 8129/1228

SCIENCE AND TECHNOLOGY

BIG CORPORATIONS STRESS TECHNOLOGICAL EXPORTS TO BOOST PROFITS

Tokyo JAPAN ECONOMIC JOURNAL in English Vol 19, No 961, 30 Jun 81 p 3

[Text] Major Japanese corporations are attempting to develop new technologies and earn good profits by exporting technological know-how to foreign countries.

Nihon Keizai Shimbun recently conducted a survey on the income and expenditures for technologies of major Japanese corporations listed in the stock exchanges in Tokyo, Osaka and Nagoya.

The following are the top 50 companies making profits from technological exports and the technological sales and the the number of patent rights owned.

The findings of the survey show that most of the high ranking companies are those in the fields of shipbuilding and steel industries and in chemicals and synthetic fibers.

Companies in electrical machinery and appliances also marked high increases in profits from technological sales in the last five years despite growing expenditures in some new technologies.

Mitsubishi Heavy Industries, Ltd., the top ranking company in selling technologies, increased its profits by more than 60 per cent in the last five years — particularly in terms of consultation fees for plant construction in foreign countries. As a result, the company's

Income from Technology Sale During Fiscal 1980

(In million of yen)

Rank	Company	Income FY1980	Income FY1975	Balance in FY1980
1	Mitsubishi H.I.	16,700	10,400	+ 1,700
2	Nippon Steel	11,800	7,700	+10,700
3	Hitachi S&E	11,348	3,854	+ 9,230
4	Nippon Koei	11,244	n.a.	n.a.
5	Sony	4,937	1,399	+ 412
6	Hitachi, Ltd.	4,600	1,800	— 2,700
7	Mitsui Petrochem.	4,030	610	+ 3,630
8	Mitsui Toatsu	3,852	2,443	+ 3,256
9	Asahi Chemical	3,300	1,500	+ 2,500
10	Ohba	2,946	1,857	+ 859
11	Toray Industries	2,303	1,197	+ 1,834
12	Asahi Glass	2,300	400	— 100
12	Sanyo Electric	2,300	600	— 200
14	Toyama Chemical	2,292	73	+ 2,230
15	Sumitomo Metal Ind.	2,274	28	+ 1,854
16	Niigata Engineering	2,240	651	+ 1,668
17	Teijin	2,200	n.a.	+ 2,160
17	Nippon Kokan	2,200	1,000	0
19	Nippon Zeon	1,930	1,626	+ 1,926
20	Sumitomo Chemical	1,906	976	+ 685
21	Fujisawa Pharm.	1,771	751	— 1,196
22	Kawasaki Steel	1,757	81	+ 810
23	Kobe Steel	1,700	540	— 2,000
24	Ube Industries	1,668	32	+ 408
25	NEC	1,500	739	— 1,800
26	Canon	1,337	516	+ 1,051
27	Yamaha Motor	1,211	n.a.	n.a.
28	Unitika	1,063	607	+ 999
29	Honda Motor	1,056	n.a.	+ 966
30	Nippon Paint	1,020	406	+ 359
31	JGC	1,000	n.a.	— 229
32	Yamazaki Bakery	989	536	+ 987
33	Sharp	923	382	n.a.
34	Kajima	875	158	+ 818
35	Nippon Suisan	865	661	+ 865
36	Mitsubishi Gas Chem.	837	430	+ 750
37	Tokyo Sanyo	820	309	+ 527
38	TDK Electronics	775	186	+ 402
39	Nisshin Steel	773	227	+ 766
40	Mitsubishi Chem.	758	1,299	— 342
41	Mitsubishi Metals	744	401	+ 359
42	Suzuki Motor	695	474	+ 299
43	Nippon Light Metal	633	131	+ 628
44	Lion	603	n.a.	+ 592
45	Bridgestone Tire	600	300	— 200
46	Sumitomo Elec.	598	279	— 168
47	Maruzen Oil	572	3	+ 484
48	Yokohama Rubber	570	310	— 80
49	Japan Synthetic Rubber	569	249	+ 501
50	Fuji Photo Film	563	447	— 861

Note: Fiscal 1979 figures for Nippon Steel.

balance of income and expenditures of technology trade reversed from a ¥200 million deficit in fiscal 1975 to a ¥1,700 million surplus.

Hitachi Shipbuilding & Engineering Co., Ltd., ranked third on the list, also tripled its income as the company earned most of its income from consultation fees for overseas plant constructions.

Masao Kinoshita, president of Hitachi S&E, said, "We have made good profits because we managed to restructure our business operations by expanding the software section."

Five major steelmakers are placed among the top 23 ranking companies in the list, including Nippon Steel Corporation, the 2nd ranking in the list, and Sumitomo Metal Industries, Ltd., the 15th. Despite soaring costs for resources and energy, these companies elevated their international competitiveness on the strength of their high technological level.

"We keep receiving requests from Western industrial countries for technological tie-ups for continuous casting," said Takeo Sakai, vice president of Sumitomo.

In the fields of electrical machinery and appliances, Sony Corporation placed fifth in the ranking because it has offered so much technological assistance in video equipment to its related companies. Its balance of accounts in the income and expenditures on technology is rather close, however.

CSO: 4120/272

SCIENCE AND TECHNOLOGY

'CAPTAIN' COMPUTER ACCESS SYSTEM TEST RESULTS PUBLISHED

Tokyo ASAHI EVENING NEWS in English 21 Apr 81 p 3

[Text] The first-stage test of the "CAPTAIN System," a new information medium which subscribers may use to request information from a computer over the telephone and receive the answer on their television screen, ended in March, and the Posts and Telecommunications Ministry and other authorities that conducted the test recently released a report on the system.

CAPTAIN stands for Character and Pattern Telephone Access Information Network. Linking 976 telephones in Tokyo, the first-stage test was conducted from Dec. 25, 1979, to March 15 this year.

Information contained in the computer includes about 100,000 "frames," including those for news, weather forecasts, quizzes and travel information.

Those making use of the system, or monitors, are limited to those living in areas under the jurisdiction of a telephone exchange equipped with electronic telephone switchboards and whose phone is of the pushphone type.

The telephone line and the TV receiving set at home are linked by means of an adapter. To use the system, one calls the CAPTAIN Center with the pushphone. After setting his TV set for reception on an open channel, he designates what he wants to know by pushing designated numbers on the keypad. Then, characters or patterns are sent via the telephone line and screened on the TV receiving set.

During the first-stage test service period, the system was used an average of 0.72 time per telephone per day, or twice in three days. The average time used per phone call was 13 minutes and 41 seconds. The average number of frames used per call was 38.

As to which categories of information were used the most, information on events, including movies, hobbies, quizzes and games were overwhelmingly popular with 46.83 percent, followed by news and weather forecasts with 10.55 percent, education with 10.36 percent and sports with 9.83 percent. Fields that were used the least were health, beauty culture, childbirth and child rearing with 0.68 percent, followed by economic and legal questions with 0.60 percent.

Household heads used the system the most at 45 percent, followed by children, 30 percent and housewives, 18 percent.

Users apparently made use of the system with clear-cut objectives. Most household heads said that they used the system "to obtain knowledge," the housewives said they used it "to obtain information necessary for our activities" and the children answered "for study and amusement."

The second-stage test service is scheduled to get under way in August this year, with an increase in the number of monitors and screens to 2,000 and 200,000 respectively, or double those used in the first-stage test.

If the results of the second-stage test are satisfactory, full-dress service will begin in fiscal 1983.

To the question "Will you subscribe to the system if full-fledged service begins?" asked during the first-stage test period, more than half of the respondents replied in the affirmative. It is particularly noteworthy that 75 percent of those who made active use of the test service answered in the affirmative.

To the query "What is an adequate fee for the service?" many replied "About ¥3,000 a month." Twenty percent of the respondents said they were willing to pay more than ¥3,000 a month.

The new information medium obviously is enjoying high popularity.

CSO: 4120/240

SCIENCE AND TECHNOLOGY

CAPTAIN TELEPHONE ACCESS INFORMATION SYSTEM DESCRIBED

Tokyo KAGAKU GIJITSU BUNKEN SABISU in Japanese No 56, Apr 81 pp 8-11

[Article on the CAPTAIN--Character and Pattern Telephone Access Information Network--system, an information medium in Tokyo by which subscribers may request information on the telephone and receive the answer on their television screen]

[Text] CAPTAIN System Outline

CAPTAIN is the Japanese version of PRESTEL. On 2 February 1979, the CAPTAIN System Development Research Institute was established. In December 1979, experimental services started to ordinary homes selected as monitors within metropolitan Tokyo.

The system structure is shown in Figure 1. In principle, it is identical to PRESTEL, but due to the special need to use Chinese characters, which calls for many kinds of ideograms in intricate shapes, a pattern transmission system that sends screened information from the center was adopted, in place of a character code transmission system, by housing a character and pattern emitter in the terminal equipment. This method is excellent in pattern expression but slow in pattern transmission, requiring as long as 10-20 seconds/transmission/page. Recently, however, with the progress of the LSI character emitter, an inexpensive ROM has been made available at retail, and the next issue at hand is faster transmission by means of the code transmission system.

The Information Center in the diagram utilizes the DEMOS-E of the Tokyo Central Data Telecommunications Bureau, and the Picture Conversion Center is set up in the Cinza Telephone Exchange. The information capacity of the center is equivalent to 100,000 pages of information, and 1,000 units of experimental terminals are on line, of which 800 are set up in monitor homes in the Setagaya and Suginami areas. The terminal equipment is divided into users' terminals and information input terminals. The former comes in two types, an adopter type and an integrated type. The input terminal also comes in two types, Type A and Type B. Type A feeds characters and simple patterns by means of a pentouch system Chinese character keyboard, and Type B includes the additional function of automatically converting spontaneous patterns to information for a read-in file memory.

Character display/page is approximately 180 characters (8 lines), including Chinese characters and the Japanese alphabet. This is quite a handicap due to the Chinese character display, compared to the maximum 960 letters in PRESTEL. The kinds of characters include the primary standard Chinese characters (2,965 characters) specified in JIS C6226 "Chinese Characters and Codes for Information Exchange," and symbols for alphabet, numerals and Japanese characters. Pattern display can be accomplished by a mosaic system whereby approximately 180 different pattern elements are combined and by a dot system whereby spontaneous patterns are expressed by dots (width 240 x length 192/page). The color display uses eight colors--red, green, yellow, blue, magenta, cyanogen, white and black. The picture display is divided into fixed display and scroll display (picture moves from botton to top continuously for several pages in this system). The specifications for the integrated user's terminal are indicated in Table 1.

The keys in the user's terminal are virtually the same as those of PRESTEL. They consist of a total of 12 selective keys, including 10 number keys plus *, #, and various control keys. The operational procedure for scanning information is also almost the same. A direct access system which designates page numbers and a guidance access system which resorts to the page of the table of contents, are available.

System Operation

CAPTAIN entered the experimental service stage in December 1979 for system evaluation and market trial. The biggest issue is the assessment of the user's responses, as in the case with PRESTEL. For this purpose, 1,000 terminals were prepared and posted on the following basis:

For diplay (general public)	25 units
For general users (ordinary homes)	800 units
For information suppliers	150 units
For system-related use	25 units

Of these, terminals for display were set up in major hotels and service centers of Nippon Telegraph and Telephone Public Corporation in metropolitan Tokyo.

The terminals for ordinary homes were set up on the following basis in consideration of categorical classifications such as life stage, housing mode and vocations:

Newlyweds	30 units
Family with preschool children	100 units
Family with school children	300 units
Family with postschool children	150 units
Family with independent children	50 units
Older Couples	30 units

Concerning the information suppliers, exploitation and systematization of suppliers are promoted. An "Information Material Supplier's Association" was

organized which set up five committees. Table 2 indicates the contents of the information that each committee deals with.

The "CAPTAIN Information Guide" is a directory published by the CAPTAIN System Development Research Institute which serves as an index for information and its suppliers. According to this book, there are 132 information suppliers, and the following is the breakdown:

Newspapers and communications	21 companies
Broadcasting	7
Publishing	23
Banks	4
Department stores	19
Public relations	17
Travel	11
Transportation	4
Movies and plays	2
Investigation and information service	8
Public offices and others	16

The information provided is roughly classified into the following fields and attached with page numbers:

News and weather forecasts	005
Public information and announcements	010
Health, beauty, childbirth, child rearing	015
Shopping and leasing	020
Cooking and taste	030
Dwellings	035
Economics and law for living	040
Helpful knowledge for living	045
Education, learning and refining	050
Sports	060
Pleasure and hobbies	065
Travel and sightseeing	075
Specialized information	085
Information in English	090
Weekly information salon	097
Street corner, townguide	098

Specialized information (085) consists of employment information, economic information and technical information. The technical information contains:

Electronics technology flash report, highlights
Mechanical technology highlights
Introduction of new medical equipment and devices
Construction technology highlights (all the above by Nikkei McGraw-Hill)
New technology commentary (Japan System Development Institute)
Trends of recent new products (Nikkan Kogyo Shimbunsha)
Lecture, seminar, symposium guide (Nikkan Kogyo Shimbunsha)

Science society guide (Nikkei McGraw-Hill)
Medical Information (Nikkei McGraw-Hill)

The information in stock comes to 85,000 pages' worth and the service time is allocated as follows:

Service time	10:00-22:00
Information input time	8:00-22:00 (New information can be fed anytime during this period)

Operational expenses are taken care of by a subsidy from the Ministry of Posts and Telecommunications and cooperative funding from information suppliers, which makes it possible to offer the service free of charge to the users.

The CAPTAIN System Development Research Institute made public the results of the questionnaire survey given to the monitors in October 1980, and the essence of the survey results will be shown in the following. This is a compilation of the replies from 429 ordinary homes and 176 business offices.

Ordinary homes

Frequency of use	once/week	32.6%
	2-3 times/week	21.9%
	under once/week	38.9%
Time used	0-10 min/call	21.8%
	16-20 min/call	21.4%
Categories used	weather forecasts	33.3%
	pleasure guide	30.3%
	shopping guide	29.1%
	cooking	26.1%
	fortune telling and quizzes	26.1%
Service fee	2,000-3,000 yen/month	29.9%
(including adopter fee and telephone fee)	1,000-2,000 yen/month	23.7%
Cost of a complete set of additional equipment	below 50,000 yen	over 70%
Information category	reservation status	54.9%
(Full-dress service)	pleasure guide	54.5%
	weather forecast	51.8%
	shopping guide	49.6%
	book guide	47.3%

Business offices (only those with different interest from homes)

Time used	under 5 min/call	17.4%
	6-10 min/call	38.8%
Categories used	weather forecasts, news, reservation status, events	
Service fee	6,000-10,000/call	29.9%
	under 5,000/call	34.0%

Potential use	probably usable	55.1%
(complete and total service)	probably unusable	13.1%
Information categories	new products and market information by industry	
(complete and total service)	survey of public opinion, survey of consumer trends, employment and real estate information.	

Items requested

1. A function to notify of telephone calls that come in while using the service.

2. A function to make seat, hotel and ticket reservations.

After the completion of the survey conducted in FY 80, an experimental service of CAPTAIN is scheduled to be further expanded in scale to prepare for the commencement of full fledged service starting in FY 83. In 1981, with a combined total of approximately 500 million yen--57 million yen from the subsidy and the rest from the cooperative funding--an experiment almost equal to the actual menu will be conducted, covering an extended service area over all Tokyo metropolitan wards, increasing the terminal units to 2,000 and providing in-stock information covering 200,000 pages. Also, display terminals will be set up in major cities throughout Japan in order to elicit extensive local response.

Consulting the items requested in the questionnaire, "Limited Member Information Service" (Closed User Groups in PRESTEL: called CUG) and "Order Collection Service" were added to the functions. The former is a special information service given to limited members oriented to business use, and the latter is a function which can be utilized for catalog sales and questionnaire surveys.

Figure 1. CAPTAIN System Structure

1. information input terminal
2. display part
3. manipulation part
4. printer part
5. control device
6. information center
7. picture conversion center
8. processing device
9. picture information file
10. picture conversion device
11. line correspond device
12. control device
13. picture file
14. user's terminal (adopter type)
15. telephone network
16. exchanger
17. exchanger
18. line correspond device
19. TV receiver set
20. adopter
21, key pad
22. telephone
23. exchanger
24. (integrated type)
25. keypad
26. telephone
27. display part
28. manipulation part
29. direct base read-in part
30. control device

Table 1. Integrated Type User's Terminal Specifications

	Item	Standards
Signal system	communication system	full duplex
	communication speed	forward direction: 3,000 bit/sec 2,400 bit/sec (switchable) reverse direction: 75 bit/sec
	synchronous system	synchronous frame
	error control system	correction of 1 bit error and detection of 2 bit error by humming check
	band compression	unidimensional run-length coding
Control	control system	program logic system by microprocessor
	memory	EPROM 3K byte (program)
Display	display screen	Model 14 color CRT
	number of characters for display	standard characters: max 120 letters (15 letters x 8 lines) small characters: max 480 letters (30 letters x 16 lines)
	display color	8 colors (colored by sub-block unit) Screen background color, header background color and flushing color can be independently designated.
	display function	fixed display: progressive system sequential system scroll display: vertical system
	picture memory	dynamic RAM 64K bit: pattern information static RAM 4K bit: color information
Input	key	0-9, *, #, control keys (7)

Table 2. Details of Service Information

Living in general	living guide	living practical knowledge, cooking, home medicine, health, child-rearing
	shopping and commodity guide	various shopping and commodity guides
Education & learning	learning	programs for learning, various school guides, status of admission to higher grade schools

	refinement	encyclopedia, new book guide, literature
Pleasure	travel, sightseeing	travel, sightseeing, hotels, inns and transportation guide
	events	radio, TV, movies, concerts and art exhibits
	sports, hobbies	leisure, sports, gambling and other sports information, hobbies (do-it-yourself, etc)
Public in General	administration, law	public notification, various administrative procedures, legal consultation
	society, economics	statistics, employment, vocational training, financial consultation
News	news in general	news, weather forecasts, etc
	specialized information	market quotation, industry and business information
	information in English	news in English, guide in English, English education and learning, etc.

8940
CSO: 4105/174

SCIENCE AND TECHNOLOGY

MITI TO SET OWN BIOTECHNOLOGY GUIDELINE

Tokyo JAPAN ECONOMIC JOURNAL in English Vol 19, No 961, 30 Jun 81 p 16

[Text]

The Ministry of International Trade & Industry has decided to set its own guideline for all industrial biotechnological ventures, including genetical engineering.

This is to ensure safety to public health as well as to prevent their undesirable developments at the factory level.

The Ministry will shortly organize a special consultative biotechnology problem study group from among businessmen, scholars as well as its expert officials to produce such a guideline as quickly as possible. There is as yet no industrial factory-level official controlling guideline of the kind in Japan, although there is a set of basic governmental guidelines on recombination of genes. Introduced in September, 1979, part of these guidelines had been set by the Ministry of Education to cover all academic researches and the remainder by the Council for Science & Technology (based in the Agency of Science & Technology) for all industrial researches.

Considering the surprising speed of development of biotechnology or bioengineering, MITI thinks it better to control all such industrial ventures by an easily changeable policy guideline than by any time-consuming legislation, after the fashion of the American guideline under the control of the National Institute of Health.

MITI now visualizes setting of a safety pollution control and other rules on bioengineering mass production lines of the chemical, fermentation, foodstuff and pharmaceutical industries. Even experimental plants intended for development of mass production lines are to be controlled.

MITI is regarded to have been prompted to form its own guideline as:

The Science & Technology Agency, the Ministry of Health and Welfare, in charge of pharmaceuticals and foodstuffs, and the Ministry of Agriculture, Forestry & Fisheries, in charge of farming, have started their respective internal studies to set such guidelines at their own initiative.

The industrial community, represented by the Committee on Life Science of the Federation of Economic Organizations (Keidanren), has started drafting the industry's own code of behaviors on bioengineering ventures.

There have been some criticism of MITI's lack of such a guideline already.

But there was also a guess that MITI has its own bureaucratic wish to capture the initative in controlling industrial bioengineering ventures, and fear that its move may further complicate the already diversifying governmental biotechnological control system to require some adjustments of jurisdictions.

CSO: 4120/272

SCIENCE AND TECHNOLOGY

NATION TO BECOME WORLD'S TOP BASE FOR 64K DYNAMIC RAM PRODUCTION

Tokyo JAPAN ECONOMIC JOURNAL in English Vol 19, No 961, 30 Jun 81 p 8

[Text]

Japan's semiconductor industry will soon enter the so-called "VLSI (very large-scale integrated circuits) era" ahead of its American counterpart.

Before the year is out, Japan will emerge as the world's largest base for production of 64-kilobit dynamic random access memory (RAM) chips. The 64K dynamic RAM, a highly-efficient IC memory to be installed in computers as main storage, is the "first generation" of VLSIs.

At the end of the current fiscal 1981, seven Japanese companies will be manufacturing a total of 2.5 million chips of 64K dynamic RAMs monthly, about three times the present 700,000-800,000 chips. The monthly production volume compares with the merely 440,000 chips for the world's 64K dynamic RAM shipments (excluding in-house use) in the entire 1980.

Nippon Electric Co. (NEC), Hitachi, Ltd., Toshiba Corp., Fujitsu Limited, Mitsubishi Electric Corp. and Oki Electric Industry Co., Japan's six largest semiconductor manufacturers, will begin mass-production of 64K dynamic RAMs in and after this summer. Texas Instruments Inc., the world's largest semiconductor maker, plans to make its wholly owned Japanese subsidiary a base to mass produce the highly integrated memory chips.

These Japanese semiconductor makers perfected their mass-production techniques by last autumn and earlier announced their plans to commercialize them. They have been closely watching the semiconductor market to determine the timing of mass-production.

The lowering of market quotations for 64K dynamic RAMs to around ¥2,000 per chip recently from ¥20,000 last autumn has prompted them to give the "go" signal.

Fujitsu, which is the nation's largest computer builder, is the forerunner in 64K production. Recently, it raised 64K device production capacity at its Aizu Works in Fukushima Pref. to 300,000 chips monthly from 150,000 chips, said President Taiyu Kobayashi. It will replace 16Ks and other memory chips with 64Ks for memory storage of computers. Fujitsu has installed 64Ks even in the Fujitsu Micro 8 personal computer to be introduced in summer

Fujitsu plans to boost the 64K production capacity at the Aizu Works to 600,000 chips in the second half (October, 1981-March, 1982) of the current fiscal year.

Following Fujitsu, Mitsubishi and Oki are going to start mass-producing 64Ks in July and August, respectively. Mitsubishi will produce 200,000 chips monthly at its Kumamoto No. 2 Works in Nishigoshi, Kumamoto Pref. At present, Mitsubishi produces 30,000-50,000 chips of 64K devices at its Kita-Itami Works in Hyogo Pref.

Monthly Production Capacity of 64K Dynamic RAMs

(In 1,000 chips)

	Present	2nd half of FY1981
NEC	100	300
Hitachi	200	700
Toshiba	70	300
Fujitsu	30	600
Mitsubishi	30—50	200
Oki	20	300
TI Japan	20	100

Note: Partly estimated.

Oki, which now produces merely 20,000 chips monthly at its Hachioji Works in Tokyo, will start producing 300,000 chips at Miyazaki Oki Electric Co., a subsidiary in Kiyotake, Miyazaki Pref.

NEC, the largest semiconductor maker, and Hitachi, the second, plan to triple output of 64Ks in the second half of fiscal 1981. NEC will be producing 300,000 chips in the second half at Kyushu Nippon Electric Co., a subsidiary in Kumamoto Pref., compared to the present 100,000 chips. As the company is the largest producer of 16Ks, NEC finds it difficult to produce more than 300,000 chips in the second half.

Hitachi, aiming at taking the top position in 64Ks, plans to raise the monthly capacity at its Musashi Works in Kodaira, Tokyo to 700,000 chips in the second half from the present 200,000 chips. Rivalry between Hitachi and Fujitsu thus is expected in the second half.

As Hitachi plans to start producing 64Ks at its Kofu Works next year, Hitachi will be the leader of 64Ks in and after next year. Industrymen estimate that Hitachi will be producing 1 million chips monthly next year.

Toshiba, which made a belated start in 64K production, will join the mass-production race in the second half as it has completed installation of 64K production facilities at its Oita Works in Oita Pref. While it now produces about 7,000 chips at its transistor plant in Kawasaki, Toshiba will be producing 300,000 chips monthly at the Oita Works in the second half.

Texas Instruments, the sole foreign-affiliated company having production plant in Japan, has completed a 64K production plant in Miho, Ibaraki Pref. Possibility is strong that the Miho Works will be TI's 64K mass-production base. TI will export a part of the products to the U.S. The Miho Works has capacity to produce 100,000 chips monthly. At present, Texas Instruments Japan Ltd. produces 3,000 chips of 64Ks at its Hatogaya Works in Saitama Pfef.

With the lowering of 64K prices, more computer builders will apply them to their products. The Nippon Telegraph & Telephone Public Corp. (NTT) recently bared a plan to incorporate 64Ks in its DIPS11 Series data communications processing computers and digital data exchange (DDX) equipment. Also, such personal computer makers as Apple Computer Inc. and Commodore Business Machines Inc. are strongly interested in 64Ks. Mainframe computers to be announced later will be fully incorporated with 64Ks.

CSO: 4120/272

SCIENCE AND TECHNOLOGY

MITI DRAFTING OVERALL RELIEF MEASURES FOR ALUMINUM SMELTING

Tokyo JAPAN ECONOMIC JOURNAL in English Vol 19, No 961, 30 Jun 81 p 6

[Text]

The Ministry of International Trade & Industry is working out overall relief measures for the heavily-depressed aluminum smelting industry.

MITI plans hastily to implement such measures, pending a recommendation on the industry's reconstruction due to be announced in August by the Aluminium Industry Committee of the Industrial Structure Council, advisory organ to the MITI minister.

MITI's relief measures will center on introduction of a tariff quota system on imports of aluminum ingots, which is expected to help reduce costs for aluminum ingot imports and eventually strengthen domestic aluminum smelters' international competitiveness.

More concretely, MITI plans to lower the tariff on imports of aluminum ingots, now 9 per cent, to zero to help aluminum smelters here reduce costs for import of aluminum ingots manufactured abroad on a joint venture basis. Such "develop-import" aluminum ingots account for about 260,000 tons, or one-third of total aluminum ingot imports.

MITI also intend to guide aluminum rolling companies to buy as much domestically-produced aluminum ingots as possible by using funds saved by its sharp tariff cut.

As these measures may lead to a decrease in tariff income, MITI is consulting with the Ministry of Finance on this aspect.

Japanese aluminum smelters have lost international competitiveness since their domestic electricity rates were raised sharply after the first oil crisis.

A MITI survey shows that Japan's aluminum ingot prices average ¥450,000-500,000 per ton, compared to ¥370,000 C.I.F. for ingots imported from the U.S. and Canada.

Japan's aluminum ingot imports in 1980 rose by 150,000 tons from the year before to around 840,000 tons. Despite drastic production curtailments, aluminum smelters here have held swelling inventories. Cumulative deficits of the six major smelters here now total about ¥31 billion.

CSO: 4120/272

SCIENCE AND TECHNOLOGY

COMPANY OWNERSHIP OF PATENT RIGHTS INCREASED 35 PERCENT IN FY 1980

Tokyo JAPAN ECONOMIC JOURNAL in English Vol 19, No 961, 30 Jun 81 p 3

[Text]

The tendency among Japanese corporations to develop new technologies is reflected in the increasing number of patent rights owned by invidual companies.

The total number of patent rights owned by 566 companies surveyed amounted to 392,000 in fiscal 1980, up 35 per cent from fiscal 1975. And the number of patent applications in the same year (out of 560 companies) was 157,000, up 56 per cent.

According to the survey, Hitachi, Ltd. ranked the highest in the number of patent rights owned — 39,734 — following by Matsushita Electric Industrial Co., Toshiba Corp. and Mitsubishi Electric Corp.

Matsushita, whose patent rights increased by 12,592 in the last five years, has been working at patents particularly in the field of electronics and office automation, shifting from the home appliances.

Sumitomo Chemical Co., Ltd. moved up to fifth rank as the company's research investment in fine chemicals such as agricultural chemicals and medicines started producing results.

Nissan Motor Co., Ltd., 10th in the ranking, applied for many patent rights in chassis and electronics after the company introduced the front-wheel drive system for making small cars.

Patent Rights Owned

(In cases)

Rank		FY1980	FY1975
1	Hitachi	39,734	35,494
2	Matsushita Elec. Ind.	33,411	20,819
3	Toshiba	23,848	20,754
4	Mitsubishi Elec.	14,097	10,306
5	Sumitomo Chemical	11,222	10,068
6	Sanyo Elec.	11,029	8,013
7	Teijin	9,560	n.a.
8	NEC	9,300	7,600
9	Mitsubishi Heavy Ind.	8,468	5,790
10	Nissan Motor	7,309	3,116
11	Toray	6,269	7,278
12	Honda Motor	6,048	1,991
13	Nippon Steel	6,000	5,200
14	Hitachi S&E	5,754	1,932
15	Asahi Chemical	5,300	4,000
16	Fuji Photo Film	5,200	3,800
17	Takeda Chemical Ind.	4,810	4,565
18	Fujitsu	4,484	2,803
19	Furukawa Elec.	4,436	2,718
20	Ricoh	4,068	2,645

Patents Owned and Applied by Major Companies Listed on Stock Exchanges

(In cases)

	FY1980	FY1975
Patents owned	392,926	290,707
(Of which, established abroad)	(107,706)	(74,051)
Patent applications	157,879	100,626
(Of which, applied abroad)	(19,399)	(17,513)

Coverage: 566 firms for patents owned and 560 firms for applications.

CSO: 4120/272

SCIENCE AND TECHNOLOGY

MITI POLICY FOR IC DEVELOPMENT OUTLINED

IC Patent Policy

Tokyo NIHON KEIZAI SHIMBUN in Japanese 2 Jun 81 p 1

[Text] As a means to encourage development, MITI has decided to adopt the policy of giving firms participating in the new model semi-conductor development project, which is to be launched as part of the system to develop technology for the next generation industrial base, the right to preferential use of patents developed by the project. This is to match the U.S. effort to tackle in earnest new model semi-conductor development through joint government-private sector projects. Even though Japan is advanced in the production and technology of semi-conductors, it was decided that Japan would fall behind the U.S. in the area of semi-conductor technology with its existing system of development. In addition to the preferential measure on patents for participating firms, MITI is considering introducing the U.S. method of competition in which participating firms not producing results would be selected out and dropped from the project.

The new model semi-conductor development project, which MITI has taken the lead in promoting, includes the development of high performance semi-conductors, such as three dimensional circuit elements, based on the "next generation technology development system" set up to achieve the most advanced basic technology. It also includes the establishment of a joint government-private sector research center to develop optical IC's, of which much is expected in the industrial robot, automobile, and computer areas.

Three dimensional chips are semi-conductors in which several million individual transistors are packed into the seven cubic milimeter square of semi-conductor material. It is said that these will allow an existing medium-size computer to be miniaturized to such an extent that it will fit in the palm of a hand. This development project will last for 7 years, beginning with this fiscal year; development will be carried out by enlisting participating firms and by dividing the subsidy among them, entrusting the research to these firms.

However, research and development funds included in the budget by MITI for this fiscal year--and these funds are earmarked for all semi-conductors including the optical IC project--total no more than around 1.5 billion yen. Furthermore, the arrangement calls for any patents developed by firms participating in this kind of project to be the property of the state, and semi-conductor manufacturers such as Hitachi, Ltd are strongly urging MITI to make some improvement in the handling of patents.

For this reason, MITI has made a fundamental reevaluation of the development system for new model semi-conductors, and although the principle that patents resulting from government research and development funds are property of the state did not change, MITI did decide to grant firms involved in development rights to preferential use in order to stimulate interest in research and development.

IC Design Center Policy

Tokyo NIKKAN KOGYO SHIMBUN in Japanese 17 Jun 81 p 1

[Text] MITI is proceeding with a study of creating in fiscal year 1982 an "IC Design Center" (its provisional name) which would engage in the design of IC's to meet the needs. The major task of this center would be to meet the broad needs for custom IC's (IC's specially made for individual customers) among medium and smaller enterprises, which have a growing need for IC's but are not being met by the existing mass-produced IC's. More broadly, the center would serve also as a consulting agency for IC technology in general. So far, MITI has been considering having the actual development of this center be made part of the work of the Small and Medium Enterprises Trade Association. However, custom IC users are calling loudly for not only the design and testing, but the production of IC's on a limited scale as well; it is possible that this plan will mean a center performing everything from design to production.

Japan's semi-conductor/IC industry has come to rank with that of the U.S. as the standard for the world, and this is shown by the fact that U.S.-Japanese competition to develop very large-scale integration (LSI) has become an incessant topic of discussion. Because of this advanced technology, a wide variety of industrial sectors, such as the electrical and electronics industries, of course, as well as machines and automobiles, have been caught up in and engulfed by the tidal wave of IC utilization.

While there has been on the supply side of development and production a proliferation of major manufacturers of large-scale production types of IC's, they have not been able to meet satisfactorily the need for a variety of multi-type, small-lot production of custom IC's. Pushed by demands for large-volume production of IC's to the extent that they have a serious shortage of capacity, the major manufacturers cannot engage in multi-type, small-lot production of IC's.

These broad needs are developing in every sector, and deriving from a desire on the part of companies to put unique IC's in their own equipment or machinery. Thus, this gap between need and supply will be a problem of an IC-using society.

The concept of a design center has as its objective an attempt to deal with this problem; therefore, it is aimed at meeting the needs of various sectors which, while having such needs for custom IC's, do not have the design capabilities.

The idea is for this to function also as a consulting center which would meet needs by improving on widely-used existing IC's, when the design of a custom IC is unnecessary, by introducing users to IC manufacturers who could meet their needs, and by introducing users to design manufacturers.

While there are great expectations on the part of users for the establishment of such a neutral IC design agency, voices are also being raised calling for the creation of an agency which would not be limited to design, but would include production on a limited scale as well.

This is prompted by concerns that, following the design stage, there may not be any manufacturer who, if approached, would take on production because design rules differ between companies and because most cases would involve a limited production run.

Unlike the U.S., there are no design and manufacturing companies in Japan which specialize in typical custom IC's; this fact has also been instrumental in heightening such voices. However, the appearance of a custom IC design and manufacturing company controlled by MITI could lead to the new problem of competition with private industry, and so the future unfolding of this idea is still a delicate matter. Even NTT is considering the idea of setting up a new company to serve as this kind of custom IC design agency. Therefore, efforts to respond to the need for custom IC's are starting all at once to pick up.

9844
CSO: 4105/185

SCIENCE AND TECHNOLOGY

INDUSTRIAL PLANTS SAID TO BE GROWING 'OLD'

Tokyo JAPAN ECONOMIC JOURNAL in English Vol 19, No 961, 30 Jun 81 pp 1, 19

[Text] Though private plant and equipment investment is continuing to increase, superannuation of Japan's production facilities is progressing at an increasingly steady pace.

According to surveys of private financial organs, such as the Industrial Bank of Japan (IBJ), the average age of production facilities for all industries in fiscal 1980 reached 7.32 years, up 0.03 year from the preceding fiscal year.

The outlook is that the superannuation in fiscal 1981 will remain about the same or slightly increase.

Aging of production equipment particularly conspicuous in industries related with basic materials. The Long-Term Credit Bank of Japan figures that an increase of slightly more than 10 per cent, nominal, in plant and equipment investments every year is necessary to prevent such aging.

Capital expenditures began following a sluggish trend after the first oil crunch at the end 1973. They began showing signs of recovery from fiscal 1978. Recently, plant and equipment investment steadily has increased, and the Nihon Keizai Shimbun estimates the gain to be 8.7 per cent in fiscal 1981.

According to IBJ, the superannuation of production facilities for all industries in the past 10 years increased by 0.52 year to become 7.32 years in fiscal 1980. Compared to about 1973, when facilities were the youngest, this is an aging of nearly one year.

In particular, plants and equipments in the manufacturing field in fiscal 1980 became 1.29 years older than in 1970 and 1.43 years older than in fiscal 1973. The reverse gap is attributable to the fact that the amount of capital expenditures for four years after fiscal 1975 marked a minus growth.

The superannuation is the most conspicuous for the basic materials-related industries with regard to manufacturing. For instance, principal plants of the petrochemical industry are now over 10 years, and they are being operated after their "legal lifetime" (depreciation years set by the tax law: mainly 7-9 years in the case of petrochemical facilities).

Indications are, moreover, that the petrochemical makers will go slow in undertaking plant and equipment investment in considering the fact that even if they renovated their old plants, they will not be able to compete with the counterparts in the U.S. and Canada which use cheap natural gas as raw material. Cases of the age of facilities used by the aluminum, oil, paper-pulp and synthetic fiber industries going beyond their "legal lifetime"

also are conspicuous.

There are many instances generally of industries advancing their dates for renovation of old facilities. IBJ says, "The average renovation time has been extended to around 12 years from about 10 years in the past."

At the same time, many, such as the government's Economic Planning Agency, feel that investments for expansion of production capacities are going to continue sluggish amid slow demand.

Owing to such a situation, the Long-Term Credit Bank of Japan feels that the age of facilities, even from now on, is going to advance at the rate of 0.1 per cent every year.

However, the aging in fiscal 1981 will stay little changed from the preceding fiscal year, since large-scale capital expenditures were made in fiscal 1980.

The Industrial Bank of Japan estimates that capital outlays need to grow by over 10 per cent yearly in order to forestall attrition of facilities. Renovation spendings alone need to increase 7-8 per cent yearly, it says.

The age of the America's manufacturing facilities lately has been maintaining the line of nearly 10 years, and that for Japan gradually is approaching this. While there are such aspect as that of steel, in which the degree of newness of the Japanese steel industry definitely will be superior to that of the U.S. for the next 10 years, there is fear that the superiority of Japan's production facilities gradually will weaken with the approach of their age to a level close to that of the U.S.

CSO: 4120/272 END