

SCIENCE BULLETIN

*National Science Council
2 Canton Street
Taipei, Taiwan, Republic of China*

Third National Conference On Science & Technology Slated January 27-30

The Third National Conference on Science and Technology will be held on January 27-30 with discussions centered on 10 topics.

The conference, held once every three years, will open at the Grand Hotel. Listed on the agenda are the following topics:

- Institutional research, with stress on basic science, humanities and social sciences, engineering and life sciences,

and science education.

- Industrial technology, with stress on machinery, electronics, energy, information, materials, chemical industry and pollution, electro-optics and bio-engineering.

- Agricultural technology, with stress on food processing, readjustment of agricultural production structure and agricultural technologies.

- Medical science & public health,

with stress on prevention and control of major diseases, clinical medicine, toxicology, environmental protection and pharmaceutical technology.

- Communications technology, with stress on telecommunications technology and development and weather forecasts.

- Sci-tech manpower.

- R/D funding.

- Administrative support and sci-tech development, with stress on personnel system, accounting and auditing.

- Private participation in R/D, with stress on technology transfer, patent system, lease & rental loans.

- Development of high-tech industries, with stress on investment in high-tech industries and the role of the Hsinchu Science-based Industrial Park.

Nat'l Science Council To Launch 8 Research Projects This Year

The National Science Council will launch eight large-scale research projects this year on various social problems Taiwan faces today.

Among them is gerontology research. A total of 15 specialists and scholars in related fields, such as medicine, public health, sociology, economics, psychology and social welfare, will join in the interdisciplinary research.

This is the first time that local scholars approach the subject related to the "gray wave" on a large scale. Thanks to political stability and economic prosperity in the past decades, life expectancy in Taiwan has risen sharply. The ratio of the aged in the entire population is expected to surge from the current five percent to nine percent by the end of the century.

The 15-member team will probe into various problems facing aged per-

sons and work out medium- and long-term solutions for the reference of policy-making authorities.

In the first year, the team will survey about 3000 old folks at various levels on different topics, including their health conditions, their role in the family and society, diseases most common among old folks, impact of the death of spouses, social welfare programs, relations between younger generation and the aged as well as financial resources of old people.

The seven other research projects are those related to voting behavior of the people, change of value system of local farmers, enactment of various laws against environmental pollution, relations between automobile industry and other industries, improvement of banking and financial system, apportionment of export quotas as well as cost and impact of import restrictions.

Semiconductor Production Center to Be Set Up in Hsinchu

The Hsinchu Science-based Industrial Park Administration announced over the weekend that it has decided in principle to set up a semiconductor production center in the park to facilitate further development of the nation's semiconductor industry.

Yang Shih-chien, deputy director of the administration, said that the purpose in setting up this center would be to provide specialists and experts in semiconductors with proper production facilities and equipment, and help them to bring their research results and new designs in this field to fruition.

Local Firm Develops 32-bit Microprocessor

Microtex International Inc., a leading electronics maker in Hsin-chu Science-based Industrial Park, has successfully developed the world's first emulator for the 32-bit microprocessor, with the brand name MICE-32/68020 (see photo).

At a news conference at the Lai Lai Sheraton Hotel in Taipei yesterday, Carter Tseng, vice president of Microtex, said that MICE-32/68020 portable emulation can be operated with any IBM-PC/XT/AT personal computer through parallel or serial interface.

He added that the 32-bit microprocessor will play an important role in high-end and high-performance pro-

ducts. The 32-bit microprocessor is the first model of Microtex's third generation of Micro-In-Circuit Emulator.

Tseng told local reporters that the newly developed product is a fully integrated development system that provides the most powerful features.

The MICE-32/68020 consists of a switching power supply and five boards, namely, Control Processor Module (CPM), Emulation Processor Module (EPM), Logic Analyzer Module (LAM), Emulation Memory Module (EMM), and Parallel/Serial Module (PSM).

The emulator has three kinds of breakpoints with the first consisting

of two execution breakpoints, the second of two bus activity breakpoints, and the third with an external trigger breakpoint.

Tseng said: "The MICE-32/68020 performs real time emulation and can run up to 14MHz with no wait states. 256KB of emulations memory can be located anywhere within 4GB.

"The trace buffer is 2K bytes deep, and 104 cycles wide records addresses up to 32-bit wide, 32-bit wide data, status, execution time and 8 external trace bits for each cycle. When accessing data or program from emulation memory, the dynamic bus sizing ability of the 68020 CPU is supported, to permit accurate emulation for a variety of targets."

The new emulator, he added, also offers software features: Two selectable input methods on Menu Mode and Command Mode are provided, while soft key operation permits quick learning of the 32-bit emulator's operation through simplified command operation and minimization of keystrokes.

The emulation features include system configuration such as clock selection, memory mapping, memory interface, input-output interface, register access, trace, breakpoint and disassembly.

Information Month Starts On New Year's Eve

The 1986 Information Month raised its curtain at the newly completed Exhibition Complex of the Taipei World Trade Center on New Year's Eve. Premier Yu Kuo-hwa personally presided over the grand opening.

The theme of the exhibition is "information and automation." The show features the following pavilions:

(1) General Pavilion: Photos, short written explanations and movable miniatures are used to introduce the current status of the information industry, the future of information in society, and concepts of information and automation.

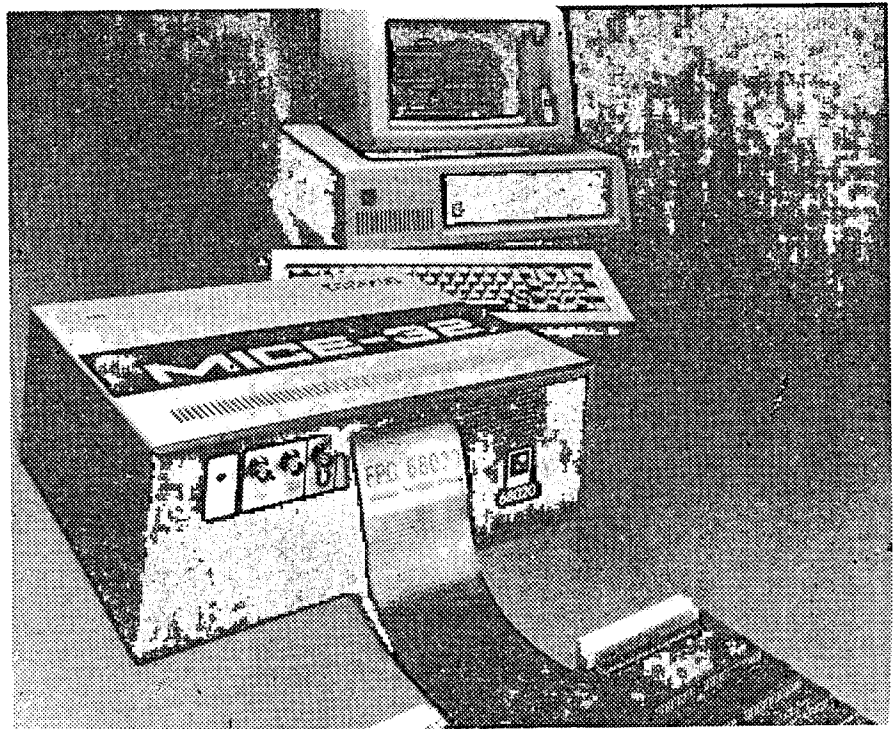
(2) Application of Information: Present the result of research in information and automation. The items exhibited and attending organizations are: a. Office Automation Hall: National Science Council, IBM, WANG and NEC. b. Home Automation Hall: Industry Technology Research Institute, Tecom Co., Trunp Enterp. Co., Ltd. c. Industry Automation Hall: Industry Technology Research Institute. d. Communication Automation Hall: Directorate General of Telecommunications, Directorate General of Posts, Central Weather Bureau, Yang Ming Line, China Engineering Consultants, Inc. e. Energy Automation Hall: Energy Council, MOEA; Chinese Petroleum Corp., Taiwan Power Co. f. Financial and Monetary Hall: Data Processing and Audit Center, MOF; Financial Information System Group, MOF. g. Municipal Administration Hall: Taipei Municipal Government. h.

National Defense Hall: Ministry of National Defense.

(3) Information Facilities: Display all kinds of computer systems, associated facilities and software.

(4) Video Hall: Show films about information technology, accompanied by video presentations and a TV wall.

(5) Information Publications Section. A large collection of books and other printed matter related to information will be on exhibition.



Gov't Plans to Spend NT\$33.7B. For Sci-tech R/D Projects in 1986

The government is projected to earmark an estimated NT\$33.7 billion for various sci-tech research and development projects in 1986, according to the Council for Economic Planning and Development.

The CEPD said that the R/D budget will account for 1 percent of the gross national product (GNP), compared to 0.96 percent in 1983. The number of R/D personnel will number 21,500 and the average annual spending of

each researcher will be NT\$1.57 million, the CEPD said.

The country's top economic planning body has drafted the R/D plan for 1986. According to the plan, the government will set up a technological research and development fund to help finance R/D projects initiated by private enterprises. The government will also assign certain banks to offer low-interest credits to both private and public enterprises to encourage devel-

opment of new industrial technologies.

The government will also take the following steps to promote industrial sophistication and innovation:

- Revising the existing regulations to encourage private industry to develop new products;

- Offering more tax incentives by further revising existing tax laws;

- Help finance R/D projects initiated by non-profit associations and social organizations;

- Stipulating that public enterprises must set aside a R/D budget;

- Requesting public enterprises and government agencies to purchase machineries and office equipment locally so as to encourage domestic makers to produce and develop new products.

ERSO Puts Out 32-bit Computer System

The Electronics Research and Service Organization (ERSO) announced yesterday it has successfully developed a prototype 32-bit microcomputer system.

ERSO director Shih Chin-tai said that 32-bit microcomputers will have great market potential in the future because of the development of 32-bit micro-processors and prices of such peripheral components as memory chips are declining.

The ERSO-developed 32-bit microcomputer system uses 32-bit 68020 micro-processor, produced by Motorola Corp. of the United States, as its

central processing unit. The system has memory management and multi-user functions and can do floating point calculations with an affiliated floating point unit, Shih said.

He added that the system's 2 million-bit main memory can be expanded to 16 million-bit and is capable of detecting errors and making corrections. It can do on-line operations with four terminals, and can be developed into various commercial and office automation and engineering work stations when applying ERSO-developed computer charting and network technologies and peripheral equipment.

PC Area Network Helps Boost Hi-tech Exports

A 16-bit personal computer area network recently developed by the Industrial Technology Research Institute's Electronics Research and Service Organization has helped boost the Republic of China's hi-tech exports to other countries.

An ITRI official said Tuesday that many new computer technologies which have been transferred by ITRI to the private sector over the years have greatly enhanced the competitiveness of ROC-made computers on the world market.

In the past six months, he said, the nation's computer makers have exported over 2500 sets of the newly-developed 16-bit PC area network after obtaining technological know-how from ITRI.

The official pointed out that the 16-bit PC area network is a new system capable of linking computers. Usually, a personal computer can do only such work as data processing, but with the assistance of this new device, its function will greatly expand, he said.

This networking approach was first used in the Taiwan Power Company's office automation project. Taipower has expressed satisfaction with the performance of this new system, the official said.



The Electronic Research Service Organization (ERSO) of the Industrial Technology Research Institute has developed a prototype 32-bit micro-computer system (see photo). It has memory management and multi-user functions.

Conclusions and Recommendations

Group 6 — Telecommunication

The Seventh Board Meeting of

The Advisors for Science and Technology

The Executive Yuan, Republic of China

(Continued from last issue)

Geographical localization frequently is useful in reducing the required extent of the optimization. Digital telephones will be desirable only if digital lines are available which in turn are served by a digital local office. That area could be considered as distinct from the area of another local office serving analog lines and analog phones. However, the separation breaks down when we include inventories, training and organizing costs for installation and maintenance, and, importantly, new services made possible by end to end digital connectivity.

These examples are intended to illustrate the following: interdependence must be considered in establishing current system optimization. The anticipation of system optimization in the future may require a temporary loss of current optimization.

Discussion

This essay explored the difficulty of stating a simple concise policy of purchasing for telecommunications equipment. It is not possible to purchase an entire network nor is it feasible to put every component out to bid. Fortunately, in practice the problem reduces primarily to the policy involved in the purchase of switching offices. These are the vital hubs of communications; they contain the inanimate brains of the system; they reach out to every entity to determine the type of service to be provided; they are the most costly components of the system.

The present purchasing policy is the biggest single obstacle to the achievement of the goals of DGT. It also runs counter to the economic goals of ROC, i.e., the stimulation of local manufacture. Here are some of the problems:

a) Bid Requirements

The bid requirement for switching offices presumes that, through specifications, the performance, with respect to the network, of any office can be made identical, irrespective of manufacturer. This assumption is wrong. Unless the designs were identical,

which they are not, interface specifications, no matter how detailed, cannot ensure uniform performance. Of course, the network always consists of some machines of different characteristics. It is always in a transition stage as old offices are replaced with new ones of different capabilities. This cost penalty is less than what is gained by more efficient offices that also provide new services. However, each new design of office that is introduced increases the costs of operation and maintenance, and potentially reduces the overall level of service. Thus overall network costs go up as different designs are introduced without producing compensatory savings.

b) Bid Procedure

One penalty always associated with competitive bidding is the time required to offer and receive bids, to evaluate bids and frequently to perform multiple rounds of bidding. Since different manufacturers do not produce identical offices, as previously discussed, DGT's planning often must be delayed until the outcome of the bidding competition is determined. Long range planning is the heart of the telecommunications business; the bid procedure provides a serious delay.

The current procedure also imposes a serious penalty on manufacturers. With the prospect of every office being competitively bid, there is no reasonable assurance of any future level of production by any given manufacturer. Since manufacturing costs are highly dependent on volume, an office by office approach forces the manufacturer to bid very high, assuming no future production, or to underbid expecting to make up the difference in later negotiations. In either case, DGT obtains unnecessarily costly facilities.

A related manufacturing problem is that, to obtain the substantial cost benefits of large volume production, a long lead time and much capital are required to install suitable production facilities. Without some assurance that these could be adequately employed, the manufacturer faces an unreasonable risk. It is not in the best interests

of ROC to promote bankruptcy of local manufacturers because of purchasing policy.

In summary, the present policy leads to delay in planning and execution, both for DGT and for manufacturers, and it leads to higher prices to DGT and an unhealthy environment for manufacturers.

Recommendations

Concerning such a complex subject, these remarks should be thought of as suggestions rather than firm recommendations.

1) The bidding procedure should focus on Life Time Costs rather than First Costs.

2) Switching Office Contracts should be awarded to cover one or two years of DGT's requirements as opposed to office-by-office awards.

3) To save the costs of Operations and Maintenance, the country could be divided into segments with switching offices of predominantly a single manufacturer in each segment.

4) No matter limit is accomplished, some form of manufacturing continuity must be established. Otherwise local manufacturing must depend for stability on exports. This is not promising; it could prove to be disastrous to DGT.

5) Although the focus here has been primarily on switching offices, the recommendations apply in varying degrees to the other components of the system. As we proceed through modernization to the all digital network with integrated services, the network must perform as a still more highly integrated system. It will become even more important that network planning encompass more of the components with predictable properties. All of this should be built into the philosophy of the Purchasing Policy.

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