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SPECIAL ISSUES

RMB 245 Billion R&D Expenditure

According to a statistical bulletin on S&T expenditure, jointly issued on September 18, 2006 by the State Statistics Bureau, the Ministry of Science and Technology, and the Ministry of Finance, China's has registered a record high S&T expenditure in

2005, at RMB 245 billion, or RMB 48.37 billion up compared with the preceding year, with a growth of 24.6%. The expenditure takes up 1.34% of China's GDP in the year. As a result, R&D expenditure per R&D personnel is raised to RMB 180,000, or RMB 9000 more compared with the preceding year.

When measured by activity type, basic research takes up a portion of RMB13.12 billion, or 11.9% more compared with the preceding year, applied research RMB 43.35 billion with a growth of 8.2%, and R&D activities RMB 188.53 and a growth of 30.1%. The three S&T activities secure their respective proportion at 5.4%, 17.7% and 76.9%.

The statistics, when sorted out by implementers, show that industry has recorded a growth of 27.4% for RMB 167.38 billion, compared with the preceding year, government sponsored research institutes 18.9% at RMB 51.31 billion, and universities 20.6% at RMB 24.23 billion. They take up a respective portion of 68.3%, 20.9% and 9.9% in the nation's total R&D expenditure. Industry enjoys a raised share by 1.5%, indicating a further enhanced mainstream position in technology innovation activities.

When viewing the statistics by sector, the R&D expenditure consumed by six major sectors, including the data from large and medium enterprises, have exceeded the level of 1%, with 1.6% for special equipment manufacturing, 1.5% for pharmaceuticals, 1.4% for electric machinery and transport equipment manufacturing, 1.3% for general equipment manufacturing, and 1.2% for telecommunication equipment, computer, and other electronic equipment.

There are seven cities or provinces whose R&D expenditure has exceeded RMB 10 billion, including Beijing, Jiangsu, Guangdong, Shanghai, Shandong, Zhejiang, and Liaoning, with a combined total of RMB 158.72 billion, or 64.8% of the nation's total.

The bulletin also shows that in 2005 the state treasury has secured an S&T appropriation worth RMB133.49 billion, or RMB 23.96 billion up compared with the preceding year, with a growth of 21.9%, and a weight of 3.9% in the nation's total financial expenditure. Of the appropriations, the fund destined to S&T activities accounts for RMB 80.78, or 16.7% up compared with the preceding year, with a share of 9.2% in the nation's total

financial expenditure. Local S&T appropriations reached RMB 52.71 billion, with a growth of 30.8% compared with the preceding year, or 2.1% in the total local financial expenditures.

S&T Training for Farmers

A large scale S&T training project aiming at farmers was officially kicked off on September 1, 2006. The novel training initiative, financed by the state treasury in a sum of RMB 100 million, will benefit farmers selected from 10,000 villages. Co-sponsored by the Ministry of Agriculture and Ministry of Finance, each participating village will be granted with RMB 10,000 for the training. The endeavor will give farmers opportunities to be familiarized with advanced farming techniques and skills, in an attempt to raise farmers' quality, add more scientific contents to farming activities, and increase their income.

According to a briefing issued by the two sponsoring ministries, 40 farmers engaged in major farming activities will be selected as trainees from each village. Intensive training for each selected village will not be less than 15 days, and field training tailored to farming seasons will not be less 15 times. The training is supposed to noticeably raise farmers' technical skills, and the level of scientific farming.

The two ministries also ask local authorities to bring universities, schools, and research institutes, farmers associations, and township enterprises to the scene. Training agencies will be selected under the principle of "openness, fairness, and equality".

**INTERNATIONAL
COOPERATION**

China-Australia S&T and Education Seminar

The first forum on S&T and education, sponsored by Federation of Chinese Scholars in Australia, was held not long ago at University of New South Wales. Some 150 scholars and officials from universities, research institutes, and government departments of both countries attended the event.

The gathering has attracted attentions of the governments, and S&T and education communities of both countries. WANG

Dianzuo, Vice President of the Chinese Academy of Engineering, CEN Jianjun, Deputy Director, Department of International Cooperation, a part of the Ministry of Education, and ZAHNG Jungao, charge d'affaires, and counselors and consuls in charge of science and education at the Chinese Embassy in Australia attended the event. Participants from the Australian side include David de Kretser, Victoria's Governor, John Zillman, President of the Australian Academy of Technological Sciences and Engineering, officials in charge of international cooperation at the Australian Ministry of Education and Science, heads of six universities, including the Guizhou University, Xiamen University, and Monash University, and representatives from BHP Billiton and Rio Tinto.

At the two-day meeting, officials and scholars discussed a range of topics concerning exchanges and cooperation in the fields of sustainable development and environment, biomedical science, resources and energy, advanced materials, nanotechnology, information technology, and botany. The event has enhanced the mutual understanding in the domain of S&T and education, and will lead to more extensive and in-depth collaborations between the two nations in the future.

Expedition for Mount Ximalaya

A scientific expedition heading for the Mount. Ximalaya, co-sponsored by the Bureau of International Cooperation, a part of the Chinese Academy of Sciences, and the International Centre for Integrated Mountain Development (ICIMOD), will be kicked off in the mid-October. Made up of 16 scientists from China, India, Nepal, and Bhutan, the expedition will last for a month, surveying the Mount. Ximalaya area.

The trip is designed to have an improved understanding of geological, geographic, humanitarian, economic, and cultural developments along both the northern and southern slopes of the mountain. During the expedition, researchers will work on the following topics: the impacts of the southern Asia corridor on the political, economic, and cultural life over the mountain region; positioning and development of Mount. Ximalaya corridor; the proven experience of nature protection/utilization, and comprehensive/sustainable development in the southern Asian region; natural landscapes over the northern and southern slopes of the mountain, and associated impacts on the adjacent

climate and environment; comparative study of fauna and flora between the northern and southern slopes; study of geological, physiognomic, glacier, and hydrological conditions along the two slopes; relationship between the two slopes in the context of ethnic culture, religions, and economic development; and working out a basic geological map starting from the tropical plains of the southern slop, and covering the natural northern and southern slopes.

RESEARCH AND DEVELOPMENT

Longxin 2E Chip Approved

The Institute of Computing Technology, a part of the Chinese Academy of Sciences, announced on September 13, 2006 that its new generation CPU, Longxin 2E has recorded a performance equivalent to Pentium IV processor. Made up of some 47 million transistors on a chip of two-thumb size, the Chinese made CPU is a 64-bit processor, with a power consumption ranging between 3-8 watts. As the first instance in the country using 90-nanometer design technology, Longxin 2E has become a general processor with the highest performance, in addition to the one manufactured by the United States and Japan. The chip renders a maximum frequency of 1.0GHz, and 4 trillion floating-point operations per second. XU Guanhua, Chinese Minister of Science and Technology believes that the development represents a key stride that China has made in information technology. He stresses that technology development shall be closely linked with the industrial development.

Launched in May 2005, Longxin 2E project rolled out its first prototype chip on March 17, 2006, which passed the experts' validation on March 23. Using a 64-bit Linux operating system, the new chip smoothly work with a range of application programs, including Mozilla, OpenOffice, and Mplayer, under an entry and display system in Chinese. Experts have reached the following conclusions: the chip makes the first instance in the mainland using 90-nanometer design technology, with a maximum frequency of 1.0GHz, and 4 trillion floating-point operations per second. The proprietary CPU has reached an internationally advanced level in the context of individual

processor design.

During the 10th Five-year period(2001-2005), the Institute has worked out a line of Longxin 2 products, including Longxin 2B, 2C, and 2E, following the successful development of Longxin 1 in 2002. With the support of the National 863 Program, Chinese scientists have produced the Longxin series with each having an enhanced performance three times better than the preceding one, realized a leaping development in the area. Also derived from the project are 12 invention patent applications, and 39 papers. Longxin 2E has been put into bulk production, and will be sold in market at the end of 2006. In the meanwhile, the research team has embarked on the design part of Longxin 3, a processor with multi-cores.

Femtosecond Comb Developed

A project to develop the femtosecond optical frequency comb, contracted to the Chinese Academy of Metrology under a special fund of the Ministry of Science and Technology for supporting basic research, was approved by an expert panel organized by the General Administration of Quality Supervision, Inspection and Quarantine on September 12, 2006. The event secures China's capability of establishing such a system on its own. The system is able to directly readout all the optical frequencies of visible or near infrared lights. While providing a powerful technical support for a range of areas, including national defense, telecommunication, and basic research, the new technology also creates a necessary foundation for another key R&D project: "photon clock".

Experts believe that the project has resulted in the following accomplishments: realized a range of technology innovations, including server feedback control technology using photon crystal fibers, effectively prolonged the locking time of femtosecond optical frequency comb, and proposed and realized a laser frequency measuring method applicable to long duration measurement. Researchers also realized for the first time in the country an iodine and helium-neon based measurement at a respective frequency of 532nm and 633nm, using Cs atom fountain clock as reference. The value 532nm derived from the measurement is in line with the values (frequency difference less than 0.1kHz, and a relative frequency uncertainty of 3.6×10^{-14} (100s means) recommended by the International Committee

for Weights and Measures.

Seeds Satellite Blasted Off

At 15:00, September 9, 2006, CZ-2B launch vehicle successfully sent a seed breeding satellite into the preset orbit, from the Jiuquan Satellite Launch Center. The satellite, a recoverable experimental platform developed by China Academy of Space Technology, has 215-kg payloads of crop seeds for 9 major categories, including grains, cotton, and vegetables. The seeds are to be tested for possible mutations in a space environment. The satellite is also equipped with a number of sounding equipment to explore radiation, microgravity, and electromagnetic field in the space environment. A comparative study will be made to understand seeds mutations in a space environment. The Ministry of Agriculture will organize research institutes to screen out capable seeds from the retrieved payloads for further growth, in an attempt to breed out high-yield and high-quality new varieties for further diffusions. Scientists will also create a mimic space environment to study biological effects, and explore the possible ways to breed out improved seeds using the mimic environment. The satellite also leaves some room for other scientific experiments.

New Telsat Launched

At 00:02, September 13, 2006, the Chinese made Zhongxing-22 A Telsat was blasted off with a CZ-3A launch vehicle, from the Xichang Satellite Launch Center. 25 minutes later, the data received by the ground controllers showed that the satellite has smoothly entered a geosynchronous orbit at a perigee altitude of 207km, and an apogee altitude of 42,000km, indicating a successful launch.

Zhongxing-22 A Telsat, a geosynchronous satellite developed by China Academy of Space Technology, a part of the China Aerospace Science and Industry Corp., has a design life for 8 years, and will be operated by ChinaSat, an affiliation under China SatCom.

Having entered the transfer orbit, the satellite will be tracked down and controlled by the Xi'an Satellite Control Center, in collaboration with a measuring boat on the sea. It will be delivered to the user, when positioned above the equator at 98

degree east longitude.

Low Temperature Wind Turbine

Not long ago, four 1500kw low temperature wind power generators rolled off at the Dongfang Gas Turbine Works in Deyang, Sichuan. The wind power generators will be installed and put into operation on the Hulunbei'er Prairie. The development applauds the largest low temperature wind power generators so far manufactured in the country. The proprietary technology, a result derived from the combined process of importation, digestion, and absorption, has filled up a domestic blank.

In 2004, Dongfang Gas Turbine imported the German technology for wind turbines. In the meanwhile, Chinese researchers worked out key components on their own, and produced seven 1500kw wind turbines for normal-temperature setting in December 2005, which were installed and put into operation in Zhudao, a part of Rongcheng, Shandong. The low temperature version rolled out this time can work smoothly under a temperature as low as -35°C , and will not fail to produce power even under a further low temperature at -45°C . With each module having a weight of 56 tons, length 10m, width 3.8m, and height 4m, and a performance exceeding the similar European standards, the new system is manufactured with localized parts and components as high as 75.46%.

Comments or inquiries on editorial matters

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