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SPECIAL ISSUES

"221" Space Project

SUN Laiyan, Director of China National Space Administration, said recently that China's space industry will enter an important leaping stage, during which a range of space activities will be realized, including manned space flight, moon probe, and

new-generation super launch vehicles. The efforts is named "221 project ", meant to work on manned space flight and moon probe (the first 2), develop a high resolution ground observation system and a second-generation navigation and positioning system (the second 2), and roll out the new generation super launch vehicles, or the last 1.

In the manned space project, Chinese scientists will focus their efforts on space walkout and space vehicle docking, and establishing a space lab that can be operated either under manned manipulations or on its own for a long period of time. This will create conditions for future manned space activities.

The moon probe project is designed with moon circling and moon environment probe missions for the 11th Five-year period(2006-2010), under a 'three-step' strategy (circling, landing on, and returning from the moon), allowing China to develop the capability of exploring and utilizing the moon resources, and mastering the key technologies for deep space probes.

Based on the existing smooth operation of the ground observation system, an advanced satellite, airplane, and stratosphere airship based high resolution ground observation system will be developed to meet the needs of the national economic development, in a timeframe of 10-15 years. China will also establish an integrated all-weather ground observation system, covering both space and ground, with high spatial, temporal, and spectrum resolutions. The efforts will raise China's ground observation system as a whole.

China will roll out a second-generation satellite navigation system before 2010, covering China and adjacent regions, with a text communication function and interference resistance capability, scalable for global coverage and regional navigation. In 2020, a satellite navigation system, made up of geostationary and non- geostationary satellites, and associated ground stations and users terminals, will be established.

It will take 6 or 8 years for China to put its new generation 5-meter-across super launch vehicle into operation. With numerous merits, including toxicity and pollution free, low cost, high reliability, and enhanced adaptability, the new launch vehicle, with a carrying capacity of 10-25 tons for the near-earth

orbit, and 6-14 tons for the geosynchronous orbit, will accommodate the future development of China's space industry.

Popular Science for Rural Areas

China Association for Science and Technology and Chinese Ministry of Finance jointly announced on August 21, 2006 that a project to benefit the rural areas with popular science will be launched, in an attempt to raise farmers' scientific literacy, and promote the development of socialist new rural areas.

Under the principle of setting up role models for demonstration and diffusions, the project will produce a group of role models, either individuals or collectives, with outstanding contributions, and strong demonstration and radiation capability. They will be conferred with the title "national advanced unit for benefiting the rural areas with popular science", or "national individual role model for benefiting the rural areas with popular science", and financed with subsidies for their activities in the area.

Referring to the special fund dedicated to the project, authorities concerned explain that in 2006 a sum of RMB 50 million will be allocated by the state treasury for rewarding 100 rural technical associations, 100 rural popular science demonstration centers, 100 rural popular science individual role models, and 10 popular science teams selected from the ethnic communities. Each rural technical association and popular science demonstration center selected will enjoy a subsidy worth RMB 200,000, with RMB 50,000 for an individual role model, and RMB 500,000 for a popular science team selected from ethnic communities. The subsidies will be mainly used for purchasing popular science materials and equipment, or for other popular science activities, including training, workshops, and diffusion of new technologies and species.

948 Program for 11th Period

In the decade since its implementation, the 948 program has shortened the cycle of China's agricultural R&D research by 10 to 15 years, and saved research expenditures by 30%—50%, said WEI Chao'an, Vice Minister of Agriculture on August 20, 2006, at a meeting to kick off the 948 Program for the 11th Five-year period. The effort has narrowed down the gap between China's research level in agriculture and the internationally advanced

level from 15 years a decade ago to current 7 years.

With the approval of the State Council, the state treasury will make RMB 110 million available for the 948 Program in the 11th Five-year period, an initiative for introducing internationally advanced agricultural technologies. The sustained support will assist China to raise its capability in developing agricultural and forestry products, irrigation equipment, agricultural safety, and ecological construction.

During the 11th Five-year period, the 948 Program will, with agrifoods as the tie, work on 6 major facets, including plantation, animal husbandry, veterinary, fishery, agricultural machinery, and farmland reclaiming, focusing on 7 main crops, including wheat, rice, corn, soybean, and rape, and 6 livestock, including pig, cow, beef cattle, sheep, and chicken. Efforts will also be made to improve processing techniques for some 40 agrifoods, including fruits, vegetables, sugarcane, tea, sesame, peanut, sunflower, and sweet potato. A range of high technologies will also be made available for establishing platforms concerning resources environment, molecular seed breeding, biological control, agricultural information process, and protective farming.

S&T Incubators Develop Healthily

As of 2005, there have been 534 S&T business incubator facilities in China (not including 50 national campus S&T parks), with 39,491 businesses under incubation, and 15,815 S&T businesses graduated on a combined basis. Of the 534 S&T business incubators, 135 are the facilities at the national level. Statistics marks a new breakthrough landed by S&T incubators in both quantity and quality, with most S&T business incubator facilities entering a sound development track.

- 1) Further enhanced capacity and fast development of national incubator facilities. Statistics show that 15,815 S&T businesses have been incubated out on a combined basis, or 35.5% more compared with 2004. According to incomplete figures, in 2005 the business revenue derived from the graduated enterprises amounted to RMB 143.33 billion, with an industrial output worth RMB126.18 billion.

As of the end of 2005, there are 135 national incubator facilities, with 23,343 businesses under incubation, or

59.1% of the total businesses under incubation. These incubator facilities have produced a revenue worth RMB 95.54 billion, or 58.8% of the total, and created 425,000 jobs, or 59.3% of the total. They absorbed an investment amounting to RMB 1.92 billion, or 55.2% of the total, and produced 11,406 S&T enterprises, or 72.1% of the total.

- 2) Noticeably raised R&D capability of the enterprises under incubation, supported by a variety of national projects. In 2005, the enterprises at 534 incubator facilities have been contracted to 846 S&T projects under a range of national S&T programs, including National 863 Program, National Key Technologies Program, and National Innovation Foundation, with a financing arrangement worth RMB 600 million. Small and medium-sized S&T enterprises are the happiest beneficiaries of the support, enjoying 445 projects, and a financial favor worth RMB 236 million.
- 3) Noticeably enhanced intellectual properties. Statistics on 534 S&T business incubator facilities show that in 2005, 17,128 patent applications have been filed, or 4,994 more compared with 2004, with a growth of 41.2%. Of them, 6,222 are invention applications, or 2,674 up compared with 2004, with a growth of 75%. Among 10,809 grants, invention takes up 3,962 in number, or 1,755 more compared with 2004, with a growth of 80%.
- 4) Improved quality of human resources, with an increasing number of overseas talents. In 2005, the 534 incubator facilities have a staff population of 720,000. Of the employees, 64.4% has an education background at the college level or above. Thanks to the agreeable environment created by the incubator facilities, more and more overseas Chinese students have been attracted to create their own businesses there. In 2005, the incubator facilities have absorbed 12,000 overseas Chinese students, who came from the United States, Japan, European countries, Russia, Australia, New Zealand, and Southeast Asian countries and regions.

**INTERNATIONAL
COOPERATION**

Multinational Training

Shanghai Jiaotong University, Microsoft Research Asia, and Carnegie Mellon University jointly announced on August 16, 2006 that the three parties have reached an accord for nurturing talents with concerted efforts, and signed a document to that effect. Using Microsoft Research Asia as a tie and major base, the multinational efforts will introduce a brand new training modality for producing high caliber computer talents, with the concerted efforts of two world renowned universities.

According to the accord reached by three parties, each year Shanghai Jiaotong University and Carnegie Mellon University will select qualified students to study at the opposite campus for a semester, before furthering their study at Microsoft Research Asia. It is agreed that in the first year, each university will select 5 students, who have studied for two years or longer under a four-year undergraduate curriculum, for joint training, through interviews and comprehensive examinations. The project will in the future be further expanded to the training of master's and doctoral students, and young teaching faculties. According to the representative of Carnegie Mellon University, cooperative training of young teaching faculties is under discussion, which will eventually lead to the promotion opportunity for young teachers, raising their research horizons, and building up their research capability.

Dr. Shen Xiangyang, managing director of Microsoft Research Asia, said his center has achieved fruitful cooperation with both Shanghai Jiaotong University and Carnegie Mellon University in nurturing computer talents. Training modules are differed according to the needs of students at different learning stages. Its experimental course, in collaboration with Shanghai Jiaotong University, for training computer scientists, has been thought highly by the Chinese Ministry of Education, and has been incorporated in a case study for cooperation between Chinese universities and large businesses made by the Ministry in June 2006. The above-mentioned cooperative project is a brand new experiment initiated by Microsoft Research Asia for IT personnel training, trying to narrow down the divide between Chinese students and world top universities, and paving a way for future multinational personnel training.

Young S&T Personnel Exchanged

A young S&T personnel exchange program between China and the United States called a success in Beijing, after 8-week long activities from June 18 to August 13, 2006. 28 American students from renowned universities, including Stanford University, the University of Pennsylvania, and Boston University, have become part of the exchange event.

In a short period of 8 weeks, American students visited a number of Chinese universities, including Peking University, Tsinghua University, China Agriculture University, China University of Mining and Technology, Beijing Jiaotong University, the Chinese Academy of Forestry, and the Chinese Academy of Sciences. They worked together with Chinese S&T personnel on a range of topics, under the guidance of their Chinese tutors. Some of them had field investigations in the provinces outside Beijing, including Sichuan, Qinghai, and Inner Mongolia. While gaining research experience, American students also spent some time understanding the political, economic, S&T, and cultural developments in the host country. China's fast S&T development and a great culture embracing both broadness and depth has deeply impressed the visitors. Some of them plan to come back working on targeted research projects in the near future.

RESEARCH AND DEVELOPMENT

World First Cretaceous Well

Not long ago, Chinese scientists started to drill a continental well at the Daqing Oilfield, which will eventually unveil a Cretaceous setting, the first of its kind in the world. Named Songke I and physically located at the Songliao Basin, the effort is an important component of the study of major Cretaceous geological events and greenhouse climate change, under a national basic research program. The development makes the third scientific expedition drilling in the country, following a continental expedition well drilled in the East China Sea area, and another at the Qinghai Lake area. Jointly implemented by the Daqing Oilfield Co. Ltd, and China University of Geosciences, the project has attracted the participation of scientists from a dozen of foreign countries, including the United States,

Germany, Canada, Japan, and Austria.

Using most advanced drilling and measuring technologies, the project will work on the exploration from ten major aspects, including stratigraphy, paleontology, sediment phase, paleomagnetism, organic geochemistry, cyclostratigraphy, and earth organism. Scientists will also study six major cutting-edge issues concerning paleoclimatology reconstruction, descriptions of major Cretaceous geological events, sediment response, formation of massive hydrocarbon source rocks, biological colony replacements, and fast climate change under a greenhouse climate. In the meanwhile, a range of engineering objectives have been defined for contamination prevention, continuous core collection, and core recovery as high as 98%, in reappearing of an ancient geological environment. The project will also touch the issues concerning basic geology and oil explorations.

Laudable Progress for Aerodynamics

China has up to date constructed some 140 fully equipped wind-tunnels, and achieved laudable progresses in a range of areas, including wind-tunnel experiment, numerical computation, and flight simulation. According to China Aerodynamics R&D Center, the Center has designed and established a wind-tunnel cluster, the largest of its kind in Asia, made up of 8 internationally advanced sound velocity wind-tunnels of a 2.4-meter span, which can be used to work on aerodynamic experiments from low speed to 24X sound velocity, desirable for underwater, ground, and an upper air as high as 94km applications.

In addition, the Center is equipped with a variety of sophisticated equipment, including a computer system capable of 1.4 trillion floating-point operations per second, and application software that can perform simulating calculations for diverse flying vehicles. The Center, working on a range of aerodynamic experiments for aircraft, airship, and launch booster, has achieved eye-catching accomplishments in developing unmanned flying vehicles.

The Center has so far registered some 47,000 wind-tunnel experiments, which brought up key technological solutions for designing re-entry capsules and escape vehicles of the manned

Shenzhou spacecraft, and for other flying vehicles and weapons. Almost all the spacecraft, airplane, and launch vehicles used in the aviation, space, and shipping industries have been tested at the center, before becoming a prototype.

Comments or inquiries on editorial matters
or Newsletter content should be directed to:

Mr. Mao Zhongying, Department of International Cooperation,
MOST 15B, Fuxing Road Beijing 100862, PR China

Tel: (8610)58881360 Fax: (8610) 58881364

<http://www.most.gov.cn>