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SPECIAL ISSUES

## S&T Supports Modern Service Industry

During the11th Five-year period(2006-2010), China will launch an S&T action to support the service industry. The action plan is designed with the following objectives and tasks: striving for breakthroughs in the common and key technologies needed by the service industry, including e-commerce, commodity circulation, and digital content making; establishing a technical service system for the industry; formulating standards, regulations, and by-laws for the industry; establishing a preliminary system using proprietary standards; enhancing demonstration and diffusion parts in a range of areas, including e-commerce, modern circulation industry, digital media, digital education, digital medical service, digital community, digital tourism, and electronic banking; nurturing a number of service giants, establishing a modern service chain, with noticeable economic and social returns; establishing an S&T innovation system for the industry, enhancing its proprietary innovation capability, and promoting the transformation of the traditional service industry into a modern one; and guiding and supporting the development of the modern service industry, and raising the weight of the modern service industry in the national economy.

For a smooth implementation of the S&T action plan, the Ministry of Science and Technology has established, in collaboration with involving government agencies and local authorities, a work mechanism for coordinating the efforts between agencies, and localities, and for strengthening the design efforts at the tope level, and an overall coordination, in an attempt to promote the action with concerted efforts. In the meanwhile, the Ministry of Science and Technology has kicked off the initial efforts for common technology development and associated application demonstrations for the modern service industry, a major project listed in the 11th five-year plan. The implementation of the project calls for the concerted efforts of different government agencies, industries, and localities, requesting an enhanced liaison and coordination with other scientific programs. The action plan has also made deployments in a range of related areas, including a fund raising system for the industry, an alliance between industry, universities, and research institutes, a supervising and management system, and formulating policies encouraging disciplinary capacity building, personnel training, and development.

## Technology Import Encouraged

Not long ago, eight government agencies, including the Ministry of Commerce, and the State Development and Reform Commission, published the comments on encouraging technology import and innovation, in an attempt to facilitate the change of foreign trade growth mode. According to the Comments, China will raise the weight of special technology contracts and technology permits to 50% in the total technology import pie in 2010.

China will establish a system to promote the industrial technology import and innovation, including strengthening multilateral and bilateral cooperation, establishing and perfecting an international trade credit service system, advancing industrial intellectual property management and protection, encouraging collaborative R&D between industry, research institutes, and universities, and establishing high caliber intermediary service organizations.

China will use diverse economic means to encourage technology import and innovation, including supporting industrial technology import and innovation oriented export with a foreign trade development fund, providing necessary financial support for importing advanced technologies and re-innovations, and providing banking and foreign exchange support for the Chinese enterprises that plan to establish R&D centers overseas.

China will also perfect regulations and by-laws on technology import and innovation, including establishing a well-functioned legal system for technology import, an exchange and training system, and a comprehensive statistic system.

### Environment Friendly Auto Accreditation

Starting from September 1, 2006, China will introduce a volunteer accreditation system for energy efficiency and environment friendly light duty autos. The system will go into a full-fledged operation, covering the whole auto industry in 2008.

To guide and help consumers to purchase and use energy efficiency and environment friendly products, the China Certification and Accreditation Administration organized technical organizations, enterprises, and experts to work on an accreditation system for energy efficiency and environment friendly autos, starting from 2004. The concerted efforts has led to the establishment of a system in line with China's situation. The system allows unified accreditation for both domestic made and imported autos, using the same rules, technical standards, reviewing procedures, and accreditation logo. The accreditation will be made through random screening and continuity examination. The follow-up supervision will also be made on the autos that have passed the accreditation. The accreditation logo will be officially granted by the China Certification and Accreditation Administration. Relevant information will be given on a slip attached to the logo, including the name of the accreditation agency, and other indicators such as noise and emission.

China Certification and Accreditation Administration will establish a website for announcing the accreditation results, and taking users' complaints, in an attempt to raise the service level of the accredited enterprises.

## RESEARCH AND DEVELOPMENT

### China's Moon Probe Opens Up

China's moon probe programs opens to scientists across the world, said SUN Laiyan, Chief of China National Space Administration, at an international moon probe and utilization conference held on July 25, 2006. He welcomes scientists from other countries to be part of studying and analyzing the scientific data collected by the Chang'e I, China's first moon probe satellite.

According to SUN, the data products derived from the moon probe program will be handled in line with the standards set up for the planet data system, and be classified to support diverse studies and special products making. He wishes that the data would become evidences for relevant studies. A special application committee will be established for the purpose. Under the efforts of the committee, a great number of scientists and scholars will be attracted to be part of the moon probe program, in an attempt to harvest more scientific findings. China will exhibit the findings through a range of popular science activities, to attract and encourage younger generations to be an active part of scientific and innovative explorations. Scientists across the world are welcomed to join the efforts, through appropriate cooperative channels, studying the scientific data derived from the program.

### China's Space Lab

After the successful completion of the phase I manned space project, China will dive into a more ambitious project to establish a space lab system, consisting of a space lab, transport spacecraft, launch vehicle, launch site, landing site, and associated measuring and communication, said GU Yidong, Vice President of Academy of Opto-Electronics, a part of the Chinese Academy of Sciences, at a forum held not long ago to discuss China's manned space applications.

GU explains that to realize the above-mentioned objectives, one needs to work on a range of challenges, including space vehicles' docking, astronauts' walk-out, and a space lab designed with a reasonable service life, allowing astronauts to live in and work on space experiments. According to GU, China's space lab will be made for a longer service life, allowing astronauts to stay there for a short period of time. A series of space experiments, either manned, or controlled through the ground stations, will be initiated through the same efforts.

To enrich the future space station with more functions, China plans to release microsatellites from the space lab, which will have a mission to monitor the surrounding environment in the parallel flight. In the meanwhile, Chinese scientists will work on laser and THz band communications between the space lab and microsatellites. A quantum information transmission experiment between space and ground is also planned.

### Chinese Made Software Protects Astronauts

LIU Siqing, a research fellow with the Center for Space Science and Applied Research, under the Chinese Academy of Sciences, told the 36th World Space Conference convened recently that a software developed by Chinese scientists to analyze the radiation dosage received by astronauts in space activities has effectively protected astronauts' safety in the two manned space flights. The software will continue to play a protective role in the future manned space flights and astronauts' walk-out. China's demanding space probe activities have raised more and new requirements and challenges for a safe space environment.

According to LIU, Chinese scientists have developed the software system to analyze the radiation dosage received by astronauts, based on the findings of high-energy radiation environment and effects, in an effort to ensure a successful manned space flight. The software is also used to analyze and evaluate the high-energy radiation environment that may threaten astronauts' safety. During the in-orbit operations of SHENZHOU V and VI capsules, researchers performed a full-range tracking calculation of the radiation dosages received by different parts of human body, including bone marrow, testicles, lens, and skin, using the software.

### Improved Bioreactor

With the support of the National 863 Program, China's bioreactor technology has made the following accomplishments:

1) Buffalo cloning. The Guangxi University has successfully cloned a buffalo, the first of its kind in the world. The development heralds a completely new species cloned, expecting a great potential impact on the future buffalo reproduction activities, and associated genetic modification applications. The efforts has resulted in two pregnancies from the 18 receptor cows. One gave birth to a male calf on November 19, 2004, through the Caesarean birth, and the other in March 2005.

2) The completion of a specific expression system for carrot roots. Researchers harvested the invertase II, a gene promotor. The promotor is used to produce vaccine proteins in carrot roots' specific expression. The development marks the first instance in the world using roots as a bioreactor, a breakthrough in the area.

3) The development of proprietary bioreactor modulators. Researchers have developed YAC and BAC based modulators needed for an efficient and stable expression. These modulators are used to work out YAC and BAC carriers with stable expressions. Researchers also rolled out dual coupling components, such as CMV NP14 and UBQ, which enhance the expression level of vaccine proteins in carrot roots. In addition, they sorted out the modulators that enhance the specific expression of green leave plants. The modulators are used to construct expression carriers for such plants.

4) Ox cloning using genetically modified body cells. The efforts has led to the establishment of a technical platform for cattle production using the technique, with an overall efficiency reaching the world leading position. The double-marker screening of exogenous transgenes has registered a 100% success. The pregnancy rate using GM body cells reached 33.3%, with a birth rate of 37.5%. China enjoys an overall efficiency of 10% in the area.

### Ensemble Planting Technology

The National 863 Program has established an indicator system for evaluating water efficiency planting models. The system has worked out different water efficiency planting models suitable for different regions. For example, researchers have rolled out 17 typical water efficiency planting models, and associated technical procedures for the northern, northeast, and northwest parts of the country. They also established a regional basic database for water efficiency farming. The results have been diffused to the "three norths" regions, with a coverage of 40%-50%. Under a prerequisite for no compromising the total yield, the system saves water by 4 to 5 billion cubic meters. Under a similar water resource supply, the system can utilize 5.5-6.5 billion cubic meters more of water resources in diverse forms, and increase the food production by 7-8 billion kg, with noticeably raised economic benefits.

Researchers proposed an optimized structure for spring corn's water and fertilizer utilization, and developed desirable winter wheat species that may use water and fertilizers in a more efficient manner. The efforts has resulted in the improved corn species with fine drought resistance and stable yield, with a perspective for diffusion. Researchers also studied the implications of uniformity coefficient on the spatial distribution of moisture and nitrogen in soil, and on yield, and proposed the spraying water utilization plan and associated calculation methods for the breeding stage. The project has so far produced 14 moisture-fertilizer modulating models for some crops, including winter wheat, spring corn, dry rice, tomato, and green pepper, and 6 major controlling indicators for cropland water and fertilizer application. In addition, researchers developed 15 technical procedures for water-fertilizer efficiency, and 7 protective farming procedures for the farming-grazing areas, arid areas in the northwest, and northern plain regions.

## NEWS BRIEF

### Engineering Service Enhanced

As of the end of 2005, China has 148 engineering technology research centers at the national level, covering eight major technology domains, including agriculture, manufacturing, electronics and information, and materials. In 2005, the research centers have produced a revenue worth RMB 12.309 billion, with a growth of 27.9%, profits & taxes RMB 1.143 billion, and hard currency from export USD 122 million, compared with the same period.

As far as the finding diffusion is concerned, in 2005 the research centers were contracted to 6,773 research topics, with 4,075 completed. 3,369 research findings have found commercial applications, and diffusion is made to 5,241 findings on a combined basis, with a 52.53% growth, compared with the same period. The efforts also led to the establishment of 486 crop demonstration bases, with an area amounting

to 68.67 million mu (1 mu= 0.0667 hectare), and 25 livestock reproduction bases that produced fine breeds of 1. 7 million heads, and a slaughtered volume of 1.755 million heads.

In the area of service and staff training, 340 labs have opened up in 2005 for public services, with 3,164 units of equipment and instruments, and 228 production lines, registering a respective growth of 21%, 22.64% and 10.14%, compared with the same period. The research centers also sponsored 9,068 rounds of technical training courses and 1,452 engineering lectures, in addition to 5.18 million technical personnel trained for research institutes and industries, with a 34.58% growth, compared with the same period.

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