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SPECIAL ISSUES

CAS Goals for Next 5 Years

BAI Chunli, Vice President of the Chinese Academy of Sciences, unveiled major directions and objectives that his academy will head for in the next 5 years, at a working meeting held on March 20, 2006. He says CAS will make the following disciplines part of the advanced ranks in the world: quantum structure and quantum information, nanotechnology, intense laser physics, brain, cognition and neurosciences, protein and evolutionary biology, human and animal genomics and functional genes, core mathematics, and economic and social forecasting and prediction.

In the area of strategic technologies, to support industrial upgrading, nurture up new industries, and meet the nation's security needs, China will strive for major proprietary breakthroughs in high performance chips for general and special applications, supercomputers and servers at a trillion time level, new generation and low cost personal computer, digital audio and video standard, innovative drugs, clean coal utilization and spin-off technology, conversion of natural gas, carbon dioxide fixation and utilization, and advanced materials.

Regarding the sustainable development in economic and social areas, China will obtain a systematic knowledge of changes in resources, environment, and ecology, in an attempt to provide evidences for implementing the concept of scientific development. CAS will address major S&T issues concerning economic and social sustainable development, and provide new methods, technologies and means for resources efficiency and development, ecological protection and clean environment, modern farming and regional sustainable development, pre-warning for major natural disasters, and long range climate forecasting.

By 2010, CAS will, through transfer of knowledge, technology and findings, raise the industrial revenue to RMB 100 billion, with profits and taxes worth RMB 10 billion. The enterprises created by CAS institutes will

also expect an annual revenue of RMB 170 billion, with a profit of RMB 20 billion. In the meantime, the efforts will result in some 100,000 jobs for the nation.

China's Sustainable Development for 2006

The Chinese Academy of Sciences published on February 28 a report concerning China's sustainable development in 2006. Report points out that building China into a saving oriented society is a core task for the socioeconomic sustainable development in the country. It also proposes long and medium term objectives for building such a society.

It proposes that by 2020 China shall place its general demand for major energy and resources under an effective control, with a stable environmental quality, turning for better. The saving indexes for 10 resources and pollutants shall come down by 60%, compared with 2000, with resources productivity or ecological efficiency being raised by 2-4 times.

Report defines a range of concrete objectives, including curbing excessive consumption of energy; lowering per GDP energy consumption by 50%-60%; zero growth for water consumption, and lowering per GDP water resources consumption by 80%, with a reduced 45 % for water consumption in agriculture, or an annual reduction by 1%, and recycled industrial water consumption exceeding 85%; zero growth for cement and steel consumption, with per GDP cement consumption being lowered by 55%, steel by 40%, and non-ferrous metal by 20%; zero growth for waste water emission, with per GDP waste water emission being reduced by 70%; stabilizing the emission of sulphur dioxide, with a lowered emission by 75%; striving to curb the growing emission of carbon dioxide, with a reduced per GDP emission by 60%; improving wastes recycling, with steel recycling exceeding 55%, and common non-ferrous metal 50%.

Standards for Cyclic Economy

Indicator system for qualifying an ecological industrial park, an important standard for cyclic economy, was recently approved, at a meeting wrapping up a project

concerning cyclic economy theory and ecological industrial technologies held on March 2, 2006. As a result derived from a key national project in the 10th five-year period, the indicator system will be officially enacted by the State Environmental Protection Administration at the end of the month. In addition, an indicator system for qualifying a cyclic economy city, also stemmed out from the project, will be made into a national environmental protection standard. Another indicator system for assessing industrial technologies from an ecological point of view has been listed by the State Environmental Protection Administration as a next move in 2007.

Not long ago, the State Development and Reform Commission and the State Environmental Protection Administration had jointly initiated demonstration projects for cyclic economy cities and ecological industrial parks. In this context, a standard is needed to judge the qualifications of cyclic economy cities and ecological industrial parks. In addition, the standard provides rich information, with which the national authorities can evaluate the strength and weakness of an industrial park, and work out corresponding policies concerning management and environmental monitoring. The standard also helps ecological industrial parks to understand their gaps from an internationally advanced level, and thus set up goals for catching up.

RESEARCH AND DEVELOPMENT

Final Preparation for Moon Probe

Official from the Center for Space Science and Applied Research, a part of the Chinese Academy of Sciences, said recently that Chang'e I, China's first moon probe satellite, was making the final test of its effective payloads, before lifting-off into space. To ensure the smooth operation in space, the satellite is equipped with a line of sub-systems, including microwave sounding, space environment probe, and payloads management. In the final test phase, researchers are

working very carefully under a range of strict standards for a best possible delivery.

According to a briefing, the microwave sounding sub-system is designed to measure and assess the depth of moon soils, the first instance in the world probing the moon using microwave means. The space environment sounding sub-system, consisting of three instruments including a system detecting high-energy solar particles, will collect parameters concerning earth, moon and near moon environments.

Key Collider Parts Localized

The Institute of High Energy Physics under the Chinese Academy of Sciences has localized magnetic iron power switch and connectors, the key components of Beijing Positron and Electron Collider. Researchers have produced 9 power control switches and 38 connectors. Lab test shows a fine performance of the localized components, with all indicators including noise and stability reaching the levels of imported ones, but with a drastically reduced manufacturing cost only one fifth that of the latter.

Localization of power control switch and connectors not only lowers down the risks and costs in importing the same components, but also improves the reliability of power source control, desirable for the steady operation in the long run. The efforts also help to free China from dependence on imported components for the Collider.

Novel Network Virus Killer

On February 28, 2006, Jiangmin S&T, a major domestic vendor for computer virus killer, unveiled its 2006 version for network viruses. Designed with a multiple-level control center that can be further divided into endless levels, KV-2006 enjoys an enhanced network management capability that builds a powerful defense system for large networks that cover different levels, regions, and sections. A control center corresponds to a number of levels, and each level exercises a unified management over its inferior units. The core management authorization rests at the

control center, though network management personnel can be authorized to operate via valid account numbers or passwords. The new system is also designed with diverse control modes for terminal operations, such as unified or separate authorizations. In addition, KV-2006 enhances mobile security patrolling, in a move to reduce the workload of management personnel, allowing the control panel to be installed in a mobile terminal for intelligent monitoring at anytime and anyplace. The new system is so uniquely convenient that it is termed as a virus killer sitting in a chair.

New Mobile System Improves Life

The Chinese Ministry of Science and Technology initiated to work on the new generation of mobile telecommunication system in 2001, under a FuTURE program. As a result, the Southeast University came up with a novel mobile telecommunication system, which made its debut in January at a fair displaying major S&T innovation results in Beijing. The new system heralds substantial technical changes, compared with the previous three predecessors.

Equipped with the MIMO technology, the new system produces enhanced frequency utilization, with a transmission speed reaching 50-100 megabits per second, or 50-100 times that of the third generation system. Users can surf websites, send files, and watch online movies at any time and any place, using a handset with such system. Enjoying a speed that can match the broadband system, the new system has an enhanced volume by several times.

The new system also supports high-speed mobile terminals. It allows the new generation mobile telecommunication system moves in a speed reaching several megabits per second, which makes working or entertaining activities at a high-speed train just feel like at home.

Substantial changes have also been made to the network structures. The new system uses a distributive structure, instead of a cellular one, in which a base station supports a service area, covering a distance up

to several kilometers. The cellular system would produce weakened signals, if high-rise structures or topographic obstacles were in existence. On the contrary, a distributive system enjoys multiple connection points within a service area. Such a structure does not compromise the transmission, even when one or more connection points suffer signal blocking. That means, in addition to an improved frequency utilization, a holder of such handset can be connected to more than one points in a service area.

The new system also presents enhanced power efficiency. Electromagnetic radiation has long been a controversial issue, as any radio equipment produces, to some extent, electromagnetic radiations, not mentioning earlier mobile telecommunication equipment usually produced relative high electromagnetic radiations, as the result of large transmitting power. The new system is designed with improved power efficiency for reduced transmitting power by 10 times. The innovative system not only reduces electromagnetic radiations, but also prolongs battery life and cuts down manufacturing costs of mobile phones.

Apart from the above mentioned merits, the new generation mobile system supports high quality transmission, with a data error ratio lower than one millionth, or 1000 times better than the current standards for voice communication. People will no longer worry about errors in such data transmission.

Raising Service Life and Reliability

With the support of Ministry of Science and Technology, a special project is created under the National 863 Program for the 11th Five-year period(2006-2010) to study the theory and basic common technologies improving the service life and reliability of major products and facilities. The project analyzed the service life requirements for 9 major products, including power facilities, nuclear facilities, satellite system, locomotive system, engines (aviation, ship, and gas burning), bridges and structures, manufacturing system, major national strategic oil storage facilities, and process industries. It also

proposed technical frameworks for major products or facilities, including 6 priority common technologies that shall be dealt with in the 11th Five-year period, namely service life and reliability design and analysis technology, experimental and evaluation technology for service life and reliability, failure prediction and diagnosing technology, safety analysis and risk evaluation technology, built-in software reliability, and reliability management technology. Along with the above mentioned common technologies, the project proposed three-level sub-projects for common basic technologies, tools and equipment development and integration technology, and applications and demonstrations. The first level will concentrate on the development of common basic technologies and methods, and the second one will mainly work on practical software tools, data environment, simulation system, and tools and equipment. The third level will produce a range of application and demonstration projects, aiming at reaping significant economic and social benefits, taking proven technologies as the basis for application guidelines and standards.

New Immune Treatment for Hepatitis B

Cytokines in Interleukin-12 can quickly wipe out infected cells, while facilitating the secretion of other cytokines, inhibiting viruses duplications, and regulating the immune functions of other cells. The Zhongshan University School of Medicine, a domestic leader in the field, has established a special project for treating hepatitis B with Interleukin-12. It is believed that the progress creates a new approach for treating hepatitis B.

As a therapeutic vaccine, Interleukin-12 not only triggers human body to produce a specific immune response, but also results in long lasting immune responses in cells. It prevents the attack of hepatitis B viruses, and is effective in treating a full blown hepatitis B case. It provides an alternative for those who have failed conventional treatments, and helps patients to reactivate the immune functions that have been tranquilized by long infections.

Researchers at the Guangdong Yinhang Hospital found

that the level of duplicated hepatitis B viruses in patients' body is reduced, after treating them with vaccines, Interleukin, and thymosin in clinical trials. This implies that it is possible to remove the viruses without damaging liver cells. Experts believe that this makes a new therapeutic means, featured with specific cellular immunity and self-eradication of hepatitis B viruses. It improves the results of clinical treatment, while reducing the leaping and mutation of viruses. The new alternative produces a noticeable effect, especially when using along with other drugs for suppressing the rising of GPT in chronic patients.

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