

# CHINA SCIENCE AND TECHNOLOGY NEWSLETTER

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- **Hu Jintao's Report:Ecological Issues**
- **Major Science and Technology Indicators in the Twelfth Five-Year Plan Period**
- **The 12th Five-Year Special Development Plan for the Technology of Navigation and Location-based Services**
- **MOST Proposes Twelfth Five-Year Plan for the Development of New-Type Display Technologies**
- **A New Development Plan for Meteorological Satellites**

## Headline News

### 18TH CPC CONGRESS

#### Hu Jintao's Report:Ecological Issues

**Improve development of China's geographical space.** Guided by the principle of maintaining balance between population, resources and the environment and promoting economic, social and ecological benefits, we should keep the pace of development under control and regulate its space composition. We should leave more space for nature to achieve self-renewal. We should

keep more farmland for farmers, and leave to our future generations a beautiful homeland with green fields, clean water and a blue sky. We should enhance our capacity for exploiting marine resources, resolutely safeguard China's maritime rights and interests, and build China into a maritime power.

**Promote resources conservation.** We should

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drastically reduce energy, water and land consumption per unit of GDP, and use such resources in a better and more efficient way. We should support the development of energy-efficient and low-carbon industries, new energy sources and renewable energy sources. We should better protect water sources and impose a cap on total water consumption. We should strictly control land use. We should strengthen the exploration, protection and proper exploitation of mineral resources. We should develop a circular economy.

**Intensify protection of the ecosystem and the environment.** We should launch major projects to restore

the ecosystem, increase our capacity for producing ecological products, and take integrated steps to control desertification, stony deserts and soil erosion.

**Enhance system-building to promote ecological progress.** Resource consumption, environmental damage and ecological benefits should be covered by the system of standards for evaluating economic and social development, and related goals, evaluation methods and reward and punishment mechanisms should be adopted in keeping with the need of promoting ecological progress.

(Source: Beijing Review)

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## Premier Wen Jiabao: Developing strategic emerging industries

To develop strategic emerging industries is an important measure we have taken to meet both China's immediate and long-term needs. In developing those industries, we must be open to the outside world. We need to attract the participation of foreign companies, in particular their technology and talent. I wish to state in a serious manner that foreign-invested enterprises, when participating in the development of strategic emerging industries in China, will enjoy the same policy treatment as their Chinese counterparts.

Technology and talent are crucial to the development of strategic emerging industries and the market plays a fundamental role. Therefore, we must provide policy guidance and support to those industries. The development of strategic emerging industries is a

dynamic process and we will continue to enrich and improve the related policies. Many foreign companies have advanced technologies in such fields as electric vehicles, new materials, new energy sources and bio-medicine. We must work closer with them to ensure that the economy enjoys sustainable development in the future and strategic emerging industries play a leading role.

I know many foreign companies are most concerned about IPR protection and whether they receive equal treatment in government procurement and other matters. I want to tell you that we will strengthen IPR protection and give foreign companies the same treatment in government procurement.

(Source: Beijing Review)

## S&T Management Information

### Major Science and Technology Indicators in the Twelfth Five-Year Plan Period

Indicator	2010	2015
R&D expenditure as a share of GDP (%)	1.75	2.2
R&D staff per 10,000 employees (persons/year)	33	43
World standing of international science paper citations (place)	8	5
Patents owned per 10,000 persons (pieces)	1.7	3.3
Patent applications by R&D staff (pieces/100 persons/year)	10	12
Total volume of transaction in the national technology market (100 million RMB yuan)	3906	8000
Added value of high-tech industry as a share of the total added value of manufacturing industry (%)	13	18
Proportion of population with basic scientific literacy (%)	3.27	5

(Source: MOST)

### Overview of R&D Expenditure in 2011

In 2011, China invested a total of 868.7 billion RMB yuan in R&D programs, up by 162.44 billion RMB yuan or 23% over the previous year; the R&D investment intensity (R&D investment as a share of GDP) moved up from 1.76% in 2010 to 1.84%. Per capita R&D investment calculated by the total number of R&D staff (full-time equivalents) reached 301,000 RMB yuan, which was 25,000 RMB yuan higher than the previous year.

By category, 41.18 billion RMB yuan was spent on basic research, up by 26.9% year-on-year; 102.84 billion RMB yuan on application research, up by 15.1%; 724.68 billion RMB yuan on testing development, up by 24%. The relative weight of R&D spending in each of the

three categories is 4.7%, 11.8% and 83.5%.

By sector of performance, 657.93 billion RMB yuan was spent by companies of different types, up by 26.9% over the previous year; 130.67 billion RMB yuan by government-affiliated research institutions, up by 10.1%; 68.89 billion RMB yuan by institutions of higher learning, up by 15.3%. The relative weight of R&D spending by each of the three departments is 75.7%, 15% and 7.9%.

By industrial sector\*, there were 8 sectors with a total R&D investment of over 20 billion RMB yuan, accounting for 72% of the total R&D spending of industrial companies over the designated scale; 11 sectors with a R&D investment intensity (R&D investment as

a share of main business revenue) above the average level of industrial companies over the designated scale (0.71%). (Note: \*only industrial companies over the designated scale, i.e. companies with an annual main business revenue of 20 million RMB yuan or above, are covered by the statistics).

By region, there were 8 provinces (municipalities) spending over 30 billion RMB yuan in R&D programs, i.e. Jiangsu, Guangdong, Beijing, Shandong, Zhejiang, Shanghai, Liaoning and Hubei. Their cumulative expenditure, 577.47 billion RMB yuan, accounts

for 66.5% of the national total. Eight provinces (municipalities) reached or exceeded the national average in terms of R&D investment intensity (R&D investment as a share of regional GDP), i.e. Beijing, Shanghai, Tianjin, Jiangsu, Shaanxi, Guangdong, Shandong and Zhejiang.

(Source: Statistical Bulletin of R&D expenditures in China-2011, the National Bureau of Statistics, the Ministry of Science and Technology and the Ministry of Finance, October 25, 2012)

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## **The 12th Five-Year Special Development Plan for the Technology of Navigation and Location-based Services**

In order to further implement the Outline of the National Program for Medium- and Long-Term Scientific and Technological Development (2006-2020), the Ministry of Science and Technology formulated the 12th Five-Year Special Development Plan for the Technology of Navigation and Location-based Services.

The Plan points out that navigation and location-based services industry has become, following internet and mobile communication, one of the fastest-growing emerging information industries, with an average annual growth rate of over 50% in recent years and with huge market potential. Facing the enormous demand for fostering navigation and location-based services industry and building national Positioning, Navigation and Timing (PNT) system, China will conduct collaborative research

together with Beidou Navigation Satellite System, in order to enhance the innovative capacity and strengthen the technical support systems; independently develop the core system and make breakthroughs in technologies that are key to industrial development; accelerate the application of scientific and technological achievements and broaden the application domains of navigation and location-based services; promote the application and industrialization of Beidou Navigation Satellite System and improve the navigation and location-based services industry chain; build the capacity of independently providing controllable navigation and location-based services, and comprehensively improve our core competitiveness in this industry.

(Source: MOST, September 18, 2012)

## MOST Proposes Twelfth Five-Year Plan for the Development of New-Type Display Technologies

In order to implement the *Outline of the National Medium- to Long-term Programme for Scientific and Technological Development (2006-2020)*, the *Decision of the State Council on Accelerating the Cultivation and Development of Strategic Emerging Industries* and the *National Twelfth Five-Year Plan for Scientific and Technological Development*, and promote the development of new-type display technologies and industries, the Ministry of Science and Technology (MOST) has drafted the *Twelfth Five-Year Plan for the Development of New-Type Display Technologies* (the Plan). Guided by the basic principle of full innovation chain designing, the Plan has laid special emphasis on basic research and the research of new materials, new

technologies and new components. It has set the goal of strengthening frontier technological research, developing core materials and key technologies, obtaining core intellectual property, enhancing application research, developing matching materials and key equipment required for the building of the industrial chain, enhancing the development and application of new products, promoting industrialization demonstration, putting R&D outcomes to use in production, improving the planning and top-level designing for developing the full innovation chain of new-type display technologies, and ensuring the sustainable development of the display industry.

(Source: MOST)

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## A New Development Plan for Meteorological Satellites

On October 24<sup>th</sup>, 2012, the briefing of China's Meteorological Satellite Development Plan (2011-2020) was held and pointed out that by the year 2020, China will have established a long-term, sustained and stable meteorological satellite observation system so as to ensure the development and operation of meteorological satellites series and their upgrading.

In August 2012, the State Council deliberated on and passed the Meteorological Satellite Development Plan (2011-2020), which explicitly defines the overall demand for efforts of the meteorological satellites undertaking in disaster prevention & mitigation, tackling climate change, sustainable socio-economic development, and national security by the year 2020. Considering future trends and conditions, the plan sets up the following goals in two development stages:

◎ By 2015, we will form an observation group of FY-2

Geostationary Meteorological Satellites to provide in-orbit backup to each other; launch FY-3 Polar-Orbiting Meteorological Satellite; develop GPS Occultation Detectors and hyperspectral Atmospheric Infrared Sounders, so as to improve the ability of atmospheric vertical detection; establish and improve the ground receiving station network that consists of domestic stations and polar stations, which will reduce the time of receiving global observation data from satellites to less than 2 hours, thus realizing the transformation from qualitatively to quantitatively using satellite data.

◎ By 2020, we will form an observation group of FY-4 Geostationary Meteorological Satellites to provide in-orbit backup to each other; develop a three-satellite observation system that includes a morning orbit satellite, an afternoon orbit satellite and a precipitation measuring radar satellite of FY-3

Polar-Orbiting Meteorological Satellites in order to improve the ability to monitor climate change; and establish a remote sensing system that covers the national, provincial, prefecture and county level. China's satellite application will enter into a stage of stable development. We will strengthen detectivity in many areas such as meteorological disasters, climate

change, water conservancy, forestry, agriculture, ecology and ocean; increase the proportion of satellite data in numerical forecast models to 90%. By then, the Chinese satellites and their application will approach the world-class level.

(Source: Science and Technology Daily, October 30, 2012)

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## Scientific Research Progress and Achievements

### Vice Minister of Science and Technology: China's Gap with Developed Countries in Science and Technology is Closing Rapidly

In a speech delivered at the 2012 High-Tech Research Results Exhibition & Cooperation Fair held on October 15 in Changchun, Jilin Province, Vice Science and Technology Minister Cao Jianlin pointed out that "the gap between China and developed countries is narrowing, especially in the field of science and technology". "China is making progress in economic and social development by harnessing the power of science and technology, and investing more resources in research and development." Vice Minister Cao said China's R&D investment has already reached the average level of developed countries, and will continue to increase in the coming years."

According to statistics from the National Bureau

of Statistics, China's R&D expenditure totaled over 860 billion RMB yuan in 2011, marking an increase of 21.9% over the previous year. Consistent with the notable increase in R&D investment, the output of R&D projects in China also registered strong growth. The number of granted patents alone reached 172,000 in 2011, up by 27.4% year-on-year and ranking third in the world. According to Vice Minister Cao, China has already set the goal of spending 2.2% of its GDP on R&D expenditure by 2015, and by 2020, China should have increased its R&D expenditure to 2.5% of its GDP and joined the ranks of innovative countries.

(Source: xinhuanet.com, October 16, 2012)

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### China Experimental Fast Reactor Passes Official Checks

China Experimental Fast Reactor (CEFR), a key project under China's National 863 Program, passed official checks from the experts organized by Ministry of Science and Technology on October 31<sup>st</sup>, 2012. The experts believed that finishing this experimental fast

reactor symbolizes major breakthroughs in the second step of the Three-Step Strategy in developing China's nuclear power (from pressurized water reactor, fast reactor, to fusion reactor) and that China has taken the leading position in terms of R&D of the 4<sup>th</sup> generation

nuclear power technology. The fast reactor is uranium-efficient and safe, and has an advantage in nuclear waste transmutation. Therefore, it becomes the preferred reactor of the world's 4<sup>th</sup> generation advanced nuclear energy system, representing the development trend of the nuclear system. CEFR is designed to have a power of 65 Mw (thermal power) /20 MW (electric power). It is one of the few experimental fast reactors in the world that have high power and generate electricity. Its main system settings and parameter selection are identical with those of large fast reactor power stations.

During the 12<sup>th</sup> Five-Year Plan period, the Ministry of Science and Technology will continue to develop fast reactor technology, nuclear fuel cycle technology, nuclear security technology, the application of nuclear technology etc. We will further highlight innovation in the next step of R&D of China Demonstration Fast Reactor. We must adhere to the principle of "safety comes first", and fully consider all risks that may occur to ensure absolute safety.

(Source: Science and Technology Daily,  
November 1, 2012)

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## **Recombinant Human Serum Albumin: From Bench to Bedside**

On October 11, the launch & signing ceremony of the industrialization project of recombinant human serum albumin (HSA), a major national project in China, was held in Zhangjiang High-tech Park, Shanghai. The launch has ushered the project into the phase of pilot-scale test, and paved the ground for Shanghai-made recombinant HSA to enter the market. Through independent research efforts, Shanghai Xin Rui Te Biopharmaceutical Technology Co., Ltd. has succeeded in developing an injection-grade recombinant HSA in laboratory and

preliminary tests, acquired a number of world-leading new production techniques and new testing methods, and delivered the second-generation recombinant serum albumin products with the highest purity in the world to date. With these accomplishments, the company has been chosen to undertake the major R&D project for new drug development in the Twelfth Five-Year period, in order to unleash the benefit of this home-made blood product for the Chinese people.

(Source: www.stdaily.com)

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## **Hefei-Wuhu-Bengbu Pilot Zone Brings up 1,000 Leading Professionals for the Development of Strategic Emerging Industries**

On the eve of the National Day holiday, five American and German experts on new energies visited Anhui Province as advisors to a local company, Hefei Jing Ao Solar Energy. This is one of the foreign expert groups invited by the provincial government of Anhui to provide technical guidance, consulting services and project opportunities on site for local companies following the signing of the framework agreement with the State Administration of Foreign Experts Affairs on

the comprehensive cooperation in attracting intellectual resources. Up to date, foreign experts that came to Anhui under the framework of the cooperation agreement have already trained over 700 senior technicians and managers for local companies, solved 16 technical bottlenecks and helped to bring about more than 30 investment and intellectual support projects to the province.

(Source: Science and Technology Department of Anhui  
Provincial Government, October 23, 2012)

### International Scientific and Technological Cooperation Base (IV) Tangshan Railway Vehicle Co., Ltd.

Tangshan Railway Vehicle Co., Ltd. (TRC) is a major Chinese base for international cooperation in science and technology. The Tangshan base is developed and managed by TRC, and its main businesses for cooperation include technological research, product development, manufacturing, testing and validation of high-speed bullet trains, urban railway vehicles, medium- and low-speed railway vehicles. Since its establishment in 2008, the Tangshan base has taken an active part in international scientific and technological exchanges and cooperation, and completed dozens of technological development, analysis and testing projects in high-speed bullet trains, high-speed comprehensive inspection trains and urban railway vehicles in over 10 countries and regions.

In 2008, the CRH3C bullet trains jointly developed by the TRC international base and Siemens were put into operation on the Beijing-Tianjin inter-city railway line. To date, it has safely run over 115 million kilometers and earned a global reputation for its fine quality. CRH380BL, an updated bullet train product,

set a new world record of 487.3 km/hr in a test run on the Beijing-Shanghai high-speed railway line in 2011, and is now widely used in the Beijing-Shanghai route. CRH380B002, the high-speed comprehensive inspection trains developed in the Tangshan base, has a synchronized inspection capacity of up to 400 km/h. It has already provided inspection services for the launch and operation of Beijing-Shanghai and Harbin-Dalian railway lines.

The TRC international base has established cooperative relations with companies and research institutions in Germany, the United States, Japan and other countries, and trained a number of professional technicians in the field of railway vehicles. The products developed in the TRC base have entered the markets in several Asian and African countries and regions.

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