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NEWSLETTER

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IN THIS ISSUE

RESEARCH AND DEVELOPMENT

Key Breakthroughs for Medical Instruments

Not long ago, the Chinese Ministry of Science and Technology organized an expert meeting to validate a range of technologies key to bringing out innovative medical instruments.

Beijing Xinxing Yangsheng S&T Co. Ltd. has developed a no-wound blood pressure measuring technology for human arteries, which works on korotkoff sound delay and internal dynamic variations of blood pressures. The new technology keeps an accurate watch of blood pressures in a consecutive and dynamic manner, and has been made into an original product.

Tianjin University developed a no-wound human blood sugar test technology that works on a new theory of floating reference. Researchers produced a line of blood sugar test products with the technology, and offer technology support for patients' no-wound blood sugar monitoring.

While developing technologies for vision induced potentials and brain-machine interface for imaginary movement, Tsinghua University rolled out a brain signal based brain-machine interface technology and the associated device for disable environment applications.

The above mentioned three original findings make an international leader in their respective area.

No. 1 Chinese Military Medical School developed a clinic medical imaging post-processing system, featured with image dividing and configuration reference solutions. The product, having an internationally advanced design, has admitted for clinical applications.

LDRD-P digital X-ray machine, developed by Beijing Hangtian Zhongxing Medical Company, is an internationally advanced low-dosage X-ray machine built to meet China's specific requirements. It is a proprietary innovation based on technology import and digestion.

Beijing Hailiying Medical S&T Co. Ltd. produced a sleeping monitoring system, featured with easy operation and low physiological payloads for general applications; Neusoft has completed the development of a range of key technologies relating to multi-level reconstruction algorithms, heart function analysis, and board based high pressure generator, under a multi-level spiral CT project. Its researchers developed a two-level and an

eight-level spiral CT products that are the domestic leader with an internationally advanced level.

Shenzhen Anke High Tech Corp. has worked out a digital color ultrasound imaging system, equipped with an internationally advanced linear probe that can produce harmonic images; An interference therapeutic device for congenital heart disease, jointly developed by Guangdong Provincial People's hospital and Shenzhen Xianjian Company, is lined up with technological innovations for closing artery, and filling up heart chamber's defects. The technology has won extensive clinical applications, with strong commercial perspectives.

New Desktop system

Desktop operating system and associated supporting environment, a project separately undertaken by Red Flag Software and S^2C under the National 863 Program, recently passed a validation check. Red Flag Software produced a 5.0 version for RedFlag Linux desktop operating system, while S^2C a 2.8 version for its Linux operating system. Both products have passed LSB and GB18030-2000 tests, and witnessed a substantial improvement and enhancement in compatibility, operation, and performance. Using together with Office software, the new operating system can meet the needs of daily office chores and some professional applications.

Red Flag Software has, in collaboration with other domestic and overseas software developers, created a number of successful stories for government office environment and online educations. S^2C also made its successful explorations, including developing a desktop software for Hair's JJL computer system, and HOTEL PC applications.

Both products have found preliminary commercial applications. According to a CCID briefing, two vendors have taken half of the domestic market for Linux desktop operating system, on a combined basis. The efforts have not only brought up fine economic and social returns, but also promoted the development of China's basic software industry.

High Speed Precision Machine Tools

High speed precision digital machine tools: key technologies and applications, a project undertaken by Nanjing Digital Machine Tools Co. Ltd. under a robot initiative of the National 863 Program, passed a validation check.

Through working on the key technologies for the gyration system of high speed principal axis, C-axis accuracy, cutting tool balancing system, mixed

processing technology, dynamic analysis of machine tools' performance, and optimized structural design, researchers have taken a solid grasp of the key technologies determining the performance, accuracy, and reliability of high speed precision digital machine tools. They rolled out a high speed precision digital machine tool having a principal axis running up to 8000 rounds/minute, with a processing precision reaching IT5, capable for diverse precision processing requirements. In the past year, the research team has sold over 300 sets of CK1420 digital machine tools to defense, aviation, and automobile sectors, with a revenue over RMB 100 million. Mainly working on small parts and components, CK1420 digital machine tool is desirable for precision processing. N-094 is a digital machine tool with a combined lathe and grinding function, especially designed for processing auto brake discs. It can lathe and grind both sides of a brake disc in a single run, which ensures perfect balancing of working parts. The fully automated process brings out a brake disc with a parallel ≤0.005mm, and surface roughness ≤Ra0.4.

Dynamic Marine Environment Watch

Dongfanghong 2, a marine expedition boat, has become a technical role model for dynamic marine environment watch. It gathers numerous advanced technologies and equipment, including an integration system, an instrument based comparing and analyzing system, a special lab and associated supporting equipment, an integrated system monitoring platform, a special local network for data transmission, integration and demonstration software, ADCP, a CTD system for a depth of 6000m, a CTDC with an accuracy of 6000m, a self-contained CTD at a depth of 1000m, a PAADCP, an ACCP, and a dragging multi-parameter section measuring system.

The new integration and demonstration system has stood an 80-day on-the-scene test over China's South Sea and northwest waters of the Pacific Ocean, with a combined cruising mileage over 10,600 sea miles. Researchers conducted a full-fledged performance test on the on-board equipment and instruments, and made consecutive comparisons with their international counterparts. The test travels through 148 stations, and 32000-m consecutive stations, with 5 rounds of dragging test for CTD at a depth of 5000m, and 3 rounds of diving buoy releasing and retrieval at a depth of 2000m.

Technology Platform for Marine Remote Sensing Data

Chinese scientists have developed a technology platform able to provide marine remote sensing data, in an effort to meet the nation's retrieval and

application needs for marine satellite data. Researchers rolled out a line of software for components development, and multi-dimensional data viewing and calculating, together with a proprietary software system able to process the data derived from 15 domestic and overseas satellites. With an open system, multi-data source conversion capacity, and module integration capability, the platform also works on class II water bodies and sea-air interface modules.

The new system presents an important value, as it changes the monopoly status of overseas remote sensing data processing software in China, while meeting the nation's needs for marine remote sensing data. It provides an important technology support for the application of marine remote sensing data derived from China's own Marine I satellite. It also builds up China's capacity for marine satellite design and application, and for maintaining the national marine information security, and for uplifting China's S&T position in the world.

Accuracy Offshore Seismic Probe

Accuracy offshore seismic probe technology, a special Bohai Oil Field prospecting project under the National 863 Program, has recently passed a validation check.

Undertaken by the Shengli Oilfield Administration, the four-year efforts have produced a range of substantive progresses in collecting, processing, and interpreting offshore seismic data. Researchers developed proprietary innovative seismic sources and land based piezoelectricity detectors, and found solutions for surface structural survey, secondary positioning, error correction, fake reflection, and cyclic seabed quake suppressing. In addition to a workflow for accuracy offshore seismic probe and a line of data collection and processing technologies, the project has generated 8 utility patent grants, 4 design grants, and a copyright for accuracy offshore seismic probe software.

Started from 2002, the research team has harvested major progresses amid collecting seismic data across the offshores of the Shengli Oilfield. Statistics show that the main frequency of the seismic data is raised from 50Hz to 70Hz, the interpretation accuracy from 85% to 95%, closure identification accuracy from 0.3km^2 to 0.1km^2, and well exploration success from 50% to 59%.

China Harvests Meteorites in Antarctica

As of 22:00 January 24, 2006, local time, China's 22nd expedition team collected 5,282 pieces of meteorites over the Grove Mountains, a statistics

exceeding the combined total of meteorites collected by Chinese teams in the past. The efforts makes China's treasury of Antarctic meteorites approach 10,000 in number.

The expedition constitutes the fourth of its kind made by the Chinese team over the Grove Mountains, marked by a booming meteorites collection and a record high for a single collection. The development narrows down China's gap with Japan and the United States in Antarctic meteorites possession.

According to a briefing, the total weight of the collected meteorites reached 60.68 kg. Of the stones, one is believed a drop from the moon, or the first of its kind obtained by China over the continent. In addition, the expedition collects a large meteorite weighing 4.8 kg.

Apart from collecting meteorites, the expedition team studied advancing and withdrawal of ice covers, paleoclimate, geology, inland ice cover mapping, and satellite-ground measuring. The meteorites collection has been completed as scheduled. In the future expedition, the team will turn to other planned activities.

Biotic Extinction is a Phased Process

XIE Shucheng and YIN Hongfu, a professor and an academician with China University of Geosciences, in collaboration with British scholars, have concluded from their study of molecular fossils unearthed from the Permo/Triassic (P/Tr) boundary at Meishan in South China that faunal mass extinctions in Earth history have experienced at least twice biotic crisis. Prof, XIE and others separated microbialites from marine food chain fossils, and calculated time variations using these biomarkers. They concluded that there occurred at least twice drastic microbial changes across the P/Tr boundary. For example, the biomarkers present two maximum values at 26th and 29th levels of the Meishan section, which indicates two multiplication peaks for the bacteria. In the meantime, researchers discovered two biotic extinction peaks for invertebrates at 25th and 28th-29th levels, which occurs right before the two multiplication peaks, showing a well connected coupling.

XIE points out that each biotic extinction is followed with a microbial multiplication peak, which reflects microbial responses to the catastrophic events that caused the extinction and initiated ecosystem changes. Their findings show that the catastrophic events occurred 250 million years ago is multi-phased in nature. Major causes of the events come from the inner earth, rather than the outer one. The finding is published in the journal *Nature*.

Innovative Beef Processing

Commercial applications of AFD beef production technology, a project financed by the national special fund for agricultural S&T findings' spin-offs, rolled out an innovative technology combing both two-phased beef dehydration (vacuum cold drying and hot-wind drying) and western beef processing techniques. The innovative technology, the first of its kind in the country, has resulted in a 500-ton pilot production line for dehydrated beef, featured with reduced energy consumption and production costs, but raised number of finished product, and competitiveness.

In 2003, the research team invested impressive manpower and resources in developing an AFD beef dehydration production process, in an attempt to address technical difficulties brought by vacuum based cold drying process, including irregular shapes of finished products, low rate of finished products, high energy consumption, and unstable microbes indicators. A year's efforts has brought the success to the pilot production.

In 2004, the project got the further momentum from a national special fund for agricultural S&T findings' spin-off. The research team improved the design of AFD beef production process, and added key equipment and testing instruments, which laid a solid ground for the eventual successful spin-offs.

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