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IN THIS ISSUE

*Moon Probe Satellite Launched
*China-Italy Collaboration on Novel Concrete Structures
*China-Netherlands Agricultural Collaboration
*Evidences Found for Human Bird Flu Spread
*World First Doppler Insect Radar
*China ' s First Smart Storage Card

## SPECIAL ISSUE

### Moon Probe Satellite Launched

At 1805, October 24, 2007, China successfully blasted off its first moon probe satellite aboard a CZIIIA launch vehicle, from the Xi 'chang Satellite Launch Center. 24 minutes after lifting off, the Beijing ground control center received the data showing that the satellite was separated from the carrier rocket. Chang 'e I satellite entered a geosynchronous orbit with a perigee altitude of 205 km, and an apogee altitude of 50,930 km. The moon satellite will work on four major missions, including obtaining 3-D moon pictures, analyzing the content and distribution of moon surface chemical elements, probing the lunar soil, and understanding the space environment between earth and moon ranging from 40,000 to 400,000 km.

The moon probe satellite has been working smoothly since its launch. It successfully changed its orbiting in the afternoon of October 25, lifted from a perigee altitude of 200 km to 600 km, with the apogee altitude unchanged at 51000 km. At 1744, October 26, it changed orbiting again from its perigee altitude, entering a 24-hour orbit, with a lifted apogee altitude from some 50,000 km to more than 70,000 km. At 1801, October 29, the satellite changed its orbiting once again, also from its perigee altitude, into a 48-hour orbit from the previous 24-hour orbit, with a further raised apogee altitude from some 70,000 km to 120,000 km. This changes China 's history of satellite control up to 80,000 km, marking a new era for the space industry in the country.

The satellite will open two payloads: solar wind detector and solar high-energy particles detector in the 48-hour orbit, collecting environmental data. It will make its fourth change of orbiting on October 31, into a lunar transfer orbit, starting its long journey heading for the moon.

## INTERNATIONAL COOPERATION

### China-Italy Collaboration on Novel Concrete Structures

China 's Tongji University has fostered a cooperation tie with 9 EU research institutes, including Milan Polytechnique, for the systematic study of high intensity concrete and high intensity fiber concrete based novel prefabricated concrete structures with anti-earthquake properties, and associated utility design. Collaborators will also evaluate the anti-earthquake properties of novel concrete structures, which will eventually become technical evidences for modifying Eurocode 8, and for formulating China 's standards of prefabricated concrete structures making.

The study will be made up of a range of activities, including anti-earthquake property modeling and static experiment of concrete structures, dynamic experiment, shocking platform experiment, dynamic modeling, non-linear dynamic reaction, and anti-earthquake parameter design. The novel technology will find its application in special prefabricated concrete structures that are made of high intensity concrete and high intensity fiber concrete.

In the course of collaboration, both sides have initiated academic exchanges and visits, so as to ensure the smooth running of research activities. International cooperation has greatly narrowed down China 's gaps with the internationally advanced level in the theoretical research of prefabricated concrete structures, which is important for facilitating the application of prefabricated concrete structures in China, promoting the restructuring of China 's structure construction industry, and enhancing proprietary innovations in the area.

### China-Netherlands Agricultural Collaboration

An inauguration ceremony was held on October 22, 2007 to celebrate the opening of China-Netherlands Innovation Promoting Center. Both WEI Chaoan, Chinese Vice Minister of Agriculture, and Mrs. Gerda Verburg, Minister of Agriculture, Netherlands, attended the ceremony and addressed the audience. WEI pointed out that two

countries have had fruitful collaborations in the area of agriculture for many years. The establishment of the center is an important decision made by the government of both countries to further deepen the collaboration in the area. It is an important step for enhancing the friendship between two peoples, and for strengthening cooperation in the area of agriculture between the two countries. He hoped that S&T personnel in both countries grasp the opportunity, and stage training and technology exchanges through this platform. The new center will collaborate on a range of activities, including agrifoods safety analysis, and new plant species protection, in an attempt to turn itself into a platform for agricultural S&T innovations, diffusion of modern technologies, and high caliber personnel training, and make new contributions to the common agricultural development of both countries.

## RESEARCH AND DEVELOPMENT

### Evidences Found for Human Bird Flu Spread

A study team, led by Prof. GU Jiang, with Peking University School of Basic Medical Sciences, recently published a finding on the spread of bird flu in the *Lancet*. Researchers found that bird flu viruses do not limit their existence in human lungs, but also in other human organs, including windpipe, gastrointestinal tracts, and brain. The virus is able to affect human immune cells, not only from a bird source to human, but also from human to human. The finding has overthrown the theory that an avian flu h5n1 virus only exists in human lung, and that it has not yet found the evidence to show a spread of such viruses from human to human.

Researchers performed postmortems on two patients died of bird flu, using an array of new techniques, including molecular hybrid, immune tissues chemistry, RT-PCR, and NASBA. They discovered the traces of bird flu virus genetic material and antigens in the lungs, cells of the trachea and the lymph nodes, neurons in the brain, and in cells of the placenta.

The findings of the two post mortems reveal that the H5N1 strain of avian flu is more invasive than previously thought. Researchers studied the post-mortem tissues of one man and one pregnant woman as well as testing the fetus of the woman. The examination of the four-month-old fetus found both viral genetic material and antigens of H5N1 virus in the lungs, circulating cells of the immune system and in cells of the liver, suggesting the virus can overcome maternal immune protection of the fetus.

"The study could change a lot of our previous views. For example, the trachea was previously thought uninfected by H5N1 and this was used to explain that H5N1 could only infect the lower respiratory system, but our studies have clearly shown it is not such a case." Gu said. He added that when a fetus was infected, it means a new born, or a child, or even an adult, can be infected, too. The only difference is after birth, human can become more resistant to viruses, which means some change may take place in the receptors. However, the epidemic rule of infectious diseases is the same.

### World First Doppler Insect Radar

A Doppler radar able to monitor insects, developed by Nanjing Agriculture University, has successfully tracked down the extensive migration of planthopper this year. Test results gave shown the smooth operation of radar ' s transmission and receiving system, data collection, and automatic recording. The event hallmarks the official operation of the world first Doppler insects radar.

Comparing with similar products manufactured overseas, the new radar system is of a Doppler effect and separate test functions for receiving and transmission, able to observe the vertical movements of insects, including taking off and landing, and lower level flying up to 50m. A traditional insect radar is only able to observe the horizontal movements of targeting insects, with a blind area under 200m. The new system is of a great application value. For example, it can monitor the outbound migration of local planthoppers as well as the inbound migration of external planthoppers, which is desirable for long term monitoring of agricultural pests.

Equipped with a solid state transmission technology, the new radar system has cut down the operational cost for long term monitoring activities. The system can also be operated on an automatic basis, thanks to the application of a range of new technologies, including broadband, and power source control.

### M2 Leukemia Expects a Cure

Ruijin Hospital, part of Shanghai Jiaotong University Medical School, disclosed on October 27, 2007 that its Blood Institute has landed a major breakthrough in treating M2 leukemia. Researchers have so far completed pre-clinical experiments, and entered a drug development phase. The development indicates that one more leukemia will soon find an effective treatment.

Thanks to their tireless efforts for two decades, the Institute has secured breakthroughs in APL study and associated clinical treatment. The combined application of Tretinoin and Arsenic trioxide, has raised the 5-year APL survival rate to 90% or above, making the leukemia a basically curable disease. The Institute has extended the effort to the second type of leukemia, or M2 leukemia. Researchers screened out extracts from traditional Chinese herbs to treat M2 leukemia, and obtained fine results in both theoretical research and clinical trials.

The Institute inked on October 27, 2007 a cooperation accord with Jiangsu Hengrui Pharmacy to continue the clinical trials of treating M2 leukemia with new herbal extracts, which marks an important step towards clinical application.

### High Speed and Precision Positioning

MEMS processing and its high precision positioning technology, a project under the advanced manufacturing and automation component of National 863 Program, has run smoothly, with the completed R&D of two dimensional Cartesian coordinate system based high precision positioning system.

Researchers developed a two dimensional Cartesian coordinate system driven by linear motor, which can be used to perform high speed and high precision positioning based IC chip packaging. It is designed to directly drive X and Y work platform using linear motor, saving the link of transmission. Enjoying numerous merits, including no-lag effects, high response, high speed, high accelerated speed, and easy control, the new technology has effectively raised the performance of positioning system. Applied with a non-seam decoupling structure, it allows the system to possess the dynamic decoupling function of

a traditional x y working bench, while reducing the movement inertia by fixing the driving component at the base. In addition, linear grating is used as a terminal feedback, to ensure the high speed and high precision nature of the system.
In addition to applications in MEMS and associated components, the new technology can fine broad applications in an array of areas, including IC packaging, sophisticated electronic equipment assembling, biochips preparation, and large area and high speed scanning device. It also can find diverse applications working with unit integration.

### Low Stress Film Processing

Low stress and multi-layer thin film processing techniques, a project under the advanced manufacturing and automation component of National 863 Program, has seen breakthroughs. Derived from the project are three open technical platforms for MEMS techniques, packaging, and reliability test, with a PCM+Cpk+SPC control system for technical consistency. Researchers have rolled out the following results:

1) Low stress thin film processing platform, for preparing low stress multi-layer metal films, medium membrane, and monocrystalline silicon films, with an allowed error of <±10%, a sacrificial layer release end product rate larger than 50%, overprint precision smaller than 1um, and processing end product rate larger than 60%.
2) A packaging platform that allows diverse functions, including protruding manufacturing, thin chip mount, BGA printing, BGA coating, multi-layer base board design, and SMT packaging, with a surface mount precision≤±2um, surface mount end product >90%, and sealed end product rate >80%.
3) A reliability test platform that allows diverse environment, electromagnetism, and feasibility tests. Researchers have developed two standardized techniques for low temperature surface sacrificial layer and monocrystalline silicon, and three test rules for low stress thin filming, packaging, and reliability tests. Derived from the efforts are 13 papers, of which 3 have been collected by EI, 3 national invention patents, and 2 utility patents.

The novel platform has provided standardized processing service for MEMS switch, and phase transforming. The project has rendered 30 rounds of processing and packaging service for a dozen users, including New Zealand Industrial Institute, Southeast University, Nanjing University, and Peking University.

## NEWS BRIEF

### China ‘s First Smart Storage Card

Not long ago, China Putian Information rolled out a smart storage card allowing multifunctions of storage, security, and RFID. Like an ordinary storage card, it can be part of numerous terminals, including mobile phone, digital mobile TV, and PMP. What it enjoys more is it can save a large volume of data, in addition to its enhanced functions including user identification, data encryption and decryption, non-contact card scanning, and mobile payment. It is a promising application in mobile payment, added value telecommunication service, mobile digital TV, and digital contents.

The smart card is a solution to addressing the shortcomings of existing mobile storage standard, such as mono-function, and lacking of added values, which creates new opportunity for the mobile storage industry. The smart card is the first innovative product derived from turning new generation national mobile storage standards into a reality.

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