



# NEWSLETTER

October 2013



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**Mode:** Multi-spectrum  
**Processing:** RESENSOR  
**Resolution:** 6 meters  
**Date:** September 28, 2013
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**Mode:** Multi-spectrum  
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**Date:** September 17, 2013

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**Editor’s Note:**

*The International Society for Digital Earth (ISDE), founded in Beijing in May 2006, is a non-governmental international organization principally promoting academic exchange and international collaboration towards Digital Earth. Its secretariat and Chinese National Committee are both located in RADl. The International Symposium on Digital Earth is a biennial event initiated in Beijing in 1999, with the objective of promoting the academic exchange in theoretical studies of Digital Earth and the advancement of the science discipline. Being held for the first time by a Southeast Asian country, the 8<sup>th</sup> International Symposium, under the theme of Transforming Knowledge into Sustainable Practice, was attended by more than 500 experts and scholars from 35 countries and regions.*

## 8<sup>th</sup> International Symposium on Digital Earth Held in Malaysia

From August 26 to 29, 2013, the 8<sup>th</sup> International Symposium on Digital Earth, themed “Transforming Knowledge into Sustainable Practice”, was held at Borneo Convention Centre Kuching, Sarawak, Malaysia. It was jointly organized by the International Society

for Digital Earth (ISDE), Technological University of Malaysia (UTM) and University Malaysia Sarawak. This was the first time of the symposium being held in a Southeast Asian country in the past 14 years since its launch.

### Invited Speeches Prelude Meeting

On August 26, the Opening Ceremony attracted participation of over 360 experts and scholars in the field of Digital Earth from 35 countries and regions. Prof. Mazlan Hashim, Symposium Chairman and Director of UTM Institute of Geospatial Science & Technology, ISDE President Prof. John Richards, and Mr. Lo Khere Ching, Chairman of Kuching Bada Vaughan Council were on the stage and gave their respective speech.

Prof. Mazlan Hashim recognized the supportive role of Digital Earth technology in ecological environmental monitoring, disaster emergency response, and human health and well-beings. According to him, with global warming and frequent natural disasters, we will face more challenges and have greater responsibilities to update the Digital Earth concept. Prof. John Richards pointed out that in the past decade, the Digital Earth technologies had been developed rapidly and they are now gradually maturing. By integrating and applying multi-disciplinary knowledge and mobilizing public participation, we would be able to make the global digital model based on the Digital Earth technology more scientifically in identifying and describing the natural, social and economic phenomenon closely related to human



Opening ceremony.

sustainability, in order to better conserve and improve our living environment.

Dr. Barbara Ryan, Secretariat Director of Group on Earth Observations (GEO), Dr. Alessandro Annoni, European Commission Joint Research Centre (JRC), Dr. Mustafa Din Subari, Deputy Director of Malaysian National Space Agency, and GUO Huadong, Director General of CAS Institute of Remote Sensing and Digital Earth (RADl) were invited to give keynote speeches, entitled “Building a Global Earth Observation System of Systems”, “Next-generation



GUO Huadong delivers a plenary speech.

Digital Earth: Earth Observation today”, “National Earth Observation Program for Digital Earth”, and “Big Data and Digital Earth”, respectively.

GUO elucidated in his speech the characteristics of

Digital Earth in the big data era and the close relation between big data and Digital Earth. He believed that Digital Earth meant the practical application of big data in Earth observation and Earth science, brought more opportunities and challenges for the development of Digital Earth and showed a new direction for more innovative and higher-level development of Digital Earth.

During the four-day meeting, participants exchanged ideas on 12 topics including the Digital Earth concept and innovation, Earth observation technology, natural resources management, and digital heritage. The meeting included 18 specially-invited keynotes, 38 parallel sessions and over 200 presentations, in addition to topic-specific seminars on each afternoon, providing an excellent platform for scientific exchange by scientists, entrepreneurs, and administrators in Digital Earth field.

## Colorful Activities of Academic Exchanges

More than 200 oral presentations were given at 38 parallel sessions, making the conference full of interesting topics and lively discussions.

In addition, Taylor & Francis, a long-term cooperation partner of ISDI, sponsored a special workshop for young scholars to share their views on well-written scientific research papers and paper publication in international journals.

During the meeting, the first Summit Meeting of Developing Nations on Disaster Mitigation with Space Technology was held by the CAS-TWAS Centre of Excellence on Space Technology for Disaster Mitigation (SDIM). It was attended by more than 20 scholars and experts from international organizations or developing countries. They held discussions on such topics as review of international plans and activities for disaster mitigation, key technologies urgently needed by the developing world in the



Exhibit booth of ISDE.

field of disaster mitigation, challenges facing their capacity building and multilateral cooperation in this regard. With the objective of upgrading developing nations’ capacity in disaster mitigation with space technology, it is decided that a joint task force will be set up by SDIM through the cooperation with such organizations as CEOS, GEO, IRDR, ISDE and ITC. A major work for the task force is to complete a report on the strategy of developing countries for disaster mitigation with space technology in three years.

Under the joint auspices of SDIM and GEO, special session on Digital Earth and Disaster Mitigation with Space Technology was also held at the conference. It was attended by scholars from developing nations such as Morocco, Chile and Cambodia. They shared their views on the application of Digital Earth and earth observation technologies in disaster reduction.

Chaired by ISDE President Prof. John Richards, a



Exhibit booth of RADI.

30-minute workshop was held each day after the special session, focusing on such topics as the advancement of Digital Earth technologies, the contribution of Digital Earth to global change studies, the sustainable development of Digital Earth, and knowledge transformation and practice of

sustainability.

More than 20 well-known enterprises and research institutions, including RADI and ISDE, displayed their research achievements and state-of-the-art technologies at the meeting.

## Exploring Future Development Plans

On August 25, the 8<sup>th</sup> ISDE Executive Meeting (i.e. first Council Meeting) was held. The council was debriefed on the preparations for the 8<sup>th</sup> International Symposium on Digital Earth and 5<sup>th</sup> Digital Earth Summit to be held in Nagoya of Japan in 2014, the bidding presentation for hosting the 9<sup>th</sup> ISDE in Canada and the summary report of the 4<sup>th</sup> New Zealand Summit. Council members also discussed the establishment of the Digital Heritage Committee and the Awarding Committee, the development of the Young Scientists Committee, membership management and development, promotion of Digital Earth programs, the way to improve the organizational structure of ISDE, and how to promote the development of ISDE. The plan to form long-term partnership between ISDE and IOP was approved.

During the meeting, the 5<sup>th</sup> International Editorial Board Meeting of the International Journal on Digital Earth (IJDE) was also convened. The board was given the working report of the journal by the editorial office and the statistics report on the publication of the journal by Taylor & Francis, and thoroughly discussed how to improve the influence and citation rate of the journal and how to attract more high-level articles in the field of Digital Earth. The Best Paper Award of



A scene from the 8th Session of ISDE Executive Committee.



A scene from the 5th Session of the Editorial Committee of IJDE. the meeting went to John R. Townshend from the University of Maryland for his paper Global characterization and monitoring of forest cover using Landsat data: opportunities and challenge.

## Successful Conclude



ISDE Secretary-General Prof. GUO Huadong bestows a commemorative award on ISDE8 Chairman Prof. Mazlan Hashim.

The meeting wrapped up on the afternoon of August 29. At the Closing Ceremony, ISDE expressed full acknowledgement to the organizing committee, and ISDE Secretary General GUO Huadong presented the commemorative plate to Chairman



A representative of the ISDE9 host in Canada takes over the meeting flag.

Prof. Mazlan Hashim, and ISDE Chairman Prof. John Richards made a summary for the symposium and announced that the 9th International Symposium on Digital Earth would be held in Halifax, Canada, in 2015.

## Summer Working Conference for Remainder of 2013

RADI Summer Working Conference, held on July 16 and 17, was attended by more than 70 administrative staff and leading scientists. Its objectives were to review previous work in 2013, promote exchanges between various departments, upgrade administrative level, set priorities for the second half of the year and push forward the implementation of the “One-Three-Five” Strategic Planning.



A scene from the summer working conference.

In the morning sessions of the meeting, leaders of various subordinate organizations reported their work achievements, difficulties and future plans. They were from: State Key Laboratory of Remote Sensing Science and its Radiation Transfer Division, CAS Key Laboratory of Digital Earth Sciences and its Digital Earth Theory and System Division, the Center for Applied Technology of Earth Observation and its RS Image Processing Division, the National Engineering Center for Geoinformatics and its Renewable Resources Division, China RS Satellite Ground Station and its Operation Division of Satellite Ground System, Airborne Remote Sensing Center and its Airborne Data Processing Division, and various supporting and administrative departments.

Panel discussions were held in the afternoon session of July 17. After listening to the reports of different panels, RADI Director-general GUO Huadong made concluding remarks. He said that the year 2013 witnessed the further development of various fundamental tasks of RADI, therefore it is a year for consolidating its operation mechanisms and a key period for the institute to implement its “One-Three-Five” Strategic Planning. Over the first half



Panel discussions.

of the year, RADI did a good job in the monitoring and evaluation of the Lushan earthquake, dynamic monitoring in Wenchuan five years after its 2008 earthquake, a report meeting for RADI establishment, the opening of regional research centers, research network development, and the convention of important international meetings.

Prof. GUO stressed that the tasks in the remainder of 2013 will be even tougher. He called on RADI people to focus their efforts on implementation of the “One-Three-Five” Strategic Planning and the realization of its objectives. “It is the key indicator to measure the success of the institutional integration.” He emphasized that efforts should be developed through creative thinking and growth modes through system innovation. Culture development will play an important role in the advancement of the new institute, he said, however, it would not be achieved overnight, and we should cultivate good cultural concepts through a variety of ways.



RADI Director-general GUO Huadong makes concluding remarks.

## Review Meeting on Lushan Earthquake Monitoring

RADI convened a conference on June 8 to review and exchange experience in data sharing and disaster monitoring of Lushan after a major earthquake struck the region in April 2013. It was attended by representatives from 18 user organizations including China Earthquake Administration, the Ministry of Civil Affairs, the Ministry of Land and Resources, the Ministry of Transport, the National Administration of Surveying, Mapping and Geoinformation, the Ministry of Water Resources and the Ministry of Environmental Protection.

On April 20, 2013, a 7.0 magnitude earthquake hit Lushan County of Ya'an in south China's Sichuan Province. RADI immediately activated its emergency response system and obtained near real-time airborne remote sensing data and initiated its data-sharing system. As from May 2, a total of 6136 GB high-resolution airborne data were sent to Sichuan government and 37 institutions under 14 ministries, offering strong support to the national and regional rescue efforts and reconstruction planning. Thanks to the higher positional



A scene from the meeting.

accuracy of the data, according to users, they have played an important role in various aspects of the rescue drive, including decision-making in operation, settlement of quake victims, disaster evaluation, traffic mitigation, power supply, resource and environment carrying capacity evaluation, giant panda protection and potential and secondary disaster control and management.

## NSFC VP Visits RADI

On June 6, Prof. LIU Congqiang, Vice President of the National Natural Science Foundation of China (NSFC), made an inspection tour to RADI.

In a report entitled Promoting Innovation-driven Country Development through Prosperous Basic Research, Prof. Liu made an introduction to NSFC in an all-round way.

After his visit, Prof. Liu spoke highly of the achievements made by RADI in terms of cutting-edge S&T research, talent development, and international cooperation. He encouraged the institute to make leapfrog advancement in remote sensing science and related areas by giving full play to its advantages and exploring new development modes and mechanisms.



NSFC Vice President Prof. Liu Congqiang delivers a report.

## Research Centers Extend Local Cooperation

Since their establishment, RADI research centers in Kashi and Sanya have been working hard to serve local socioeconomic development. To this end, in August and September 2013, the two centers held workshops with

local governments to strengthen S&T cooperation and support local advancement by giving a full play to RADI's advantages in remote sensing technology. For instance, in September 27, Prof. Fu Bihong, Deputy Director of the



Researchers show local officials their research progress in remote sensing monitoring of Tuomuer glaciers.

Kashi Center met with officials from Aksu City to have a better understanding of the local S&T development and its demands on remote sensing and airborne observation technology.

At the meeting, Prof. Fu introduced the positioning, objectives, and S&T capacity of the center and its recent research into remote sensing monitoring and environmental evaluation of glacier changes in Tuomuer region, while local government officials talked about local difficulties that need S&T solution, including the feasibility study of building a reservoir nearby Tuomuer Mountain, the route selection of Wensu-Zhaosu highway, causes of dust storms, urban planning, smart city, the impact of urbanization on the environment, the Tuomuer Natural Reserve zoning, and geological disaster prevention.

Prof. Fu assured the local government that the center will satisfy the local needs in resource exploration,

ecological and environmental protection with its remote sensing expertise.

On August 19, 2013, researchers from the RADI Center in Sanya held talks with a team of local governmental officials led by Mr. CAO Bing, Vice Director of the Sanya Municipal Bureau of Science, Technology and Information.

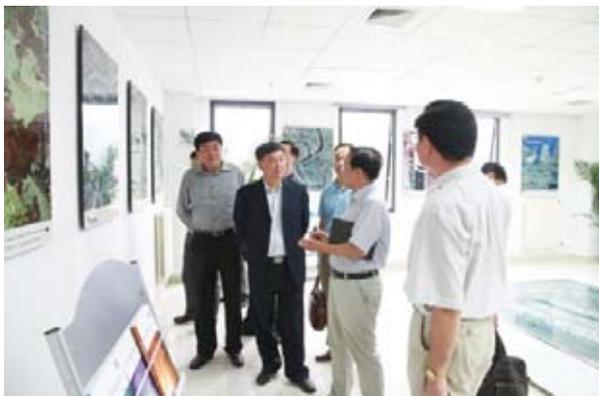
Prof. LIU Yongwei, Director of the Sanya Center, briefed the visitors on the S&T capacity of RADI and the priorities of the RADI Center in Sanya in 2013, including Digital Sanya, international conferences, and the establishment a CAS-Hainan Key laboratory for Digital Hainan.

Mr. Cao said Sanya is weak in information technology development regarding international tourism island building, digital/smart city construction and land and resources survey. He said that Sanya government will provide support to the Sanya Center through various means and enable it to serve local socioeconomic growth.



Mr. CAO Bing, Vice Director of the Sanya Municipal Bureau of Science, Technology and Information, visits Sanya Center.

## Sanya Vice Mayor Visits RADI



Sanya Vice Mayor visits RADI.

RADI Director-general GUO Huadong met with Sanya Vice Mayor LI Baiqing in Beijing on September 22, saying that the space information industry is developing rapidly in China and RADI will support various strategic moves of Sanya government and Hainan Province with its S&T and talent advantages.

Mr. Li stressed that Sanya place importance on S&T advancement and invites cooperation with high-level S&T institutions such as the Chinese Academy of Sciences. He hoped that RADI and Sanya could join hands in promoting the development of High technology in the city, and build Sanya into a world-class city.

## CAS and Kashi Local Officials Carry Out Studies at RADI

Prof. FENG Renguo, Deputy Director of the CAS Bureau of S&T for Development, and Mr. ZHENG Zhong, Director of Kashi Bureau for Science and Technology, came to RADI Center in Kashi on separate occasions recently.

Prof. Feng's visit took place on September 19. He listened to a report on such issues as satellite data reception, campus construction, scientific research and talent development. He also held talks with researchers.

Prof. Feng hoped the center would do a good job in developing national major S&T infrastructure so as to ensure the high-quality operation of satellite data reception. He also urged the center to align its scientific research with the overall objectives and national needs. To start with, he said, the center may support ecological and environmental protection and resource utilization in Xinjiang and Central Asia with its data advantages.

Mr. ZHENG Zhong made a trip to the Kashi Center on June 6. He attended a meeting on the remote sensing monitoring of snow and ice changes, and discussed about the cooperation on local water resources and environment protection.

Speaking highly of the snow and ice remote sensing monitoring in Kashi, Mr. Zheng paid close attention to ice and snow coverage on the upper reaches of the Yarkant



Prof. FENG Renguo, Deputy Director of the CAS Bureau of S&T for Development, visits the Kashi Center.

River. He said that water is a precondition for local growth as Kashi is a typical arid region with insufficient water resource and its unbalanced distribution. Therefore, long-term remote sensing monitoring of alpine ice and snow conditions is very important. He hoped that the center could support local agricultural development by helping make predictions of runoff changes in major rivers. He called on the center to strengthen its S&T collaboration with local government and enterprises to serve local development in various aspects with its remote sensing technology.

S & T Research

## Moon Craters may Hold Ancient Asteroid Materials

The Moon's impact craters may contain remnants of asteroids that created them, a new study finds.

Previously, asteroids responsible for the formation of large lunar impact craters are often assumed to melt or vaporize during the impact, so that only geochemical traces or small fragment remain in the final crater.

Dr. YUE Zongyu, a researcher at the Institute of Remote Sensing and Digital Earth (RADI) under the Chinese Academy of Sciences (CAS), in collaboration with planetary scientist Prof. H. Jay Melosh and his colleagues from Purdue University, used computer model to simulate the formation of impact craters exemplified by Copernicus crater and found

that for vertical impact velocities below about 12km/s, the projectile material may both survive the impact and be swept back into the central peak of the final crater as it collapses under the moon's gravity, although it would be fragmented and strongly deformed. Contributors to the research also include RADI's planetary remote sensing team members Prof. DI Kaichang, HU Wenmin, and LIU Yilang.

The simulations may explain the occurrence of minerals called olivine in the central peaks of many large lunar craters such as the 93 km-wide Copernicus.

Spinel and olivines are abundant in many asteroids, meteorites and chondrules, so it's possible that these unusual

minerals observed in the central peaks of many lunar impact craters could be exogenic in origin and may not be indigenous to the Moon, this study concluded.

The findings of the new study, was recorded in a paper titled "Projectile remnants in central peaks of lunar impact craters", published online May 26 in the journal Nature Geoscience.

The findings have other ramifications that materials projected from the Earth following powerful impacts in the geological ages and which impacted on the lunar surface at comparatively low velocities may also have been preserved on it.

"This raises the possibility of finding early Earth material," Erick Ashpaug of Arizona State University wrote in an accompanying commentary in the same issue of Nature Geoscience.

"Even more provocative is the suggestion that we might someday find Earth's proto-biological materials, no longer available on our geologically active and repeatedly recycled planet, in dry storage up in the lunar 'attic'," Ashpaug added.

In a way, therefore, the findings point out an intriguing prospect for further studying the composition of the lunar surface as well as other asteroids including the early Earth.

## Earthquake Monitoring and Disaster Evaluation in Gansu

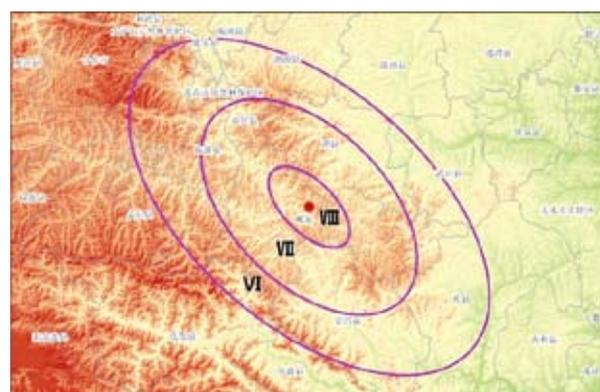
A 6.6 magnitude earthquake hit Dingxi in northwest China's Gansu Province with a focal depth of 6.6 kilometers at about 07:45 on July 22, 2013. With rich experience in disaster monitoring, RADI rapid started its emergency response system with remote sensing technology. Its rapid evaluation of victim number and the geological ranges in the earthquake was adopted by the central authorities. In addition, a total of six disaster briefings were sent to governmental departments without delay, providing data and information support to rescue operation.

The evaluation shows that the intensity of the earthquake in severely hit regions reached more than VIII, affecting an area of 16,350 square kilometers involving six countries, with a total victim of about 900,000.

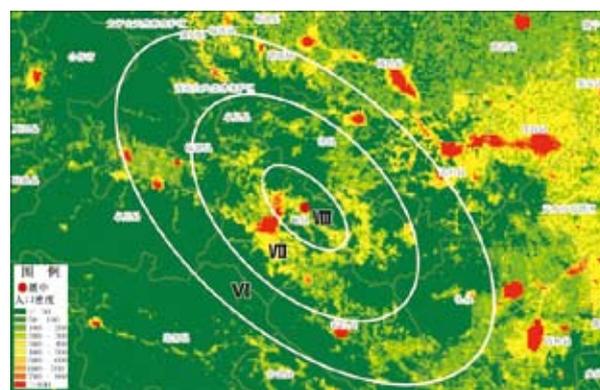
A monitoring of temporary shelters in the northeastern part of badly damaged Minxian County shows that the area has a complex landform with many rivers flowing through. Therefore, a warning was made to keep local people to alert on the environmental and geological changes and secondary disasters caused by rainfall and aftershocks.

A monitoring of secondary disasters in severely affected areas shows the earthquake caused small-scale landslide in 12 places, without significant impacts on transport and watercourses. It also identified an area under the threat of debris flow and the position of a building is in the dangerous range of a flood discharge canal.

A comprehensive analysis of possible areas to suffer secondary disasters shows that local geological situations (such as the fault development, fractured mountain bodies, intensified watercourses and valleys) might lead to



An evaluation map showing the geological range affected by the quake.



An evaluation map showing the number of victims.

secondary disasters (such as landslides and debris flows) under the conditions of heavy storms and rains. Four key areas to prevent possible secondary disasters were identified according to comprehensive analyses using multi-source remote sensing data.

An interpretation map showing major areas for the prevention of secondary disasters in Dingxi.

An analysis of collapsed housing in the 24 villages and towns nearby the epicenter shows the buildings were mainly made of wood and bricks. It also identified 106 damaged building/housing areas covering 40,000 square meters.

Analysis also shows that only one large-scale landslide body was caused by the earthquake. With an area of 62,700 square meters, the secondary disaster caused by the body buried five dwellings. In addition, because of the loose soil of the body, it is very likely to cause new secondary disasters.



Monitoring of collapsed houses in severely affected areas.

## More than 50 RADI Projects Won NSFC Support in 2013

A recent news release of the National Natural Science Foundation of China (NSFC) shows that 56 RADI projects are succeeded in obtaining financial support of NSFC, including 1 key program, 24 general programs, 26 programs for young scientists, 4 programs for international cooperation and exchanges, and 1 program for distinguished

young scholars. The funding totaled 28,198,000 yuan.

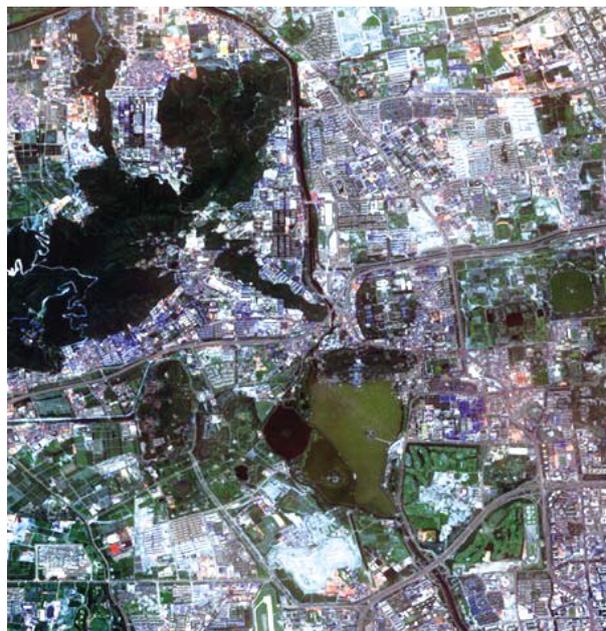
Since its establishment in 2012, RADI actively undertakes various national S&T tasks focusing on global environmental change, emergency response system for disasters, dynamic monitoring of resources and the environment, and land resources management.

## RADI to Receive and Process SPOT-6 Satellite Data

The installation of the SPOT-6 satellite data processing system was completed and its acceptance test was passed on 12 July 2013 at RADI.

RADI adopts domestically-made demodulators for receiving SPOT-6 satellite data and has independently developed the interface between satellite raw data and the processing system, thus realizing SPOT-6 data processing and data products production. The SPOT-6 satellite data processing system is capable of providing panchromatic wave band, multi-spectral band, Pan-Sharpening fusion and other forms of data products and its product processing level is divided into the Primary level and the Ortho level. With products in the DIMAP format, the system has a much-enhanced processing capacity of over 200 products per day.

The completion of installation and the acceptance test of the SPOT-6 satellite data processing system means that the system is now operable and ready for product production in China. RADI will then adjust the existing operation system



SPOT-6 satellite multi-spectral data Ortho products (image of the Summer Palace, received by Miyun Station on 6 July 2013).

to achieve fully automated operation of the SPOT-6 satellite data processing system as early as possible.

Launched by France as a high-resolution remote sensing satellite for Earth observation, with an imaging width of 60km, a panchromatic ground resolution of 1.5m, a 4-band visible light/near-infrared image ground resolution of 6m, as well as along-track and across-track large angle side-view imaging capabilities, the SPOT-6 satellite has a very high application value in land survey, resource exploration, crop management, surveying & mapping, project planning, environmental monitoring, and other fields.



SPOT-6 satellite panchromatic data Ortho products (image of Beijing South Railway Station, received by Miyun Station on 6 July 2013).

## Chinese Scientists Apply Earth Observation Technologies to Study and Protect Wild Camels

Chinese scientists plan to apply Earth Observation technologies comprehensively to protect the critically endangered wild camels, including airborne and satellite remote sensing, satellite positioning, geographical information system (GIS) and wireless sensors networks, etc. The project is made up of mapping the range of the wild camels based on GPS tracking data, population assessment, water resource protection, and eliminating the negative effect of hybridization of wild camel and domesticated ones. Education will also play an important role in this project.

An International Research Center for Wild Camel Conservation (IRCWC) has been co-established this year by RADI, the Lop Nur Wild Camel National Nature Reserve (LWCNR, in Xinjiang) and the Wild Camel Protection Foundation (WCPF, in the United Kingdom). It coordinates with the strength from multi-discipline as well as various departments in order to research and protect wild camels together.

Prof. LIU Shaochuang, a RADI researcher, has attached Satellite Positioning Trackers to 10 wild camels in Lop Nur and ranges of Arjin Mountains, which are two of four wild camel's separated habitats in the world. Based on them, the first batch of tracking data was acquired. He is also collaborating with the scientists in Mongolian Academy of Sciences in research and protection wild camels in Mongolia. Thereafter, multiple cooperative research projects will be carried out.

"By satellite tracking wild camels in both China and Mongolia, their distribution and migration can be fully discovered and threats can be estimated. Therefore, the accurate and reliable evidence will be provided for effective protection of wild camels and their habitat," LIU Shaochuang says.

But he indicated that the currently being used tracker will not easily become popular, as it has to depend on the Globalstar or Iridium satellites communication system to transfer the tracking data. With the increasing improvement of Chinese 'Beidou' system, Prof. Liu's team will develop the new wild animal tracker based on 'Beidou' Satellite Navigation System, which is an important step for its navigation and positioning products to become worldwide.

The survey revealed that there were fewer than 1,000 wild camels still alive all over the world. But the detailed amount of wild camels could not be determined even today. Due to their scarcity in number but their migration in large area, mainly in the severely draught deserts and Gobi regions, the traditional wild animal population assessment methods, mainly through visual observation and on-site counting, do not effective to wild camels.

"Based on aerial photos and remote sensing images of high resolution satellite, IRCWC can calculate the number of wild camels in China and Mongolia, through manual or automatic recognition technology", LIU Shaochuang says, "In addition, satellite remote sensing technology is capable of monitoring illegal mining activities effectively in the

habitats of the wild camels."

In some regions of wild camels habitat, the hybridization between domesticated camels and wild ones are occurring, which caused big threat to the wild camel's genome integrity. Regarding to this, IRCWC researchers will carry out Unmanned Aerial Vehicle(UAV) surveillance and recognize every herd of wild camels clearly, in order to separate the domesticated ones from them.

Besides, scientists show much interest in applying Wireless Sensor Network(WSN) technology to preserving the wild camel. The WSN was originally motivated by military applications. It is an unattended ground sensor network, made up of various kinds of sensors, for sound, seismic, infrared, electromagnetism, chemistry and so on. Its application has extended to civil fields, e.g., long-term environmental monitoring, anti-terrorism, public security, industry and medical treatment, etc.

"It is an innovative application for WSN technology to be used for wild animal protection, with specific sensors by special development. But it is very suitable for preserving wild camels", LIU says.

He says that too many people involved in tourism, exploration or mining have illegally entered the habitat of wild camels. It has severely threatened their existence. Because their movement occupies large area, with harsh environment and very limited management staff, it is



Wild camel images captured by camera traps.

necessary to deploy the WSN in order to make large area monitoring come true.

Some boundary area to Mongolia in Xinjiang Uygur Autonomous Region and Gansu Province, China, is also the habitat of wild camels. Unfortunately, the barbed iron wire fence along the country border severely hampered the migration of wild animals, including wild camels.

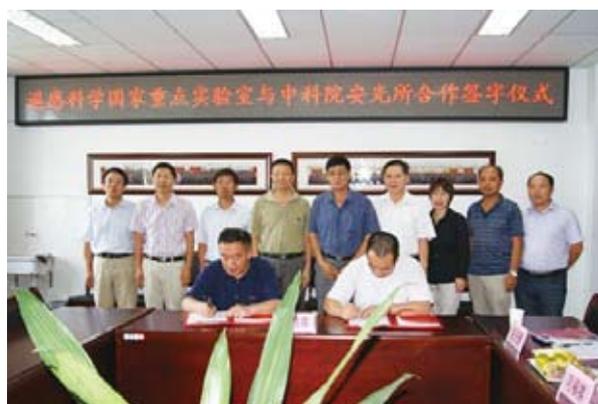
"If a trans-boundary nature reserve could be established on the border of China and Mongolia, and the fence might be removed, the unattended ground sensor network would help in solving the cross-border issue on the regulatory staff", LIU Shaochuang says.

## Strategic Partnership Established between RSLAB and AIOFM

A Strategic Cooperation Framework Agreement was inked between the State Key Laboratory of Remote Sensing Science (RSLAB), and Anhui Institute of Optics and Fine Mechanics (AIOFM), on September 9.

With the support of RADI and Beijing Normal University, RSLAB is China's only State key laboratory devoted to basic research of remote sensing.

According the agreement, the advantageous unites of the two organizations will join hands in carrying out basic theoretical research and technology development, and forming an industrial chain by data accumulation and analytics.



A strategic cooperation framework agreement is inked between RSLAB and AIOFM.

## National Engineering Laboratory of Remote Sensing Satellite Applications Accepts On-site Assessment

An expert group was assigned by CAS on September 9 to check the operation of the National Engineering Laboratory of Satellite Remote Sensing Applications, which received the approval of China's National Development and Reform Commission (NDRC) in November 2008.

The laboratory was jointly established by RADI and the Twenty-first Century Aerospace Technology Company in 2009. As the only State key laboratory in the field, the laboratory is created to focus on the studies of generic and key technologies in the complete chain of remote sensing satellite information applications and services, the formulation of standards and specifications for remote sensing data and information products, and the development of an open platform for technology research, development and verification.

The expert group paid an on-site inspection to assess the operation of the laboratory. With three years development, the laboratory plays an active role in promoting the industry application for China's autonomous satellites. It has built a technology supporting system for China's satellite remote sensing industry, and made breakthroughs in terms of satellite data reception and processing, and information



Experts listen to the reports on the meeting.

integrated equipment. It also formulates technology supporting system for standardized satellite remote sensing products. In addition, it has established a ground testing platform for satellite remote sensing, which has been applied to national major projects.

According to the on-site assessment, the laboratory has fulfilled the objectives defined by NDRC. In future, the role of the laboratory is to support national satellite remote sensing industry and develop towards engineering and industrial applications.

## International Cooperation

### Cambodian Deputy Prime Minister Meets the RADI Delegation HIST Signs MoU for Cooperation with APSARA

On June 20, Cambodian Deputy Prime Minister Dr. Sok An met in his residence the delegation of RADI and the International Centre on Space Technologies for Natural and Cultural Heritage (HIST) under the auspices of UNESCO. The delegation was in Cambodia to attend the 37<sup>th</sup> Session of UNESCO World Heritage Committee and to make a study tour to Angkor, the cultural world heritage site.

Sok An highly praised the substantial cooperation carried out by HIST and RADI with the Authority for the

Protection and Management of Angkor and the Region of Siem Reap (APSARA) and promised full support to such cooperation. According to Sok An, After the inclusion of Angkor into the World Heritage List in 1992, more than 20 countries have participated in its restoration and reconstruction under the advocacy and coordination of UNESCO, making contributions to the protection and maintenance of the site. However, continuous social and economic development posed huge challenges to the

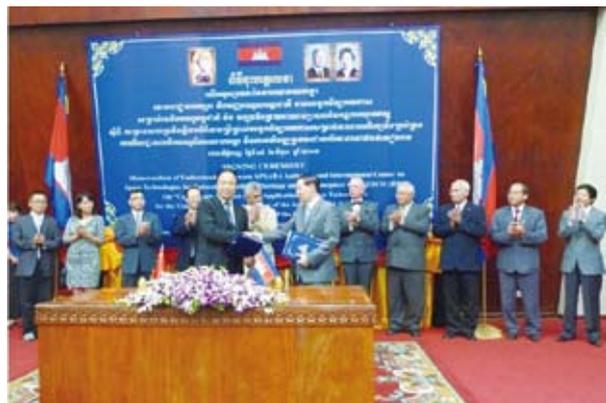
conservation of the surrounding ecological environment of Angkor Site including illegal housing in its vicinity, deforestation in the north, etc. These all leave the Angkor Wat under severe threats. The dropping ground water table in the dry season and the floods in the rainy season may both undermine it. Therefore, the Deputy Prime Minister hoped that on the basis of the Memorandum of Understanding for Cooperation between the two sides, HIST and RADI would offer technological support so that APSARA can use space-borne and air-borne remote sensing technology to monitor the surroundings of Angkor. He also hoped that RADI can send its remote sensing aircrafts to Siem Reap to collect data on Angkor Site, Kulen Mountain in the north, watersheds of Siem Reap River and two other rivers flowing down from the north, and Tonlé Sap Lake in the south, so as to provide basis for the policy-making concerning the protection and management of the world heritage site of Angkor as well as to strengthen the preservation of the ecological environment surrounding the site. Meanwhile, He also expressed the hope that HIST and RADI could train professionals in space technology for APSARA and set up an office in the city of Siem Reap, for which the Cambodian side would like to offer a villa. At last, he suggested that HIST start the remote sensing project as soon as possible and present its research achievements at the Third Intergovernmental Conference on the Conservation and Development for Angkor Wat Archaeological Site to be held in Siem Reap at the end of the year under the auspices of UNESCO, so as to showcase the technological advantages of HIST and RADI.

Prof. GUO Huadong, Director-General of RADI and Director of HIST, gave a brief introduction to HIST and RADI. He said that HIST would launch the environment remote sensing project for the Angkor heritage site as soon as possible with the support of the Chinese government and Chinese Academy of Sciences, under the framework of the MoU and on the basis of the discussions between the two sides.

Upon the invitation of the UNESCO World Heritage Center and APSARA, GUO and his parties attended the 37<sup>th</sup> Session of the UNESCO World Heritage Committee held in Phnom Penh to discuss the cooperation on using space technologies for the conservation of Angkor Site and to do a field study in the Site as well as its surroundings. On June 14, on behalf of HIST, GUO Huadong signed the Memorandum of Understanding for Cooperation with Mr. Bun Narith, Director-General of APSARA in the Council of Ministers, Cambodia. After that, Prof. GUO and his



Dr. Sok An meets with RADI and HIST delegation.



GUO Huadong, on behalf of HIST, signs the Memorandum of Understanding for Cooperation with Mr. Bun Narith, Director-General of APSARA.

team had a work meeting with APSARA Authorities in the National Commission of Cambodia for UNESCO on the content, ways and other aspects of the cooperation under the framework of the MoU. He also paid an investigation visit to the Kulen Mountain, the Tonlé Sap Lake and Siem Reap which surround of Angkor Site.

HIST is the first international center on using space technologies for world heritage sites under the auspices of UNESCO and the first UNESCO research center of CAS. Relying on the development of the Institute of Remote Sensing and Digital Earth (RADI), HIST aims to use RADI's advantageous space technologies to support UNESCO and its members in conserving and managing world heritage sites, building their capacity and promoting sustainable development.

Located in northwestern Cambodia, Angkor is renowned for its grand architecture and fine relief sculpture, and it is also the largest temple in the world. It was listed by UNESCO as a world cultural heritage site in 1992. The Cambodian government has made it a national strategy to protect Angkor

well. In the past nearly two decades, with the mediation of UNESCO, over 20 countries have assisted the Cambodian government in the restoration and reconstruction of Angkor. However, as the number of tourists grows and the social and economic development progresses in Cambodia, the surroundings of Angkor, which are vital to its survival, are facing serious challenges such as deforestation, disorderly immigration and illegal construction. Potential risks have also been detected in river basin conditions and ground water situation. Space technologies are urgently needed for monitoring purposes, while Cambodia is in lack of conditions and talents in this area. Therefore, the Cambodian government and APSARA both wished to cooperate with HIST.



The delegation's field trip to Kulen Mountain.

## RADI Delegation Visits Kyrgyzstan National Academy of Sciences

From June 30 to July 7, a delegation from RADI Kashi Research Center, led by Prof. Fu Bihong, visited Kyrgyzstan National Academy of Sciences and relevant research institutes for academic exchanges.

K. M. Zhumaliev, academician of the National Academy of Sciences of the Kyrgyz Republic and head of the Institute of Physical & Technical Problems and Materials Science (IPTPMS), extended warm welcome to the delegation. The two sides exchanged ideas on the preparation for the 2nd International Symposium on Earth Observation for Arid and Semi-Arid Environments (ISEO2014) to be held in Issyk-Kul, Kyrgyzstan in September 2014, and agreed that efforts should be made to further strengthen the cooperation between both sides in such fields as Earth observation and Digital Earth research and application. The two sides signed an agreement on scientific cooperation, with an aim to advance the construction of China–Kyrgyzstan Joint Research Center for Earth Observation and Digital Earth, launch substantive collaborative research projects, jointly organize international meetings, and promote the training and joint cultivation of young talents, etc.

During the visit, the delegation met with Prof. Abdygany Erkebaev, and Prof. Altai Borhbaev, President and Vice President of the National Academy of Sciences of the Kyrgyz Republic. The professors exchanged ideas with members of the visiting delegation on such issues as how to make good use of the geographic and technological



Prof. K. M. Zhumaliev and Prof. Fu Bihong signing the cooperation agreement.

advantages of both countries, deepen bilateral scientific and technological cooperation, and hold ISEO2014 successfully. The Kirghizstan side said that they will make efforts to secure more support from the government so as to create favorable conditions for the two sides to launch effective international cooperation.

The delegation also visited the Division of Geology and the Division of Earthquake of Kyrgyzstan National Academy of Sciences, as well as other relevant scientific institutes and universities, exchanged ideas extensively and discussed with Kyrgyzstan research fellows on fields of common concern, and had a short field investigation for the validation of some issues of the Mid-Asia Science and Technology Support Program.

## Jean Ping Visits RADI

On July 9, 2013, Jean Ping, former Chairman of the African Union Commission, and his party paid a visit to RADI.

Prof. HONG Tianhua, Deputy Director of the International Centre on Space Technology for Natural and Cultural Heritage (HIST), gave a general introduction to RADI and its international cooperation and exchanges. MENG Qingyan, head of the Applied Earth Observation System Division, made a report entitled “Agri-environment Remote Sensing Monitoring Information System of Sino-Egypt”, introducing in detail the quantitative inversion of crop parameters and land classification technology developed together by RADI and Egyptian Space Administration over the past five years, as well as the construction of the information system. Jean Ping expressed the wish to launch cooperative studies in fields relating to remote sensing.



Guests visit the workspace of RADI international S&T cooperation platform.

After the meeting, GU Xingfa, Deputy Director of RADI, gave as gifts *Beijing 1 Micro-satellite Image Atlas* and *Demonstrative Studies of the Egyptian Remote Sensing Applications* to Mr. Jean Ping.

## TWAS Officials Visit RADI

To strengthen the scientific cooperation and exchange between the Chinese Academy of Sciences (CAS) and the World Academy of Sciences (TWAS) in the field of space-based technology for disaster mitigation, and specifically, between CAS-TWAS Centre of Excellence on Space Technology for Disaster Mitigation (SDIM), and TWAS headquarters and regional centers, TWAS science project officer Peter McGrath and Prof. Romain Murenzi, Executive Director of the World Academy of Sciences (TWAS), visited RADI in June and September respectively.

TWAS science project officer Peter McGrath visited RADI on June 28, 2013. RADI Prof. Wang Changlin introduced the scientific researches, operation and international cooperation of RADI. Prof. Zhang Wanchang introduced the “space-based disaster mitigation” cooperative project of SDIM, involving the training of overseas students from developing countries, the training programs on space technology for disaster mitigation, and the high-level meeting on space-based disaster mitigation to be held at the 8th International Symposium on Digital Earth in Malaysia. Prof. Wu Bingfang, head of the Digital Agriculture & Global Disasters Division, introduced the scientific researches in agricultural disasters, floods and fire, as well as the mutual



TWAS science project officer Peter McGrath visited RADI.

cooperation under the CAS-TWAS framework, especially the South-South cooperation with Latin American countries. Dr. Feng Qiang introduced the work of IRDR-CHINA.

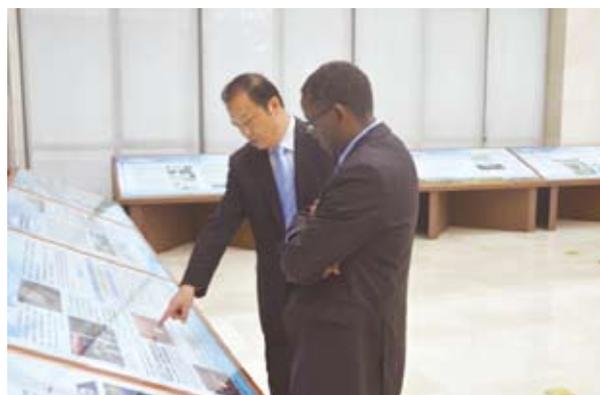
Mr. McGrath expressed the wish to strengthen the cooperation and exchange between TWAS headquarters and RADI. He believed that the multi-channel cooperation and exchange in various forms between SDIM and other TWAS centers would help more developing countries to make new progress in talent training, capacity building, etc.

On September 13, Prof. Romain Murenzi, Executive

Director of the World Academy of Sciences (TWAS) paid a visit to RADI.

RADI Director General GUO Huadong gave Murenzi a brief introduction to RADI, including its research, operation and international cooperation. Prof. Chen Fang shared the operation and latest progress of CAS-TWAS Centre of Excellence on Space Technology for Disaster Mitigation (SDIM) which was hosted by RADI, including the international student program for developing countries, the High-Level Meeting on Space Technology for Disaster Mitigation in Developing Countries held during the 8th International Symposium on Digital Earth (ISDE8) in August, as well as the training workshop on space technology for disaster mitigation to be held in Sanya in November.

Murenzi hoped that the TWAS headquarter would



Prof. Romain Murenzi visits RADI.

strengthen the communication and cooperation with SDIM to enhance the space technology for disaster mitigation in developing countries, especially those in Africa.

## Guests from International Space Agencies Visit RADI

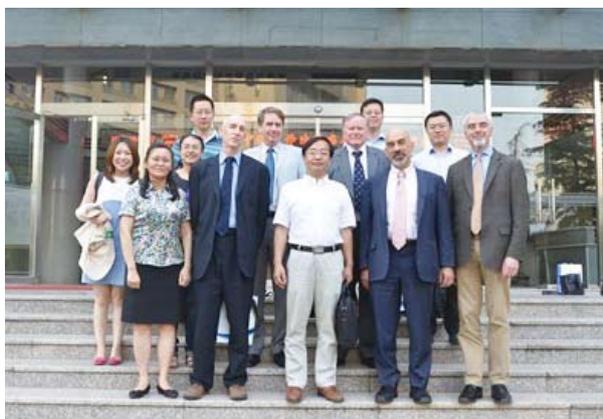
A delegation from the National Academies Space Studies Board (SSB) visited RADI on June 19.

Both sides agreed that important development has been achieved in Earth observation technology and it is playing an increasingly vital role in varied fields like disaster research, agriculture, and combating climate change, and much progress has been made in the production of Earth observation data. Both sides believed that they should further reinforce communications and mutual understanding, actively explore potential fields for cooperation, and carry out practical cooperation in related areas.

A five-member delegation of Thailand Geographic

Information and Space Technology Development Agency (GISTDA), headed by Deputy Director Chaowalit Silapathong, paid a visit to RADI on August 5, 2013.

At the discussion, the two sides reported their respective research fields and the progress in these fields, and discussed the possibility of further cooperation. RADI researcher ZHANG Wanchang briefed China's application of remote sensing technology in flood monitoring, especially in the 2012 floods in Thailand. Researcher CHEN Fang introduced the CAS-TWAS Centre of Excellence on Space Technology for Disaster Mitigation (SDIM) housed by RADI. Mr. Silapathong held that both sides should work together to



SSB delegation visits RADI.



GISTDA delegation visits RADI.

help more developing countries in talent training, capacity building and other aspects.

On September 17, a Swiss delegation led by Mr. Daniel Neuenschwander, Director of the Swiss Space Office (SSO), visited RADI. The delegation consisted of a dozen of delegates from the Science & Education Division of the Swiss Embassy to China, Swiss Space Center, Bern University and several airlines in Switzerland. The guests spoke highly of the achievements made by RADI in its Earth observation, international cooperation and infrastructure construction. Both parties hoped to strengthen exchange and cooperation in the future.



SSO guests visit RADI.

## Guests from UNESCO, IUCN, and ICOMOS Visit RADI

On September 18, Mr. R. Jayakuma of UNESCO Bangkok Office, Mr. William Logan, Deputy Director of the International Center for Integrated Water Resources Management (ICIWaRM) under the auspices of UNESCO and Mr. Shi Yichuan, a remote sensing expert of the International Union for Conservation of Nature and Natural Resources (IUCN) paid a visit to the International Centre on Space Technologies for Natural and Cultural Heritage (HIST) under the Auspices of UNESCO, which was housed by RADI.

HONG Tianhua, Deputy Director of HIST, gave a brief introduction to the application of space technologies on the conservation of UNESCO-Inscribed sites, and the background, objectives and operation of HIST. Mr. Logan made a presentation on the operation mechanism, main focus and recent work of ICIWaRM. Mr. Shi also made a

presentation on the work that has been done by IUCN on the use of space technologies for nomination of new natural world heritage sites, and for conservation of current natural world heritage sites.

On September 21, Prof. Douglas Comer, Co-president of the International Committee on Archaeological Heritage Management (ICAHM) of International Council on Monuments and Sites (ICOMOS) paid a visit HIST.

In the meeting, RADI researchers introduced the progress of archaeology research in China using remote sensing technology and the recent discoveries of “Silk Road” by remote sensing and field work. Prof. Comer made a presentation on the frontier technology of remote sensing archaeology.

This visit laid a good foundation for the cooperation between HIST and ICAHM/ICOMOS in the future.

## ABC Radio Australia Interview: GUOHuadong Talks about China’s Progress and Cooperation with Australia in Remote Sensing Technology

The IEEE International Geoscience and Remote Sensing Symposium (IGARSS) was held in Melbourne, Australia from July 21 to 26, 2013. More than 300 experts from China attended the Symposium. During the symposium, Professor GUO Huadong, Director-General of RADI, accepted the exclusive interview from the ABC Radio Australia (Chinese),

introducing China’s progress and cooperation with Australia in remote sensing. As an expert in remote sensing in China and academician of Chinese Academy of Sciences (CAS), Prof. Guo told the reporter that China had set up the stably operating remote sensing satellite system (RSSS) and that the remote sensing data had played a critical role in each field. In a closely

cooperative relationship, China and Australia learned from each other and made achievements in the remote sensing field.

According to GUO, China started to develop the remote sensing technology in the 1970s. After 30 years' development, it built up a remote sensing monitoring system including four series of satellites in terms of meteorology, resources, environment and disaster mitigation, and oceanography. The remote sensing data acquired by the system have been widely used in each field. Meanwhile, China also launched a series of scientific satellites. Currently, it is developing the satellites which can be used to monitor carbon dioxide in the atmosphere with a view to addressing the climate changes. In the future, the country will launch the satellites to monitor electromagnetic properties and provide scientific basis for earthquake forecast. Besides, its spacecraft of the Shenzhou series carried various remote sensors to observe the Earth.

China has built up 10-odd ground stations for remote sensing satellites which receive the data not only from its own remote sensing satellites but also from foreign ones. These data have been widely applied to diverse fields like agriculture, forestry, environment, city, ocean, and plotting, as well as the new area of global climate change in recent years. All of these applications have proved to be productive. In the era of globalization, China's remote sensing data has also made great contributions to the whole world in many aspects like global crop yield estimation and

global water distribution. Also being used to help China's disaster reduction, the remote sensing technology has played significant roles in monitoring and evaluation of disaster conditions, according to GUO.

Regarding the remote sensing cooperation between China and Australia, Prof. Guo explained that unlike China who launched its own satellites, Australia built the ground stations to receive data from international remote sensing satellites (including China's) for domestic environmental monitoring, resource surveys, and other purposes.

In GUO's view, China and Australia have maintained long-standing cooperation in both practical and theoretical remote sensing fields. Their partnership becomes more significant particularly when the whole world is addressing climate changes. The two countries, located in northern and southern hemisphere respectively, are bestowed with more cooperation opportunities in this regard.

RADI has cooperated with Australia's counterparts for a long term. Professor GUO gave an example, saying that two years ago the institute initiated the ABCC Program involving research organizations in Australia, Brazil, China, and Canada to use the remote sensing technology to conduct comparative studies on the global climate changes. In the 1990s, at the invitation of the Northern Territory Government of Australia, the institute flew a plane carrying the imaging spectrometer sensors above the northern region for one month to carry out a mineral resources survey.

## Academic Exchanges

### Seminar on High-Resolution EO Satellite Data Applications Held in Hebei

A seminar was held to discuss the application potentials of High-resolution Earth Observation Satellite data in Qinhuangdao, Hebei province on August 22.

Organized by China National Committee on Remote Sensing, the two-day seminar brought together over 180 participants including experts in the remote sensing field, government officials and the major users of Gaofen-1 satellite.

The seminar focused on the potential of Earth Observation Satellite System (EOSS), satellite remote sensing policy, standard setting, and the Gaofen-1 data



Seminar on High-Resolution EO Satellite Data Applications Held in Hebei.

processing. At the seminar, the major Gaofen-1 users made presentations on using Gaofen-1 data in the field of land resources, agriculture, environment protection, traffic, ocean, forestry, among others.

China successfully sent its first Gaofen-1 high-resolution remote sensing satellite into space on April 26. By improving the precision and timeliness, the satellite data could be widely used for national economic and social



Group photo.

activities and in other science research fields.

## RSLAB Holds Land Data Assimilation Training Course

From August 17 to 20, the 3<sup>rd</sup> training course for land Data Assimilation took place in northeast China's Changchun City. Under the auspices of the State Key



Prof. Shi Jiancheng is giving a lecture.

Laboratory of Remote Sensing Science (RSLAB), it was co-organized by the CAS Northeast Institute of Geography and Agroecology, the CAS Institute of Tibetan Plateau, the Cold and Arid Regions Environmental and Engineering Research Institute, and the Beijing Normal University.

The training course was attended by more than 140 researchers and students from universities and research institutes. The course was

Fifteen experts gave lectures on such topics as fundamentals and methods of data assimilation, application of data assimilation, land surface simulation and assimilation, soil moisture observation and simulation. The event was also a good opportunity for academic exchanges between scholars.

## Three Forum Sessions Take Place at RADI

At the 63<sup>rd</sup> Session of the RADI Forum on Earth Observation and Digital Earth held on June 3, Dr. Wu Zhaoyang from the University of Toronto gave a talk entitled "What we can learn from regional fluxnet data synthesis: a source of new knowledge".

Based on his findings and his long-term observation with remote sensing and fluxnet data, Dr. Wu showed the ways of primary productivity estimation model correction in north America, and the construction of forest light energy utilization with vegetation and temperature as indexes, the evaluation of the impact of precipitation frequency on summer soil moisture, the annual impact of autumn phenological characteristics variety on carbon absorption.

Dr. Wu conducts research into generation inverting biophysical and biochemical vegetation parameters and

net primary productivity with remote sensing data, and integration of surface fluxnet data and ecological simulation. As a lead author, he has published 29 SCI paper.

At the 64<sup>th</sup> Session of the Forum on Earth Observation



Dr. Wu Zhaoyang delivers a report.

and Digital Earthheld on June 14, Prof. David Johnston, Chair of the Scientific Committee of Integrated Research on Disaster Risk (IRDR), was invited to give a talk on Canterbury Earthquake Sequence and its Impacts.

During his presentation, Prof Johnston gave a description of the devastating infrastructural, economic and social effects of the magnitudes 6.2 and 6.0 earthquakes on the city of Wellington, which occurred on 22 February and 13 June 2011 respectively. Both earthquakes were aftershocks of the September 2010, magnitude 7.1 Darfield earthquake. He introduced international rescue operation during the disasters, including urban search and rescue, victim identification, rescue mechanism and staff members. He also talked about urban drinking water safety evaluation and heating supply after an earthquake. Focusing on the social and psychological impact of the earthquake on the local residents, he analyzed intervention pyramid for mental health and psychosocial support in emergencies & long term programmes. He also provided the audience with an overview of the lessons learnt from these events, and the move towards making Wellington a resilient city in the wake of these experiences. The international support in the aftermath of the earthquakes was also highlighted, and Dr. Johnston especially thanked China for sending search and rescue personnel to assist in these operations. He also pointed out challenges facing human beings, including providing accurate advice on likelihood further earthquakes in what increasingly appears to be a sequence of events - a rapidly evolving, time- varying, situation; providing confident advice to allow insurers and other agencies to make the correct decisions on where, when, and how to begin the rebuild of Christchurch; developing suitable adjustments to building code provisions in a time-varying hazard situation; finding the societally acceptable balance between current risk aversion and appropriate building standards for the nominal 50 year design life of reconstruction – acceptable risk and tolerable impacts; and developing an accurate assessment of socio-economic impact of the earthquake sequence and evaluate vulnerabilities with respect to city



Prof. David Johnston speaks with audience.

reconstruction.

Prof Johnston is a Senior Scientist at GNS Science (New Zealand's Geological Survey) and Director of the Joint Centre for Disaster Research in the School of Psychology at Massey University, Wellington. He assumed the role of Chair of the IRDR SC on 1 January 2013, a body on which he has served since 2008.

At the 65th session of the Forum on Earth Observation and Digital Earth, Prof. LIU Guosheng from the University of Florida was invited to give a talk entitled Remote Sensing of Cloud Ice and Snowfall from Satellite Microwave Observations

During his talk, Prof. Liu showed fundamentals of retrieving cloud liquid and ice water through satellite remote sensing and its state-of-the-art development. He said that as global climate model is inefficient in accurately inverting ice-phase clouds and solid fallouts, it is important to develop algorithms to retrieve cloud liquid water, cloud ice water, precipitation and surface turbulent fluxes using a combination of visible, infrared and microwave satellite observations. At present Prof. Liu also developed a fast and accurate radiative transfer model for applying satellite microwave data to physical parameter retrievals and numerical weather forecasting models.

Prof. Liu's areas of interest include radiative transfer, satellite remote sensing, and applications of satellite measurements to weather forecasting and climate research.

## *Journal of Remote Sensing* Establishes "Haze: Remote Sensing" Column

*Journal of Remote Sensing* established a "Haze: Remote Sensing" Column in partnership with RADI State Environmental Protection Key Laboratory of Satellite Remote Sensing. The special issue has been published online (<http://www.jors.cn>) in the 4<sup>th</sup> issue of 2013.

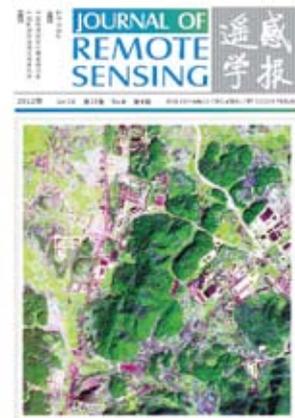
The "Haze: Remote Sensing" column of this issue contains nine papers that focus on the serious haze pollution in Beijing in January 2013. The papers introduced remote sensing instruments such as the sun-sky radiometer, laser radar and space borne multi-band CCD camera, and analyzed the haze aerosol properties obtained using ground-space, active-passive and other remote sensing methods.

The papers also reported the remote sensing monitoring results of Beijing haze. Comparing with ground monitoring stations, remote sensing monitoring not only can cover the regions that are beyond the monitoring scope of ground stations, but also can provide important haze parameters such as distribution, area, level, frequency, which has greatly

enriched and improved the indicator system of the present ground monitoring stations.

This Column aims to promote the application of remote sensing technology in studying global climate change and in environmental monitoring, so as to enhance China's capability of forecasting and responding to

regional pollution problems. *Journal of Remote Sensing* will closely follow the developments in remote sensing monitoring, and continuously publish related researches results.

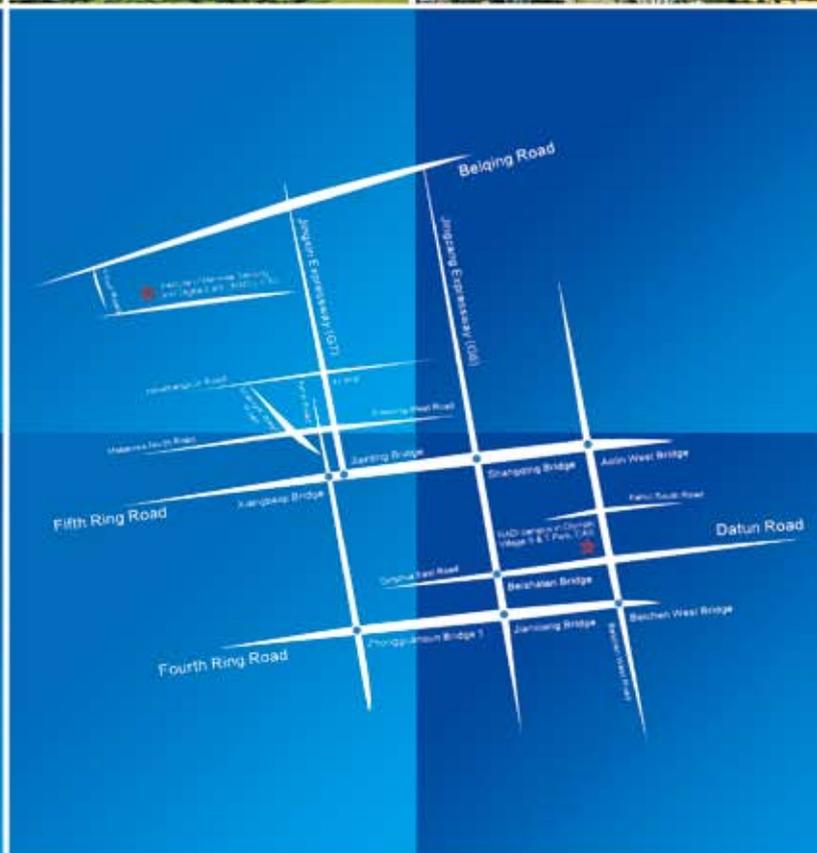


*Journal of Remote Sensing.*

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