



**Regional Committee of United Nations Global Geospatial
Information Management for Asia and the Pacific**

(UN-GGIM-AP)



Working Group 3

Place-based Information Management for Economic Growth

Status Report

October 2014

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1. ACTIONS TAKEN BY WG3 SINCE LAST PLENARY MEETING

The following activities have been conducted according to the resolution and work-plan of WG3:

- (1) Continue the investigation on the status of development of place-based information management, led by Gottfried Konecny, Emeritus Professor from Leibniz University Hannover. (Annex “A”).
- (2) Continue the user requirement analysis, and case studies on measurement of return on investment for Australia (Annex “B”).
- (3) Continue the case study on web-based distributed geo-data management and on-line services in China. (Annex “C”).
- (4) Continue the studies on fast acquisition and update of place-based data in Malaysia. (Annex “D”).
- (5) Successfully held the ISPRS TC IV Symposium on ‘GeoSpatial databases and location based services’ during May 14-16 2014 in Suzhou, China. (Annex “E”).
- (6) Hosted the seminar for developing countries on the global web-based geoinformation services during October 14-27 in China, with the funding from Ministry of Commerce of China. (Annex “F”).
- (7) Prepare and submit application to the special fund of the regional cooperation in Asia and Pacific regions for the training of technicians from UNGGIM-AP members on the technologies of Web-based geoinformation services.

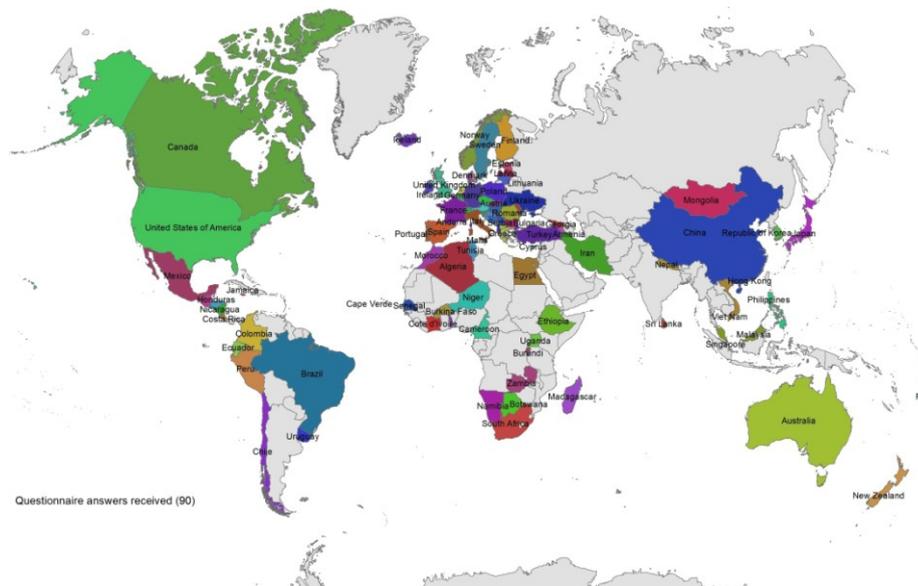
2. FURTHER WORKPLAN

No	Activities/ Steps	Date
1	Continue the Investigating the status of development of place-based information management in Asia & Pacific Region. Define common requirements for place-based information management related to the economic growth and society development.	2014-2015
2	Continue pilot studies on the fast acquisition and update of place-based data, construction interoperable distributed databases, and the experimental usage for e-government	2014-2015
3	Continue experiment on developing Web/cloud-based platform for management, processing, visualization and analysis of place-based data, and for provide location-based services to e-Government and public services.	2014-2015

4	Organize pilot studies, trainings and tutorials on fast data acquisition and updating, web/cloud-based services, under the leadership of UNGGIM-AP, for the member countries/regions,	2015
5	Jointly (with ISPRS) propose the resolution on: Globe interested to investigate the progress on status of topographic mapping and land cover mapping, and suggestion on the continue to support the activities.	2014-2015
6	Jointly organize the UNGGIM Forum on National Mapping during the ISPRS 2016 Congress.	2016
7	Report on outcomes of WG3 activities	UNGGIM-AP Meetings

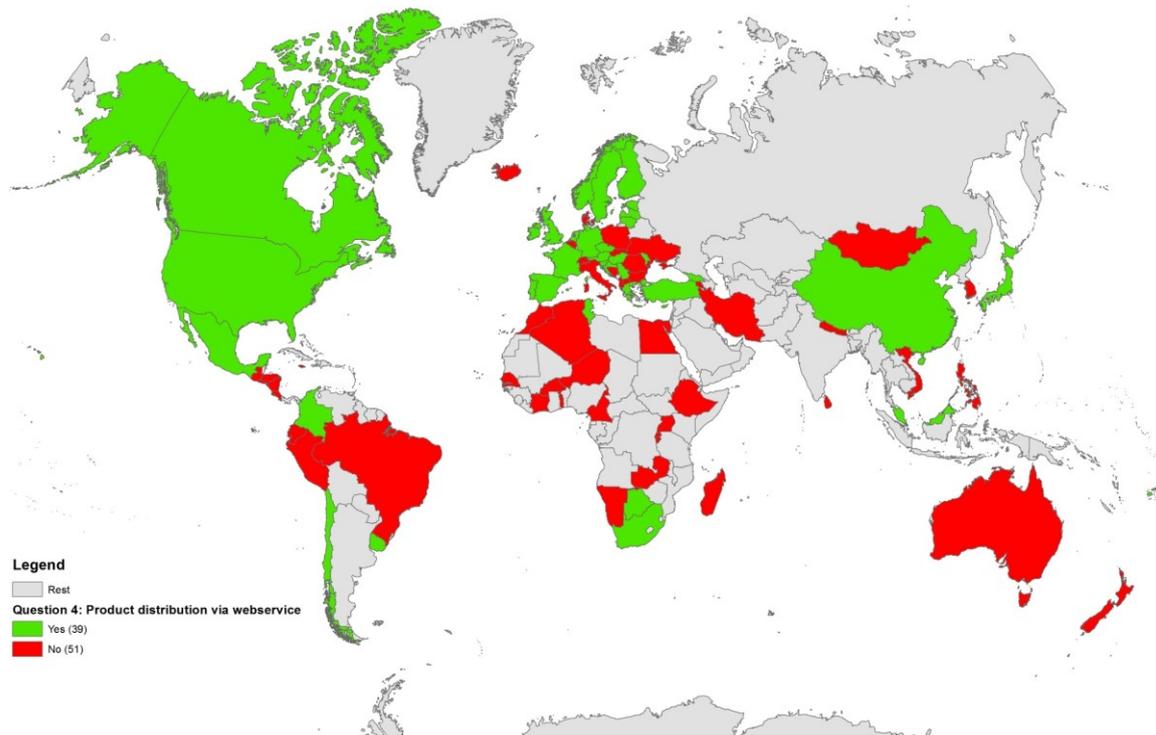
INVESTIGATION ON THE STATUS OF DEVELOPMENT OF PLACE-BASED INFORMATION MANAGEMENT

The investigation was led by Gottfried Konecny, Emeritus Professor from Leibniz University Hannover, based on the joint efforts by ISPRS and UNGGIM. A joint questionnaire was designed and the GGIM Secretariat has mailed it to the UN member States on April 27, 2012. By July 2014, 103 answers of the questionnaire were received. An analysis of the database was made and kept updating for the 27 questions asked. The results of the analysis has been presented and published in different UNGGIM and ISPRS conferences.



Returned Questionnaires from 103 replies out of 193 UN Member Countries

Among the 27 questions of the questionnaire, the most interesting questions include (1) national data coverage at various scale ranges; (2) age of the data and update cycles; (3) availability of data to the public without restrictions; (4) sale of the data or free distribution; (5) methodology of updating; (6) orthophoto mapping use as map substitute; (7) use of satellite imagery for updating; (8) mapping operations inhouse or by outsourcing; (9) use of lidar for DEM's and use of radar; (10) use of 3D products; (11) national cadastral map coverage; (12) web distribution of geospatial products.



Web distribution of maps (green = yes; red = no)

Based on the analysis, we know that governments around the world are not succeeding to complete or update their mapping requirements at the critical scales 1:5000 to 1:50 000; Imagery from satellites and digital aerial cameras offer a faster and more cost effective technology; more efforts should be done on web-based geo-information access and location-based services; industry can help to supplement missing governmental information.

The analysis was presented by Prof. Konency in the plenary session of the ISPRS Commission IV Symposium held 14-16 May in China this year. One technical session on 'Global Status of Mapping and Geospatial Database Updating' was organized during the symposium with 4 oral presentations. Vladimir A. Seredovich from Russia talked about 'New trends for 3D mapping using laser scanning data'. John Trinder from Australia talked about 'The current status of mapping in the world - spotlight on Australia'. Karsten Jacobsen from Germany talked about 'Development of large area covering height model'. Yuangang Liu from China talked about 'A complete solution of cartographic displacement based on elastic beams model and Delaunay triangulation'.

The investigation got the financial support under the ISPRS Scientific Initiatives Program for the Year 2014 in the amount of 8000.00 Euro. With this support, a further in depth analysis of the collected data will be done and information from other sources will be augmented.

We suggest UN-GGIM-AP request the member countries support the questionnaires by providing the information, and make further efforts, such as training and technology exchange, to promote the web-based geo-information sharing and collaborative LBS.

USER REQUIREMENT ANALYSIS AND CASE STUDIES ON MEASUREMENT OF RETURN ON INVESTMENT FOR AUSTRALIA

A workshop was held at Geoscience Australia with the Applied Geosciences Technology Division (AGTD) of the Secretariat of the Pacific Community Strategic Directions between 27-29th November, 2013. The workshop covered a range of activities of interest and included discussions on Spatial Information Infrastructure. It was recognised that there may be synergies between work in AGTD on the Pacific Risk Information System (PaRIS) and Australia’s National Exposure Information System (NEXIS). PaRIS is seen as an essential tool for helping Pacific countries assess their natural hazard risks. However, one drawback is that the models used are not open and extendable. A major issue is the problems associated with data management for high volumes of data. An area of collaboration to share expertise around spatial information infrastructure to build capacity in the South Pacific was seen as a way of Geoscience Australia linking several international initiatives, such as UN-GGIM aimed at applying geographic information systems for sustainable development. A follow up meeting is planned for early June 2014 in Fiji in conjunction with staff attending a Disaster Risk Reduction Forum.

Australia and New Zealand have progressed work on their Foundation Spatial Data Framework (FSDF) with the release of data set information for 10 key themes in April 2014 (<http://www.anzlic.org.au/FSDF>). A series of working groups for each theme have now identified data sets that are to be regarded as components of the FSDF and have provided data set descriptions, digital links to these data sets and information on availability. The second edition of the One ANZ Foundation Spatial Data Framework booklet is also available through the website, along with the web page descriptions and web links to all FSDF data sets. Data custodians for each of the data sets have been identified and will be invited by ANZLIC to formally become part of the FSDF. It is anticipated that the custodians will move towards open access for all data sets.

Australia has made a number of attempts in the past 2 years to quantify the economic benefits of spatial information. These attempts have proved difficult and results have been uncertain. The focus has now shifted to a 'risk-aversion' or 'value chain' approach. The aim is to show dependencies of a range of government, industry and community functions on fundamental spatial data.

In Australia, requirements for place-based information management for economic growth/society development are being gathered over the next 12 months. In Australia, the major geographic focuses for these drivers are in northern Australia and in Australia's marine jurisdiction. Information requirements to support the renewable energy sector will also be developed.

The Australian Government also strongly supports open data policies as a means for boosting innovation and economic development. The Australian Government is developing a "National Map" which will provide access to open place-based data from a variety of government sources. This portal will be completed in mid-2015.

CONTINUE THE CASE STUDY ON WEB-BASED DISTRIBUTED GEO-DATA MANAGEMENT AND ON-LINE SERVICES IN CHINA

The administration of geographic information in China operates under the principle of unified leadership and decentralized organization, including national level, provincial level, municipal level and county level. The National Administration of Surveying, Mapping and Geo-information of China (NASG) is the leading organization in the central government in charge of geographic information in the whole country. Under the unified administration of NASG, the national level, provincial level and municipal level geo-spatial databases are constructed and maintained with funding from the national, provincial and municipal governments separately.

To make these distributed datasets easy access for all users under predefined rule, NASG started in 2009 to establish the national platform for common geo-spatial services, with Chinese name TIANDITU which means Map World. TIANDITU is the web-based platform that integrates the dispersed geospatial information resources into a "one stop" online geospatial information service system. The platform consists of national nodes, provincial nodes and municipal nodes (or data centers). Each node manages the data in his administrative area and publishes the corresponding services conformed to OGC standards. TIANDITU was first launched in October 2011 that marked significant progress of NASG on improvement of service manner, service ability and the industrial supporting. One updated version has been launched each year since then. English beta version was launched in March 2013. The version for Chinese e-government network was launched in May 2013. By now, 1 national node with 5 data centers, 30 provincial nodes and 130 municipal nodes have been established and connected. It has been assigned as the authorized platform for publishing the images from Chinese satellites and aerophotos. Now TIANDITU can provide geo-spatial services covering the whole world, with specially abundant information within China.

Thousands of applications have been established based on the services of TIANDITU. It has become a well-known national brand of web-based geospatial information service platform, featuring with rich and detailed content, high quality and efficient service. The agreement between Tianditu and Beidou system was signed months ago. The Chinese national LBS platform will be established based on Tianditu, Beidou, with constant image supply from Chinese satellites and topographic data from both surveying and mapping agencies and industries. Since the summer of 2013, more than 10 central ministries took Tianditu as the key platform for their business information integration and location-based services.

Further efforts will done to enrich data resources, improve service functionality, and expand application range. International cooperation based on TIANDITU for techniques and software sharing, staff training, service integration will also be promoted.

CONTINUE THE STUDIES ON FAST ACQUISITION AND UPDATE OF PLACE-BASED DATA IN MALAYSIA

This report is a continuation from the last report in May 2014 under Work Plan No. 2. It was reported that JUPEM (Department of Survey and Mapping Malaysia) has embarked on the purchase of UAV/UAS for the purpose of fast acquisition and update of place-based data.

The UAV system has five main components namely aircraft, UAV control system, cameras, image processing software and supporting vehicle. The UAV system is called Pteryx system and comprises of a portable and winged UAV that has a total takeoff weight below 5kg. The flight duration can be up to 120 minutes. It can be assembled in a short time and the system is autopilot and the electronics components are for all weather operation. The ceiling of the UAV operation can be up to 2500m and the range of UAV operation can be up to 40km. The take-off method is using bungee launcher while the flight and landing method is fully autonomous. The cameras used in the UAV system are Digital Single-Lens Reflex (DSLR) camera and Shortwave Infrared Camera. The infrared camera is designed to augment the DSLR camera in enhancing the classification of land cover and land use mapping. The system will also be equipped with the software called Pix4UAV to generate orthomosaic, Google Map tiles, DSM and Point clouds.

The use of the UAV was investigated in generating an orthophoto mosaic for town map production. Malaysia town map revision is depended on how often the town area is spatially captured. The traditional method of acquiring aerial photo through aircraft platform is costly and not economical for the map updating of small area.

The specification for the accuracy requirement for the orthophoto production using normal aerial photo campaign was used to assess the accuracy of the orthophoto production using UAV. Mersing Town was selected as a pilot project.

A total of 399 still images and eight GCPs over Mersing Town with the size of 3.72 sq km were captured. The result using Pix4UAV software showed that the orthophoto production conform the accuracy requirement for town map production. The orthophoto mosaic has yet to be used for map updating but the data has been used to produce an orthophoto map as in Figure 1.

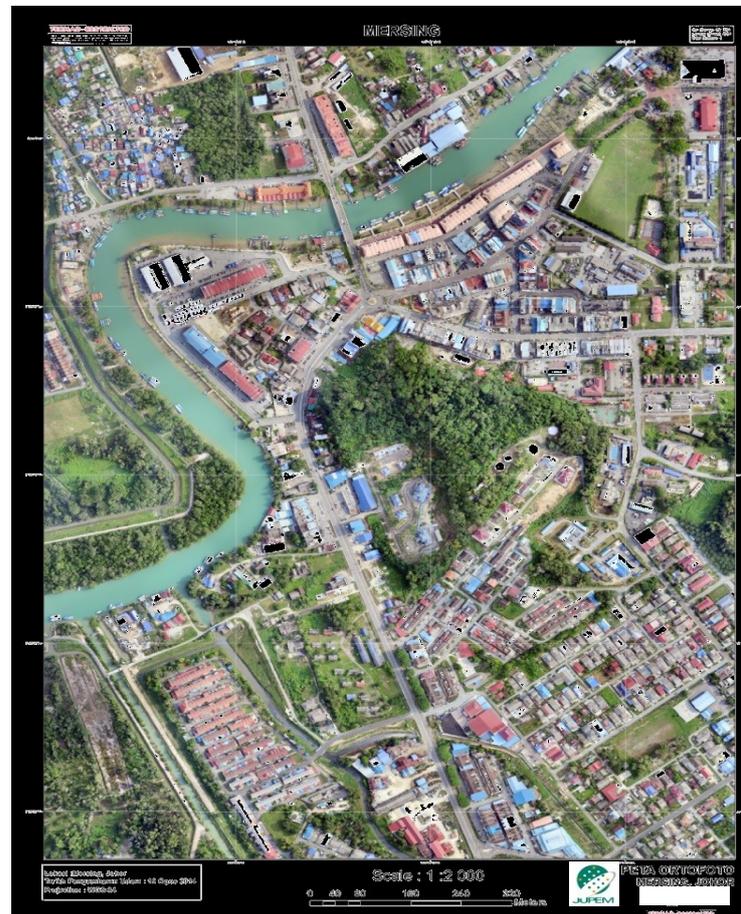


Figure 1. Orthophoto Map of Mersing Town

The UAV has also been deployed to support the monitoring activity of Natural Resource Management (NRM). Although remote sensing technology has been used in monitoring this activity, it is quite costly to monitor a small area and especially in highland areas that is always being covered by cloud. Therefore, JUPEM has been tasked by the government to capture imageries over the area that need to be regularly monitored using UAV.

The deployed UAV has successfully captured imageries which in turn were used to generate orthophoto over the area of interest as in Figure 2. The product was

then integrated with other spatial elements such as cadastre lots, forest reserve compartments and ongoing activities permitted by the local authorities using geographic information system (GIS) to serve specific stakeholders.



Figure 2. Orthophoto Map of selected area for Natural Resource Management

This work will be continued with the evaluation on the UAV capability on performing fast data capture and updating of place-based data. In addition JUPEM is in the process of procuring another UAV system with higher capability and more sophisticated mode of operations. It will be a vertical take-off type of UAV that will carry a bigger payload in the form of a medium format metric camera and which promises significantly longer flight duration and higher resolution image capture.

SUCCESSFULLY HELD THE ISPRS TC IV SYMPOSIUM ON ‘GEOSPATIAL DATABASES AND LOCATION BASED SERVICES’ DURING MAY 14-16 2014 IN SUZHOU, CHINA

The Mid-term Symposium of ISPRS Technical Commission IV on “geospatial database and location based services” was held during 14th to 16th, 2014 in Suzhou City, Jiangsu Province, China. It was organized by the ISPRS Technical Commission IV, hosted by the National Geomatics Center of China. It got supports from the Chinese National Administration of Surveying, Mapping and Geoinformation; Chinese Society for Geodesy, Photogrammetry and Cartography; GNSS & LBS Association of China; China Association for Geographic Information Service; National Nature Science Foundation of China; Jiangsu Provincial Bureau of Surveying, Mapping and Geoinformation; and Suzhou Municipal Bureau of Land and Resources. It was sponsored by Tianditu Co. Ltd.; Beijing Geoway Software Co. Ltd.; Geo-Compass Information Technology Co. Ltd. and Lenovo Group.

There were total 320 registered participants from 17 countries and regions took part in the symposium, among them 10 student volunteers and 49 free visitors from local universities and surveying & mapping agencies. Total 42 ISPRS officers attended the Symposium, including 4 Council Members, 4 Honorary Members, 4 Technical Commission Presidents and 1 TC secretary, 28 Working Group chair/co-chair/secretaries, and the Editor of ISPRS Book Series.

Eleven themes were designed, including 10 on the Working Group topics and one ICA-ISPRS TC IV joint theme. Total 129 abstracts/papers were received. After evaluation by the Scientific Committee members, 83 full papers were published, including 68 papers in ISPRS Archives and 15 papers in the peer-reviewed ISPRS Annals.

Nineteen Oral sessions with 86 presentations and 2 poster sessions with 43 presentations were organized. The oral sessions include 1 keynote session, 2

plenary session and 16 oral technical sessions.

The Symposium started with the opening ceremony in the morning of May 14th. Three keynote speeches were delivered in the keynote session following the opening ceremony. The first one was entitled 'Street View Maps based LBS' given by Prof. Deren LI from Wuhan University. He is the ISPRS Honorary Member, Academician of Chinese Academy of Sciences and Chinese Academy of Engineering. After briefly introduction the system architecture of LBS, demands of various users, he discussed the street view maps and mobile mapping technology, the application and development of the industry, and the service mode and applications. The second keynote speaker was Prof. Georg Gartner, President of International Cartographic Association. His topic was 'Service-oriented cartography and Location-based Services'. He briefly reviewed the status and vision of LBS. Then he discussed 3 phases of LBS development, they are technology-driven, data-driven, and user-driven LBS. The third keynote speaker was Bryant Austin, the experimental multi-media artist from Studio: cosmos, USA. With the topic on 'The Art of Creating 1:1 Scale Full Body Photo Mosaics of Whales', he shared the highlights of his twenty year evolution to create 1:1 scale photo mosaics of whales, taking inspiration from NASA's approach to create ultra-high resolution photo mosaics of our planets and moons. He also provided insight into the methods and techniques required to safely create such photographs.



Opening ceremony of the symposium

The 2 plenary sessions were held in the afternoon on May 14th. ISPRS

Congress Director Lena HALOUNOVÁ presented 'Why you should participate in the XXIII ISPRS Congress in Prague?' She introduced the preparations of the XXIII ISPRS Congress in Prague and called the participation. Gottfried Konecny, ISPRS Honorary Member and co-chair of ISPRS WG IV/2 presented the status of global mapping and updating based on UN supported questionnaire. ISPRS President Jun CHEN reported the approach and results of 30-m global land cover mapping conducted in China. ISPRS 2nd vice President Marguerite Madden presented the geovisualization and analysis of animal behavior, habitats and conservation. Jan-Peter Muller, chair of ISPRS WG IV/3 delivered a presentation on the status of CEOS-WGCV Terrain Mapping from Satellites. E. Pattabhi Rama Rao, chair of WG IV/4 presented the applications of geospatial technology in ocean information and advisory services. Bert Veenendaal, chair of WG IV/5, presented the development of a flexible higher education curriculum framework for geographic information science. Sisi Zlatanova, chair of WG IV/7, talked about the challenges and opportunities in 3D indoor modelling and navigation. Xin Ren from National Astronomical Observatories of the Chinese Academy of Sciences introduced the DEM reconstruction and preliminary scientific exploration planning of the Chang'E 3.

Sixteen oral technical sessions with 73 excellent oral presentations, and 2 poster sessions with 43 presentations were held during May 15h to 16th, focusing on "Methods for the Update and Verification of Geospatial Databases", "Global Status of Mapping and Geospatial Database Updating", "Global DEM Interoperability", "Geospatial Data Infrastructure", "Web and Cloud Based Geospatial Services and Applications", "Sensor Web and Internet of Things", "3D Indoor Modeling and Navigation", "Planetary Mapping and Spatial Databases", "Computing Optimization for Spatial Databases and Location based Services", "Global Land Cover Mapping and Services" and "LBS and Ubiquitous Cartography".

Technical exhibitions were organized during the symposium. Eight exhibitors attend the exhibition, including GIS software, graphic workstation, image processing platform, unmanned aircraft system, web maps etc. Chinese

computer-maker Lenovo Group, as the most typical one of them, brought four-screen solution for data processing which generated lots of attention from users intrigued by features like price and efficient performance. The on-line geographic information service platform MapWorld (Tianditu), developed by National Administration of Surveying, Mapping and Geoinformation of China (NASG), also drew lots of attention.

Social events were organized during the symposium. The welcome reception with live traditional Chinese music play in the evening of May 14th offered delightful opportunity for relaxing and catching up with friends. The beautiful city of Suzhou with the history of more than 2500 years, and the comfortable atmosphere, spiced up the symposium.

The symposium was a great success. We anticipated a well-attended symposium but our grandest expectations were exceeded. The quality of both the papers and the presentations was quite high. The symposium provided good opportunities for scientists, researchers and practitioners to discuss cutting-edge technologies, exchange research ideas, and promote international collaboration.

HOSTED THE SEMINAR FOR DEVELOPING COUNTRIES ON THE GLOBAL WEB-BASED GEOINFORMATION SERVICES DURING OCTOBER 14-27 IN CHINA, WITH THE FUNDING FROM MINISTRY OF COMMERCE OF CHINA

The seminar was organized by Academy for International Business Officials (AIBO), Ministry of Commerce, P. R. China. It was hosted by the National Administration of Surveying, Mapping and Geoinformation.

This seminar included presentations and field trip. All presentations were given by government officials or experts, covering topics such as “General Review of China”, “China’s Opening-up & Economic Development”, “Brief Introduction of Modern Surveying and Mapping Technology”, “ICT-based Management of Geospatial Projects”, “Progress of Web-GIS”, “Multi-resource Data Management and Efficient Image Processing”, “Land Cover Classification Based on High Resolution Images”, “Cloud-based Geospatial Information Service Platform”, “Web-based Geospatial Information Applications in Governmental Agencies” .

Participants visited Tianjin, Shanghai and met with local government officials and researchers, visit local geographical survey department and exchange ideas with them to get a better understanding of China’s geographic information service development and at the same time seek opportunities for more cooperation.

The invited participants of the seminar were officials at director’s level in surveying and mapping administrations from Ethiopia (1 person), Ghana (1 person), Zimbabwe(1 person), Kenya (1 person), Mauritius (1 person), Namibia(1 person), Nigeria (1 person), Uganda (1 person), Zambia (1 person), Cameroon(1 person), Madagascar(1 person), Indonesia(1 person), Laos (1 person), Vietnam (1 person), Sri Lanka (2 people), Mongolia (1 person), Georgia (1 person), Palestine (2 people), Jordan (1 person), Ecuador (1 person), Cuba (1 person), Vanuatu (2 people).

Similar seminar or training will be organized in coming years.