



**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 2012–2013

for the

UN-GGIM-AP Plenary Meeting

28-30 October, 2013

Teheran, Iran

Chair

Ms. Jie Jiang, China, jjie@nsdi.gov.cn

Vice Chair

Mr. Ahmad Fauzi bin Nordin, Malaysia, fauzi@jupem.gov.my

Vice Chair

Mr. Simon Costello, Australia, Simon.Costello@ga.gov.au

1. TERMS OF REFERENCE FOR WORKING GROUP3

1.1 Purpose

The 19th UNRCC-AP adopted nine resolutions, a number of which charged the UN-GGIM-AP with undertaking further activities on geodetic framework, data sharing and disaster management, and place based information management for economic growth.

The fundamental goal of the UN-GGIM-AP WG3 is to achieve the recommendations in the Resolution adopted by the 19th UNRCC-AP.

The purpose of the UN-GGIM-AP WG 3 is:

- (1) To promote the common understanding and advancement of place-based information, by:
 - (a) investigating the status of development of place-based information management in Asia & Pacific Region; and
 - (b) defining common requirements for place-based information management related to the economic growth and society development.
- (2) To promote the fast acquisition and update of place-based data by intensifying the development and experimental usage of interoperable geospatial data in pilot studies on the local, regional and national level.
- (3) To encourage developing Web/cloud-based platform covering the Asia & Pacific Region for the management, processing, visualization and analysis of place-based data;
- (4) To initiate dedicated efforts on promoting the application of place-based information in e-Government and public services.
- (5) To promote capacity building by developing joint action programs for the educational and training facilities on place-based data handling, delivering, and application.

1.2 Timeline

The work began 2012 and continued through 2015.

1.3 Membership of the Working Group

Chair:

Jie Jiang
National Geomatics Center of China

Vice-Chairs:

Ahmad Fauzi bin Nordin
Department of Survey and Mapping, Malaysia
Simon Costello

1.4 Resources

The existing resources of WG3 Chair Jie Jiang include:

- (a) As the President of Technical Commission IV on Geospatial Database and Location-based Services, ISPRS, she will introduce related ISPRS resources (including the state of art of the field, the advanced ideas and technologies, the experts, the conferences, etc.) to WG3, and combine the activities (conferences, tutorial, training, pilot study, etc.) of the two group;
- (b) As the Chair of Technical Commission on Common Geospatial Information Services, China Association of GIS, she will introduce related resources (including the technology and products, the experts, tutorial, training, etc.) into WG3;
- (c) As the program leader and chief engineer of Chinese National Platform for Common GeoSpatial Information Services, she will provide experiences and technical supports on web-based geoinformation services to the WG3

The existing resources of WG3 Vice Chair Ahmad Fauiz bin Nordin include:

As the Deputy Director-General of Survey and Mapping, Malaysia and Chair of the MyGDI (Malaysian Geospatial Data Infrastructure) Technical Framework Committee, will provide related expertise, linkages, facilitations and Malaysian input for planned programs of WG 3.

The existing resources of WG3 Vice Chair Simon Costello include:

- (1) Coordination of input from Australian government agencies into defining common requirements and economic benefits for place-based information, based on existing programs of work in Australia
- (2) Investigate opportunities for rapid acquisition, cloud-based management, and provision of geospatial services in alignment with existing Australian and Asia-Pacific programs
- (3) Provision of geospatial advice, facilitation and expertise to assist with projects relevant to this WG.

1.5 Responsibilities

The Chair of the UN-GGIM-AP WG3 will:

- (1) Develop more specific terms of reference based on each project,
- (2) Implement and complete work plans,
- (3) Report regularly on working group activities at the UN-GGIM-AP Executive Board

Meetings, Plenary meetings, UNRCC-AP meetings,

- (4) Provide expert advice, on request, to agencies and organizations,
- (5) Lead discussions at relevant meetings,
- (6) Draft resolutions.

Vice Chairs of the UN-GGIM-AP WG3 will:

- (1) Carry out the Chair's duties in his or her absence,
- (2) Provide support and assistance to the Chair in carrying out his or her responsibilities,
- (3) Taking on specific responsibilities from the Chair

1.6 Mode of Operation

UN-GGIM-AP WG3 will conduct their activities through organizing seminar, symposium, tutorial/training under the administration and plan of UN-GGIM-AP.

2. RESOLUTIONS ADOPTED AT THE 19th UNRCC-AP (corresponds to WG3)

2.1 Acquisition and maintenance of place-based information

The Conference,

Noting the increasing importance of place-based information for many aspects of economic growth and societal development,

Also noting the increasing role of interoperable distributed databases created and maintained by different nations and regions to support web-based processing and query,

Recognizing the necessity of up-to-date and properly integrated geospatial information for time-critical applications, such as e-government and emergency management and disaster management,

Also recognizing the benefits of sharing and common use of authoritative geospatial information,

Further recognizing the importance of enhancing national efforts, including investments, in the acquisition and maintenance of geospatial information and its dissemination,

Recommends that Member States improve the acquisition and maintenance of geospatial information by:

- (a) Promoting the use of various sensors, imagery and volunteered geographic information for more rapid acquisition and update of authoritative geospatial information;
- (b) Piloting and evaluating the usage of fundamental, multiple-use geospatial information for local, national and regional applications.

2.2 Smart services for the delivery of geospatial information

The Conference,

Noting that the increased usage of geospatial information over the web has continuously changed the way Governments function and transact information and services,

Also noting the trend of using the web/cloud to provide smart services for managing, processing and service platforms for geospatial information, Recognizing the potential for web/cloud services for both the timely processing, delivery and application of static and dynamic geospatial information,

Also recognizing that the international standards organizations, such as the International Organization for Standardization and the Open Geospatial Consortium are developing standards for the delivery and sharing of geospatial information,

Recommends that national geospatial information authorities utilize and share knowledge on web/cloud-based platforms and other smart services for dynamic management, processing, visualization, analysis and delivery of geospatial information.

2.3 Capability to deliver and use geospatial information

The Conference,

Noting the progress made in the development of fundamental geospatial information in the Asia and Pacific region,

Also noting the variability in the maturity of geospatial information usage within the Asia and Pacific region,

Further noting that national geospatial information authorities and professionals need to continuously update and share their knowledge on geospatial information,

Recognizing the increased demand for geospatial information in supporting government functions and community well-being,

Recommends that Member State national geospatial information authorities and professionals extend their capabilities to deliver and use geospatial information by developing joint action programmes for education, training and capability development on the acquisition, management, delivery and application of geospatial information.

3. WORK PLAN OF WG3

No	Activities/Steps	Date
1	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.	Dec.2012-2014
2	pilot studies on the fast acquisition and update of place-based	2013

	data, construction interoperable distributed databases, and the experimental usage for e-government	In some of the countries
3	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. This event should be cooperate with WG 1 based on the geodetic system and navigation system in AP region	2013 Joint-efforts of some of the countries
4	Training courses on place-based data, platform and application.	2013, 2014
5	International Symposium on Geospatial Databases and Location-based Services (joint event with ISPRS TC IV)	May 14-16, 2014 Suzhou, China
6	Reports of the progresses	2013-2015

4. ACTIONS TAKEN BY WG3 SINCE THE 19TH UNRCC-AP

The following activities have been conducted according to the resolution and workplan of WG3.

4.1 Investigation the status of development of place-based information management

The investigated was conducted based on the joint efforts by ISPRS and UNGGIM leading by Gottfried Konecny, Emeritus Professor from Leibniz University Hannover.

(1) Background

After the creation of UNGGIM by UN ECOSOC in 2009 an attempt to document the current status of basic mapping and its updating in the world has been launched under the initiative of ISPRS. A joint questionnaire was designed between ISPRS and UNGGIM, and the GGIM Secretariat has mailed it to the UN member States. An ISPRS Working Group (WG IV/2) has been created to assure sustainability of the effort. By now 91 answers have been received and analyzed. Reports have been presented in ISPRS and UN meetings.

Authorized by Prof. Gottfried Konecny, the head of the action, WG 3 of UNGGIM-AP analyzed the received questionnaires with focus on AP countries/regions.

(2) Summary of the investigation

Among the 60 UNGGIM-AP member countries/regions, 14 returned the questionnaires by April 2013, including Australia, China, Fiji, Iran, Japan, Malaysia, Mongolia, Nepal, New Zealand, Philippines, Republic of Korea, Singapore, Sri Lanka, Vietnam, (As shown in Fig.1).



Fig.1 Returned questionnaires from 14 UNGGIM-AP member countries

From the limited returned questionnaires, we can see that:

- All country have national topographic maps/databases. The scale of map/databases changes in different countries. But most countries have 1:250, 000 and 1:50,000 scale (Tab.1).
- About 57% countries have restricted access or limited circulation to the maps/data. The other 36% have no restrictions or limitations (Fig.2)
- About 64% countries allow public access to the map/data. 14% don't allow public access. (Fig.3)
- About 64% countries charge for use of the map/data. 21% countries don't charge for use of the map/data(Fig.4).
- About 57% countries provide web-based map services or meta-data service. 28% countries have not provide on-line services yet.(Fig.5).
- About 43% countries have national satellite imagery acquisition program, but only half of them have domestic satellite imagery capability. 50% countries have no national satellite imagery acquisition program. (Fig.6 and Fig.7).

Further investigation should be done for other AP member countries/regions, and on the status of the applications of the maps/databases.

The map/database scales in different countries. As shown in Tab.1.

Country/region	1:1 million or smaller	1:500 000	1:250 000	1:200 000	1:100 000	1:50 000	1:25 000	1:10 000	1:5 000	1:1 000 or greater
Australia										
China										
Fiji										
Iran										
Japan										
Malaysia										
Mongolia										
Nepal										
New Zealand										
Philippines										
Republic of Korean										
Singapore										
Sri Lanka										
Vietnam										

Tab.1 Scale of Map in countries/regions

Eight of the countries have restricted access or limited circulation to the maps/data. Five countries (Australia, New Zealand, Sri Lanka, Japan, Philippines) have no restrictions or limitations. One country (Nepal) has not submitted related information. As show in Fig.2.

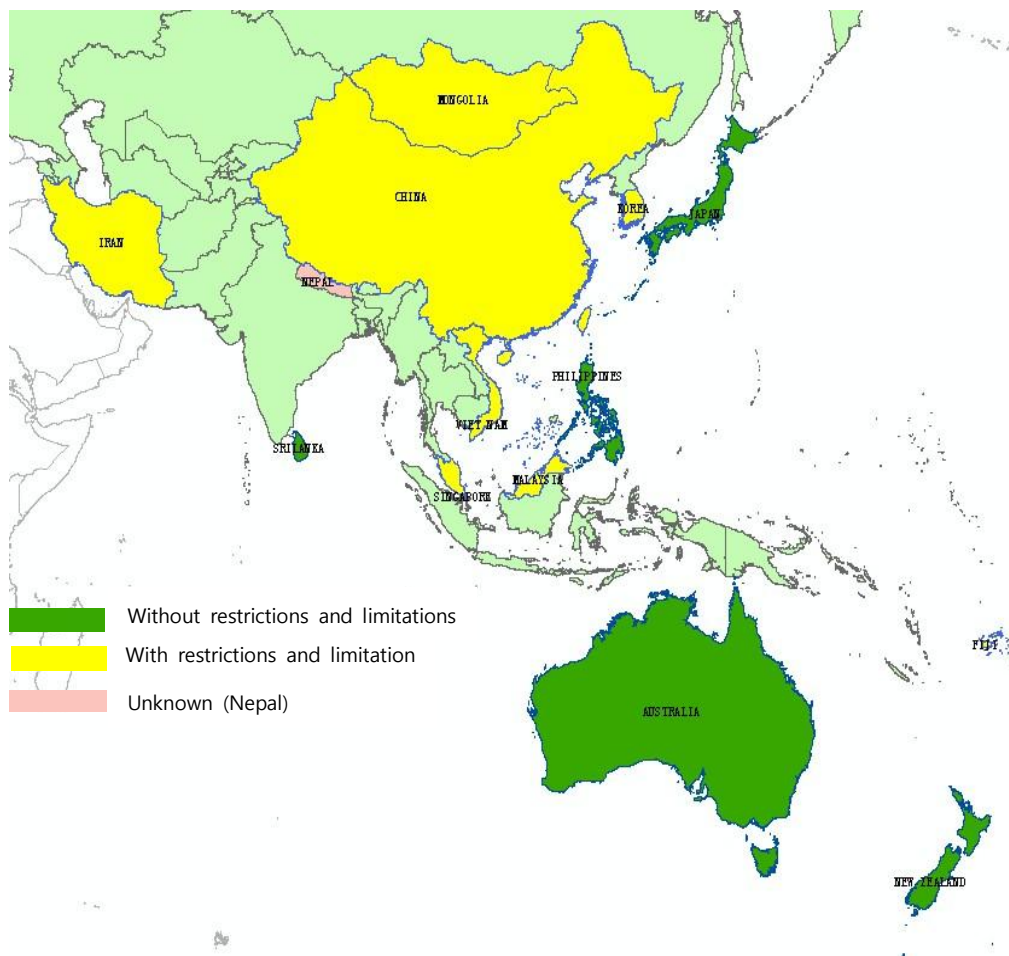


Fig.2 Restrictions and limitations for data access

Nine of the countries allow public access to the map/data. Two countries (Mongolia, Vietnam) don't allow public access. Three countries have not submitted related information (Nepal, Singapore, Sri Lanka). As shown in Fig.3.

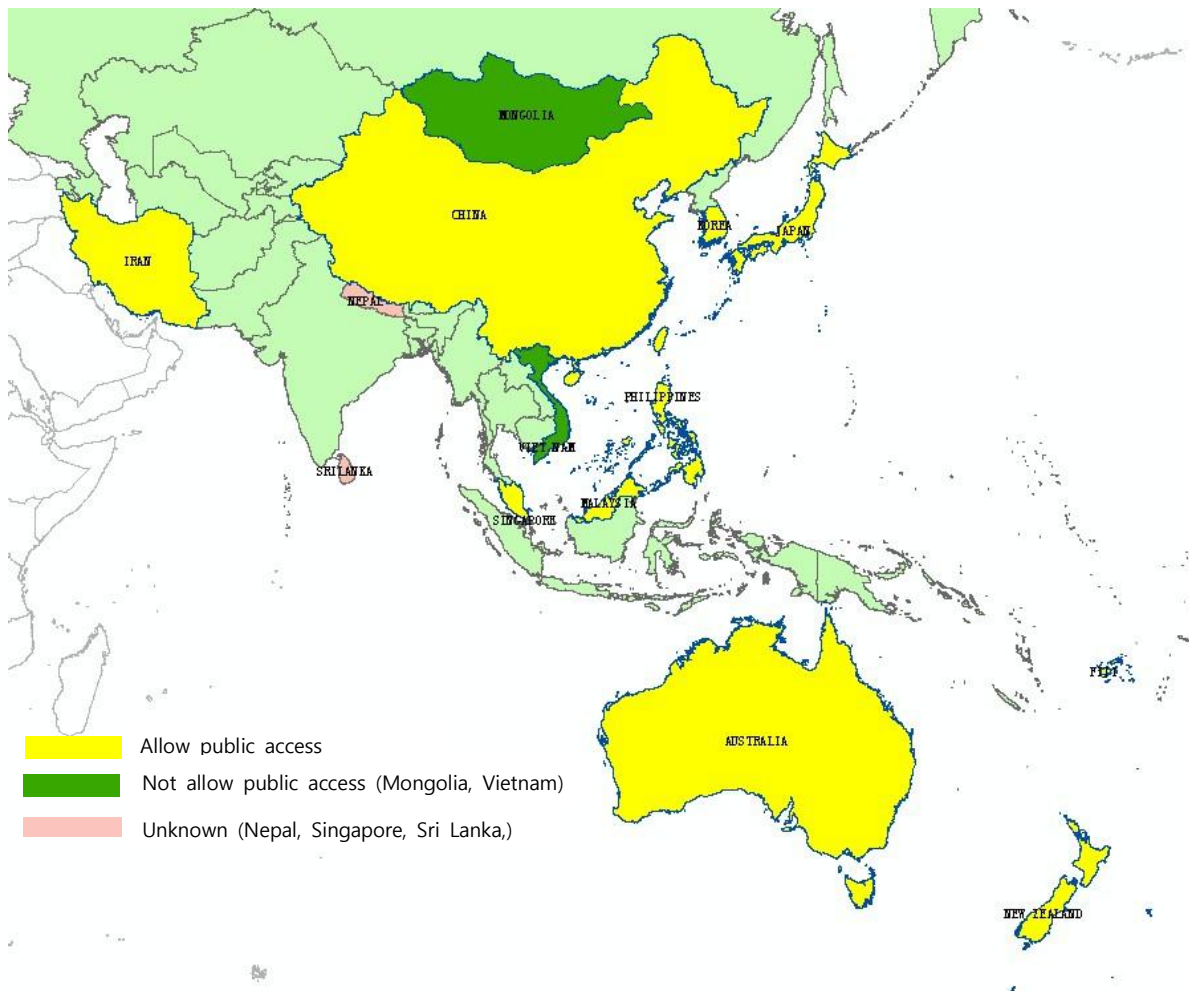


Fig.3 Allow public access

Nine countries charge for use of the map/data. Three of the countries (Australia, New Zealand, Philippines) don't charge for use of the map/data. Two countries (Nepal, Japan) have not submitted related information. As shown in Fig.4.

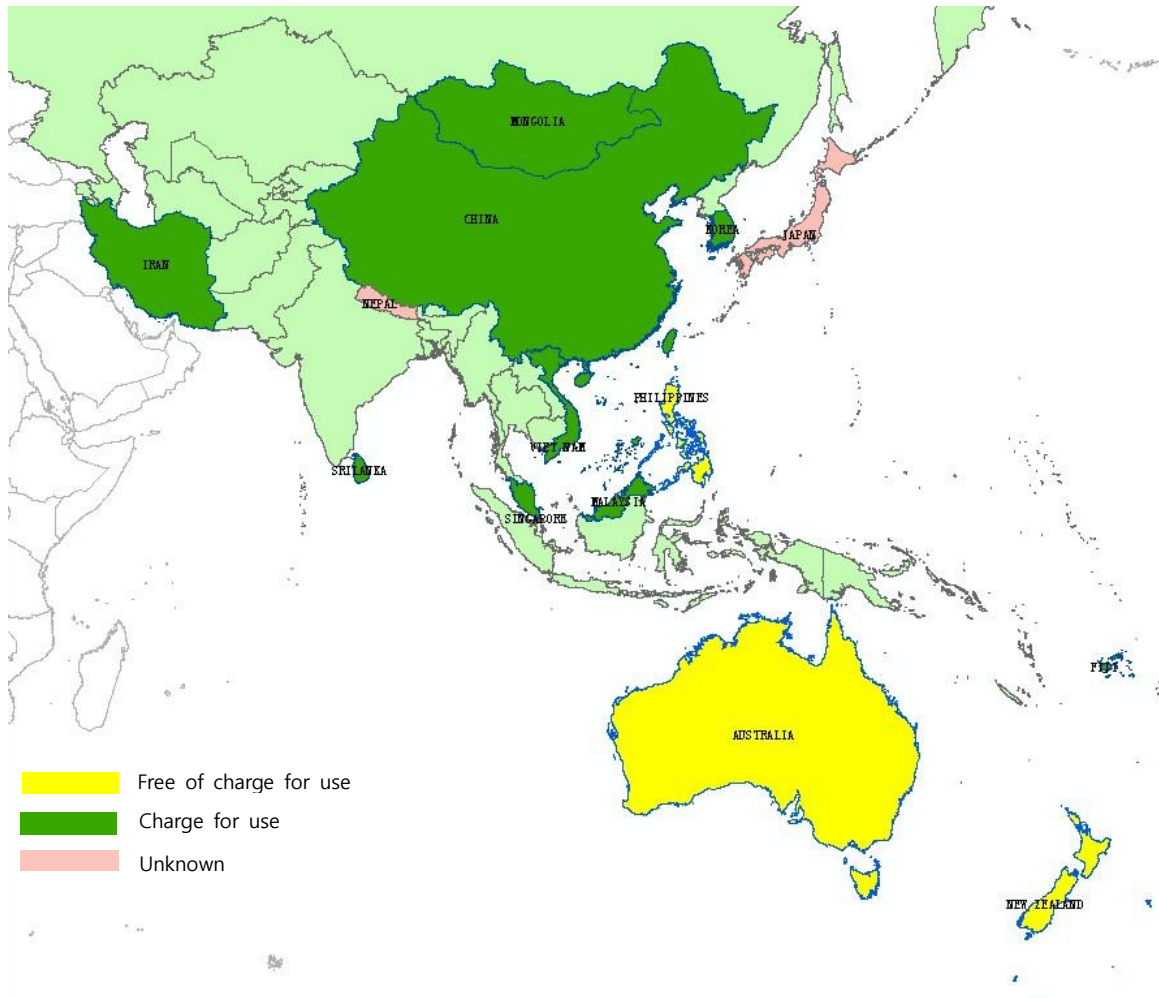


Fig.4 Charge for use

Eight of the countries provide web-based map services or meta-data service. Four countries (Fiji, Iran, Mongolia, Sri Lanka,) have not provide on-line services yet. Two countries (Nepal, Vietnam) have not submitted related information. As shown in Fig.5.

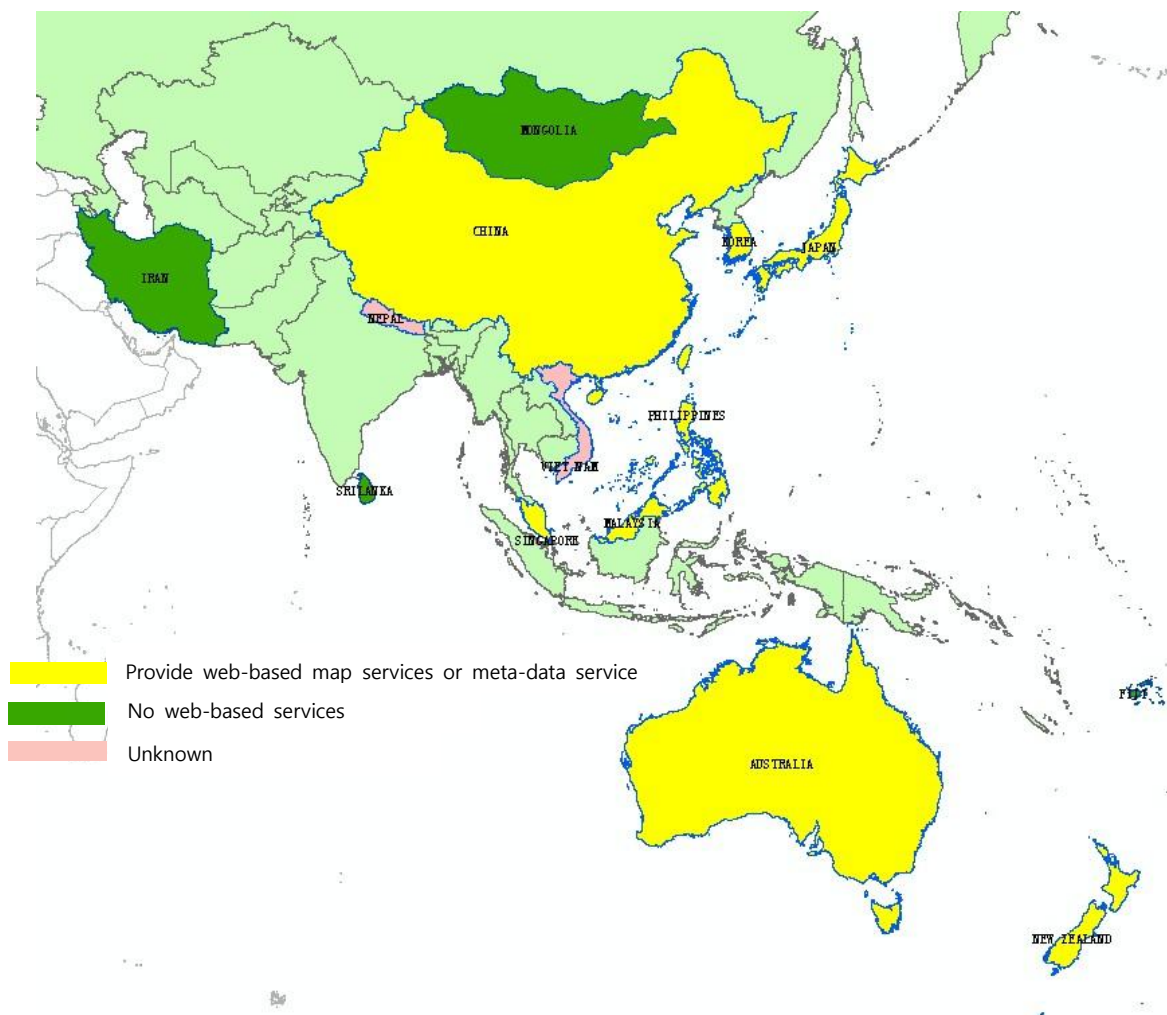


Fig.5 Web-based map services or meta-data service

Six of the countries have national satellite imagery acquisition program (Australia, China, Malaysia, New Zealand, Republic of Korea, Vietnam). Seven countries (Fiji, Iran, Japan, Mongolia, Philippines, Singapore, Sri Lanka) have no such program. One country (Nepal) has not submitted related information. As shown in Fig.6.

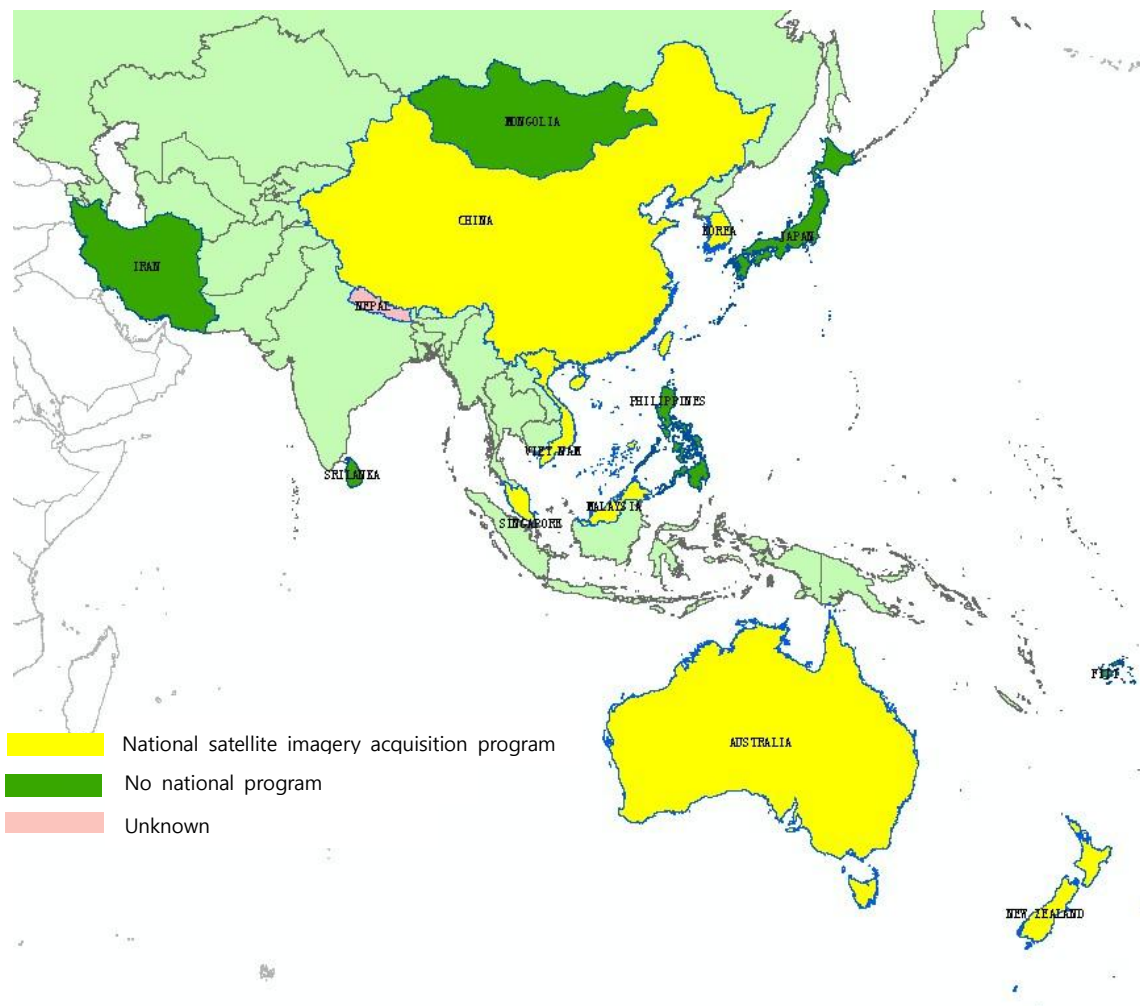


Fig.6 National satellite imagery acquisition program

Three of the countries have domestic satellite imagery capability (China, Republic of Korea, Singapore). As shown in Fig.7.

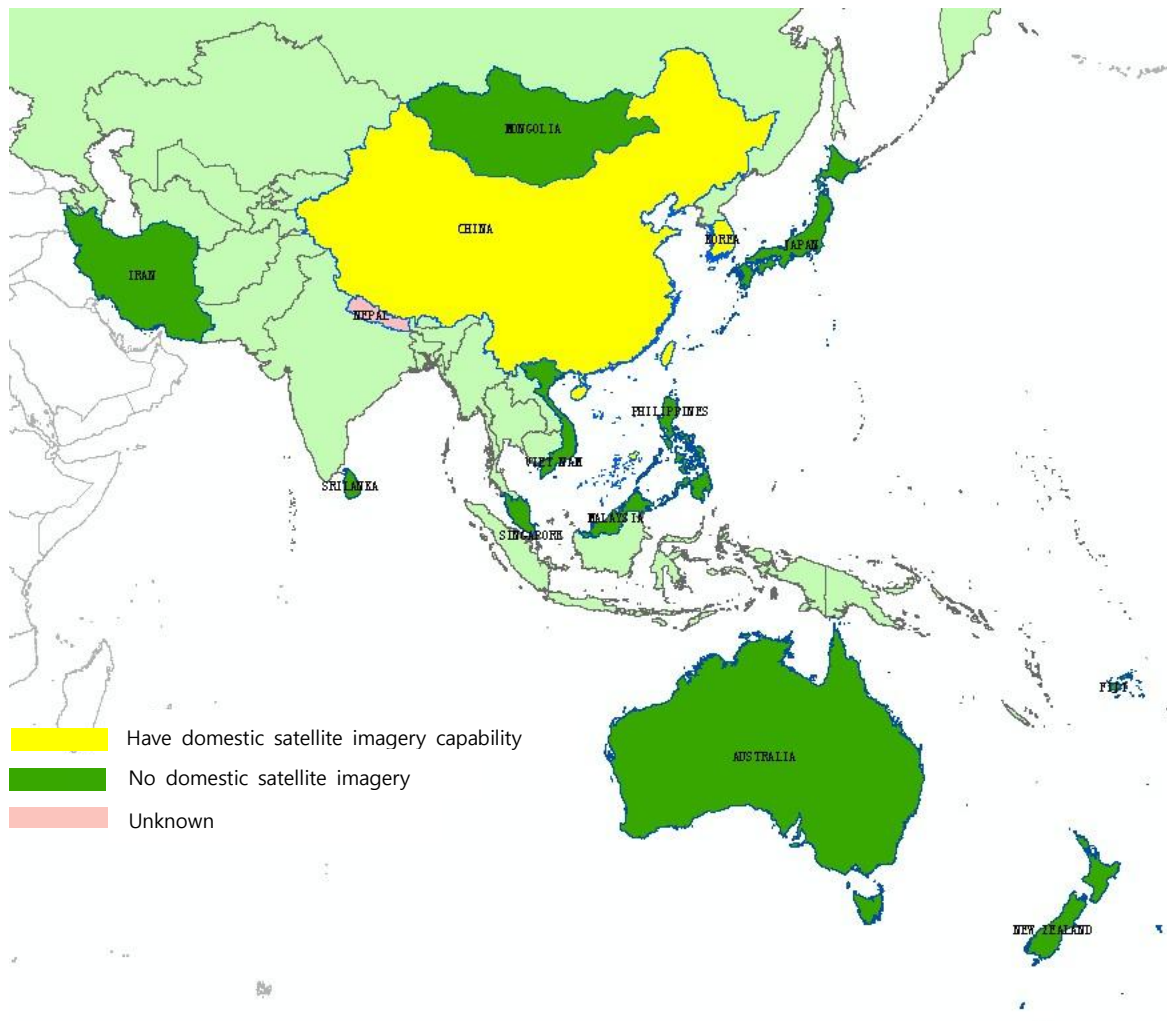


Fig.6 Domestic satellite imagery capability

4.2 User requirement analysis for Australia

User requirements for national data in Australia are currently being collated as part of the development of the One Australia New Zealand Foundation Spatial Data Framework (FSDF). Requirements for spatial information to meet a range of federal government, industry and community needs – to deliver against legislation, underpinning sustainable economic growth and public safety, and provide an opportunity for innovation – are being matched against spatial information datasets in ten themes – positioning, elevation and depth, imagery, place names, land parcels and property, transport, water, addressing, administrative boundaries, and land cover.

Profiles for relevant datasets, including the uses for which datasets are required, will be published by April 2014.

4.3 Case study on web-based distributed geo-data management and on-line services in China

(1) Background

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. Generally the scales of national level database include 1:1 million, 1:250,000, 1:50,000. The scales of provincial database include 1:10,000 and 1:5,000. The scale of municipal level database include 1:2,000, 1:1,000 and 1:500. National Geomatics Center of China (NGCC) is the government agency for national level databases construction, maintenance and distribution. There is one similar agency in each province and municipal, responsible for the databases within the area.

With decades efforts, the national level databases has covered the whole territories including 1:1 million, 1:250,000 and 1:50,000 scale. While the provincial database (1:10,000) covers more than 50% territories and larger scale data cover most of downtown areas. In the meanwhile, great volume of satellite images and aerophots have been collected. Recently more and more images come from Chinese surveying satellites such as ZY-3, etc. According to statistics, there are already about 1158 TB images in the National image database, among them 965 TB aerophots and 194 TB satellite images. There are several versions of low resolution (≤ 2.5 meter) satellite image covering the whole land area. Most of the urban areas have been covered by high resolution images (higher than 1 meter).

These databases effectively alleviated the urgent need from social-economic development. However, challenges arise accompanying with the further and wider application of the place-based information. One of the most urgent challenges is the one-stop access and integrated-usage of the multi-scale and distributed databases.

To solve this problem, a program was initiated by NASG in 2009 to establish the national platform for common geo-spatial services, with Chinese name TIANDITU which means Map World.

(2) General Structure and Main Achievement of the Platform

TIANDITU is the web-based platform that integrates the dispersed geospatial information resources into a "one stop" online geospatial information service system. It is

designed as an important part of the geospatial framework for Digital China, aiming to promote geographic information resources sharing and improve the capability and efficiency for better services. As shown in Fig.7. The platform consists of national nodes, provincial nodes and municipal notes (or data centers). The nodes are connected by Internet or Intranet. Each node manages the data in his administrative area and publishes the corresponding services conformed to OGC standards. All services will be registered in the service management system and be accessed by the users via the unique portal and website (Fig.8). The data sources come from various surveying and mapping agencies, enterprises, professional agencies, social organizations and volunteers. Data specifications have been defined according to the requirements of web services and all data should be processed to meet the specifications. Ordinary users can use the website to browse maps, locate places, measure distances or areas, plan car driving routes. Professional users can access TIANDITU’s resources via service URLs to development value-added services and applications. TIANDITU also provides many Application Programming Interfaces (APIs) to facilitate integration of its service resources and various systems or websites.

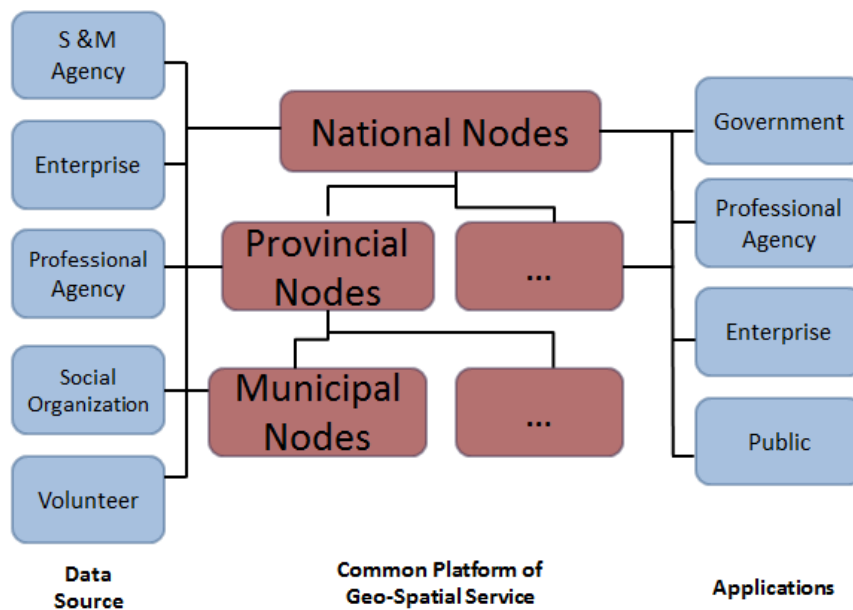


Fig.7 General Structure of the Platform

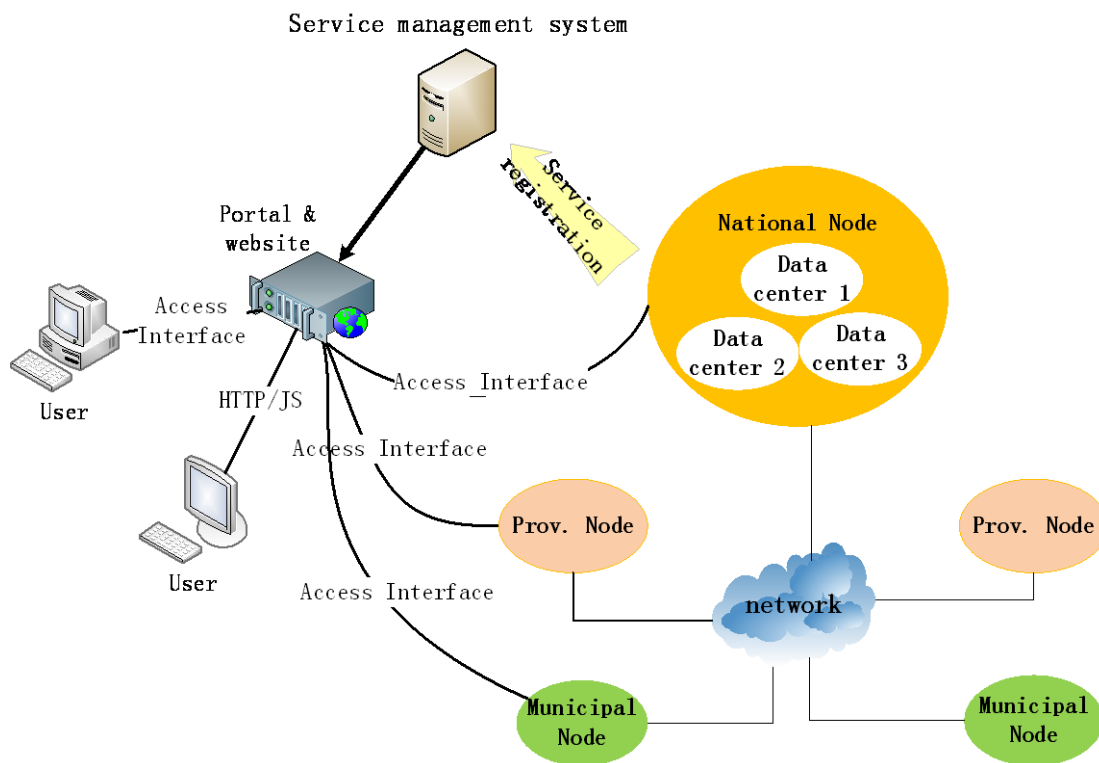


Fig.8 Operation Pattern of the Platform

TIANDITU was first launched in October 2011 that marked significant progress of NASG on improvement of service manner, service ability and the industrial supporting. With 3 years progresses, 1 national node with 3 data centers, 30 provincial nodes and 66 municipal nodes have been established and connected. TIANDITU now can provide abundant geo-spatial services including vector road network (in navigation data model) and 2.5 meter image covering the whole Chinese territory, building outlines and 0.5 meter image covering more than 450 cities/towns, and more than 20 million POIs. Full-scale data update has been down once a year and feature updating have been down every day. English beta version was launched in March 2013. TIANDITU also provide map services in the other part of the world, mainly based on 1:1 million map and 2.5-30 meter images from Chinese satellites. Serial standards have been published to regular the data processing and services interoperability, softwares have been developed for data processing, data management, and service publishing.

Thousands of applications have been established based on the services of TIANDITU. Now 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. TIANDITU has also gained international concern and full affirmation by Chinese government. Premier of China, Mr. Li Keqiang, stated that TIANDITU not only provides a valuable platform for non-profit government service, but also supports the

development of domestic industry and the improvement of common people's lives.

Further efforts will be 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.

4.4 Studies on fast acquisition and update of place-based data

In line with Work Plan No. 2, JUPEM (the Department of Survey and Mapping, Malaysia) through the coordination of Vice Chair I, has embarked on the purchase of UAV/ UAS for the purpose of fast acquisition and update of place-based data. This is actually a new capability which is additionally aimed at augmenting the current geospatial mobile system capability in the field. In this regard, the UAV system should be able to perform the function of especially producing rapid response products. This capability should also be able to be applied to support national security and humanitarian assistance and disaster relief works.

The UAV system has five main components namely aircraft, UAV control system, cameras, image processing software and supporting vehicle. The system is called Pteryx system and comprises of a portable and a fixed winged UAV that has a total takeoff weight of below 5kg. The flight duration can be up to 120 minutes. It can be assembled in a very short time, is autopiloted with the electronics component suitable for all weather operations. 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 Pix4D to generate orthomosaic, Google Map tiles, DSM, and Point clouds.

The UAV system will be undergoing a Final Acceptance Test from Nov 2013 to Dec 2013. During this test, small study areas will be selected in order to analyse the accuracy of orthophoto products. The study areas will be categorised based on three different profiles namely flat, semi hilly and hilly. The orthophotos generated by the UAV system will be compared to orthophotos of the same areas acquired using aerial cameras. The results are important as it provide the benchmark for the testing of UAV accuracy for mapping capability. The work will subsequently be continued in 2014 with the evaluation on its capability on performing fast data capture and updating of place-based data.

4.5 Case studies on measurement of return on investment for Australia

ANZLIC – the Spatial Information Council for Australia and New Zealand - has

commenced the development of an economic business strategy for its Foundation Spatial Data Framework (FSDF). The development of the business case has highlighted gaps in direct evidence of the value of spatial information, which in turns makes determining the return on investment in spatial information difficult.

A number of other nations outside the Asia-Pacific region have published or are currently investigating the value of spatial information for a range of economic development, environmental protection and other drivers – in particular in the context of open-access spatial information. The most comprehensive is the *Final Report of the National Enhanced Elevation Assessment* for the USGS, which is available at <http://www.dewberry.com/Consultants/GeospatialMapping/FinalReport-NationalEnhancedElevationAssessment>. The ANZLIC report will utilize some of this information and approach, but will also consider key linkages to Government initiatives and benefits by demonstration of demand.

The report by ANZLIC is expected to be available early in 2014.

4.6 Promotions

The chairs of WG3 took part in some international activities to promote the WG tasks.

Jie Jiang took part in the ISPRS Workshop on “Global Geospatial Information” in Novosibirsk, Russia in April 2013.

Simon Costello took part in the FIG Pacific Small Island Developing States Symposium (SIDS) in Fiji this September and will deliver a plenary speech on behalf of WG 3. The SIDS Symposium highlighted the need to improve the capacity and the capability of place-based information within the Pacific – but to do so in such a way that maximizes the use of “technology-lite” solutions. Many of the economic development questions that such nations have would benefit from current and timely spatial information, but the methods by which that information is delivered to decision makers and users need to consider limitations of infrastructure, availability of electricity, and spatial understanding.

Ahmad Fauzi Nordin participated in the International Symposium and Exhibition on Geoinformation 2013 (ISG 2013) held in Kuala Lumpur, Malaysia on 24-25 September 2013

Jie Jiang and Simon Costello will take part in the Chengdu Forum on UN-GGIM Global Map for Sustainable Development held 15 – 17 October 2013, Chengdu, China.

5. Further workplan

The proposed workplan for the coming year is as follows:

No	Activities/ Steps	Date
1	Complete 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.	2013
2	International Symposium on Geospatial Databases and Location-based Services (joint event with ISPRS TC IV)	May 14-16, 2014 Suzhou, China
3	Continue pilot study on the use of UAV for rapid data acquisition and update of geospatial information	2014
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,	Can be combined with Suzhou meeting
5	Report on outcomes of WG3 activities	UNGGIM-AP Meetings

6. Annexed

1. Gottfried Konecny (2013), The International society for Photogrammetry and Remote Sensing (ISPRS) study on the status of mapping in the world, Proceedings of the IX International Exhibition and Scientific Congress "InterExpo Geo-Siberia-2013", April 2013, Novosibirsk, Russian Federation
2. Questionnaires on the current status of mapping in the world, ISPRS and UNGGIM, 2013