Scalable Solutions for Image Information Mining

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1. **Background:**

The Secretariat of the UN Economic and Social Council (UN-ECOSOC) in New York.

has established the UN Global Geospatial Information Management (UN-GGIM) Secretariat in 2009 as a followup on the UN Cartographic Conferences held between 1955 and 2009. These are governmental conferences, for which the delegations of the UN member countries have to be nominated by the member governments.

UN-GGIM Conferences have been held 2011 in Seoul, 2012 in New York, 2013 in Cambridge, England and now 2014 in New York. The Conferences are supported by UN-GGIM Fora with academic and industrial participants. Fora were held 2013 in Qatar and 2014 in New York. NGO´s are admmitted to both Conference and Fora as observers. Furthermore UN-GGIM has started regional activities, such as UN-GGIM Asia and UN-GGIM Americas. Other regional activities, such as UN-GGIM Europe,

UN-GGIM Africa and UN-GGIM Arab States are in preparation.

2. Own Motivation to Participate in the Activities:

As a participant in the UN Cartographic Conferences since 1976 representing Germany and ISPRS one of the aims was to follow up on UN activities of the

UN Secretariat to determine the state of geospatial information existing in the different countries of the world. While this activity was supported by various resolutions at UN Cartographic Conferences in Asia and the Americas, there was a lack of followup between 1986 and 2009. ISPRS suggested to the UN-GGIM Secretariat to undertale a joint effort in 2009 based on the past resolutions.

3. The UN-GGIM – ISPRS Project on the „Current Status of Geospatial Information“

The project was agreed upon in December 2011 and it started with the joint design of

a questionnaire in January 2012 and the mailing of the questionnaire to the UN member states in April 2012.

The first two questions covered the present coverage of data in the relevant scale

Ranges 1:1000, 1:5000,1:10 000, 1:25 000, 1:50 000, 1:100 000 and 1:200 000 or 1: 250 000 and the dates of the last update of these maps.

The remaining 20 or more questions tried to characterize the infrastructure of Mapping, such as: are the data restricted, are they free of charge or sold, do updateprograms exist, which methodology is used, are there own governmental facilities or is mapping outsourced, is laser and radar mapping used, exists there a cadastral data coverage, are the data available in digital or analog form, are they dissiminated by the Internet?

The response by the UN member states was rather slow. By June 2012 56 countries had responded, by August 2013 it was 69 countries and by August 2014 107 countries.

The first two questions about coverage and age of data were rather sensitive, since many countries do not wish to reveal this information for military reasons. This mainly explains, why 86 countries have still not responded. But even though only 55% of the countries have supplied the information, the analysis of the responses is interesting and useful, sice it reveals global trends.

With respect to the data coverage and its actualization date a cooperation has been initiated between Eastview Geospatial in Minneapolis, Minnesota and the Institute at the University of Hannover. Eastview maintains a confidential data base, but it has agreed to deliver the missing data about coverage and age. In this way the current global status of geospatial data may be determined in cooperation with Eastview.

Of great interest is also the sizable competition created by military and prIvate initiatives to official mapping efforts carried out by governments (MGCP, Google, Microsoft, Here, Tomtom). Again, these data providers are for military or commercial reasons reluctant to share this information with the public. But an international ISPRS working group with members from China, Russia, Europe

and the USA was able to collect at least general information to complete the picture.

Only the largest GIS producer in the wold, ESRI, in Redlands, California, is ready to share data on high resolution satellite data coverages and their dates.

4. Visit to Eastview Geospatial in Minneapolis, Minnesota.

Before the UN-GGIM events in New York I visited Eastview Geospatial in Minneapolis.

I had a lenghthy discussion with CEO Kent Lee, which resulted in the following cooperation agreement:

1) Eastview will review the relevance of the UN-GGIM/ISPRS questionnaire and suggests desirable modifications or expansions of the database structure

2) Eastview reviews the correctness of the Hannover Excel database

3) Eastview supplies the desired country percentage coverages and their ages of the missing countries in the database from their own database.

Kent Lee will come to Intergeo in Berlin on October 7, 2014 for a meeting with us.

5. UN-GGIM Forum, August 4 to 5, 2014

The Forum was chaired by the recently appointed Director of the UN Statistics Division, Dr. Stefan Schweinfest and by his predecessor Dr. Paul Cheung From Singapore.

The present challenge lies in the fusion of statistical data with the geospatial data supplied by the surveys and mapping administrations of governments. The provision of these data is slow and costly. Industrial commercial interests offer rapid and cost effective alternatives to the traditional and standardized efforts by governments. This is currently a big challenge.

The presentations to the topic to fuse statistical data with geospatial data by China, Eurostat, Mexico, Australia, South Africa, Germany, USA, Sweden and OECD are downloadable from the web page: www.ggim.un.org/GlobalForum.html

The second day of the Forum was devoted to the Project „Global Mapping". It originated at the Rio UNCED Conference 1992, when it was decided to crate a homogenized thematic map series at the scale 1:1 000 000 to which many nations contributed. The project will be completed in 2016. At the age, when high resolution satellite images with 25cm have been declassified and WordView3 has started to gather image data world wide at 35cm GSD, the future need will be for global mapping at larger scales, e.g. at 1:50 000. Spain has proposed an update requirement of 3 years for roads and for urban settlements and of 5 years for hydrography. These data, however cannot be made visible at such a small scale as 1:1 000 000.

The US Bureau of Census has managed to integrate population statistics with geodata and to distribute the result over the web.

The International Hydrographic Office IHO in Monaco has raised the issue of a great lack of hydrographic charts in coastal areas oft he globe.

Pasco, Japan has discussed the possibilities by the Japanese Technical Cooperation Agency JICA, to launch mapping projects in developing countries by technical cooperation. Such data are needed rapidly in crisis areas (potential earthquake, flood and war activity areas)

6. UN-GGIM4 Conference, August 6 to 8, 2014.

The Conference was opened by UN-ECOSOC Undersecretary Wu Hangbo and chaired by Vanessa Lawrence, Great Britain.

There were 90 delegations of UN member states with 208 delegates, as well as 57 observers from NGO´s present at the meeting.

The first activity was to draft a resolution for the UN General Assembly to establish a „Global Geospatial Reference Frame GGRF", an independent spatial reference system oriented to quasars in space, which permits to define and permanently monitor changes of the earth crust (continental drift and rise, tectonic changes of the earth crust, changes of sea level). At present ITRF is determined by voluntary contributions of some scientific institutions in France, Germany, Japan, USA, Norway, Canada, Australia, Britain for science reasons. But the sustainability of funding for the present 32 laser tracking stations with VLBI operations, as well as more than 400 GNSS CORS stations requires a recommendation by the UN General Assembly. About 20 delegations spoke in favour for such a resolution.

Thereafter China presented its „Global Land 30" Land Cover Project, which will be donated to

the UN. It is based on a global cover of Landsat images with 30m GSD for

the years 2000 and 2010. The data were homogenized an verified in part in China, Europe and some African States. The datasets permit to determine land cover changes during the last decade.

This was followed by a discussion on „Core Global Datasets“ at national, regional and global level. The contributions by Britain, France, Mexico, Spain, Japan and South Africa are downloadable from the Internet under www.ggim.un.org

Another issue was the desirable population of the „Knowledge Base“ at www.ggim.un.org . The reports on the UN-GGIM/ISPRS project „Current Status of Global Geospatial Data“ are part of the Knowledge Base and they are downloadable from there.

The President of ICA announced that in August 2015 the „International Map Year“ will be launched during the ICA Congress in Rio de Janeiro.

In the final session of the meeting the agenda for the UN-GGIM5 Conference, which has been scheduled for August 3 to 7, 2015 in New York, was discussed.

It was agreed to place a final report on the UN-GGIM/ISPRS Project on the Current Status of Geospatial Data onto the agenda.

The 90 delegations present in New York offered the possibility for personal discussions to sollicit further questionnaire responses for the UN-GGIM/ISPRS project.

Such responses have been promised by 20 such member states:

Antigua and Barbuda, Argentina, Azerbaijan, Barbados, Cambodia, Dominica, Dominican Republic, Grenada, Guyana, Haiti, Indonesia, Kuwait, Lao People´s Republic, Qatar, Saudi Arabia, St. Lucia, St Vincent and the Grenadines, Suriname, Trinidad and Tobago.

7. Meeting with Lawrie Jordan, Director of Imagery, ESRI, Redlands, CA,

August 11, 2014

After a presentation of the Hannover created and compiled Excel database with visualization of the metadata for each country, we disussed future cooperation possibilities.

ESRI has a database within ArcGIS Online , which can display and superimpose map data and (high resolution satellite) imagery and is able to integrate metadata for visualization by countries.

Lawrie Jordan suggested to create a pilot project for the integration of the ESRI and the Hannover UN-GGIM/ISPRS datasets during the next year. The completed system is intended to be placed on the web for free of charge use by scientific users.

8. Meeting with Barbara Ryan, Director of UN-GEO, Geneva during the UNGGIM4 Conference.

Barbara Ryan agreed to place the UN-GGIM/ISPRS Project onto the UN-Geo website for public use.

9. Meeting with Amor Laaribi, UNGGIM Secretariat, New York.

Amor Laaribi agreed to make an annual UNGGIM Secretariat mailing to UN member countries, solliciting updates of the UN-GGIM/ISPRS Project database in cooperation with ISPRS to make the project effort sustainable.