



# The importance of surveying: looking to the future

Dr Vanessa Lawrence CB  
Co-Chair  
UN-GGIM Committee of Experts



UN-GGIM | United Nations Committee of Experts on  
Global Geospatial Information Management

ggim.un.org



UN-GGIM | United Nations Committee of Experts on  
Global Geospatial Information Management

ggim.un.org

## The Internet in Real-Time

How Quickly Data is Generated

Click here to watch as these internet giants accumulate wealth in real-time.

660 Accounts Created 342000 Tweets	120 Video Hours Uploaded 138840 Video Hours Watched	10920 User Searches	1388880 Minutes Used	1111140 Likes 60000 comments 41640 Uploaded	
347220 +1s	1380 Blog Posts	276480 Searches \$96120 Ad Revenue	60 Posts 780 Comments 12720 votes	27780 Posts	14280 Pins
3060 Items Purchased \$141540 Money Spent	2100 Check-Ins	30 Reviews	204166680 Emails Sent	694440 Files Saved	347220 Stories Viewed 486120 Messages Sent
38040 App Downloads	74160 App Downloads	3131760 Likes 3298560 Posts 360 GB of Data	720 Accounts Created 13194420 Messages Sent	23160 Hours Watched	61140 Hours Streamed

By the way, in the 60 seconds you've been on this page, approximately 1354440 GB of data was transferred over the internet

Source: Business Insider – showing change every five seconds: January 2015

UN-GGIM | United Nations Committee of Experts on Global Geospatial Information Management | ggim.un.org

## ...However this is not a new concept for governments - an extract from February 1998

### ELECTRONIC GOVERNMENT

- How might ICT change Government?
- Deciding the pace of change.

Information and communication technologies (ICT) have revolutionised many businesses and transformed relationships with customers. In the public sector however, effects have been less dramatic, raising the question whether the full benefits of ICT in delivering public services are being realised. The potential of ICT also inspires visions of a more open Government with greater public participation.

**POST has reviewed 'electronic government' and how ICTs might be used to transform the relationships between government and the citizen. This note summarises the full report!**

**BACKGROUND**

We are surrounded by reminders of the growth in the capabilities of information and communication technologies (ICT) - whether in new applications such as the Internet and the imminent digital television (DTV) services, or in the way that commercial enterprises use ICT to reach out to their customers, providing dramatic improvements in service. By analogy, governments have the opportunity to harness ICT to:

- improve the efficiency and effectiveness of the 'executive functions' of government including the delivery of public services;
- enable governments to be more transparent to citizens and businesses giving access to more of the information generated by government;
- facilitate fundamental changes in the relationships

## POST

REPORT SUMMARY

February 1998

This is a summary of a 100-page report available from the PARLIAMENTARY OFFICE OF SCIENCE AND TECHNOLOGY (extranet/9840).

**Box 1: EXAMPLES OF THE USE OF ICT IN GOVERNMENT**

- Nationally mandated adoption of ICTs by government departments to improve access to information, reduce paperwork, and require departments to facilitate electronic access (USA).
- A policy of free dissemination/ access to government information (USA).
- Numerous examples of electronic services and transactions (e.g. applying for licenses, comprehensive government information) in many states (USA).
- One-stop government shops allowing access to all transactions (such as all necessary permits and licenses when starting a business) at one location (Canada).
- IT used for social security fraud detection (Australia).
- Creation of an 'Intelligent Island' (Singapore).
- Smart cards and fingerprints used for access to social security benefits (Spain).
- Experiments in 'local electronic democracy' (USA).

**Box 2: THE GOVERNMENTDIRECT PILOT PROJECTS**

- Public access terminals giving information about Inland Revenue, Customs and Excise duties, and National Insurance contributions.
- An Internet service (Direct Access Government), providing access to government forms and leaflets relevant to businesses.
- Demonstrator of a comprehensive land and property information service for Scotland.
- 'Geodata' project makes available geographical and geological data from 6 different Departments and Agencies.

UN-GGIM | United Nations Committee of Experts on Global Geospatial Information Management | ggim.un.org

FIG Kick Off Event  
24 January 2015 Athens, Greece

2

## Everything happens somewhere



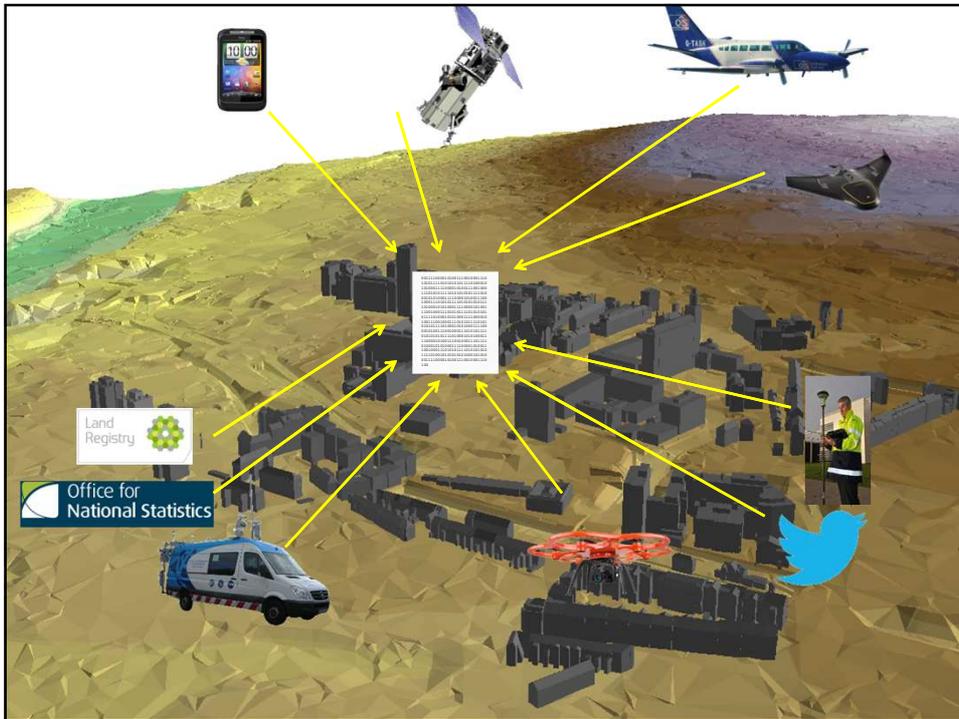
 **UN-GGIM** | United Nations Committee of Experts on  
Global Geospatial Information Management ggim.un.org

## Location Intelligence...



...underpinning our daily lives

 **UN-GGIM** | United Nations Committee of Experts on  
Global Geospatial Information Management ggim.un.org



## **RIO+20** United Nations Conference on Sustainable Development

Accurate location information assisting better decision-making in:

- Water management
- Food management; food supply and sustainable agriculture
- Sustainable energy



**UN-GGIM**

United Nations Committee of Experts on  
Global Geospatial Information Management

[ggim.un.org](http://ggim.un.org)

## Rio+20 conference



UN-GGIM

United Nations Committee of Experts on  
Global Geospatial Information Management

ggim.un.org

## “The Future We Want” – 19 June 2012

187. We recognize the importance of early warning systems as part of effective disaster risk reduction at all levels in order to reduce economic and social damages including the loss of human life, and in this regard encourage States to integrate such systems into their national disaster risk reduction strategies and plans. We encourage donors and the international community to enhance international cooperation in support of disaster risk reduction in developing countries as appropriate through technical assistance, technology transfer as mutually agreed, capacity building and training programmes. We further recognize the importance of comprehensive hazard and risk assessments, and knowledge and information sharing, including reliable geospatial information. We commit to undertake and strengthen in a timely manner risk assessment and disaster risk reduction instruments.

274. We recognize the importance of space-technology-based data, in situ monitoring, and reliable geospatial information for sustainable development policy-making, programming and project operations. In this context, we note the relevance of global mapping and recognize the efforts in developing global environmental observing systems, including by the Eye on Earth network and through the Global Earth Observation System of Systems. We recognize the need to support developing countries in their efforts to collect environmental data.



UN-GGIM

United Nations Committee of Experts on  
Global Geospatial Information Management

ggim.un.org

## The importance of geospatial information

'I am also pleased to see that the importance of reliable, trusted geographic information is now recognised. The United Nations has now established a Committee of Experts of Member States, which the UK co-chairs, to move this agenda forward.'



Rt Hon Nick Clegg MP,  
Deputy Prime Minister,  
United Kingdom Government, Rio+20 June 2012



UN-GGIM

United Nations Committee of Experts on  
Global Geospatial Information Management

ggim.un.org

## The United Nations steps forward: Global Geospatial Information Management

'There is a significant gap in the management of geospatial information globally'

*Paul Cheung, Director, United Nations Statistics Division,  
Cambridge Conference, June 2011*



UN-GGIM

United Nations Committee of Experts on  
Global Geospatial Information Management

ggim.un.org

## UN-GGIM – What is it?

- The United Nations Committee of Experts on Global Geospatial Information Management (UN-GGIM) was established to enhance and coordinate geospatial information management globally
- UN-GGIM provides a formal mechanism under the UN system to discuss and coordinate Geospatial Information Management activities by **involving Member States** at the highest Government level as the key participants

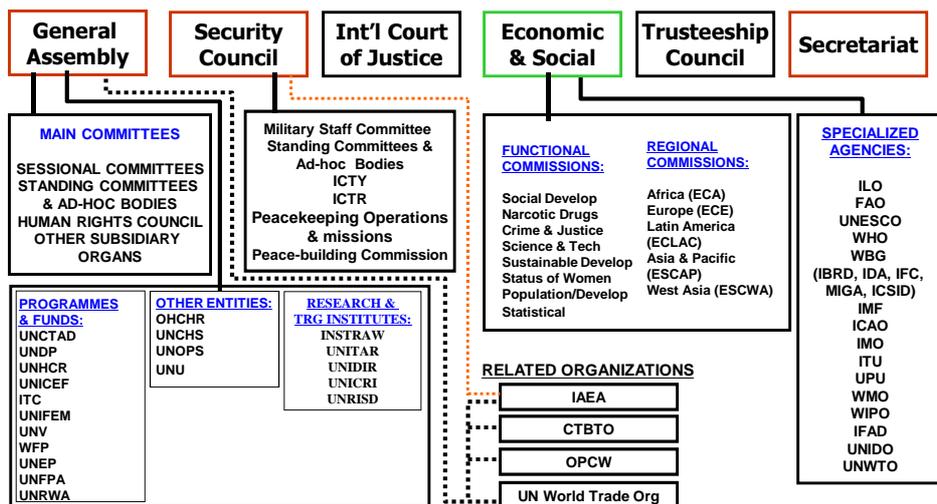


UN-GGIM

United Nations Committee of Experts on  
Global Geospatial Information Management

ggim.un.org

## The United Nations: Principal Organisations



UN-GGIM

United Nations Committee of Experts on  
Global Geospatial Information Management

ggim.un.org

## United Nations Committee of Experts on Global Geospatial Information Management

### Formal inter-governmental UN Committee of Experts to:

- Be the apex organisation in the United Nations involved with geospatial information
- Make joint decisions and set directions on the use of geospatial information within national and global policy frameworks.
- Work with governments to improve policy, institutional arrangements, and legal frameworks.
- Address global issues and contribute collective knowledge as a community with shared interests and concerns.
- Develop effective strategies to build geospatial capacity in transitional and developing countries.



UN-GGIM

United Nations Committee of Experts on  
Global Geospatial Information Management

ggim.un.org

## UN-GGIM: its role

To make accurate, reliable and authoritative geospatial information readily available to support national, regional and global development



UN-GGIM

United Nations Committee of Experts on  
Global Geospatial Information Management

ggim.un.org



## UN-GGIM: Interactions

Other interactions occur with the UN-GGIM via the following:

- The Joint Board of GeoSpatial Societies (JBGIS) has come together to represent one voice to the UN-GGIM from the following Professional Societies:
  - FIG (representing Surveying);
  - ICA (representing Cartography);
  - ISPRS (representing Surveying, Photogrammetry and Remote Sensing);
  - GSDI (representing those interested in Spatial Data Infrastructures),
  - IAG (representing Geodesy);
  - ISCGM (representing those interested in Global Mapping);
  - IEEE-GRSS (representing Geoscientists and Remote Sensing);
  - IGU (representing Geographers, particularly those in academia);
  - IHO (representing Hydrographers);
  - IMTA (representing those involved more broadly in the mapping industry).
  
- The organisation of a UN-GGIM High Level Forum once per year provides the opportunity for informal conferences and involvement by invitation of the private sector, the Non-governmental organisations and volunteer groups



UN-GGIM

United Nations Committee of Experts on  
Global Geospatial Information Management

ggim.un.org

## FIG participation at UN-GGIM

- FIG have participated in all the UN-GGIM Committee of Expert Sessions to date.
- Actively participated in the High Level Forums.
- Member of the UN-GGIM Working Group on Development of a Statement of Shared Principles for the Management of Geospatial Information
- Published the FIG/UN-GGIM-AP Statement on Global Geodetic Reference Frame

For these and the other contributions may I thank you.



UN-GGIM

United Nations Committee of Experts on  
Global Geospatial Information Management

ggim.un.org

## UN-GGIM Committee of Experts

UN-GGIM Asia-Pacific	UN-GGIM Africa	UN-GGIM Arab States	UN-GGIM Americas	UN-GGIM Europe
China Rep. of Korea Japan	Member States to be elected	Member States to be elected	Mexico Chile Mexico	Sweden Netherlands Spain
WG 1 Geodetic Reference Frame for SD	CODIST-Geo	To be determined	Working Groups & Region Vocals	European Commission + Eurostat
WG 2 Data Sharing & Integration for Disaster Mmmt.	AFREF African Reference Frame	UN-GGIM Arab States placed on UN ESCWA Commission Agenda for 2014. First meeting in Jordan convened February 2014. Next Meeting In Saudi Arabia in February 2015	PAIGH Pan Amer. Inst. of Geography and History	Euro Geographics
WG 3 Place-Based Information for Economic Growth	UN ECA: Geoinfo merged with Statistics. 3/2013 CODIST meeting recommended CODIST-Geo become UN-GGIM Africa.		SIRGAS Geocentric Reference System for Americas	European Environment Agency
			GeoSUR Geo. Network for Latin America & Caribbean	WG A: France WGB: Germany



UN-GGIM

United Nations Committee of Experts on  
Global Geospatial Information Management

ggim.un.org

## UN-GGIM: Europe Executive Committee



UN-GGIM

United Nations Committee of Experts on  
Global Geospatial Information Management

ggim.un.org

## UN-GGIM-Asia and the Pacific

“The new committee will renew and strengthen their efforts by aligning the unique needs and interest of Asia and the Pacific with the UN-GGIM initiative.”

“I believe that such efforts will significantly contribute to the furtherance of UN-GGIM and to the benefits of the growing geospatial community.”

Dr Li Pengde, President of UNGGIM-AP and Head of the State Bureau of Survey and Mapping, China



UN-GGIM

United Nations Committee of Experts on  
Global Geospatial Information Management

ggim.un.org

**National strategy of geospatial information**

Digital China + Geospatial Monitoring + Geospatial Information Industry = Leading Country

- 1 Network
  - Geo-referencing
- 2 Maps
  - Topographic
  - Thematic
- 3 Platforms
  - Digital City
  - Geospatial Monitoring
  - Map World
- 4 Bolsters
  - Administration
  - GI Industry
  - Human Resource
  - S&T Innovation

UN-GGIM | United Nations Committee of Experts on Global Geospatial Information Management | ggim.un.org

# SURVEYING UNDERPINNING ECONOMIC GROWTH

UN-GGIM | United Nations Committee of Experts on Global Geospatial Information Management | ggim.un.org

## Geospatial information: its importance to governments



'In Namibia a country in which water is a scarce resource...spatial data is only below water in significance'

Minister Alpheus G. !Naruseb, Minister of Lands and Resettlement, Namibia



'We envisage a dynamic Pacific if we can be assisted in implementing the UN-GGIM Resolutions for geospatial information. We need to put in place a solid framework from local to national then regional level'

Tevita Boseiwaqa, Permanent Secretary for Lands and Mineral Resources, Fiji



UN-GGIM

United Nations Committee of Experts on Global Geospatial Information Management

ggim.un.org

## Land Tenure regularisation in Rwanda

- The UK's Department for International Development (DfID) have been supporting a major Land Tenure Regularisation programme in Rwanda since 2009.
- Rwanda is one of the most densely populated countries in Africa, with pressure on land likely to increase in the coming years. In 2009 only 40,000 land parcels registered
- The project completed registration of 10.6 million land parcels in 2014, helping to reduce conflict and provide the security needed by farmers and businesses to invest in long-term food production.
- Location information is a key part of this process.



Esperance, 39, a mother of four used to be in constant dispute with her neighbours over ownership of the land she lived on. Through a DfID-funded land registration programme, the dispute is now settled and she is a proud landowner.



Source: UK Gov/DfID



UN-GGIM

United Nations Committee of Experts on Global Geospatial Information Management

ggim.un.org

## Land Tenure regularisation in Rwanda

*“Rwanda has created an electronic land registry which is known as the Land Administration Information System (LAIS). The Electronic Land Registry now has been connected to all banks to ease the process of getting loans using the land as collateral. The electronic registry also clearly increased transparency about land ownership and has reduced fraud.”*



HE Ambassador Protais Mitali, Ambassador of Rwanda to Ethiopia and Permanent Representative to the African Union



UN-GGIM

United Nations Committee of Experts on  
Global Geospatial Information Management

ggim.un.org

## Fit-For-Purpose Land Administration

- 75 percent of the world's population do not have access to formal systems to register and safeguard their land rights.
- The approach used for building land administration systems in less developed countries should be flexible and focused on citizens' needs, such as providing security of tenure and control of land use, rather than focusing on top-end technical solutions and high accuracy surveys.
- Foreign investors through large scale land acquisitions have attained more than 30 million hectares of land in largely poor and middle-income countries since 2000.



UN-GGIM

United Nations Committee of Experts on  
Global Geospatial Information Management

ggim.un.org

## Fit-For-Purpose Land Administration



- A joint publication by FIG and the World Bank.
- The report states that A fit-for-purpose approach includes the following elements:
- **Flexible** in the spatial data capture approaches to provide for varying use and occupation.
- **Inclusive** in scope to cover all tenure and all land.
- **Participatory** in approach to data capture and use to ensure community support.

### Fit-For-Purpose Land Administration



JOINT FIG / WORLD BANK PUBLICATION



UN-GGIM

United Nations Committee of Experts on  
Global Geospatial Information Management

ggim.un.org

## Fit-For-Purpose Land Administration

- **Affordable** for the government to establish and operate, and for society to use.
- **Reliable** in terms of information that is authoritative and up-to-date.
- **Attainable** in relation to establishing the system within a short timeframe and within available resources.
- **Upgradeable** with regard to incremental upgrading and improvement over time in response to social and legal needs and emerging economic opportunities



Peri-urban developments, Lagos, Nigeria



Favela developments, Rio de Janeiro, Brazil



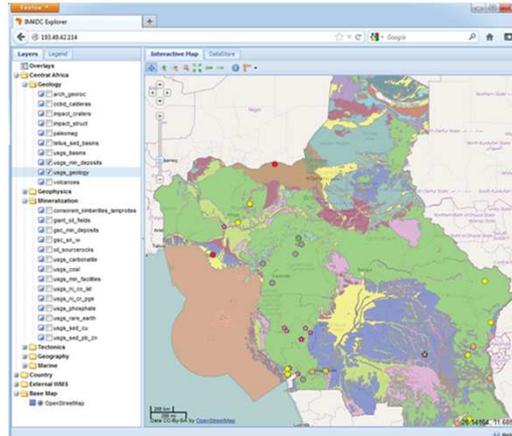
UN-GGIM

United Nations Committee of Experts on  
Global Geospatial Information Management

ggim.un.org

\$\$\$ The Billion Dollar Map \$\$\$  
 “will unlock the true worth of Africa’s mineral endowment”.

- “The potential investment that publicly available geo-data could mobilize for many countries in Africa will far exceed revenue they now receive in development assistance. Under sound, transparent and accountable management, this investment can lead to local job creation, along with revenues to government that translate into programs in health and education, among others, that help reduce poverty and boost shared prosperity.”

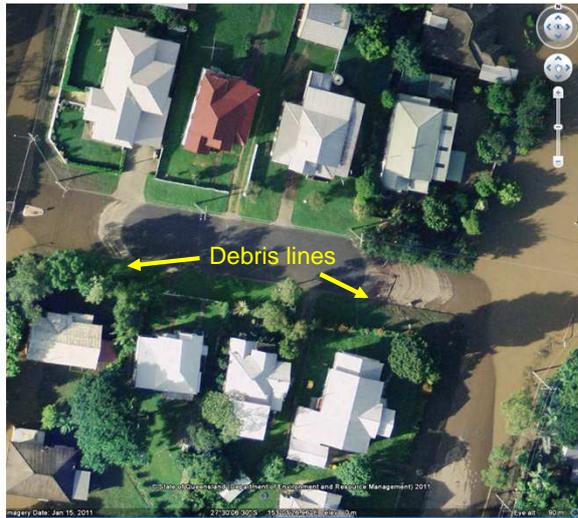


Tom Butler, International Finance Corporation

UN-GGIM

United Nations Committee of Experts on  
 Global Geospatial Information Management

ggim.un.org



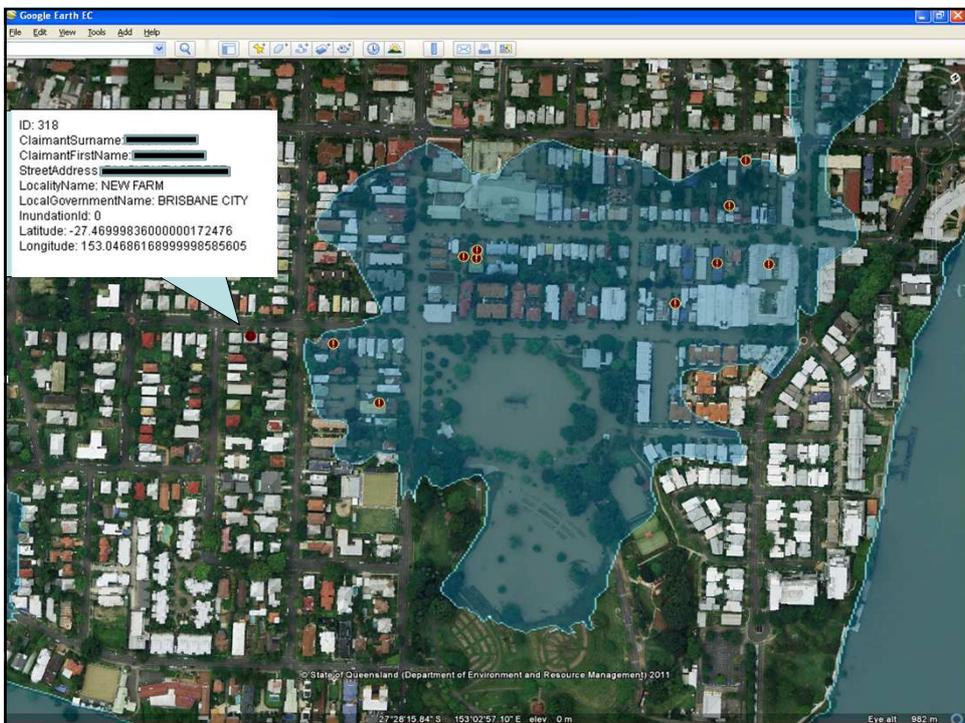
- Flood line mapping
- 2D photo-interpretation
- Aided by Lidar & 0.25m contours
- Important record of actual water line



UN-GGIM

United Nations Committee of Experts on  
 Global Geospatial Information Management

ggim.un.org



## GI and the post-2015 development agenda



“Geospatial information is fundamental to decision making, policy formulation, measuring and monitoring development elements, all critical to the post 2015 sustainable development agenda.”

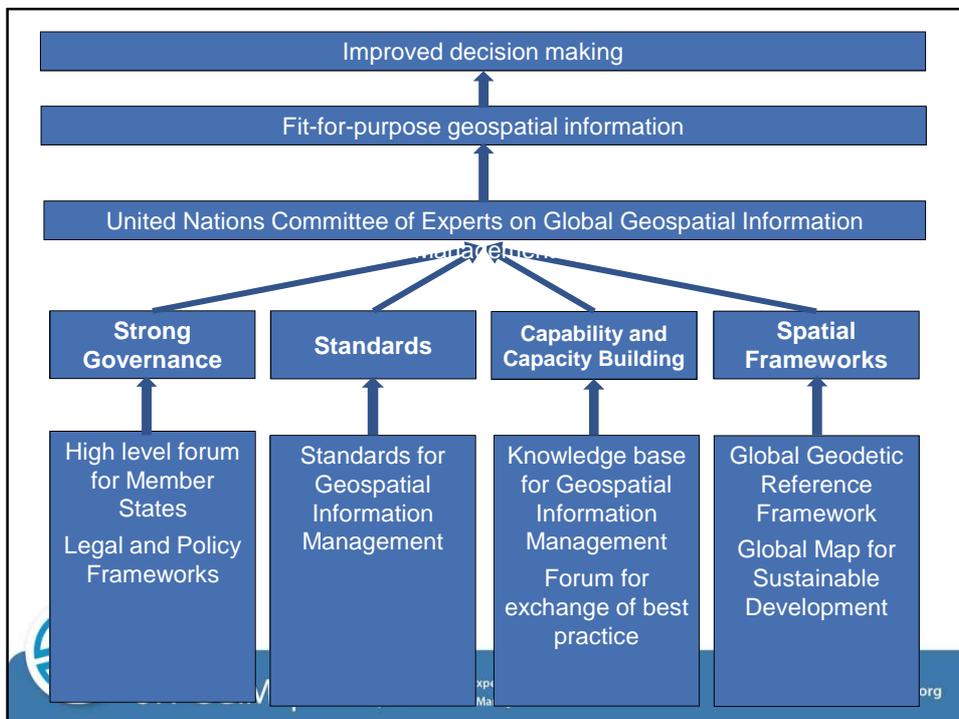
Mr. Wu Hongbo, Under-Secretary-General for Economic and Social Affairs, 2014



UN-GGIM

United Nations Committee of Experts on  
Global Geospatial Information Management

ggim.un.org



## Existing Standards – now working together

UN-GGIM issue	Number of standards		
	ISO	OGC	IHO
(a) Developing a national, regional and global strategic framework for geospatial information	6	5	1
(b) Establishing institutional arrangements and legal and common frameworks	5	2	7
(c) Building capability and capacity, especially in developing countries	5	2	2
(d) Assuring the quality of geospatial information	7	6	8
(e) Promoting data sharing, accessibility and dissemination	63	24	15
(f) Embracing trends in information technology	20	18	3
(g) Promoting geospatial advocacy and awareness	-	4	2
(h) Working in partnership with civil society and the private sector	-	-	-
(i) Linking geospatial information to statistics	7	6	-



UN-GGIM

United Nations Committee of Experts on  
Global Geospatial Information Management

ggim.un.org

## UN-GGIM and International Standards

Two formal reports submitted to UN-GGIM4 and a complementary paper:

- A guide to the role of standards in geospatial information management. Authored by OGC, ISO, and IHO
- Companion document on standards recommendations by tier. Authored by OGC, ISO, and IHO
- National Mapping Authority Perspective: International Geospatial Standards – Authored by Ordnance Survey and INEGI, Mexico



UN-GGIM

United Nations Committee of Experts on  
Global Geospatial Information Management

ggim.un.org

## UN-GGIM and International Standards

“The Guide”  
and  
“The Companion Document”



Available to download from the UN-GGIM website

UN-GGIM

United Nations Committee of Experts on  
Global Geospatial Information Management

[ggim.un.org](http://ggim.un.org)

## THE IMPORTANCE OF GLOBAL GEODETIC REFERENCE FRAME (GGRF) RESOLUTION



UN-GGIM

United Nations Committee of Experts on  
Global Geospatial Information Management

[ggim.un.org](http://ggim.un.org)

## Global Geodetic Reference Frame

- Geodesy is the science of measuring and monitoring the size and shape of the Earth and the location of points on its surface and its use makes global positioning possible
- Global geodesy is dependent on contributions from nations around the globe.
- No single country can maintain the global geodetic reference frame alone.
- We expect to change from the current system where contributions to the development of the global geodetic reference frame are undertaken on a “best efforts” basis to one where they are made through ‘a multilateral collaboration under a UN mandate.’



UN-GGIM

United Nations Committee of Experts on  
Global Geospatial Information Management

ggim.un.org

## The Global Geodetic Reference Frame



Global Geodetic Reference System



Regional Reference System



Local application



National Reference System

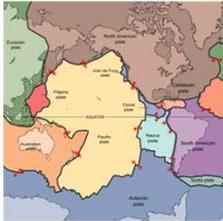


UN-GGIM

United Nations Committee of Experts on  
Global Geospatial Information Management

ggim.un.org

## GGRF Applications










**UN-GGIM** | United Nations Committee of Experts on  
Global Geospatial Information Management

ggim.un.org






## Invitation to briefing on Geospatial Information Technologies

**Tuesday, 6 May 2014**

The Permanent Missions of Australia, France, Jamaica and Norway invite you to attend a briefing on the importance of Geospatial Information Technologies.



### THE GLOBAL GEODETIC REFERENCE FRAME

The United Nations Committee of Experts on Global Geospatial Information Management (UN-GGIM), established in 2011 by the Economic and Social Council (ECOSOC), recognizes the growing demand for more precise positioning services, the economic importance of the global geodetic reference frame, and the need to improve global cooperation within geodesy.

**Geodesy provides a coordinate reference frame for the whole planet, fundamental for:**

- *Monitoring changes to the Earth including the continents, ice caps, oceans and the atmosphere*
- *Mapping, navigation and universal timing*

This coordinate system allows us to know where people and features are on the Earth. "Location" is a vital component for effective decision making.





PHOTO: BERNI LINDI / HOLMBERG      PHOTO: ANNE BRUNSDEN      PHOTO: MORTEN BREAN

**IMPORTANT APPLICATIONS ARE:**

**Natural hazard and disaster management**

Decision makers need an accurate and stable global geodetic reference frame to make good decisions for the future and to identify areas under threat of flooding, earthquakes or drought and to adopt preventive measurements to protect them. Geodesy provides the location basis for such decisions.

**Climate change and sea level monitoring**

Climate change is a global challenge that puts stronger requirements on the precision of the global geodetic reference frame. Geodesy provides information about sea level changes, plate movements, land uplift, and ice sheet and glacier changes. Global society requires information about current trends at a scale measured in millimeters to detect changes of the Earth system with sufficient accuracy, for local, regional and global planning.

To be able to monitor and estimate future sea level variations, significant improvements in both geodetic infrastructure and data analysis are needed.

**Geospatial information, mapping and navigation**

"Location-based" services are becoming increasingly important in modern society. The global geodetic reference frame supports satellite positioning technology and is a critical enabler of geospatial information interoperability and applications such as land titling and ownership, engineering construction, precision agriculture, intelligent transport and navigation.



**UN-GGIM** | United Nations Initiative on  
Global Geospatial Information Management

ggim.un.org

FIG Kick Off Event  
24 January 2015 Athens, Greece

22

## UN resolution: Global Geodetic Reference Frame

- UN-GGIM endorsed the draft Resolution and requested that the UN-GGIM Secretariat refers the Resolution to ECOSOC for its endorsement and further referral to UN General Assembly.



THE EARTH TIDE



THE EARTH ROTATION



PLATE TECTONICS



GLOBAL MASS TRANSPORT



UN-GGIM

United Nations Committee of Experts on  
Global Geospatial Information Management

ggim.un.org

## Economic Growth: Kenya

### Establishment of a modern geodetic reference frame

- |                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                            |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> <li>• Networks that do not meet accuracy standards for geodetic control surveys and scientific research</li> <li>• Inconsistent and Different co-ordinate systems necessitating regular co-ordinate conversion when undertaking project.</li> <li>• Inadequate height data</li> <li>• Destroyed pillars</li> </ul> | <ul style="list-style-type: none"> <li>• Expected realization of a faster and easier access to geo-spatial information for socio-economic development</li> <li>• Data from the stations to be made available to both Government institutions and Private Sector</li> </ul> |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

Existing Pillar



Reconstructed Pillar



UN-GGIM

United Nations Committee of Experts on  
Global Geospatial Information Management

ggim.un.org

