Importance of Open Geospatial Science

Suchith Anand

http://www.geoforall.org
What is the economic impact of GEO SERVICES

Geo services are:

- Satellite communications
- Surveying, mapping and manufacturing
- Location-based services
- Video games industry
- Geo services $150-270 billion
- Airline industry $994 billion
- Geo services global added value is around $103 billion per year

Geo services save:

1.1 billion hours
0.5-2.8 billion
3.5bn

Geo services facilitate competition, leading to savings from reduced prices among infrequently bought goods and services of up to:

$8-$22 billion

Geo services can improve agricultural irrigation, helping to achieve global cost savings per year of:

$8-$22 billion

Students educated using Geo services can expect 3% higher average wages five years after graduation than those who weren't

Source: Oxera (2013), 'What is the economic impact of Geo?'. January.
Why?

Very few universities/educational institutions in developing/poor countries currently are able to teach Geospatial Science courses

- High cost of software
- Lack of skilled staff
- Lack of freely available training materials
Mission

Making Geospatial education accessible to all

“Geo for All”
Memorandum of Understanding
between the
Open Source Geospatial Foundation and International Cartographic Association
September 2011

The purpose of this Memorandum of Understanding (MOU) is to establish a collaborative relationship between the Open Source Geospatial Foundation (OSGeo) and the International Cartographic Association (ICA). Both parties to this MOU share the goal of developing on a global basis collaboration opportunities for academia, industry and government organizations in open source GIS software and data.

The MOU will cover the following proposals and topics:

- To provide expertise and support for the establishment of Open Source Geospatial Laboratories and Research Centers across the world for supporting development of open-source geospatial software technologies, training and expertise. In the first phase five laboratories will be established, one each in Asia, Europe, Africa, the Americas and Australasia which will act as nodes for future expansion.

- To provide support for building-up and supporting development of open source GIS training materials. For example through the ELOGeo- eLearning platform for the Open Geospatial Community.

- Development of collaboration opportunities for academia, industry and government organizations in open source GIS for the purpose of creating a sustainable ecosystem for open source GIS globally.

- Joint organization of open source GIS events, workshops through the ICA network for wider participation globally.

- ICA Commission on Open Source Geospatial Technologies to help OSGeo to establish framework for publications for the academic track of FOSS4G conferences.

This MOU will be reviewed annually by both parties at which time revisions may be made and the agreement renewed.

Prof. Georg Gartner (ICA President) and Arnulf Christl (OSGeo President) shake hands after signing the MoU at Intergeo 2011 in Germany (Sep 2011)
ICA is the world authoritative body for cartography and Geographic Information Science

ICA Research Agenda

The ICA research agenda is a basic document for the research work in the Commissions and Working Groups of the ICA. The current version can be downloaded below or explored on the this website. As the research agenda is not set in stone you are encouraged to leave comments on the following pages!

ICA Research Agenda (529kB)

Viranteus, Kiri; Fairbairn, David; Kraak, Menno-Jan. In: The Cartographic Journal, Volume 46, Number 2, May 2009, pp. 63-75(13), Publisher: Maney Publishing

BACKGROUND TO THE ICA RESEARCH AGENDA

Maps and geographic information (GI) have special power through their ability to connect and integrate data sets by the inherent geographical location, and present the information contents in a user-friendly and understandable visual and textual way. Such ability has long been recognized as an intrinsic property of the map artefact, as well as contemporary geodatabases. The power of maps and geographic data handling has been recently recognized in many real world applications and strategic decision making situations related to current topics like crisis management, early warning systems, efforts for supporting sustainability and decreasing...
Open Source Geospatial Foundation (OSGeo)

Upcoming events

- **2014-03-19** FOSSGIS 2014, Berlin, Germany
- **2014-03-24** OSGeo Code Sprint, Vienna, Austria
- **2014-03-26** 8as Tornadas de SIG Libra (Spanish FOSS4G), Girona, Spain
- **2014-05-07** 6th Latin American and Caribbean gvSIG Conference, Sao Paulo, Brazil

Stay Informed, Get Involved

- Stay informed by subscribing to our announcements e-mail list.
- Get involved by subscribing to our discussion e-mail list.
- Start contributing by following the instructions on the Getting Started page.
Open Source Geospatial Foundation (OSGeo) established in Feb 2006

OSGeo is the leader of Open Source Geospatial and high impact community

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OS Geo Product development statistics 2008
Why - Social Responsibility

Making resources including software and data openly available offers an opportunity for knowledge to be shared widely so as to increase learning opportunities.

Example – Collaborating with educational initiatives like gvSIG Batoví

For details contact: Sergio Acosta y Lara sacosta@dntopografia.gub.uy Alvaro Anguix aanguix@gvsig.com
gvSIG Batoví: an educational resource for Plan Ceibal

For details contact:
Sergio Acosta y Lara
sacosta@dntopografia.gub.uy
Alvaro Anguix
aanguix@gvsig.com

https://gvsig.org/web/home/projects/gvsig-educa
Aims of ICA-OSGeo Labs Initiative

- Establishing research and training opportunities in open source GIS
- Build teaching and research infrastructure worldwide
- Provide worldwide learning platform
“Geo for All” Education Initiative

ICA-OSGeo MoU in Sep 2011

Over 75 labs established worldwide as of today

North America – 13 labs
Europe – 31 labs
South America – 9 labs
Africa – 4 labs
Asia – 15 labs
Australia - 1 lab

Distribution ICA-OSGeo labs established in Europe
Image : OSGeoREL @NCSU (6 months back)

Will be establishing over 100 labs in universities worldwide by Sep 2014
Why having a framework for Open Geospatial Science important for the future?

Strategic level
Research
Teaching
Attracting research funding
/sustainability
Social Responsibility
Big Picture - Open GIS is key for innovation in GIS Research

Ability for showing the operation of general laws is fundamental for scientific research

Geospatial Standards (for ex. OGC spec.)

Open Data

data.gov.uk

Opening up government

Maturity of open source software (for ex. OSGeo stack)

OpenStreetMap

The Free Web World Map

Search

Where am I?

examples: "Akreer", "Regent Street, Cambridge", "C22 3AO", or "post offices near Lumen" more examples...

OpenStreetMap is a free worldwide map, created by people like you.
The data is free to download and use under its open license. Create a user account to improve the map.
Government level initiatives - Key for interoperability and lower costs
Open Data – key for innovation and transparency
Research importance - Increasing software quality

NASA Open Source Software

NASA conducts research and development in software and software technology as an essential response to the needs of NASA missions. Under the NASA Software Release policy, NASA has several options for the release of NASA developed software technologies. These options now include Open Source software release. This option is under the NASA Open Source Agreement "NOSA".

The motivations for NASA to distribute software codes Open Source are:

- To increase NASA software quality via community peer review
Increasing innovation

Internet backbone is powered by OSS

Since April 1996 Apache has been the most popular HTTP server software in use. As of May 2011 Apache was estimated to serve 63% of all websites and 66% of the million busiest


Reuse big enabler for Research and Teaching

The Projects

GeoNetwork Opensource

GeoTools

GDAL

GEOS

MetaCRS

OSSIM

SIG

MAPSERVER

degree

GeoServer

geomajas

Mapbender

Mapfish

MapGuide Open Source

OpenLayers

PROJ.4
Proj4js
CS_Map
GeoTiff/libgeotiff
SpatialReference.org
Proj4J

Open Source Opportunities in GIS – Summer School. Girona 2011
Reuse big enabler for Research and Teaching

Today's Toolkit

Monolithic Black Box

Open Source Opportunities in GIS – Summer School. Girona 2011
Aim 1

Establishing open source GIS research and training opportunities
30/07/2010

- **The materials & results are available.** All documents have been published on this website ([Materials Tab](#)).

21/07/2010

- **The Summer School in pictures.** The image gallery is already available on Flickr.

- **Project materials & results.** All materials and results of the Summer School will be published on this website soon.

- **Materials & Illustrations from the Ecole Central de Nantes.** The documents presented at Girona are available on OrbisGIS’ website.
Strategic Training Programs

Hands-on workshop: Open Source GIS and WebMapping for UN staff 20 and 21 November 2012

Time and Duration
Venue City: Vienna

Basic Information
Date: 20/11/2012 - 21/11/2012
Venue: Institute of Geocartography, Vienna University of Technology, Austria
Venue Country: Austria
Event Organisers:
The Commission on Open Source Geospatial Technologies of the International Cartographic Association (ICA)
Co-organisers:
Vienna University of Technology, Institute of Geoinformation and Cartography.
The International Symposium on Service-Oriented Mapping (SOMAP 2012)

More Information Link:
http://kanor.kc.se/kom/novb/SOMAP-OSGEO-workshop/
Language of event: English

From 20 to 21 November 2012, the Commission on Open Source Geospatial Technologies of the International Cartographic Association (ICA) will be hosting a hands-on workshop on "Open Source, Open Standards, Open Data for Geospatial".

This event follows the Memorandum of Understanding (MoU) which the ICA signed in 2011, jointly with the Open Source Geospatial Foundation (OSGeo), with a view to develop global collaboration opportunities in the field of open source GIS software and data for academia, industry and government organizations. This hands-on workshop will allow the participants to learn more about Open Source tools for GIS and mapping on the Web.
Aim 2 – Scale up research and teaching

Open Geospatial Labs are being established worldwide to scale up research and teaching in this theme globally (ICA-OSGeo MoU)

University of Pretoria, South Africa
Build teaching and research infrastructure worldwide

Open Source Geospatial Lab founding meeting at UoN

June 2010
University of Southampton OSGL

- "applied" research and Spatial Data Infrastructure
  - delivery of real world Open Source geospatial and data management applications for research infrastructure, government and industry, e.g.:
    - Channel Coastal Observatory
    - MEDIN UK Marine metadata portal

- development and dissemination of software:
  - Web – OpenLayers, Leaflet, OSM, PostGIS, MapServer…
  - Quantum (custom plugins)

- delivery of specialist CPD and GIS training
  - Quantum, etc.

www.osgl.soton.ac.uk  osgl@geodata.soton.ac.uk
Research topics & collaborators

Current projects

- Disaster recovery monitoring
- Crowd-sourcing data quality assessment
- Unmanned Aerial Vehicle intercropping mapping system
- Remote sensing data fusion
- Remote sensing monitoring of large-scale construction projects

Contact:
Dr. Tuong-Thuy Vu
School of Geography
University of Nottingham,
Malaysia campus
tuongthuy.vu at nottingham.edu.my
Launch in October 2012

ICA-OSGeo Lab at the University of Pretoria
First in Africa
Jeff McKenna (OSGeo President) visited us for the launch

Back: Jeff McKenna (OSGeo President), Gavin Fleming (OSGeo South Africa)
Front: Prof Elri Liebenberg (Former ICA vice-resident), Dr Serena Coetzee, Prof Hannes Rautenbach
Centre for Geoinformation Science

Research focus groups

Forensic geography
Dr Peter Schmitz

GISc Education and Training
Sanet Eksteen

Open source and data for geospatial / ICA-GIS Geo Lab
Dr Serena Coetzee

Space geodesy, earth and atmospheric observation
Dr Joel Botai

Spatial data infrastructures
Dr Serena Coetzee
Education and training

**Undergraduate**

BSc Geoinformatics

Students from Geology, Zoology, Geography, Spatial planning, Computer Science, …

*Practicals and assignments in PostGIS, QGIS, SAGA, …*

**Postgraduate**

BSc (Hons) Geoinformatics, BSc (Hons) Computer Science

*Spatial databases: practicals and assignments in PostGIS*

*Internet GIS: practicals and assignments in OpenLayers, GeoServer…*
Education and training

Continued Education at UP (CE at UP)

Short courses, CPD points for registered professionals

*Introduction to Quantum GIS*

*Spatial databases with PostGIS*

*The Basics of GIS with QGIS*

NFP Alumni Course in Namibia, Windhoek, Oct/Nov 2013

With ITC and Polytechnic of Namibia

*The use of social media, crowdsourcing and webmapping to enable spatial web presence for the private sector in Southern Africa*
The Geomatics Lab of Politecnico di Milano has been active in Como Campus since '95 and is now composed of two full professors, three assistant professors, one technician, 13 PhD and PostDoc Students, many Master Students ...

Laboratorio di Geomatica
Open Geospatial Labs are being established worldwide to scale up research and teaching in this theme globally (ICA-OSGeo MoU)

North Carolina State University, USA

Open Source Geospatial Research and Education Laboratory

The OSGeo Research and Education Laboratory (OSGeoREL) is located at the North Carolina State University Center for Earth Observation in Raleigh, NC. Our mission, as one of the founding laboratories in the OSGeo worldwide network, is to develop collaboration opportunities for academic, industrial, and government organizations in open source GIS software and data.

OSGeo/ICA Memorandum of Understanding

The Open Source Geospatial Foundation (OSGeo) and the International Cartographic Association (ICA) have signed a Memorandum of Understanding for developing global open source GIS software and data collaborations for academic, industrial, and government organizations. The MoU aims to provide expertise and support for the establishment of Open Source Geospatial Laboratories and Research Centres across the world for development of open-source geospatial software technologies and training. Laboratories are being established in Asia, Europe, Africa, the Americas and Australasia which will act as nodes for future expansion of the worldwide network.

Publications

Publications on development and applications of Open Source GIS.

Courses offered through our GIST program

- GIS/MEA582 Geospatial Analysis and Modelling
- GIS/MEA732 Advanced Geospatial Modelling
- GIS 550 Geospatial Data Structures and Web Services

Collaboration with OSGeo projects and Research groups

- QGRASS GIS
- NCSU-Korean Natural Hazards Mapping Program

Related NCSU Initiatives
Free webinars

Open Geospatial Science & Applications

March 6th, 2014
Australian Urban Research Infrastructure Network

The ICA-OSGeo Lab Network and MundoGEO are now pleased to present the "Open Geospatial Science & Applications" webinar series. The webinar will be open and free to all on first come register basis.

February 13th, 2014
NASA World Wind Virtual Globe Technology

The ICA-OSGeo Lab Network and MundoGEO are now pleased to inform the fourth webinar of the "Open Geospatial Science & Applications" webinar series on February 13th. The webinars will be open and free to all on first come register basis.

December 10th, 2013
Free and Open Source Software for Geospatial Applications: A mature alternative in the geospatial technologies arena

This webinar will be on "Free and Open Source Software for Geospatial Applications (FOSS4G): A mature alternative in the geospatial technologies arena" by Rafael Moreno-Sanchez (University of Colorado - Denver) and Maria Antonia Brovelli (Politecnico di Milano - Campus Como). Register

November 7th, 2013
Opengeoscience: meeting the UK’s geospatial data requirements in geosciences
Solutions For A Sustainable World!

Submit your proposal before 2014 May 31!

Why the Europa Challenge?
The Europa Challenge provides the opportunity for Europe's "best and brightest" to deliver sustainable solutions to the European community. And do this in ways that serve local, regional, national or international interests, while also advancing the career opportunities for those who accept the challenge.

This is an international challenge open to all on our home planet. See the 2013 Winners. China had one of the top teams last year.

The top three teams will take home the crystal Europa Challenge bull! And a few hundred Euros!

Example of an excellent Initiative led by Prof. Maria Brovelli and colleagues

http://eurochallenge.como.polimi.it
2013 Winners

Air-Quality Data 3D Visualization
www.cirgeo.unipd.it/nasaww
Show a bird’s-eye 3D view of air-quality data (PM10) acquired at time intervals from multiple sensors to reveal air-quality dynamics over space and time.
Sensors are connected with a Triangular Irregular Network (TIN) to cover the area of interest. Data is represented geometrically and colorized to easily recognize high-to-low values. Areas affected by a potential risk for health are quickly discernible. Users can adjust data-acquisition times for dynamic updating.

Environmental Monitoring With GeoJModelBuilder
www.sourceforge.net/projects/geopw
GeoJModelBuilder couples geo-processing Web services and Sensor Web services to support geo-processing modeling and environmental monitoring. The main goal of GeoJModelBuilder is to bring an easy-to-use tool to the geo-scientific community.
The tool allows a user to drag and drop various geospatial services to visually generate workflows and then to interact with those workflows in a virtual globe environment. It also allows users to audit trails of workflow executions, check the provenance of data products and support scientific reproducibility.

Urban Traffic Visual Analytics Simulator
www.interativesystem.collaborate.org
The goal is to develop a highly interactive visual analytics system that helps urban planners, decision makers and traffic analysts simulate the urban scenario related to the urban viability. Users interact directly via the 3D context. This ensures intuitive understanding and easy adjustment to any simulated scenario.
The user interacts with the 3D environment through graphical metaphors that considerably reduce the time needed to set the
Aim 3 - Providing Global learning platform and training opportunities
Geospatial IG

The Research Data Alliance is supported by the European Commission, the U.S. Government and the Australian Government.
Geospatial IG

The Geospatial Interest Group is a domain oriented interest group to coordinate and build synergies on topics related to geospatial data. Though there has been lot of developments and advances in geo data collection through mobile communications, sensor platforms, spatial search, and pervasive computing but still, the inter-disciplinary research needed to transform raw data into useful intelligence, to improve the planet’s environmental, economic and societal well being, remains constrained by a range of barriers - disciplinary, organisational, historical, and a non-existent or non-rigorous approach to quantifying uncertainty in collected datasets.

**Status:** Pending action

**Chair(s):** Suchith Anand, Peter Baumann, Luciene Delazari, Andrea Perego (tbc)

**Group Email:** rda-geospatial-ig@rda-groups.org

**Case Statement:**

### Recent Activity

Filter the group's recent activity based on content type or author

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**Web Conference Details**

- [Webconference Geospatial IG](#)
Open Science 2014 sessions planned at OSGIS 2014. We look forward to welcoming you to Nottingham.

Open Source GIS Conference
BUILDING UP OPEN SOURCE, OPEN STANDARDS, OPEN DATA RESEARCH

CfP-Fifth Open Source GIS Conference - OSGIS 2014
Nottingham Geospatial Institute

2nd - 3rd September, 2014 - The University of Nottingham

Conference Aims
- To hear presentations from government, academic, industry and policy makers on open source, open standards and open data geospatial technologies
- To provide platform to network and develop ideas for future collaborative work in open source GIS
- To understand current developments in open source GIS
- To act as a focus for open source, open standards, open data research

Important Dates
- 22 April 2014 - Abstract submission deadline
- 19 May 2014 - Authors notified
- 25 August 2014 - Registration closes
- 2-3 Sep 2012 - OSGIS 2014
Building an open source, open standards, open data research framework through OpenGIS

Key advantages

• Scalable
• Interoperability
• Low costs
• No proprietary lockin
• Benefits wider community

Represents the individual content creator on the World Wide Web
Building Open Geospatial Science - “Geo for All”

http://www.geoforall.org
Acknowledgements

To all colleagues in the “Geo for All” initiative