European GI: Key Strengths & Weaknesses - Evolution & Trends

Berlin
9 October 2014

Claudio Mingrino
VP, Exec Director EMEA
Hexagon Geospatial
1. Proliferation of point cloud elevation data. $5M USGS LiDAR Collection and Management program.

2. Emergence of low-cost, high-fidelity micro-satellites (Planet Labs, SkyBox Imaging, Urthcast) orbiting the earth with a high frequency return rate to monitor change.

3. Increased emphasis on 3D for Analytics – not just visualization.

4. Adoption of UAS for local mapping initiatives in Mining, Agriculture, Forestry, Engineering Works.


6. Fusion of airborne + terrestrial data for asset inventory/management.

7. Wider adoption of integrated Business Intelligence (BI) and Geospatial technology.
Market Trends - Business

1. Satellite data providers selling information subscriptions

2. Google and Microsoft now selling geospatial data and platforms with simple GIS functionality.

3. Shift away from perpetual licenses and towards monthly subscription pricing.

4. Open data initiatives by Western Governments and/or INSPIRE initiative in the EU.

5. Cost of cloud storage and computing decreasing.

6. Emerging markets leapfrogging desktop solutions and expanding directly with web and mobile solutions.

7. Ongoing privacy/security concerns with cloud based solution deployments
>1 billion tablet in use in 2017 (40% in EMEA)
UAVs everywhere!
Quick Reaction Remote Sensing is already operative in Italian Civil Protection
2 Billions of CONNECTED SENSORS in 2020
...that will generate 2.5 EXABYTES

or \( \frac{,500,000,000,000,000,000,000,002}{0} \) bytes

every day
Neogeography and VGI (Volunteered Geographic Information)

- WikiMapia
- OpenStreetMap
- Neogeography
- Public Participation GIS
- Geo-social networking
- Geoblog
- Participatory GIS
- Participatory 3D Modelling (P3DM)
Open Government/Open Data

Linked Open Data Cloud
Economic value of geospatial data could reach $700 billion/year by 2020 (McKinsey Global Institute)
It is about what I call “the steroids.” I call certain new technologies the steroids because they are amplifying and turbocharging all the other flatteners. They are taking all the forms of collaboration highlighted in this section—outsourcing, offshoring, open-sourcing, supply-chaining, insourcing, and in-forming—and making it possible to do each and every one of them in a way that is “digital, mobile, virtual, and personal,” as former HP CEO Carly Fiorina put it in her speeches, thereby enhancing each one and making the world flatter by the day.

By “digital,” Fiorina means that thanks to the PC-Windows-Netscape-work-flow revolutions, all analog content and processes—everything from photography to entertainment to communication to word processing to architectural design to the management of my home lawn sprinkler system—are being digitized and therefore can be shaped, manipulated, and transmitted over computers, the Internet, satellites, or fiber-optic cable. By “virtual,” she means that the process of shaping, manipulating, and transmitting this digitized content can be done at very high speeds, with total ease, so that you never have to think about it—thanks to all the underlying digital pipes, protocols, and standards that have now been installed. By “mobile,” she means that thanks to wireless technology, all this can be done from anywhere, with anyone, through any device, and can be taken anywhere. And by “personal,” she means that it can be done by you, just for you, on your own device.
VNI Forecast

Cisco Visual Networking Index

Global Mobile Data Traffic, 2013 to 2018
VNI Forecast

Cisco Visual Networking Index

Global Growth of Smart Mobile Devices and Connections

![Bar chart showing growth of billions of devices from 2013 to 2018 with a CAGR of 8% from 2013 to 2018. The chart indicates that the percentage of non-smart devices and smart devices and connections changes each year, with a focus on smart devices and connections increasing over time.](chart.png)

Percentages refer to device or connections share.
Source: Cisco VNI Mobile, 2014
VNI Forecast

Cisco Visual Networking Index

Regional Share of Smart Devices and Connections (Percent of the Regional Total)

<table>
<thead>
<tr>
<th>Region</th>
<th>2013</th>
<th>2018</th>
</tr>
</thead>
<tbody>
<tr>
<td>North America</td>
<td>65%</td>
<td>93%</td>
</tr>
<tr>
<td>Western Europe</td>
<td>45%</td>
<td>83%</td>
</tr>
<tr>
<td>Central and Eastern Europe</td>
<td>15%</td>
<td>61%</td>
</tr>
<tr>
<td>Latin America</td>
<td>14%</td>
<td>55%</td>
</tr>
<tr>
<td>Asia Pacific</td>
<td>17%</td>
<td>47%</td>
</tr>
<tr>
<td>Middle East and Africa</td>
<td>10%</td>
<td>36%</td>
</tr>
</tbody>
</table>

Source: Cisco VNI Mobile, 2014
83% of IT Managers in EMEA has declared that MORE THAN A HALF of their IT transactions will be managed in “cloud computing” in 2020.
75% of the TOTAL IT spending is devoted to MAINTENANCE & UPGRADE (Western Europe)
The Main Opportunity: Horizon 2020

What is Horizon 2020?

- €79 billion (> $100 billion) research and innovation funding program (2014-2020);
- A core part of Europe economic policy initiatives:
  - Responding to the need to invest in future jobs and growth
  - Addressing people’s concerns about their livelihoods, safety and environment
The Main Opportunity: Horizon 2020

**Horizon 2020**

A single program in several parts:

- **Coupling research to innovation** – from research to retail, all forms of innovation
- **Focus on societal challenges** facing EU society, e.g. health, clean energy and transport
- **Simplified access**, for all companies, universities, institutes in all EU countries and beyond
- **2-year Work Programs**, identifying the research areas to be funded.
- **Calls for proposals**: proposals peer-reviewed.
The Main Opportunity: Horizon 2020

Horizon 2020 Budget (2013 prices)

- **Industrial Leadership**: €17.0 billion
- **Excellent Science**: €24.4 billion
- **Societal Challenges**: €29.7 billion
- **European Institute of Innovation and Technology**: €2.7 billion
- **Euratom (2014-2018)**: €1.6 billion
- **Other**: €3.2 billion
The perception of cost and benefits of INSPIRE

INSPIRE (2007/2/EC)

Diagram showing costs and benefits at EU, national, and local levels.
From «Pyramid-shaped» model to "Spider Web"
The changing sources of spatial data (Harris & Lafone)
# SDI VS Mobile?

<table>
<thead>
<tr>
<th>Features</th>
<th>INSPIRE</th>
<th>Existing mobile map apps</th>
</tr>
</thead>
<tbody>
<tr>
<td>Formats, protocols</td>
<td>Based on heavy formats (SOAP, GML, WFS, WCS, CSW, ...)</td>
<td>Lite formats (JSON, KML, GeoSMS)</td>
</tr>
<tr>
<td>Standardization</td>
<td>Standardized services (OGC, ISO)</td>
<td>Proprietary services (Google, Apple)</td>
</tr>
<tr>
<td>Projections</td>
<td>European (LAEA, LCC, ...)</td>
<td>Universal (Spherical Mercator)</td>
</tr>
<tr>
<td>Users</td>
<td>For &quot;experts&quot; – government, EU comission</td>
<td>For &quot;ordinary people&quot;</td>
</tr>
<tr>
<td>Application area</td>
<td>Environment, administrative</td>
<td>Navigation, entertainment</td>
</tr>
<tr>
<td>Difficulty</td>
<td>Difficult to use</td>
<td>Easy to use</td>
</tr>
<tr>
<td>Open system</td>
<td>Open possibilities of view different maps</td>
<td>Bind with proprietary (licensed) maps</td>
</tr>
<tr>
<td>Typical app</td>
<td>Map portal</td>
<td>Single purpose map app (e.g. navigation)</td>
</tr>
<tr>
<td>Network traffic</td>
<td>heavy</td>
<td>Optimized for slow networks</td>
</tr>
<tr>
<td>On-line / off-line</td>
<td>On-line</td>
<td>Mixed, e.g. caching tiles on device</td>
</tr>
<tr>
<td>Unsaid purpose</td>
<td>European real estate market</td>
<td>Big brother ? / advertising</td>
</tr>
</tbody>
</table>
A Weakness: the complexity of the formalism of data models
EULF European Union Location Framework

delivering growth and better services through “location-enabled government”
EULF Context

“The European Union Location Framework (EULF) is Action 2.13 of the Interoperability Solutions for Public Administrations (ISA) Programme”.

Interoperability Solutions for European public Administrations

ISA a key enabler for Public Administrations to join forces, bring down e-barriers and overcome financial constraints
EULF European Union Location Framework

Building and extending INSPIRE for other sectors...

“location-enabled government”

Environmental Sector + Transport Sector = Marine Sector + Other Sector....
### EULF European Union Location Framework

<table>
<thead>
<tr>
<th>Relevance of location information</th>
<th>Change involving location information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low</td>
<td>Low</td>
</tr>
<tr>
<td>Med</td>
<td>Med</td>
</tr>
<tr>
<td>High</td>
<td>High</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Priority 1</th>
<th>Priority 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low</td>
<td>Med</td>
</tr>
<tr>
<td>Med</td>
<td>High</td>
</tr>
</tbody>
</table>

#### Priorities:
- 1
- 2

### Key Areas:
- **Priority 1 (Low Change):**
  - Coal industry promotion
  - European citizenship
  - Free movement of persons
  - Freedom to provide services
  - Origin of goods
  - People's Europe
  - Plant health
  - Police cooperation
  - Free movement of goods
  - Foodstuffs
  - Intellectual property law
  - Market access / monitoring
  - Mediterranean countries
  - Public works contracts
  - Refugees / displaced persons
  - Taxation
  - Textiles
- **Priority 2 (High Change):**
  - Foreign and security policy
  - External relations
  - Environmental cooperation
  - Transport cooperation
  - Regional policy
  - Science, information, education and culture
  - Agriculture
  - Energy
  - Environment, consumers and health
  - Fisheries
  - Transport
  - Animal protection
  - Freedom, security and justice
  - Shipping
  - Statistics
  - Industrial policy and internal market
  - Competition policy
  - Customs tariffs
  - Development policy
  - Economic and monetary policy
  - European countries
  - Financial and institutional matters
  - Social policy
EULF European Union Location Framework

EULF Vision

"More effective e-services, savings in time and money, and increased growth and employment will result from adopting a coherent European framework of guidance and actions to foster interoperable cross-sector and cross-border sharing and use of location information"
EULF European Union Location Framework

**EULF Focus Areas**

**Policy and Strategy Alignment:**
Consistent EU and Member States policy and legislative approach

**Return on Investment:**
Strategic funding and procurement to minimise costs and realise benefits

**Effective Governance and Partnerships:**
Fostering a collaborative, knowledgeable and skilled community to share and adopt best practices

**e-Government Integration:**
Location is a key enabler in e-Government services, addressing user needs and expectations

**Standardisation and Interoperability:**
Standards and technologies for interoperability and re-use are consistently applied
AMFM – GIS Italy: side by side with EULF!

Document is under continuous development
The present draft version is dated on 29th August

Initiative of NGO Association AMFM GIS Italia for a White Paper on geo-location

LOCATION AS UNIFYING ELEMENT OF ACTIONS AND INFORMATION FOR CITIZENS’ SERVICES
Other Global Trends

- Services-Oriented Architectures (SOA)
- Cloud Computing
- Mobility
- Social Networking
- Virtualization
- Sensors Integration
- Communication Convergency
Therefore...
Change Drives the World
We are Sensors, Problem Solvers and Solution Providers
The Sense to See
The Sense to Touch
The Sense to Smell
The Sense to Taste
The Sense to Hear
We Automatically Identify, Organize, Analyze and Decide
We are 5D – Harnessing Change into Action
Sensors ‘Sense’ and Collect Raw Content

Space

Air

Ground
Software Identifies, Organizes, Processes and Analyzes Content
We Decide and take Action
Problems
Too Much Data – Not Enough Information
Analytics Are Not Providing Answers
Challenge: Delivering Relevant Information that Makes Sense
Geospatial Challenges Facing Our Industry

• Too much time passes from Change to Action – Not Smart
  • We need to shorten the Geo-Information Lifecycle
  • Automation is Required – Leverage Upstream Metadata and Multi-Source Content
• We need to address the Big Data Problem for Geospatial
  • Management – Cataloging
  • Storage Costs
  • Delivery Speeds
• Streamline Analytics that communicate relevant information and answers
• Get Mobile
  • Light Weight Apps
• Address Access Problems
  • Content
  • Apps
So areas to address

1. Data to Information Automation
2. Big Data Management
   - Cataloging
   - Compression
   - Delivery
3. Geospatial Analytics
   - Spatial Modeler & Query Tools
4. Solution Platforms
   - Combination of “Smart Client s” + Portals + Mobile in facilitated workflows
Who is Hexagon Geospatial
Hexagon Geospatial in the Hexagon Ecosystem

- Intergraph
- Hexagon Solutions
- Leica (Hexagon) Geosystems
- Partners
Transforming the Real World
A Dynamic Earth of Constant Change
Fusing the Real and Digital World

A constant flow of information fuses the Real World (as is/as built) with the Digital World (as planned/as designed)
Today and Looking Forward

As an industry we need to do a better job of making sense of our dynamically changing world by combining sensors, with software focused on providing solutions that work together in a smart way.
Hexagon Geospatial

Provide the best geospatial software platform for ‘Making Sense’ of our dynamically changing world.

Pioneer the Next Generation of Geospatial IT

Facilitate the development, deployment and use of solutions
To Transform and Be Transformed

**Technology:**
Shorten the Lifecycle from ‘Change’ to ‘Action’
Make it Easy
Make it Human
Make it Dynamic

**Business:**
Supporting you to redefine the Geospatial Industry and it’s underlying Economy
HexGeoWiki – Documentation Collaboration

- Introduced in April
- Initially ERDAS Field Guide & ImageStation Concepts
- 4,298 page views since launch
Website – Blog – Social Network
Implementing
The Power of Transformation

Portfolio, Business and Industry Transformation
Harnessing Change to Deliver Dynamic Information

Content
- Satellite Data Providers
- HGS Sensor Customers
- Government

Software Platform
- Hexagon Geospatial Division

Industry Solutions
- SG&I
- Hexagon Solutions Division
- Distributors
- Partners

= Delivering Information & Solutions That Makes Sense
Hexagon Smart Content Program
Geospatial Content As a Service

IaaS
Information Layers

CaaS
3D Content
Feature Content
Terrain Content
Image Content
Status Quo - The Traditional Approach

- Geospatial technology genre’s created departmental silo’s that limited data use to a few.
- Limited information is made available.
- The time required to ‘turn the crank’ is slow, manual, and tedious and expensive.
- Difficult to scale.
- Start up investments are large
Current Product Offerings

- GIS
- Remote Sensing
- Photogrammetry
- Server Products
- Mobile Products
PROCESSES WORKFLOWS

GEOSPATIAL INFORMATION LIFECYCLE

CAPTURE ➔ PROCESS ➔ SHARE ➔ DELIVER
THE NEW GEOSPATIAL POWER PLATFORM

PRODUCER PROVIDER PLATFORM
POWER PORTFOLIO
Introducing a Simpler Approach
POWER Portfolio

Producer Suite

PRODUCER SUITE: POWER TO AUTHOR

ERDAS IMAGINE
GeoMedia
ImageStation
ImageStation provides high-throughput map content production.

- Streamlined ortho mosaic production
- Advanced image processing
- Multi-user and distributed workflows
- Enhanced processing options
- Modern user interface

Watch movie
Value-add for smaller photogrammetry projects

• Complete suite of photogrammetric production tools
• Create value-added products through change detection, point cloud extraction from imagery, or image classification
• One seamless, process-driven workflow
• Integrated with our dynamic remote sensing software solution
Your Comprehensive All-in-one Geospatial Authoring Platform

- Your one-stop experience for radar, multi-spectral, hyperspectral, terrain, point cloud, photogrammetry, and basic vector analytics.
- We provide advanced multi-core batch processing, making you more productive.
- All brought together in a real-time, advanced spatial modeling environment, keeping it simple and powerful.

Watch movie
Powerful GIS management, maximizing your geospatial resources

- Simultaneous geospatial data access united in a single map view
- Efficient geospatial processing, analysis, presentation and sharing
- Intuitive and dynamic tools that automatically update the result in response changes

Watch movie
Producer Suite: Deployed on the Cloud

Evolution of digital delivery
As assets become non-linear and huge, old technologies break down
$POWER$ Portfolio

Provider Suite

PROVIDER SUITE: $POWER$ TO MANAGE

ERDAS APOLLO
ECW Products
Manage big data

- Organize, describe and distribute volumes of geospatial and related digital data
- Discover data assets easily
- View or download in any client application

Watch movie
Provider Suite - SaaS
PLATFORM SUITE:
POWER TO BUILD SOLUTIONS

GeoMedia Smart Client
GeoMedia WebMap
Geospatial Portal
Mobile Alert
Mobile MapWorks

- Manage and serve secure or licensed information using standards-based web services
- Complies with the European INSPIRE directive
- Monitor web service behavior and performance
Your Enterprise Portal

- A configurable, customizable thin-client front end for all geospatial server products
- Ready-to-run, multilingual web app for finding, viewing, querying, analyzing, and consuming geospatial data
- Simultaneously display maps from compliant and secured services

Watch movie
GIS on the Go

- Bring GIS to the field for efficient capture of critical business information
- Ties directly into your enterprise GIS database
- A practical tool for field and site inspection workflows
Enlist your citizenry

- Crowdsourcing to reduce costs
- Collect actionable information on public works and local government issues
- Empower citizens and communities
- Concentrate on your business, not the technology
Platform Suite: from enabling Smart Client Platform to a Planning and Response Solution
Platform Suite

Industry Applications

Graphically & Programmatically
Orchestrate Workflows

Analytics Engine

Core technology

Web & Mobile SDKs

Smart Client Workflow Manager

Spatial Modeler SDK

Geospatial Platform Technologies
Intergraph

Smart Resources
Smart Response
Smart Defence
Smart Transport
Smart Utilities

Deliver operational solutions

Cloud
Mobile
Apps
Smart machines

Exploit smart technologies

PRODUCER | PROVIDER | PLATFORM

Accelerate information flows with faster and better creation, exploitation and access
We will generate the needed power
Thank You