

**Committee of Experts on  
Global Geospatial Information Management**

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**Legal and policy frameworks, including critical issues related to authoritative data**

**Developing a Legal and Policy Framework for Geoinformation Management**

Background Document Prepared by  
the Centre for Spatial Law and Policy

**The Secretariat acknowledges with thanks the substantive contribution of Mr. Kevin Pomfret, the author of this background paper**

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**Developing a Legal and Policy  
Framework for Geoinformation  
Management**

**Prepared for UN-GGIM 3 by the Centre for Spatial Law  
and Policy**

## Executive Summary

It has become clear that geospatial information (“geoinformation”) can play a critical role in spurring economic growth and productivity, enhancing governance and improving a citizen’s quality of life. As a result, governments around the world are struggling to develop a policy and legal framework that addresses the collection, use, visualization, analysis, distribution, storage, and retention of geoinformation (collectively, “geoinformation management”). Such frameworks will become even more important in the future, as the cost of collecting, using and distributing geoinformation decreases and geoinformation is used for more critical, real-time decision-making in applications such as intelligent transportation systems (ITS), smart grids and smart cities.

A wide range of policy and legal issues impact geoinformation management. Some of these issues can be addressed through specific laws and/or policies that direct government agencies to share geoinformation with other government agencies or with their citizens, such as those that mandate the creation of spatial data infrastructures. However, government agencies are only one source of geoinformation – industry, citizens, non-governmental organizations and universities are also important sources. Moreover, while directed data sharing policies can facilitate geoinformation management by governments, other legal and policy issues (e.g. privacy, confidentiality, national security, liability concerns) may in practice impede geoinformation management. Most of these issues have arisen due to laws, policies, regulations, court decisions, etc. that are unrelated to geoinformation management. As a result, they often cannot be addressed through a single piece of legislation or a directive.

A comprehensive picture of the impact that legal and policy issues have on geoinformation management is beginning to emerge due to a recent survey conducted by the United Nations Global Geospatial Information Management (UN-GGIM) staff and the Centre for Spatial Law and Policy. An analysis of the survey results indicate that policy and legal issues present a major challenge to government agencies around the world as they try to collect, use and distribute geoinformation. These issues concern privacy, license and data sharing agreements, liability concerns and national security. Anecdotal evidence suggests that industry, non-governmental organizations (NGOs) and universities struggle with many of the same issues.

Legal and policy issues impact geoinformation management at the local, national, and international levels. However, because each nation has its own laws and policies, there is no universal solution – each Member State will need to develop its own legal and policy framework. Ideally these frameworks will be normalized to a great extent, since geoinformation must be shared across borders to address critical transnational issues such as sustainable development.

In order to improve geoinformation management, Member States should consider a comprehensive review of the extent to which legal and policy issues impact the collection, use, and distribution of geoinformation within their respective countries. It is important to begin to

address these issues now, because they will become more complex as applications involving geoinformation become more common and more stakeholders emerge. Representatives from government, industry, universities and NGOs should be included in this process, since each group is both a provider and a consumer of geoinformation. Such review should include all relevant potential sources including laws, policies, regulations, directives, procedures, court cases, license agreements, international treaties and agreements and even national constitutions.

Upon completion of the review, the stakeholders can begin to consider ways to address the issues within each nation's existing legal and policy framework. In some cases this may simply require educating lawmakers, policymakers and lawyers on geospatial technology and the value of geoinformation management so they can make informed decisions and provide sound advice. Some Member States may wish to create new laws and policies, while others may decide to address the issues by clarifying how existing laws and policies will apply to geospatial technologies and/or applications that use geoinformation.

## **Benefits of Geoinformation Management: Location-enabled Societies**

The value of geoinformation is now widely recognized. For example, the consulting firm Deloitte identified geospatial technology as one of the top technology trends in 2012.<sup>1</sup> The potential benefits are many, including:

### Economic Benefits

The economic benefits of geoinformation are becoming increasingly clear. For example, according to a recent report “the aggregate direct and indirect application of open data across the European Union economies are estimated to be €140 billion annually.”<sup>2</sup> Much of this data can be classified as geoinformation. Similarly, according to another recent report, the value of global geo services is \$150 -270 billion per year and geo services added around \$100 billion in value per year.<sup>3</sup> In addition, geo services saved 3.5 billion litres of gasoline globally per year.<sup>4</sup> Geo services are expected to grow 30% per annum globally.<sup>5</sup>

The economic impact at the national level is equally impressive. For example, the geospatial technology industry produces \$75 billion in annual revenue in the U.S. alone and employs an estimated 500,000 people in the private sector.<sup>6</sup> The impact on the broader U.S. economy is even more significant, accounting for \$1.6 trillion in annual revenue and \$1.4 trillion in cost savings.<sup>7</sup>

### Efficient, Participatory and Transparent Governments

Government agencies around the world are repositories of information, much of it tied to a location (e.g. public transportation schedules, road repairs and closings, tax and parcel records, neighborhood crime reports, street-cleaning schedules, etc). Effective geoinformation management will result in government data being seamlessly shared among government agencies and also made broadly available to the public. Governments will be able to make “place-based” policy decisions using the most complete and accurate information. Government services will be provided to citizens more quickly and efficiently, thereby reducing costs and inconvenience.

Moreover, citizens will be safer and their quality of life will improve. For example, first responders will be able to notify citizens in real-time of evacuation routes during emergencies and firefighters will be able to locate people inside buildings. Similarly, law enforcement will be able to utilize geoinformation to quickly identify potential suspects.

Citizens will be able to check the real-time status of public transportation from home before heading out to the bus or train station. They will also be able to update and verify government information pertaining to them, their neighborhoods, streets, schools, etc. in real time. As a result, they will become active participants in how their communities operate. For example, they will be able to notify government agencies of the location of crimes, public nuisances, accidents, damage to public infrastructure, etc. with the simple click of a button on their mobile device. Government agencies will be able to immediately process and respond to these notices and citizens will be able to verify that the appropriate action was taken.

### International Leader in Transnational Issues

The challenges facing mankind are not contained within a nation's borders. These challenges include (i) sustainable development, (ii) containing the spread of infectious diseases, (iii) managing the oceans' resources and (iv) combating terrorism and piracy. The collection, analysis and distribution of geoinformation is critical to addressing these challenges. Member States that are leaders in geoinformation management will (1) understand what is happening within their borders (2) share this information with other countries and/or organizations and (3) coordinate appropriate measures.

Geoinformation management will become even more critical in the future as more devices are connected to the internet (the "Internet of Things"), each continuously collecting information tied to a location. This abundance of geoinformation, from a variety of sources around the world, updated in real-time on a regular basis, will create the foundation for a "location-enabled" society. Such a society will include:

Smart Grids - Geoinformation will be a key component to the success of the smart grid. Accurate geoinformation will be critical in determining where to install sensors, identifying assets and optimizing the grid's performance.

Intelligent Transportation System (ITS) - Tracking the location and movement of all of the vehicles on a road at any given time will be a critical feature of an ITS. Applications already exist that help drivers avoid congestion based upon information aggregated from nearby mobile devices. In addition, increasingly vehicles include sensors that are able to provide continuous real-time location information. This information can be analyzed and used to improve traffic patterns and eventually to support the deployment of autonomous vehicles.

Smart City - Smart cities are next generation cities that will be built taking into consideration not only the physical infrastructure, but also information communication and social infrastructure. A key component for the success of a smart city will be

knowing the location and movement of individuals, assets and natural resources. Experts believe this will require integrating and acting upon a variety of geoinformation, including sensor network data, public government data and social media data. Benefits of a smart city, including improved city management, increased safety, more efficient transportation, less pollution, and better utilization of resources, will become critical as more “megacities” begin to develop.

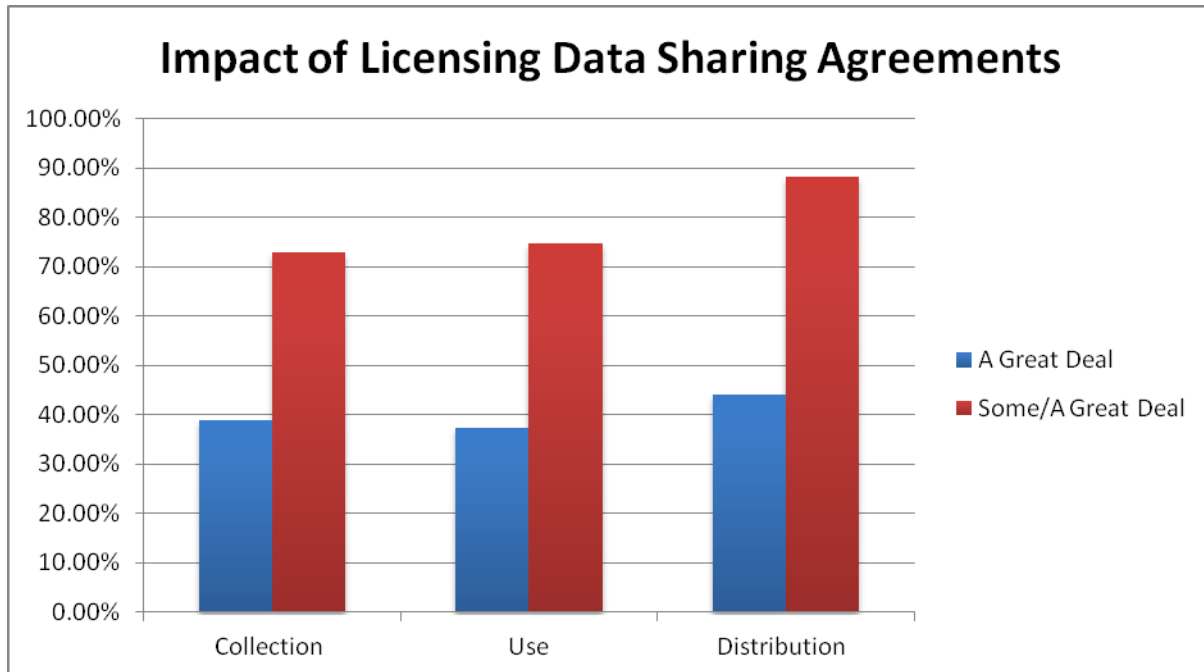
### **Policy and Legal Challenges**

While a location-based society is now achievable from a technology standpoint, there are a number of legal and policy challenges that must be addressed by Member States in order to maximize the benefits of geoinformation while still protecting governments and citizens against potential risks. These challenges have arisen because the legal and policy communities have been unable to keep up with the rapid adoption of geospatial technology and growth of applications that utilize geoinformation. As a result, laws and policies that impact the collection, use and transfer of geoinformation are often unsettled or unclear. Working through these issues will take time and requires participation of the broader geospatial community within a Member State. However, it is critical to addressing them now as they will become even more complex and difficult as new technologies and applications develop.

Recently, the UN-GGIM and the Centre for Spatial Law and Policy conducted a survey of the impact legal and policy issues have on global geoinformation management (the “Survey”). As of June 3, 2013, approximately sixty members had responded to the Survey. The responses highlight the significant impact certain legal and policy issues are having on geoinformation management in Member States world-wide. Because the issues are so varied, addressing them will require more than implementing a single law, policy, and/or a directive. Rather, it will require understanding and addressing the full range of policies and laws that impact the collection, use, and distribution of geoinformation.

### **Conforming Licensing/Data Sharing Agreements**

Increasingly geospatial products and services are created using data from many different sources. These data types may include government data, commercial and/or proprietary data and data collected by or from citizens. Geoinformation is often transferred between organizations through license or data sharing agreements. Often, each data type will be subject to its own licensing/data sharing agreements, with varying terms, restrictions and conditions. As the chart below indicates, abiding by the terms and conditions of these various licensing/data sharing agreements poses a significant challenge for government agencies in geoinformation management.



One of the primary purposes of license/data sharing agreements is the transfer of certain intellectual property rights in the data from one party to another. Licensing of geoinformation has become complex in part because of the challenging of protecting intellectual property in a digital world. In addition, determining the extent of intellectual property rights in data is not as straightforward as it is with other types of property. For example, determining the copyright protection afforded a database is more difficult than with computer software. Also, trying to conform legal terms such as “derived products” with geospatial terms such “geocoding” is a challenge. Such uncertainty increases the chance of disputes and even lawsuits, particularly as parties recognize the value of geoinformation databases. As a result, government agencies are often very cautious with geoinformation so as not to end up in court.

There are a number of initiatives to develop a single or series of standard license/data sharing agreements for the transfer of geoinformation. Some government agencies have begun to release government data under such agreements. While such efforts are praiseworthy, it is still too early to tell whether such license agreements will achieve broad adoption by both data providers and data users.

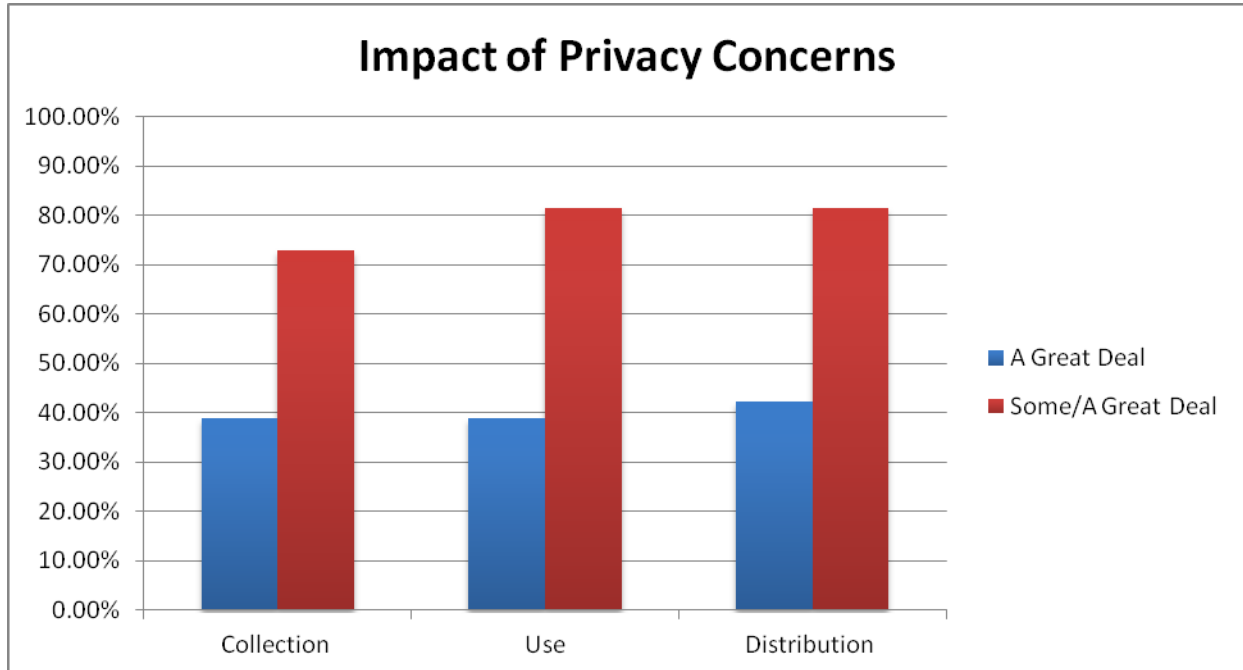
## Privacy

As the collection and use of geoinformation has increased, so have data protection and privacy concerns associated with geolocation information. Most data protection/privacy laws and regulations were introduced before geolocation information became widely available. It is proving very difficult to apply existing data protection and privacy laws to geoinformation. As a result, there is a great deal of uncertainty associated with what geoinformation should be protected, how it should be protected and who should be responsible for such protection. For example, in the United States a number of people expressed concerns over privacy when a newspaper published a map of gun owners even though records of gun ownership were publicly



available information. Similarly, governments around the world are struggling with how to apply existing laws and policies to new technologies, such as unmanned aerial vehicles.

As the chart below indicates, this uncertainty regarding geolocation privacy makes it difficult for government agencies to collect, use and or distribute geoinformation products and/or services:



Developing a legal and regulatory framework around geolocation privacy will be an important aspect of geoinformation management. Such a framework must balance the benefits of geoinformation with risks associated with improper collection, use or sharing of geoinformation. Government agencies are – and should be - particularly sensitive to these issues because if citizens feel that their civil liberties are being violated by government’s improper use of their geolocation information, they will be unlikely to take full advantage of geospatial technology. This could hamper the development of “location-enabled” societies.

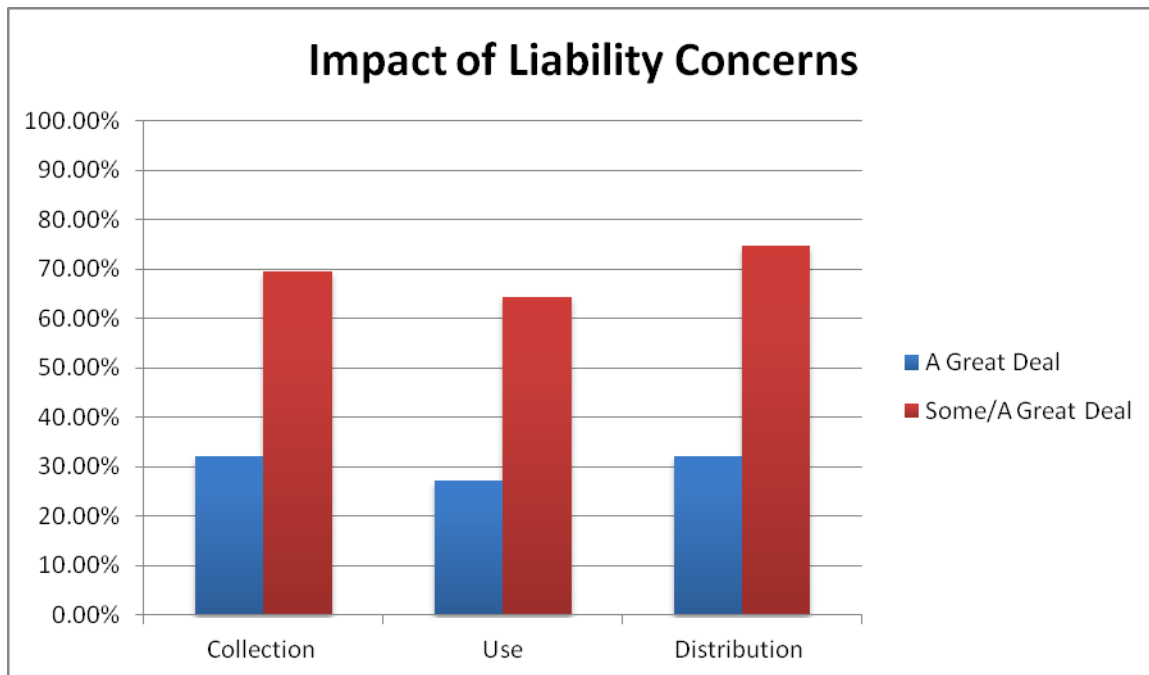
The challenge will be to develop a legal and regulatory framework that addresses these data protection/privacy risks while not making it unnecessarily difficult to collect, use or transfer geoinformation. An important first step will be to clearly define the privacy concerns. For example, the privacy concerns associated with the use of a tracking device to stalk an individual (and the legal mechanism for protecting against such acts) are different than those associated with receiving unwanted advertisements on a mobile device based upon a person’s location. It will also be important to consider whether geolocation information should be protected using existing legal and regulatory privacy/data protection constructs.

Moreover, such a legal and regulatory framework should consider the opportunity costs associated with not collecting geolocation information. For example, while someone may use the

location of someone’s device to violate an individual’s privacy, a first responder or loved one may use that same information to find and/or communicate with them during an emergency. If privacy/data protection policies make it too expensive or difficult to collect geolocation information for one purpose, it likely will not be available for other more beneficial purposes.

### Data quality

One of the unique attributes of spatial data is its versatility; a single data set can be used for a number of different applications. However, the quality of the data (accuracy, timeliness, precision, completeness, etc.) may not be sufficient for all such applications. The potential liability issues associated with poor data quality become even more important as geoinformation is used for more critical, and increasingly real-time, decision-making. Unfortunately in most countries the law with respect to liability for data errors – particularly for digital products and services – is not well developed. This creates a great deal of legal uncertainty and as the chart below indicates, this uncertainty can have a chilling impact on the collection, use and distribution of geoinformation by government agencies.



A number of countries are beginning to explore legislation that would try to regulate data quality and impose penalties for poor data quality. However, a broad effort to legislate or regulate geoinformation data quality will be difficult, given the number of different types of stakeholders involved. Also, it will likely prove difficult to determine what level of data quality is required for a particular application, particularly since many applications are relatively new. As a result, the challenge will be not to impose overly burdensome data quality requirements on an emerging high growth industry.

### Authoritative Data

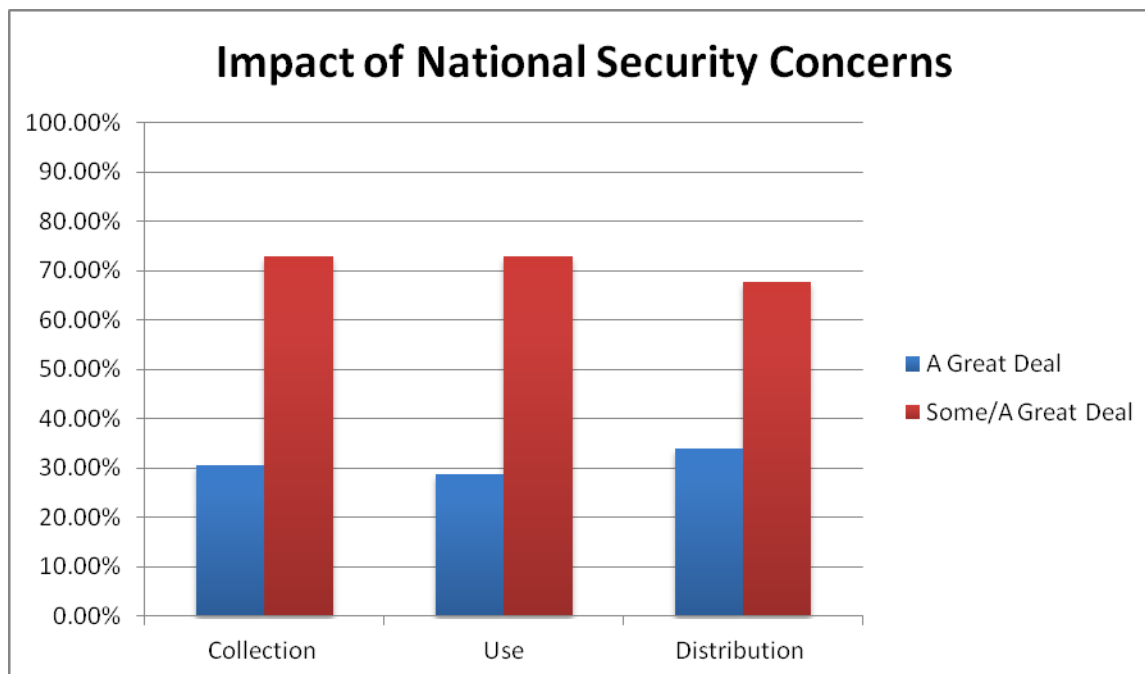
One important consideration for government agencies with regard to liability is the use of the term “authoritative data” to describe government data. The term “authoritative” has a few different meanings. For example, according to Merriam-Webster’s dictionary (a well-respected English language dictionary), the term can mean “having or proceeding from authority; official.”<sup>8</sup> However, another common definition is “clearly accurate or knowledgeable.”<sup>9</sup> Unfortunately, in many cases, it is not always clear which definition is intended.

This subtle difference could become significant in a geospatial context with respect to liability issues associated with data quality. There is not an extensive body of law in most countries with respect to liability associated with errors in information products such as maps or databases. Those cases that do exist tend to be very fact-specific and therefore do not provide broad legal guidance. However, recent research suggest that the more the data provider knows that the user is relying on the accuracy of the data the greater the degree of responsibility the data provider has to ensure the information is accurate.<sup>10</sup> This is particularly true when the data provider has reason to believe that the user will use the information for a particular purpose.<sup>11</sup>

Some may argue that by using the term “authoritative”, government agencies are encouraging users to rely on the accuracy of their data. As a result, government agencies that are holding themselves as authoritative sources of data should review local law to see if this increases their potential liability for errors in the data. Such agencies may also consider researching what protections they have or can take to minimize such exposure.

## **National Security**

Defence and intelligence agencies world-wide have expressed concerns that certain geoinformation can be used to threaten a nation’s security. As a result, a number of Member States have imposed restrictions on geoinformation for national security reasons. These restrictions arise in variety of contexts. For example, some countries have placed resolution restrictions on commercial imaging satellites. Some restrict the right of citizens to update non-governmental maps with local knowledge. Others have placed restrictions on mapping activities or the export of geoinformation. According to the Survey results, these national security restrictions are having a considerable impact on geospatial information management by government agencies:



A geoinformation management legal and regulatory framework will need to balance the perceived national security risks with the growing economic and societal benefits associated with geospatial technology. While national security risks must not be discounted, the benefits of geoinformation are becoming clearer. As a result, an appropriate legal and policy framework will minimize to the greatest extent possible the impact national security restrictions have on the broader collection and use of geoinformation.

### **Addressing the Legal and Policy Challenges**

In order to develop a framework that supports geoinformation management, Member States should consider a comprehensive review of the legal and policy issues that impact the collection, use, and distribution of geoinformation within their respective countries. Representatives from government, industry, universities and NGOs should be included in this process, since each group is both a provider and consumer of geoinformation. Such review should include all potential sources, including laws, policies, regulations, directives, procedures, court cases, license agreements, international treaties and agreements and even national constitutions.

Such a review must also take into account a number of factors unique to geoinformation, including:

**Geoinformation is versatile.** A single piece of geoinformation can be used in a variety of ways. For example, a school's location can be used by an education department for planning purposes as well as by first responders responsible for evacuation planning during an emergency. However, some may be concerned that the same information can

also be used by criminals for planning illegal activities. Any legal or regulatory effort that attempts to limit the availability of geoinformation (e.g., the school's location) to protect against improper activities could reduce the availability or use of the same information for a proper purpose (e.g., by a first responder). As a result, a legal and policy framework must balance the perceived risks with the opportunity costs associated with restricting collection/use/distribution of geoinformation.

**The issues cut across a variety of technology platforms and industries.**

Geoinformation is generated from a variety of technologies, including global navigation satellite systems (GNSS), remote sensing (both aerial and satellite), web mapping services, smartphones, radio frequency identification (RFID), geographic information software (GIS) and mapping and surveying tools. The geoinformation that is collected, processed and analyzed with these technologies is used in a number of diverse industries and subject to oversight by many different government agencies. As a result, conforming these diverse legal and regulatory regimes will be a challenge.

**A variety of stakeholders must be considered.** In order to maximize the potential of geoinformation, the needs and concerns of numerous stakeholders must be considered, including:

**Government Agencies** - Government agencies at all levels (national, regional, and local) are significant stakeholders in geoinformation management. These agencies include some historically associated with geoinformation, such as agencies responsible for land registry/cadastra, land planning, national mapping and spatial data infrastructures. However, it now includes numerous other government agencies that collect or use geoinformation without recognizing the role of geoinformation in their decision-making or the services that they provide.

**Private Industry** –Private industry plays a critical role in geoinformation management around the world, both as a collector of geoinformation (regarding the physical world, their customers and their business operations), and a user of geoinformation. Therefore policies, laws and regulations related to geoinformation management must take both aspects into consideration.

**Citizens** - In the past, a citizen's primary role in geoinformation management was as a recipient of the geoinformation-based services that government agencies provided based upon geoinformation. However, improvements in technology have resulted in more citizens become collectors of geoinformation. They are both using this information in their daily lives and sharing it with other stakeholders. With this increased awareness of the value of geoinformation, they have also become direct consumers of geoinformation from government agencies.

**Universities/Non-governmental Organizations (NGO's)** – Historically, NGO's and universities have played a significant role in geoinformation management particularly with regard to addressing transnational issues. These roles are likely to continue in the

future, and therefore, any framework must take into account their often unique legal and policy challenges.

Upon completion of the review, the stakeholders can begin to consider ways to address critical issues within each nation's existing legal and policy framework. In some cases this may simply require educating lawmakers, policymakers and lawyers on geospatial technology and geoinformation management so they can make informed policy decisions and provide sound legal advice. Some Member States may wish to create new laws and policies to address the important issues. Other Member States may decide to address the issues by clarifying how existing laws and policies will apply to geospatial technologies and/or applications using geoinformation.

The best approach for each Member State will depend upon a number of factors, such as the type, complexity and maturity of the existing legal and regulatory system. These factors will have a direct impact on the type and speed with which a framework can develop. Moreover, the importance of the legal and regulatory issues will vary. For example, some Member States may be more concerned about geolocation data protection/privacy than others.

It is important for Member States to begin addressing these issues now as the issues will become even more complicated and difficult to resolve with the adoption of new technologies and more stakeholders. Moreover, given the growing appreciation of the power of geoinformation, if Member States do not initiate such reviews themselves, other organizations are likely to do so.<sup>12</sup>

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<sup>1</sup> See ([http://www.deloitte.com/view/en\\_US/us/Services/consulting/technology-consulting/37ad18fab4335310VgnVCM2000001b56f00aRCRD.htm](http://www.deloitte.com/view/en_US/us/Services/consulting/technology-consulting/37ad18fab4335310VgnVCM2000001b56f00aRCRD.htm)) (June 10, 2013)

<sup>2</sup> See e.g. "Open public data boosts economy as well as transparency", May 16, 2013, (<http://www.euractiv.com/innovation-enterprise/opening-public-data-boosts-econo-analysis-519796>) (June 10, 2013)

<sup>3</sup> "What is the economic impact of Geo Services" (Oxera, January 2013)

<sup>4</sup> Id.

<sup>5</sup> Id.

<sup>6</sup> "Geospatial Services: A \$1.6 Trillion Growth Engine for the U.S. Economy", (The Boston Consulting Group, June 2012)

<sup>7</sup> Id.

<sup>8</sup> "authoritative" Merriam-Webster.com 2013, <http://www.merriam-webster.com/dictionary/authoritative> (June 10, 2013)

<sup>9</sup> Id.

<sup>10</sup> For a more in-depth discussion of these issues, see: Phillips, Jennifer, "Information Liability: The Possible Chilling Effects of Tor Claims Against Producers of Geographic Information Systems" (26 Florida State University Law Review 743 1998/1999) ; Reutiiman, Joseph, "Defective Information: Should Information Be a 'Product' Subject to Products Liability Claims?", Note: (22 Cornell Journal of Law and Public Policy 181 2012); and Foong, Cheryl, "Open Content Licensing of Public Sector Information and the Risk of Tortious Liability for Australia Governments, (eLaw Journal: Murdoch Electronic Journal of Law 17(2) 2010)

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<sup>11</sup> Id.

<sup>12</sup> See e.g. “Viewpoint: We need ground rules for geo-information” (<http://www.bbc.co.uk/news/business-21624799>) (June 10, 2013)