

**INTEGRATED GEOSPATIAL
INFORMATION FRAMEWORK
A STRATEGIC GUIDE TO DEVELOP AND
STRENGTHEN NATIONAL GEOSPATIAL
INFORMATION MANAGEMENT**

**PART II: IMPLEMENTATION GUIDE
WORKING GROUP ON LEGAL AND POLICY FRAMEWORKS
FOR GEOSPATIAL INFORMATION MANAGEMENT -
GUIDANCE AND RECOMMENDED ACTIONS
ALIGNED WITH STRATEGIC PATHWAY 2:
POLICY AND LEGAL**



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**Working Group on Legal and Policy Frameworks for Geospatial Information Management -
Guidance and recommended actions aligned with
Strategic Pathway 2: Policy and Legal**

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Guidance and recommended actions aligned with Strategic Pathway 2: Policy and Legal

Introduction

The Strategic Guide to Develop and Strengthen National Geospatial Information Management – Part 1: Overarching Strategic Framework identified “Policy and legal” as one of nine key strategic pathways necessary for geospatial information management. A legal and policy framework is particularly critical because it supports so many of the other strategic pathways. For example, legal and policy frameworks impact (i) Pathway 1 - Governance and Institutions, (ii) Pathway 3 – Financial, (iii) Pathway 4 - Data and (iv) Pathway 7 - Financial. As a result, this pathway directly impacts the availability, accessibility, exchange, application and management of geospatial information.

This chapter will begin by identifying several important factors when considering the appropriate legal and policy framework for geospatial information management within a nation. For example, a nation’s geospatial community is often an ecosystem, consisting of government agencies, industry, non-governmental organizations (NGOs), citizens, research institutions and universities. Each can be a data provider and a data user, depending upon the context. As a result, a legal and policy framework must consider each of the stakeholders.

The chapter will then identify the various elements of a legal and policy framework. These include both elements that are legally binding – such as laws and regulations, as well as contracts and other legal agreements – and non-binding - such as policies or best practices. The strengths and weaknesses of each will be discussed as well as their applicability to the public and private sector.

The chapter will then identify and explain the impact that key policy and legal issues have on geospatial information management. Some of these issues are more directly related to the geospatial community within a nation. Governance and accountability are two such examples. Others are also very important to the geospatial community but touch upon many other aspects of a nation. These include data protection/privacy, intellectual property rights, national security and data quality/liability. In these instances, the geospatial community should be an active participant as laws and policies are being developed.

The chapter will then explain why a nation should conduct a “gap analysis” to identify the current state of its legal and policy framework. This analysis should identify the objectives to be reached and what changes are necessary to achieve those objectives. In doing so it should consider how to balance the potential of geospatial information for governmental, economic and societal good with the perceived risks. This section will explain why stakeholders from government, industry, NGO’s and academia should be included in this exercise, including lawyers.

The rapid advancements in technologies that collect, analyze and visualize geospatial information, such as drones or machine learning, raise a number of unique policy and legal issues. Therefore, a nation should consider how to “future proof” a legal and policy framework for geospatial information management. The chapter will conclude with a discussion of measures that can be used to develop a framework that can be updated as needed to address new technologies and applications.

Considerations When Developing a Legal and Policy Framework

The geospatial community often asks whether “spatial is special”. From a policy and legal standpoint, the answer is clearly yes; there are several important considerations when developing the appropriate legal and policy framework for geospatial information management within a nation.

Important Considerations	Impact
The geospatial community is an ecosystem.	Need to consider impact of laws and policies on a variety of stakeholders.
Geospatial information cuts across policy and legal disciplines.	A legal and policy framework is complex.
Geospatial information technology is rapidly changing.	Continually need to review and update a framework.
Nations have different legal systems.	No one size fits all solution.
Nations’ geospatial information management are at different stages of development.	No one size fits all solution.
Many different types of geospatial information.	Important to consider impact of a framework on a wide range of data types.
Geospatial information is versatile.	Many potential uses impact a wide variety of sectors in a society.
Geospatial has its own nomenclature.	Nomenclature needs to align with other segments of government and society.
It is necessary to balance the benefits against the perceived risks.	Difficult to balance given the versatility of geospatial information.

Chart 1-1

- Geospatial community is an ecosystem - The geospatial community within a nation can be considered an ecosystem, consisting of stakeholders in government, industry, academia, and NGO’s. Private citizens also are playing an increasingly important role in this ecosystem. Each stakeholder in the ecosystem is often both a data collector and data user, sometimes at the same time. As a result, laws and policies that are designed to regulate the collection or use of geospatial information in one sector will often have an impact on other sectors. For example, government often rely on the private sector to collect certain types of geospatial information. Laws that limit the private sector’s ability to collect information likely will result in less information being available for government use. Similarly, limiting the ability of private citizens to collect geospatial information will result in the government not being able to receive important information that could be used to improve government services or provide other societal benefits, such as monitoring climate change.

- A number of different laws and regulations impact geospatial information management. There are a number of different laws and policies that must be considered when considering geospatial information management. Some apply to the government agencies that are responsible for the collection of geospatial information within a nation. For example, surveying is often regulated by one government body while another agency may be responsible for developing the national data infrastructure. Each play an important role in geospatial information management. In addition, there are a number of laws, including contract law, intellectual property law, national security law, liability and privacy laws that indirectly impact the collection, use and distribution of geospatial information. These must be considered as well. Also, there a growing number of platforms (i.e. satellites, aircraft, mobile devices, internet of things) that collect geospatial information that are often subject to their own regulatory oversight. As a result, developing a legal and policy framework for geospatial information management is a complex and timely endeavor.
- Legal systems vary considerably. Legal systems between nations vary greatly. Some nations' legal systems are based upon common law, while others are civil law based. Some have strong executive leadership, while others have strong legislative bodies or parliaments. Some governments have centralized authority, while others have a more federated approach – with local authorities having great authority. Each also has its own nomenclature to define legal documents, such as laws, decrees, ordinances, edicts. A legal and policy framework needs to align with a nation's existing legal system in order to be effective.
- There are many different types of geospatial information. Geospatial information consists of a variety of different data types. For example, in the U.S. there are a 16 data themes and 176 different data sets that comprise the National Geospatial Data Asset Portfolio¹. Each of these datasets have unique characteristics that must be considered in developing a legal and policy framework. For example, the data will be collected by various government agencies, used by diverse consumers for different purposes and have unique properties and legal risks. Each of these factors must be considered and addressed as appropriate.
- Geospatial information is versatile. The power of geospatial information is in part based upon its versatility. A single data set can be used for a variety of different purposes. This is challenging from a legal standpoint because while one use may be beneficial to a society, another use may be considered as a threat. It can be challenging to develop a legal and policy framework that enables the beneficial uses while protecting against the risks.

¹ <https://www.fgdc.gov/what-we-do/manage-federal-geospatial-resources/a-16-portfolio-management/ngda-themes-and-datasets> (accessed December 13, 2018)

- Laws and policies often must balance risks versus benefits. In most instances, a legal and policy framework must balance potential benefits with perceived risks. While the global geospatial community will generally agree as to the benefits of collecting and sharing geospatial information, there are significant differences between nations as to the potential risks. Some are more concerned about the potential privacy risks, others are more concerned about national security concerns.
- Geospatial technology is rapidly changing. The technology for the collection, use, storage and distribution of geospatial information is rapidly changing. As a result, such a framework must be flexible to make sure that these new innovative technologies can be effectively utilized while still addressing any potential risks.

Due to these considerations, there is no one framework that can be used for all nations. Each nation must develop a legal and policy framework that aligns with its unique legal system, its culture and history. Therefore, this chapter will not take a prescriptive approach. Instead, it will focus on the tools that can be used to create a legal and policy framework and the various policy and legal issues that must be considered.

Key Components of a Legal and Policy Framework

When the geospatial community discusses legal and policy frameworks, there is often an assumption that what is needed is an overarching law that addresses all the key issues. However, an expansive law is only one tool in creating or revising a geospatial information management legal and policy framework. There are many other tools that should be considered. Some of these tools, like laws, are binding. However, others are informal, non-binding and based upon consent. While some of these tools can be used in both the public and private sectors of the geospatial ecosystem, others are applicable only to one sector. It is important for the nation's geospatial community to understand the role of each, their relative strengths and weaknesses and how they apply within their nation.

Binding Elements of a Legal and Policy Framework

Legislation and Laws

The geospatial community often uses the terms “legislation” or “laws” when referring to elements of a legal and policy framework that are binding. However, it is important to note that there are many other equivalent terms that are used that have essentially the same meaning. These include decrees, orders, ordinances and regulations. (For purposes of this document, the term “law” or “legislation” shall apply to all of these types of legal instruments.)

Although laws can be generated or created in a number of different ways, each have several similarities, including:

- They tend to have the most force. Once created, a well-crafted law is a powerful tool to ensure compliance. The penalties for failing to comply will vary, but often simply having a law helps create compliance.
- They can take a long time to create. Because laws are binding, and can have a broad impact, it can take a long time for a law to be created. Often, several parties will have to review and approve the passage of a law. In addition, concerned stakeholders will be asked to provide input. If there is a financial impact, budget authorities will need to be consulted.

- Poorly crafted laws can hinder geospatial information management. Because the process of creating laws often means getting input from other stakeholders that might be affected, there is no guarantee that a law, once it is finalized, will be as originally drafted. It may not even be suitable for its intended purpose. For example, it may delegate authority to other government agencies, it may not provide sufficient funding, or it may impose additional obligations that are difficult to achieve.
- They can take a long time to change. For the same reasons that it takes time to create a law, it often takes a long time to change a law. This is particular a problem for the geospatial community given adoption of technologies that provide new ways to collect and use geospatial information. It can be difficult to change an old law that prohibits or hinders such use.

Example

Federal Law No. 431-FZ of December 30, 2015 on Geodesy, Cartography and Spatial Data and the Introduction of Amendments into Certain Legislation Acts of the Russian Republic².

Contracts and Other Agreements

Contracts and other forms of agreements between parties can also be an element of a legal and policy framework that enables the utilization of geospatial information. Most such agreements are legally enforceable. These include contracts for data collection, license agreements, data sharing agreements and cloud storage agreements. For example, a government agency may enter into a license agreement to acquire rights in satellite imagery from a commercial provider. It may also pay a drone operator to collect geospatial information. Alternatively, one government agency may enter into a data sharing agreement with another government agency as part of a spatial data infrastructure initiative.

There are several benefits to using an agreement to address legal issues that restrict or limit geospatial information management. One benefit is that an often takes less time to negotiate and sign an agreement than in passing a law. For example, if nations' privacy laws do not provide sufficient protection, requirements and conditions to protect data can be included in an agreement. Agreements also are much easier to change or update to address developments in technologies or applications. (Note: treaties, are another example of a type of agreement that can be legally enforceable, although negotiating treaties can often be lengthy.) Another benefit of an agreement is that it can be used by organizations in both the public (i.e. government agencies) and private sector (i.e. industry, NGO's).

² <http://ggim.un.org/knowledgebase/KnowledgebaseArticle51560.aspx> (accessed December 1, 2018)

However, agreements have several limitations. One limitation is that typically they only are enforceable between the organizations that sign them. In addition, agreements generally will terminate after a certain period, after which they must be renegotiated. As a result, although they play an important role in a legal and policy framework that enables geospatial information, that role can be limited.

Example

NextView contract between Digital Globe and National Geospatial Intelligence Agency for acquisition of high-resolution satellite imagery³.

Treaties and other international obligations

Nations are parties to a number of binding international obligations. Many of these will impact geospatial information management with a country. For example, 176 countries are signatories to the Berne Convention for the Protection of Literary and Artistic Works, which protects the intellectual property rights of certain geospatial information products and services⁴. Similarly, in 1986 the UN General Assembly adopted the UN Principles Relating to Remote Sensing of Earth from Space (the “Principles”)⁵. Although not a formal treaty, a number of countries follow the Principles, in addition to more formal treaties involving space-related activities, when developing satellite remote sensing programs.

Example

Directive 2007/2/EC of the European Parliament and of the Council of 14 March 2007 establishing an Infrastructure for Spatial Information in the European Community (INSPIRE)⁶

³ http://www10.giscale.com/nbc/articles/view_article.php?section=corpnews&articleid=94005 (accessed December 1, 2018)

⁴ <https://www.wipo.int/treaties/en/ip/berne/> (accessed December 1, 2018)

⁵ <http://www.un.org/documents/ga/res/41/a41r065.htm> (accessed December 1, 2018)

⁶ <http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32007L0002>

Non-binding Elements of a Legal and Policy Framework

There are also elements in a legal and policy framework that do not have the force of law. These non-binding elements include policies, standards, norms and best practices. While these elements may not be enforceable under law, they play an important role in the utilization of geospatial information in a country. For example, until recently, one of the primary documents outlining the roles of government agency in the collection and sharing of geospatial information in the United States was OMB Circular A-16 (the “Circular”). The Circular is not law, but simply “provides direction for federal agencies that produce, maintain, or use spatial data either directly or indirectly in the fulfillment of their mission and provides for improvements in the coordination and use of spatial data.”⁷ Moreover, in time, these informal elements can become law. For example, many components of OMB Circular A-16 were incorporated into the recently passed Geospatial Data Act⁸.

Standards are another example of a non-legally binding mechanism that can impact a legal and policy framework for geospatial information management. For example, the Open Geospatial Consortium has published standards that facilitate the sharing of geospatial information between organizations. The adoption of these standards by key government agencies responsible for geospatial information management will have a broad impact across a nation’s geospatial ecosystem. Government agencies can also make standards binding by including them into requests for proposals (RFPs) or contracts.

There are a number of benefits associated with non-binding elements. One of the primary benefits is that they are much easier to develop and implement than laws and regulations. As a result, they can be more flexible, which makes them easier or adoption. They also can remain in force longer than an agreement and can apply to both the public and private sectors. In addition, they are the easiest to modify to adapt to new technologies or legal issues that may arise.

However, there also limitations that must be considered. Since these non-binding elements do not have the force of law, they generally cannot be enforced in a court. Also, they usually only apply to a limited group that has self-selected to abide by them. However, market pressure and integrating non-binding elements in formal legal instruments (such as including standards in contracts) can increase their adoption.

⁷ https://www.fgdc.gov/policyandplanning/a-16/index_html (accessed June 30, 2018)

⁸ <https://www.fgdc.gov/gda/geospatial-data-act-of-2018.pdf>

Example

Spatial Data on the Web Best Practices (W3C Working Group Note 28 September 2017)⁹

Example

A Guide to the Role of Standards in Geospatial Information Management¹⁰

Interaction of Binding and Non-binding Elements in Creating a Legal and Policy Framework

The binding and non-binding elements work together to form a legal and policy framework for geospatial information. As discussed above, there is no “one size fits all approach” that a nation can adopt. However, there are examples that a nation can analyze to see what elements can be adopted into their legal and policy framework.

Sweden has a well-developed legal and policy framework that supports geospatial information utilization in the country. The framework highlights the ways in which the diverse elements described above can work together to promote geospatial information. For example, the Swedish Parliament approved legislation that appointed Lantmäteriet as the coordinator of the National Spatial Data Infrastructure and established a Geodata Advisory Board. Lantmäteriet working with the Geodata Advisory Board, prepared a Swedish Geospatial Data Strategy. Sweden’s Geospatial Data Strategy and the INSPIRE Directive (“INSPIRE”) – a European initiative establishing an infrastructure for creating and sharing geospatial information in Europe - were then embedded in Sweden’s broader legal and policy framework. These elements include laws and regulations directly related to geospatial information, such as the National Land Survey, the Cadastre and geographic environmental information. However, laws that are less directly related to geospatial activities, such as access to information and secrecy, are also key elements. It also includes less informal elements of the legal and policy framework, such as Sweden’s e-government strategies for data licensing¹¹.

⁹ <http://www.w3.org/TR/sdw-bp/> (accessed December 1, 2018)

¹⁰ <http://ggim.un.org/documents/Standards%20Guide%20for%20UNGGIM%20-%20Final.pdf> (accessed December 1, 2018)

¹¹ For a more detailed examination of Sweden’s legal and policy framework for geospatial information utilization, see <http://ggim.un.org/knowledgebase/KnowledgebaseArticle51513.aspx> (accessed June 30, 2018)

Sweden’s legal and policy framework highlights how each of the elements described above work together to address geospatial information management. The types and relative importance of these elements may vary, but it is critical to consider the impact of each within a nation when considering a legal and policy framework. Moreover, these elements can evolve over time. For example, two government agencies that work closely together can enter into a data sharing agreement. These data sharing agreements can incorporate many of the same protections as legislation. They can also be used to address policy and legal gaps, such as defining ownership among the parties, which party is responsible for damages that may arise and what steps are required to comply with data protection laws. Lessons learned from this arrangement can then be developed into a policy that applies to all government agencies or incorporated into license agreements for sharing data with the private sector. Over time this policy can be turned into a law that directs a government agency to develop regulations that provide for greater data sharing between government agencies and the private sector.

The recently-launched Africa Regional Data Cube (the “African Data Cube”) could be an opportunity for a legal and policy framework for geospatial information management to evolve in the region. The African Data Cube is based upon the work and principles of the Open Data Cube Project and currently includes five countries: Kenya, Senegal, Sierra Leone, Ghana and Tanzania¹². These countries launched the African Data Cube in May of 2018 and its mission is to inspect certain geographic changes over the past 35 years using satellite data.

While the African Data Cube has a limited mission, lessons learned on important policy and legal concerns (i.e. intellectual property rights, liability, national security, etc.) could be documented and developed into best practices. Governments could then use these best practices within their own nations to increase data sharing between federal and subnational government agencies. Over time, these best practices could be incorporated into the nations’ laws and regulations. The member countries could also use the lessons learned and the goodwill created through the African Data Cube to create a similar arrangement for the sharing of other types of geospatial information. These arrangements could be used in the future to develop a regional approach such as INSPIRE.

¹² https://www.earthobservations.org/documents/meetings/201805_rapp_sdg_odc/201805_odc_announcement.pdf (accessed June 30, 2018)

Critical Aspects of a Legal and Policy Framework for Geospatial Information Utilization

When constructing a legal and policy framework, it is important to identify the problems to be addressed. Once these issues are understood, possible solutions can be identified by using the binding and non-binding elements described above.

Issues that Impact Governance and Accountability

At a high level there generally two types of issues to be addressed. The first set of issues concern which organization(s) are responsible for implementation and accountability for geospatial information management? In other words, which organization(s) are responsible for ensuring that the spigot for geospatial information is turned on and upon acceptable terms.

1. Designation of Lead Organization

One critical consideration is whether to designate a lead organization that is primarily responsible for geospatial utilization within a nation. This organization would have the authority to coordinate activities between the various stakeholders. In addition, it would be the focal point on budget and finance issues. A lead organization can play a vital role for a nation to both initiate and follow through on geospatial information management initiatives.

The organization often is a government agency, such as a land registry, a national mapping agency, or in some cases a military agency. The choices of the lead organization will have a significant impact on how issues are addressed. For example, a military agency will have a very different to approach to data availability than an agency responsible for land administration. However, the lead organization does not need to be a single government agency. It can also consist of several government agencies involved in geospatial information management. For example, in the U.S. the Federal Geographic Data Committee (FGDC) is “an organized structure of Federal geospatial professionals and constituents that provide executive, managerial, and advisory direction and oversight for geospatial decisions and initiatives across the Federal government.”¹³ It is chaired by the U.S. Secretary of the Interior with the Deputy Director for Management of the Office of Management and Budget, as Vice-Chair.

As described above, there are several benefits if this designation of a lead organization is prescribed through a law. However, experience suggests that it can also be designated more informally, such as through a policy. For example, the FGDC’s authority described above comes from OMB Circular A-16, which is essentially a written statement of government policy.

¹³ <https://www.fgdc.gov/organization> (accessed June 30, 2018)

Example

Spatial Data Infrastructure Act 54 of 2003. (South Africa) – designates the Ministry responsible for Land affairs as the lead government office and grants broad authority¹⁴.

2. Data Collection and Governance

Another matter with a direct impact on geospatial information utilization that is typically addressed in a legal and policy framework is whether any particular government agency - or private sector party licensed and/or approved by a government agency - has exclusive authority to collect certain types of geospatial information. There are several reasons why the collection of geospatial information may be limited to certain approved entities. For example, national mapping agencies, or certain military departments may wish to be responsible for collecting certain types of information for national security purposes. Alternatively, it may be important for licensed surveyors to collect certain types of authoritative mapping data.

However, great care should be given when developing laws and policies that limit the collection of geospatial information to certain groups – government or licensed professionals. For example, unless the monopoly on the collection of types of geospatial information is clearly defined and limited, these groups will often try to extend their monopoly to other types of information. These efforts could reduce innovation and adoption of new technologies. For example, many states in the U.S. restrict the collection of certain types of mapping information to state-licensed surveyors. These surveyors now are trying to use these laws and regulations to restrict the use of drones for mapping applications. Some argue that the laws are outdated and not intended to address new technologies.

Example

Decree on Surveying, Aerial Photography and Mapping No. 330/GOL (September 18, 2014) – addresses a wide range of issues related to the collection, use and export of geospatial information in Laos¹⁵.

¹⁴ <http://www.ruraldevelopment.gov.za/phocadownload/Acts/spatial%20data%20infrastructure%20act%2054%20of%202003.pdf> (accessed December 1, 2018)

¹⁵ http://www.ngd.la/wp-content/uploads/2014/12/02-Decree330GOL_English.pdf (accessed December 1, 2018)

3. Sector/Platform Specific Laws

There also are a number of sector specific laws and policies that must be considered in a legal and policy framework for geospatial information management. Many of these laws and policies are closely related to the geospatial community – for example surveying, or land administration. Others are more indirect, such as satellite remote sensing – which tend to be the responsibility of space or military agencies– and aerial collection of geospatial information – which are subject to laws and policies governing aviation. However, all play an important role in the availability of geospatial information within a nation.

For example, strict licensing requirements for surveyors may limit the number of people and organizations that are collecting geospatial information. Similarly, national security concerns over satellite remote sensing data may make it difficult for certain segments of the geospatial ecosystem to acquire valuable satellite imagery.

The ability of the geospatial community to impact these law and policies may be limited because the interests of the other communities often will outweigh the geospatial community’s interests. However, it is important for the geospatial community to recognize the role these laws and policies have on geospatial information management and to highlight the impact that overly restrictive laws and policies have on important applications that use geospatial information.

Example

Australia’s Civil Aviation Safety Authority 96/17 Direction of operation of certain unmanned aircraft¹⁶

4. Financing

Financing of geospatial information management is another critical issue that must be considered in a legal and policy framework. Financing has been identified as a strategic pathway and like the Strategic Pathway 2 - Policy and Legal, it is related to many other strategic pathways.

As financing is a separate strategic pathway, it will not be discussed in detail here. However, it is important to note that appropriate financing must be in place for government agencies to not only collect geospatial information but also for maintenance, storage and making it available to third parties. Costs to be considered include hardware, software, training and all the other aspects typically associated with operating a government program.

¹⁶ <https://www.legislation.gov.au/Details/F2017L01370> (accessed December 1, 2018)

Issues that Indirectly Impact Geospatial Information Management

The second set of issues to consider in a legal and policy framework are those that impact the flow of geospatial information. Many of these are addressed as part of a nation's broader legal and policy framework. For example, data protection/privacy or intellectual property rights in geospatial information. As a result, a nation's geospatial community is not likely to be able to unilaterally decide what the laws and policies should be on these issues. However, stakeholders should understand the impact that these issues have on geospatial information and participate in all discussions pertaining to amending or updating these laws.

1. Intellectual property rights

Issue: Geospatial products and services increasingly are created by combining geospatial information from a variety of sources. However, the intellectual property rights in data are different than in other nontangible assets, such as software. For example, in many jurisdictions, copyright does not apply to a simple compilation of facts – which includes many types of geospatial information products. In other cases, such as those in Europe, countries provide certain intellectual property protections to databases. In addition, there is much uncertainty as to how to apply intellectual property rights to geospatial products or services that are created by aggregating several different data sets. The issue is likely to become more complicated with sensors that collect new types of data.

Impact: This uncertainty can have significant impact on geospatial information management within a nation. It can result in complex data licenses, as the data providers try to protect their rights through contract rather through law. This complexity increases the difficulty for data consumers to determine if and how they can use the geospatial information. The challenge is particularly complex when data providers each have their own data licenses. Alternatively, data providers may be unwilling to offer certain data in a country if they do not feel their intellectual property rights receive adequate protection. For example, if existing law allows a competitor to scrape their websites and resell data that was collected and organized at significant cost.

Analysis: A legal and policy framework that enables geospatial information management will help clarify the intellectual property rights in geospatial information for both data providers and data consumers. For example, a nation that wishes to provide data providers more protection might adopt a law that protects intellectual property rights in databases. Alternatively, a government may place government-generated information in the public domain – essentially giving up all ownership rights in the data or make the information available under an open data license with few restrictions¹⁷. There are also non-binding ways to reduce the friction associated with uncertainty over intellectual property rights. For example, in the United Kingdom, the Ordnance Survey website includes a guide to licensing¹⁸. Alternatively, efforts can be made to encourage lawyers to learn more about the various types of geospatial information and how it is collected and used, so that they will be better prepared to advise their clients.

Example

European Union Directive 96/9/EC of the European Parliament and of the Council of 11 March 1996 on the legal protection of databases (the “Database Directive”). The Database Directive provides certain protections to databases, including databases of geospatial information¹⁹.

2. Privacy/Data Protection

Issue: There is a growing trend across the globe to regulate the collection and use of personal information that could be used to identify an individual or infringe upon his or her privacy. Increasingly, government regulators are recognizing that geolocation information is a powerful tool that can be used to infringe upon an individual’s rights. As a result, laws are being passed to regulate the collection and use of certain types of geospatial information²⁰. Currently these laws do not include satellite and aerial imaging or other traditional mapping technologies, however, this may change as concerns over drones grow.

¹⁷ See below for a discussion of open data licenses

¹⁸ <https://www.ordnancesurvey.co.uk/business-and-government/licensing/using-creating-data-with-os-products/os-opendata.html> (accessed December 16, 2018)

¹⁹ <https://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:31996L0009:EN:HTML> (accessed June 30, 2018)

²⁰ See e.g. the General Data Protection Regulation (GDPR) (<https://eur-lex.europa.eu/legal-content/en/ALL/?uri=CELEX:32016R0679>) and the California Consumer Privacy Act of 2018 (https://leginfo.ca.gov/faces/billTextClient.xhtml?bill_id=201720180AB375) (accessed June 30, 2018)

Impact: Currently, there are only a few laws around the globe that regulate the collection or use of geospatial information for privacy/data protection purposes. However, even if traditional geospatial information is not regulated, there is a risk that broad data protection laws may limit the ability of the geospatial community to access and use the vast amount of new geospatial-enabled information that is now being collected. For example, laws and regulations that treat geospatial information collected by some platforms (i.e. drones) differently than others (i.e. satellites or manned aircraft) are likely to confuse data consumers. In addition, over time policy makers and lawmakers will begin to focus on regulating the data instead of the platform and this could have a significant impact on the broader geospatial community.

Analysis: Data protection and privacy laws are being introduced (or updated) to address concerns with all types of Big Data, not just geospatial information. Therefore, efforts to introduce data protection laws and policies will often occur without considering the impact on the geospatial community. In such instances, there is a real risk that the laws and policies that develop will have an unintended impact on a legal and policy framework for geospatial information management. As a result, it is critical for the geospatial community within a nation to participate in this process. Since data protection is generally a trade-off between the benefits of the data being used (both public and private) and the perceived risks, it is important for the geospatial community to highlight the many uses and benefits of geospatial information. It is also important to explain to lawmakers and policymakers the potential impact – including unintended consequences – of proposed data protection laws on geospatial information management.

Example

Regulation (EU) 2016/679 of the European Parliament and of the Council of 27 April 2016 on the protection of natural persons with regard to the processing of personal data and on the free movement of such data, and repealing Directive 95/46/EC (General Data Protection Regulation)²¹

3. Liability

Issue: As applications that utilize geospatial information grow, so will disagreements over which organizations are responsible for data quality issues or the misuse of geospatial information. Consequently, it is helpful for a legal and policy framework for geospatial information management to clarify issues of liability.

²¹ <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32016R0679> (accessed December 1, 2018)

Impact: A lack of certainty around liability issues often impacts the adoption of new technologies or applications. For example, in the United States, the testing of autonomous vehicles has been slowed due in part to concerns over which parties are responsible in the event of an accident. Some of these issues concern data quality. Similarly, some government agencies are reluctant to use crowd-sourced data as they are unsure as to the quality the information and do not want to be liable if someone is injured.

Analysis: There are several ways in which a legal and policy framework can address liability concerns associated with geospatial information. For example, in some countries government agencies are protected by sovereign immunity – i.e. they are immune from being sued for actions they take that are related to their governmental function. Such protections can be included in a nation’s constitution or in its laws. Another way to allocate risks associated with data quality is through agreements. For example, a government agency can obligate its vendors to comply with certain geospatial standards. If these standards are not followed, the vendor can be responsible for any damages that arise. Alternatively, government agencies can include in their vendor contracts provisions that waive or limit the liability of vendors. This will make it easier for vendors to perform tasks that have inherent risks associated with data that are difficult to quantify.

Example

Indonesia’s Geospatial Information Act No 4 2011 - Article 51 provides that “Government Institutions and Local Governments should use accurate GI in decision making process and/or in determination of policies that involve geospatial aspects.”²²

4. National Security

Issue: Government officials at all levels are concerned that the broad availability of certain types of geospatial information is a risk to homeland or national security. This is due, in part, because in many countries geospatial technologies were initially developed and or used by military or intelligence departments. As a result, these departments often are concerned about any new geospatial technologies and/or new applications that collect or use geospatial information. While such apprehension is understandable given the respective agencies’ mandates, as described above, overly restrictive laws and policies that are intended to limit the collection and use of geospatial information for national security purposes often will have much broader consequences.

²² [http://www.un-ggim-ap.org/article/Information/unggimap_meetings/plenary/LawNo.4Year2011GeoSpatialInformationofIndonesia- EnglishVersion.pdf](http://www.un-ggim-ap.org/article/Information/unggimap_meetings/plenary/LawNo.4Year2011GeoSpatialInformationofIndonesia-EnglishVersion.pdf)

Impact: Concerns over national security can have a significant impact on the availability of geospatial information. For example, the commercial remote sensing industry in the United States is hampered by limitations on the resolution of electro-optical imagery. In addition, national security concerns are also responsible for the slow roll out of other sensors on satellites, such as radar. Similarly, national security concerns associated with accurate maps have resulted in some countries restriction the creation of maps.

Analysis: Given that each nation has a unique set of internal and external national and homeland security concerns, it is impossible to develop a single approach to address this issue. However, when developing a legal and policy framework, it is important to realize that such restrictions will have a broader impact on geospatial information management as a whole within a nation. As a result, it is useful to have a mechanism to assess the national security concerns associated with geospatial information.²³

Example

Surveying and Mapping Law of the People’s Republic of China²⁴ - Article 29 addresses “surveying and mapping results” that are deemed “state secrets”

Role of Data Sharing Agreements/Data Licenses

Another critical element to legal and policy frameworks for geospatial information management is data sharing/license agreements of geospatial information collected by government agencies. This is because in order for geospatial information to be fully utilized, government agencies must be willing to share information with other agencies (and with the private sector). Such sharing must take place between national government agencies, as well as with subnational government agencies and international organizations.

Unfortunately, sharing by and between government agencies is often limited. There are many reasons for this lack of sharing. For example, having control over information often is considered to be power. Therefore, any sharing of geospatial information is considered by officials to be a weakening of a government agency’s authority. Another concern government agencies have in sharing is that they will be responsible – either legally or in the court of public opinion - if the geospatial information is used improperly or is otherwise not fit for another agency’s purpose. Some government agencies will claim that they are unwilling to share data due to national security concerns. Privacy concerns are also commonly used as an excuse for not sharing data, even if a country does not have a formal data protection/privacy regime.

²³ See e.g. “Guidelines for Providing Appropriate Access to Geospatial Data in Response to Security Concerns”, Federal Geographic Data Committee (2005) (<https://www.fgdc.gov/policyandplanning/Access%20Guidelines.pdf>) and Mapping the Risks: Assessing the Homeland Security Implications of Publicly Available Geospatial Information, Rand Corporation, 2004)

²⁴ <http://en.nasg.gov.cn/article/Lawsandregulations/201312/20131200005471.shtml> (accessed December 1, 2018)

A data sharing/license agreement is a complex legal document that can address these concerns by balancing the needs of the user (the “licensee”) with those of the data provider (the “licensor”). If a license is too restrictive – i.e. provides the licensor too many protections, the licensee may not be able to generate the necessary value from its use. On the other hand, a government agency may worry that if the license is too permissive – i.e. the licensor has limited protections – it will be held liable for any damages that arise from the use of the geospatial information. In developing the licensing component of a legal and policy framework for geospatial information, it is important to consider the perspectives of both the licensor and licensee.

One way to generate greater sharing of geospatial information between government agencies is through legislation. For example, INSPIRE directs government agencies in Europe to share information.²⁵ However as explained above, developing legislation can take many years.

Fortunately, there are other informal ways for agencies to share information that are much easier to initiate. For example, some government agencies enter into Memorandum of Understanding (MOUs) with other agencies to share certain data sets. Such MOUs are not binding but can still address many of the parties’ respective concerns and serve as a basis for building trust. Alternatively, agencies can enter into formal data sharing agreements. These tend to be more formal and address the concerns in more detail.

Over time, as data sharing becomes more accepted within a government, it will be easier to develop legislation that mandates such sharing. Such legislation could include many of the details in the MOUs or data sharing agreements, such as the type of geospatial information to be shared, under what conditions and which parties are responsible for data quality. It might also include what rights a licensee has to share the geospatial information it received with others. It might also outline how privacy and national security concerns should be addressed. For example, legislation might create a committee of senior officials that would adjudicate any disagreements as to whether data can be shared.

Open Data Licenses

Since as discussed above, the geospatial community is an ecosystem, a legal and policy framework should also address the way in which government generated geospatial information is made available to those outside the government. Potential consumers of government-generated geospatial information include industry, universities, research institutes, NGO’s and the public. They will use this geospatial information in a variety of ways, including to generate products and services that can create tremendous economic value, create jobs and provide other societal benefits.

²⁵ <https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX%3A32010R0268> (accessed June 30, 2018)

There are several ways in which government data can be made available for use. For example, much of the geospatial information collected or generated by the U.S. federal government is in the public domain because “copyright protection . . . is not available for any work of the United States Government.”²⁶ Therefore, generally, anyone can use or copy this information for any purpose without any restrictions.

However, in most instances a government agency will want to retain ownership rights in the data. For example, some countries’ constitutions provide that government-generated information is subject to the government’s copyright. In such instances the government agency will grant others certain rights in the geospatial information through a license. The terms of such license could be included in a stand-alone license agreement, or it could be included in a Terms of Service or Terms of Use, if the geospatial information is provided through a web portal.

Government data is increasingly being made available through “Open Data” initiatives. The requirement to make data open may be pursuant to a law. However, more often these initiatives begin as government policies. Sometimes these initiatives are led by government agencies that create geospatial information. In many cases though, these initiatives are imposed upon agencies responsible for geospatial information by other government agencies. As a result, these open data policies often do not take into consideration the unique aspects of geospatial information described above. Therefore, it is critical for a nation’s geospatial community to actively participate in government-wide open data discussions to make sure its interests are understood. A more detailed discussion of Open Data Licenses for geospatial information can be found in the Compendium for the Licensing of Geospatial Information.²⁷

²⁶ 17 U.S. Code § 105

²⁷ http://ggim.un.org/ggim_20171012/docs/meetings/GGIM7/Agenda%208%20-%20Compendium%20on%20Licensing%20of%20Geospatial%20Information.pdf (accessed December 17, 2018)

The Role of a Gap Analysis

It is important for a government to identify the reason(s) for wanting to change the existing legal and policy framework. It is also important to identify what the legal and policy framework should accomplish when the process is complete. Finally, it should identify steps that can be taken to achieve the stated goals.

Step 1 – Identifying the Existing Legal and Policy Framework.

The first step in this process is to understand the country's current legal and policy framework when deciding what additions or changes are needed for geospatial information management. This should include bringing together representatives from stakeholders across the country's geospatial ecosystem to create an inventory of laws and policies that impact geospatial information management. This "geospatial council" should consist of both users and data providers from government, industry as well as NGOs and the academic and research communities. It should also consist of lawyers that understand the issues facing the various stakeholders. The following are examples of the types of questions that the council should consider in creating an inventory:

- Is there a law or policy that identifies a lead organization for geospatial information management within the government?
- Has the country entered into any treaties or regional agreements that could impact utilization of geospatial information?
- What rights do subnational governments have to regulate the collection/use/storage/distribution of geospatial information?
- Are there laws and regulations that specifically restrict or regulate the collection of geospatial information, including the relevant platforms and/or sensors?
- Are there laws, regulations or policies, etc. that specifically restrict or regulate the use, storage or distribution of geospatial information?
- What intellectual property protections do geospatial products receive?
- Is there a data protection law? If so, does it reference geospatial information?
- Are there laws or policies that limit the collection or use of geospatial information for national security purposes?
- How is data shared between government agencies?
- Are there laws, regulations or policies that impact such sharing? Is there a standard data sharing/license agreement used between government agencies or with the private sector (industry/public/NGO's/universities, etc.)?

Step 2 - Identify the gaps

Once the inventory is completed, a government can then conduct a gap analysis. Such a gap analysis should identify how the current legal and policy framework impacts geospatial information management.

One method to accomplish this step is to conduct one or more tabletop exercises with relevant stakeholders. The tabletop exercise should be based upon a use case involving the collection, use and sharing of geospatial information that is important to the nation. An example of a use case prepared by the UN Working Group on Legal and Policy Frameworks for Geospatial Information Management can be found in Appendix 2. (This use case should be used for illustrative purposes and each nation should develop their own based upon their needs, legal systems and perceived issues.)

The tabletop exercise should include representatives from key stakeholders in industry, government, NGO's and the research and academic communities so that their respective uses of geospatial information are considered. Such stakeholders should include both data providers and consumers of data. In addition, lawyers from these stakeholders should participate so as to ensure that the proper legal issues are considered. The results from the tabletop exercise should be analyzed to determine what laws and policies need to be changed or added to reach the stated goal. The difference between the current framework and the desired framework are the "gaps".

Step 3 - Addressing the Gaps.

Once the objectives have been defined, and the gaps identified, the "geospatial council" can then make recommendations to the government on how best to address the gaps. One way to approach this step is to consider the elements of a legal and policy framework discussed above to be tools in a toolbox. The council should consider which tool – e.g. law, regulation, policy, best practice, agreement, etc. - works best to address each of the gaps that have been? For example, does an informal policy work or is a law or regulation required?

Future Proofing the Legal and Policy Framework

One of the challenges for all nations in developing a legal and regulatory framework for geospatial information utilization is that the technologies that collect and process geospatial information, and the associated applications, are undergoing tremendous change. For example, mobile devices, cloud computing, drones and small satellites already have a significant impact on the geospatial community. In the future, the internet of things (IoT), machine learning, and autonomous vehicles are all also likely to significantly disrupt how geospatial information is collected, used, stored and distributed. Each of the policy and legal issues impact – and are impacted by– these new technologies. Moreover, the immediate reaction often is to introduce a law or regulation to address the perceived risks associated with new technology, before the potential benefits are understood. As a result, it is important to try to “future-proof” a legal and policy framework as much as possible so that it does not quickly become outdated.

Future proofing a legal and policy framework must consider two scenarios. First, it must consider whether existing laws and policies need to be changed. Second, it must consider whether new laws or policies should be introduced to enable the use of new technologies. For example, in many countries drones are not able to operate in the national airspace without new laws.

There are several ways in which legal and policy frameworks can be “future-proofed”. One method is to initially address the challenges raised through informal or non-binding elements. For example, a government agency might issue a policy as to how a new technology should be used within the government or an industry group may adopt voluntary best practices. These are relatively easy to adopt, and they can be either updated or turned into law as the implications become clearer.

If the decision is made that a law or regulation needs to be developed, there are several ways to help ensure that it can adapt to future technologies. One method is to put a clause into a law that it expires unless it is re-adopted by the proper authority. These provisions, sometimes called “sunset clauses”, gives stakeholders the opportunity to review the impact of both the technology and the law to make sure there are no unintended consequences, and that the issues raised have been properly addressed. Alternatively, a law can include language that provides that it be reviewed after a certain period of time. For example, a legislative body may require a government agency to report back on an annual basis on the impact that the law is having, so as to determine whether it needs to be updated.

The geospatial council mentioned above can play an important role when considering how and when to “future-proof” a legal and policy framework. However, since disruptive technologies often are developed and used by non-traditional actors, it is critical to make sure that their input is included. This is particularly important since traditional stakeholders may be threatened by these disruptive technologies and try to use the existing legal framework hold back their adoption. On the other hand, the new stakeholders may downplay the proposed risks, or overstate the benefits of new technologies – all of which play an important calculation in developing a framework.

The recent report, “Drones Under the Horizon: Transforming Africa’s Agriculture”, highlights the need to future proof a legal and policy framework. The report highlights the tremendous value that drones offer in Africa, but warns that “UAV regulations are still in its infancy in Africa, the making and the presence of too restrictive, or even disabling regulations governing the import and use of UAVs can hinder the development of a very promising industry...”²⁸ The report goes on to state that appropriate regulations should balance competing security concerns with need to encourage innovation, economic development and youth entrepreneurship. It recommends developing a continental regulatory framework for the use of UAVs in Africa, and harmonizing policies across countries and regions.

²⁸ See Drones Under the Horizon: Transforming Africa’s Agriculture; African Union, New Partnership for African’s Development (2018). p. 11

Conclusion

The geospatial community has recognized that having the appropriate legal and policy framework is a critical element for geospatial information management. Such a framework is crucial since it impacts so many other critical strategic pathways that impact geospatial information management. A legal and policy framework consists of a number of elements – some of which are legally binding, while others are less formal, and non-binding. Each of these elements can be used to address the wide range of policy and legal issues that impact the collection, use, storage and distribution of geospatial information. Some of these issues are directly related to geospatial information management, while others, although equally important, are more indirectly related. A nation can prepare conducting a gap analysis to develop the what changes need to be made to develop an appropriate legal and policy framework for a nation. One method to identify such gaps is through a tabletop exercise in which representatives from all of the stakeholder in the nation’s geospatial ecosystem, including lawyers, discuss one or more use cases that involve the collection and use of geospatial information.

Appendix 1

Common Legal Terms²⁹

<u>Assignment</u>	The act by which one-person transfers to another, or causes to vest in that other, the whole of the right, interest, or property which he has in any realty or personally, in possession or in action, or any share, interest, or subsidiary therein.
<u>Attribution</u>	The action of ascribing a work or remark to a particular author, artist, or person.
<u>Best practice</u>	Commercial or professional procedures that are accepted or prescribed as being correct or most effective.
<u>Breach</u>	Failure to live up to a term or the terms of a contract.
<u>Commercial</u>	Making or intended to make a profit.
<u>Compensatory damages</u>	A sum of money to replace what was lost.
<u>Consequential damages</u>	Damages that can be proven to have occurred because of the failure of one party to meet a contractual obligation.
<u>Copyright</u>	A right granted by statute to the author or originator of certain literary or artistic productions, whereby he/she is invested, for a limited period, with the sole and exclusive privilege of multiplying copies of the same and publishing and selling them.
<u>Covenant</u>	Promise of two or more parties, which either of the party's pledges to the other that something is either done or shall be done or stipulates for the truth of certain facts.
<u>Decree</u>	An official order issued by a legal authority.
<u>Derivative Product</u>	A work taken from existing works that is copyrightable.
<u>Exclusive Use</u>	Use of the geospatial information is limited to the Licensee for the term of the license.
<u>Executive order</u>	A rule or order issued by the president to an executive branch of the government and having the force of law.
<u>Force Majeure</u>	An event that no human foresight could anticipate or which, if anticipated, is too strong to be controlled. Examples include earthquakes, tsunamis, lightning, or other events which make performance impossible or extremely impracticable.
<u>Indemnification</u>	To guarantee through a contractual agreement to repay another party for loss or damage that occurs in the future.
<u>Indirect damages</u>	Damages that are the necessary and connected effect of the wrongful act.
<u>Law</u>	A rule of conduct or action prescribed or formally recognized as binding or enforced by a controlling authority.

²⁹ Definitions were developed from several sources, including <http://thelawdictionary.org/>, <http://legal-dictionary.thefreedictionary.com/> <https://definitions.uslegal.com/r/representation/>, and <https://en.oxforddictionaries.com>

<u>Legislation</u>	Proposed law or laws.
<u>Liability</u>	Being responsible to pay or compensate for something by law, or to be otherwise legally responsible.
<u>License</u>	A permission, accorded by a competent authority, conferring the right to do some act which without such authorization would not be permitted.
<u>Licensee</u>	An entity to whom a license has been granted.
<u>Licensor</u>	An entity who gives or grants a license.
<u>Metadata</u>	A set of data that gives information about other data.
<u>Non-commercial</u>	Not have a commercial objective, such as making a profit.
<u>Norm</u>	A standard or pattern, especially of social behavior, that is typical or expected of a group.
<u>Ordinance</u>	An authoritative order or decree.
<u>Policy</u>	A course or principle of action adopted or proposed, often by a government agency.
<u>Precision</u>	The closeness of two geolocated items to each other.
<u>Product Liability</u>	The legal liability a manufacturer or trader incurs for producing or selling a faulty product.
<u>Public Domain</u>	The state of belonging or being available to the public as a whole, especially through not being subject to copyright or other legal restrictions.
<u>Publish</u>	Communicating a work.
<u>Punitive Damages</u>	Damages exceeding simple compensation and awarded to punish a party.
<u>Regulation</u>	A rule or order issued by an executive authority or regulatory agency of a government and having the force of law.
<u>Representation</u>	A statement of fact made with the purpose of getting someone to become party to a transaction or contract.
<u>Rule</u>	One of a set of explicit or understood regulations or principles issued by a government agency.
<u>Special Damages</u>	Extra damages that are awarded to a plaintiff over the loss of his/her property after considerations of the circumstances.
<u>Standards</u>	An agreed way to do something.
<u>Trade Secret</u>	Intellectual property like know-how, formulas, processes and confidential information giving the owner a competitive advantage.
<u>Treaty</u>	A formally concluded and ratified agreement between countries.
<u>Warranty</u>	A promise that something in furtherance of the contract is guaranteed by one of the contractors, especially the seller's promise that the thing being sold is as promised or represented.
<u>Work</u>	A literary, artistic or musical composition such as an image, audiovisual material, text, or sound.

Appendix 2

Use Case

1. Many parts of Country A are suffering from a drought, which is leading to starvation in several parts of Country A. As a result, several thousand citizens from Country A have migrated to Country B and Country C, which also borders Country A. Some experts predict that tens of thousands of others will attempt to cross the borders in the next several months if the situation in Country A does not improve. Countries B and C are seeking help in better understanding how many refugees they are likely to receive and where.
2. Civil unrest in Country A has resulted in damage to a chemical storage facility, with some toxic chemicals being released into the atmosphere. Although Country A claims that the chemical storage facility was being used solely to produce chemicals for commercial and agricultural use, some military experts outside of Country A believe that chemical weapons are stored there as well.
3. The United Nations and various Non-Governmental Organizations (NGOs) are trying to understand the extent of the drought and food shortage in order to determine how much aid is needed and where it should be sent. They also want to share this information with the governments of Countries B and C, so they can better prepare for the refugees. The entire international community is interested in learning the composition of the chemicals that have been leaked and how far and in what direction the chemicals are likely to spread.
4. Countries A, B and C and other stakeholders from around the globe will require vast amounts of geospatial information to help answer these questions. However, Country A's has limited capabilities to collect, process and use geospatial information. In addition, the International Charter on Space and Major Disasters has not been activated due to the slow-moving nature of a drought. As a result, the needed information will need to come from government agencies, industry and transnational organizations from around the globe. A number of different types of geospatial information will be required to address these issues, collected from many types of sensors, and deployed on several different platforms – i.e. satellite, air (both manned and unmanned) and ground-based). In addition, smart phones could also collect and share valuable geospatial information.
5. The stakeholders wish to create geospatial products and services by aggregating the different types of geospatial information. In some cases, this information will be publicly available, but in most cases, it must be obtained (i.e. licensed) from either industry or government sources.

Assume you are the senior lawyer in the government agency of Country A and that the legal and policy framework is identical to yours. Please be prepared to address the following questions at our next meeting.

1. OpenStreetMap has offered to come in and work with local communities to map areas impacted by the drought. Are there any laws or policies in your country that would restrict them from creating these maps or sharing them with others outside of the country?
2. A commercial satellite imagery provider has offered to donate high resolution satellite imagery to your agency but is asking for a license that is very restrictive on transfer to other government agencies, re-use and/or derivative products. You have been asked what rights you need in the satellite imagery in order to develop effective products and services to address the drought?
3. Several NGO's have asked permission to operate drones over the country to collect data on the chemical release and share this with a number of countries around the globe so that they can prepare in case the chemicals enter their atmosphere. What legal issues do you see.
4. Your military department wishes to use geolocation data from mobile phones to identify and monitor the movement of refugees. It has asked the mobile phone carrier to turn over all of its records. You have been asked if there are any legal issues that need to be considered.

Appendix 3

Additional Reading

“Building Ethics into Privacy Frameworks for Big Data and AI”, Global Pulse and International Association of Privacy Professionals (2018)

Compendium on Licensing of Geospatial Information (United Nations Committee of Experts on Global Geospatial Information Management (June 2017)

“Data as IP and Data License Agreements”, Glazer, Lebowitz, Greenberg, Practical Law (2013)

“Data is Different: Why the World Needs a New Approach to Governing Cross-border Data Flows” (Center for International Governance Innovation – Susan Ariel Aaronson) November 2018

The Dissemination of Government Data In Canada: Guide to Best Practices; v2, GeoConnections (2008)

Geographic Data and the Law: Defining New Challenges, Janssen & Compvoets, Leuven University Press (2012)

Geographic Information Service: Mastering the Legal Issues, Dr. George Cho, Wiley (April 2008)

“GIS Data Dissemination and Intellectual Property Rights”, P Jothimani and K Venugopai, Indian Cartographer (2002)

Guidance on the ‘Regulation on access to spatial data sets and services of the Member States by Community institutions and bodies under harmonized conditions’ INSPIRE: DT Data and Service Sharing (September 1, 2013)

“Guidelines for Providing Appropriate Access to Geospatial Data in Response to Security Concerns”, Federal Geographic Data Committee (2005)

“Intellectual Property Law and Geospatial Information: Some Challenges”, Teresa Scassa and D.R. Fraser Taylor, The WIOP Journal: Analysis of Intellectual Property Issues; Vol 6, Issue 1 (2014)

“Legal Interoperability of Research Data: Principles and Implementation Guidelines”, RDA-CODATA Legal Interoperability Interest Group (September 8, 2016)

Licensing Geographic Data and Services, National Research Council on the National Academies (2004)

Mapping the Risks: Assessing the Homeland Security Implications of Publicly Available Geospatial Information, Rand National Security Corporation (2004)

“Open Content Licensing of Public Sector Information and the Risk of Tortious Liability for Australian Governments”, Cheryl Foong, eLaw Journal (2011)

“The Protection of Maps and Spatial Databases in Europe and the United States by Copyright and the Sui Generis Right”, Katleen Janseen, Jos Dumortier, John Marshall Journal of Computer & Information Law (2007)

“Public Transit Data Through an Intellectual Property Lenses: Lesson About Open Data”, Teresa Scassa, Fordham Urban Law Journal: Vol. XLI, Issue V, Article VIII (2015)

Volunteered Geographic Information and the Future of Geospatial Data, C.E.C. Campelo, M. Bertlotto and P. Corcoran, IGI Global, (March 2017)