

# GIS Data Dissemination and Intellectual Property Rights

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## Abstract

With the entire globe being digitised and every inch of land and oceanic surfaces being integrated through digital data products, distribution/ dissemination of spatial data assumes greater significance. Developed countries are much ahead and their current task is to spearhead the availability of digital data products through Internet. It is challenging for developing or under-developed countries in implementing this gigantic task. It is furthermore difficult in countries like India, which traditionally adhere to strict procedures laid down by government for dissemination of such data. In the forthcoming scenario wherein we are blessed with the availability of high-resolution satellite data and its products, the new paradigm comes into play i.e., "Intellectual Property Rights". In this context an attempt has been made to explain various issues related to patent, copyright and intellectual property rights, more specific to GIS systems, products and services. This paper also attempts to review the current status of digital data generation and dissemination as well as forthcoming "NSDI networking" based thematic map dissemination and related value-added services.

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## 1. Introduction

Digital spatial data likely to be available in huge quantities that too for countries like India where a billion-plus human population interacts with environment, and its

dissemination over the network is a complex and gigantic task in scale and dimension. Integrated information and communication technologies provide tremendous opportunities as well as challenges in data storage, retrieval, analysis and dissemination. Current technological advancements and future forecast that computer networks will be powerful in gathering information rapidly and inexpensively. This leads to the tremendous integration and development of third party-products and also secondary use of transactional data. Geographical Information Systems (GIS) are concerned with spatial data collection, analysis and their use. These inputs are primarily from topographical/ thematic maps, GPS/ ground based observations and aerial and space-borne sensors. Such a digital spatial data generation and dissemination will be effective through convergence of information and technologies from geo-spatial technologies as well as Communication technologies which are broadly grouped into (a) non-spatial (b) spatial and (c) networking/ communication technologies and sub-segments listed below;

- (a) Non-Spatial Data Sets (for ex Land Records, MIS and Miscellaneous)
  - (i) Computerised MIS, Relational Data Base Management Systems
- (b) Spatial Data Sets (Basic Digital Vector Data, value-added data Services)
  - (ii) Remote Sensing/GIS Technology based products
  - (iii) 3 D – GIS and Digital Photogrammetry based products
- (c) Networking/Communication Technologies(Dissemination/ administration)
  - (v) Networking, Wireless technologies
  - (vi) Computer Integrated Telephony, Real-time applications

## 2. Digital Data Ownership and Related Copyright Liabilities

It has been primarily Survey of India, the authenticated government agency all the way responsible for survey, publication and dissemination of printed topographical maps and later spearheaded by National Atlas and Thematic Mapping Organisation (NATMO) through thematic maps. Recent developments indicate that both these agencies have gone the digital way, thus by making available digital data to the interested users. Recent decade witnessed mushroom growth of private agencies/ companies "digitizing and selling" these map products in the open market. Incidentally the source data is either from SOI/NATMO (in exceptional cases, town guide

maps). In some cases (like Eicher city maps) these large-scale maps larger than 1: 25,000/10,000 the source of data were supplemented by limited ground surveys as well as recent satellite images. Then came the “authorisation of nine government agencies” by the government of India for digitizing/ incorporating the detailed information like heights, contours etc in the commercially available digital map products. Legal ban anyway existed for publication/ dissemination of “restricted category” topographical maps and large-scale “vectorised digital spatial data”. Web based digital spatial data dissemination (digitised vector) had to depend upon the client-server computer capabilities and this enabled the user to have indirect access to the digital vector data. Bitmaps or JPEG format maps appear on the users’ screen with minimal manipulation capabilities, while the original data lies in the server and processing happens in the host-server or web-server that distributes the data.

Legal obligations include applicable sections of *official information act*, *official secrets act* and *cyber-crime act* amended from time to time. Under such scenario, ownership of geographic information, liability issues, legal rights and duties, limitations, responsibilities, code of conduct had to be promulgated and adopted under the legal framework within each countries, worldwide by users, system developers and data custodians. GIS system “per se” do not fit into any of the specific categories of ‘works’ whether literacy, dramatics or artistic but yet these are products of human creativity and of great value to the society in all its applications. It has been projected that “thin” copyright for GIS map products give the ease of copying digital data. Court of law examines the *process* as well as data as an asset in GIS systems within the framework of the concerned (Cho, 2000).

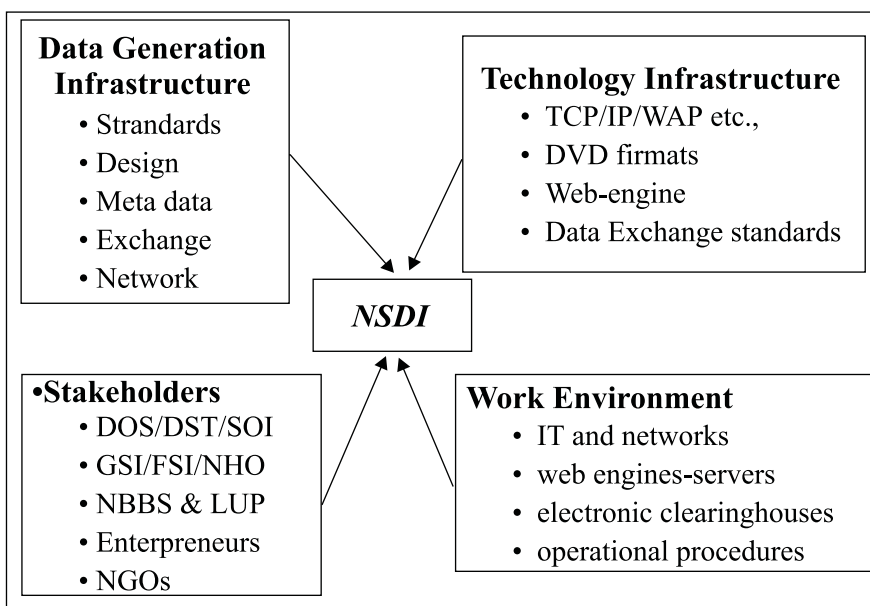
### 3. Digital Data: Current Initiatives and Future Prospects

**3.1 National Spatial Data Infrastructure (NSDI):** The Survey of India primarily has the task of evolving digital vector data (DVD) standards for creation of digital spatial data which forms the back-bone of the proposed national spatial data infrastructure (NSDI). Private entrepreneurs have much more challenging role in terms of data generation, data dissemination, value-added services and so on. With NSDI initiative becoming a near reality within few years, it is paramount to identify the private entrepreneur role within the overall framework and to propagate the efforts. Even though attempts have been made for the past two decades, its necessary to point out that inconsistency still exists in databases generated across India, (especially established by separate agencies like National Informatics Centre through its state and district centres: NIC: DISNICs) by various studies/ research. As a part of initiatives from Indian space research organization (ISRO) and department of science and technology (DST) progress is being reported to evolve a *National Spatial Data Infrastructure (NSDI)*. NSDI focuses on de-centralized approach with main emphasis on:

- Develop and maintain standard digital collections
- Develop common solutions for discovery, access and use of spatial data
- Build relationships among organizations
- Increase the awareness and understanding of the vision, concepts and the benefits

The overall framework that is being planned in NSDI is shown in *Figure-1*.

On the basis of approaches for evolving NSDI standards at domain servers, “dedicated thematic map server” expected to be established for meta-data bases and



**Figure 1: NSDI functional inter-linkage components**

available for users on demand through single window mechanism or “data clearing house” for each region/state across India. It is expected that the development of National Spatial Data Information Infrastructure (NII) in USA will enable the convergence of computers and telecommunications on a massive scale and dimension whereas in Japan it will handle voluminous data across network with bi-lingual capabilities of which major contribution comes from private entrepreneurs through NSDIPA. Under such scenario, patents, copyright and IPR issues related to digital spatial data assumes greater relevance and significance.

#### 4. An Overview of Patents, Copyrights and Intellectual Property Rights

##### 4.1 Traditional Trademarks, Patents and Copyrights:

Recently IP has been extended to refer a wide range of disparate rights including those known as “industrial property” such as patents and trademarks.

- literary, artistic and scientific works
- performances of performing artists
- phonograms and broadcasts
- inventions in all fields of human endeavour
- scientific discoveries
- industrial designs, trademarks, service marks and commercial names
- protection against unfair competition
- All other rights resulting from IP activity in the industrial, scientific, literary or artistic fields

**4.1.1 Trademarks:** Trademarks Act, 1955 protect the marks used by traders in relation to their goods and services so as to indicate the origin or trade connection of those goods and services.

**4.1.2 Registered Designs:** Designs Act, 1906 grants rights in relation to the particular appearance of an article provided its features are novel or original.

**4.1.3 Patents:** Patents Act, 1968 protects the rights of inventors in their inventions provided certain threshold requirements have been satisfied such as novelty, inventiveness and utility.

**4.1.4 Copyright:** Copyright Act 1968 protects the rights of the authors in their ‘works’ of original creative effort. Such rights also include the right to reproduce the work and to make copies and the right to present it to the public.

#### 5. Copyright and GIS

A major reason for singling out copyright for an in-depth treatment is that it imposes on nearly every aspect of GIS as we know it. GIS as applied to geographical data will involve a system of hardware, software and iterative procedures that are designed to support the capture, management, manipulation, analysis, modeling and display of spatially referenced data.

The present task is to analyse the copyright issues as they relate to GIS by examining each functional step in

the system where a perceived intellectual property right (IPR) might subsist (Cho, 1998).

##### 5.1 Risk management principles in GIS data/ services and products:

In a general way, the development of GIS involves creation and modification of databases, purchase of GIS software, hardware and other peripherals. Selection of data including topographical/ cadastral data, satellite data and other collateral data. The GIS techniques enable us to derive multi-tasking, e.g., preparation and presentation of maps, reports, and considered expert opinion on the analysis/ strategies to assist in the decision-making process. So it is essential to agree that it is experts’ commitment to provide reliable and accurate and integrated information and analysis. Some of the risk include failure to secure intellectual property rights for GIS and liability for IPR infringement; failure to secure accountability for a defective GIS and liability for breach of privacy or confidential obligations. Legal uncertainties are involved in contracting out either by or to a government agency. However if products of GIS are considered for provision of services, then different aspects of law come into play, namely liability arising from negligence - a duty of care, the breach of duty of care, causation or proximate cause, and damages. Liability in contract terms may be more limited and narrower in scope.

##### 5.2 Guidelines for costing and provision of spatial data:

Such policies do not over ride limitations imposed by privacy, confidentiality, liability, intellectual property, national security, other co-operative arrangements, international agreements or statutory obligations.. The development and applications of GIS in a commercial context may involve several legal risks, if ignored could result in a liability and loss for a business or government entity that develops GIS and/or sells, distributes and resells or provides GIS services (Reid et al 1996).

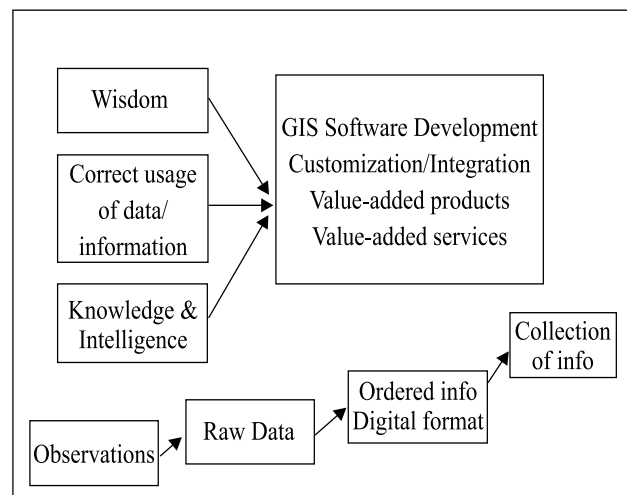


Chart 2: Process of data/information conversion into IP

#### 6. India Needs IPR Courts

Cyber Law and IPR compliance will be the guiding factors in this complex yet rewarding process. The security and

technological risks, involved in this process of transformation, too, will need to be well addressed. Ignorance and non-compliance of Cyber Law/ IPR, thus, can attract persecution in a court of law, making it imperative for every member of the corporate world to learn its technical and critical components. In an effort to create awareness and knowledge sharing regarding these issues, *The Centre for Intellectual Property Rights, Research and Advocacy (CIPRA)* was established in 1998 by *The National Law School Of India University (NLSIU)*, Bangalore. CIPRA has developed the following website <http://www.iprlawindia.org/iprlaw/> with the support of NISSAT (National Information System for Science and Technology). It provides comprehensive coverage of Indian intellectual property resources.

India needs to set up exclusive judicial courts to deal with intellectual property rights (IPR) issues, which are on the rise, according to the noted legal expert and patents judge, *Mr Michael Fysh*, who states that India has moved from the developing to a developed country status as far as IPR is concerned. Mr Fysh advocates that these courts should have at least two assigned judges who have experience in practice of IPR work and also a science degree. The IP Court should not be a tribunal as in the case of environment, consumer or labour courts because of the nature of the issues involved. The life of a patent is

around 14 years and that of trademarks and designs is 15 in the Indian context, and therefore protracted litigation does not help, as told by Mr. Fysh, currently judge, patents county court in London, to *Business Line* magazine to be assisted by independent assessors, qualified in science, the IP courts could deal with patents, designs, trademarks, copyrights and breach of confidential information among other issues, he said. The British legal expert, who is the last of his countrymen to be a member of the Bar in India, represents foreign and Indian companies in cases in the country and the sub-continent through his juniors. Mr. Fysh expressed skepticism about the efficacy of police courts, which seek to control copyright, piracy and counterfeit cases. "They can be a deterrent, but not very effective, since the police are not IP lawyers," he argued. The police, customs and the judiciary should play a proactive role in curbing the menace of piracy that is threatening to kill the culture industry in the country. India needed an IP court like the ones in Thailand, Korea, Germany, UK or the US according to former Deputy Director-General, World Intellectual Property Organisation (WIPO). *Source: Technology, Information, Forecasting Assessment Council (TIFAC), Department of Science and Technology, Government of India.* In this context Tables 1 & 2 are relevant.

**Table 1: World wide data use or ownership policies of mapping or data agencies**

Country	Agency	Cost	Uses allowed
Denmark	Danish Data Archive	No cost For non-commercial use.	May not be redistributed. May only be used for stated purpose after which data must be returned/destroyed.
Ireland	Ordnance Survey Ireland	Varies with intended use	Uses are licensed according to categories of activities (e.g., for architects, solicitors, Internet, etc.)
New Zealand	Crown Research Institutes	Recovery of direct costs is allowed	Open, except where use is not to the benefit of New Zealand
UK	Ordnance Survey	Cost recovery is allowed	Uses are licensed according to categories of activities
USA	United States Geological Survey	Reproduction and handling	Unlimited

## 7. Patenting Geographic Information Systems, Software/Products and Services

While it is indeed a valuable proposition that intellectual property rights need to be protected for a person's/ company's business strategies, future growth and service to the humanity, it is equally necessary that concerned team of groups or individuals are aware of such IPR issues. Table 3 below shows typical ideas/ products/ services/ inventions that are being patented recently in USA/Japan/China. For details please browse through the Internet. Only sample listing is shown, for authenticity and details of patents, one needs to go into details of each patent). Glancing through such patenting table throws light on each of us who are involved in the development/

deployment/implementation of such technology/ innovative idea that more awareness needs to be created among us on how to proceed on each and every stages to patent an invention or development of algorithm and value-added services/ products related to GIS and allied spatial technologies like remote sensing, GPS, digital image processing and networking. It becomes even more critical in a network sharing work environment (say futuristic NSDI infrastructure) whereby every individual efforts needs to be rewarded/rights are to be protected and any such negligence is challengeable in court of law.

## 8. Conclusion

While authors appreciate the efforts taken by the

**Table 2: Analysis on comparison of basic features of different mechanisms for protecting intellectual property**

Sr. No	Mechanism	Applicable to Data per se	Data base	Soft ware	Geographic coverage	Comments
A	Copyright	No	Yes	Yes	Respected across jurisdictions.	Only protects form of expression, not ideas or data.
B	Patent	No	No	Yes	Requires application in each country.	Not all countries allow patents on
C	Database protection	Yes	Yes	No	Only available in certain countries.	Concepts of fair use remain to be established.
D	Written license	Yes	Yes	Yes	Terms used in licenses vary with country (for ex., workservice")	If well written, provides perhaps the least risk of misunderstanding. Especially useful when dealing with agreements among diverse organizations.
E	"Shrink-wrap"	Yes	Yes	Yes	for hire" vs. "contract of/for uncertain	Validity of such licenses is still being tested in courts.
F	Trademark	No	No	No	Requires application in each country.	Used only for names and logos.
G	Trade secret	Yes	Yes	Yes	Laws protecting secrets vary greatly	Requires that deliberate efforts be made to keep information or product secret.

**Table 3. Examples of recent US patents related to Geographic Information Systems.**

*The assignee is the individual or entity to whom ownership of the patent was assigned at the time of patent issue, typically the business that employed the inventor(s).*

Patent No	Title	Assignee
6411899	Position based personal digital assistant	Trimble Navigation
6408107	Rapid convolution based large deformation image matching via landmark and volume imagery	(information not available on USPTO database)
6404920	System for generalising objects and features in an image	(information not available on USPTO database)
6389356	Geographic information system	Matsushita Electric Industrial Co
6353832	Selectivity estimation in spatial databases	Lucent Technologies
6337693	Vector-based geographic data	Autodesk
6321158	Integrated routing/mapping information	DeLorme Publishing Company
6308177	System and method for use and storage of geographic data on physical media	(information not available on USPTO database)
6307573	Graphic-information flow method and system for visually analysing patterns and relationships	(information not available on USPTO database)
6282362	Geographical position/image digital recording and display system	Trimble Navigation Limited
6262741	Tiling of object-based geographic information system (GIS)	PRC Public Sector
6247019	Object-based geographic information system (GIS)	PRC Public Sector
6240424	Method and system for similarity-based image classification	NBC USA

6240360	Computer system for identifying local resources	Multipmap.com
6229546	Rapid terrain model generation with 3-D object features and user customisation interface	Geosoftware
6216130	Geographic-based information technology management system	InGeo Acquisitions
6115672	Method for measuring and quantifying amounts of carbon from certain greenhouse gases sequestered in and by grassy and herbaceous plants above and below the soil surface	Environmentally Correct Concepts
6107961	Map display system	Kokusai Denshin Denwa, Japan/USA

government of India in creating awareness on IPR and related issues , especially by CSIR, TIFAC, DST etc, it is yet to draw comprehensive IPR policy covering the entire business processes and value-added services. In fact our attempt is one of the first of its kind to create such awareness within the paradigm of geo-spatial solutions and services industry, especially GIS and related systems development. The paradigm of "intellectual property rights" and its role in development of GIS systems/ applications/value-added services are of immense value with reference to the growing GIS industry segment coupled with expected availability of high to very-high resolution satellite data products through traditional means or over Internet. Indian geo-entrepreneurs are yet to make headway into this arena.

A set of guidelines for managing spatial information related IPR and other interesting details could be seen

from the CAS web-site and other listed web references.

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