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INVITED PAPERS

**SUPPORTING CAPACITY DEVELOPMENT FOR GLOBAL
SPATIAL DATA INFRASTRUCTURES**

Submitted by GSDI Legal and Economic Working Group **

Supporting Capacity Development for Global Spatial Data Infrastructures

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Introduction of GSDI

As a member of the Board of Directors of the GSDI Association and as Chairman of the Legal and Economic Working Group I would like to introduce the GSDI organization and our activities.
The Global Spatial Data Infrastructure Association is a global forum to support the exchange of ideas and encourage joint activities at the global level.
Our mission is to foster spatial data infrastructures that support sustainable social, economic, and environmental systems integrated from local to global scales. GSDI serves as a point of contact and effective voice for those in the global community involved in developing, implementing and advancing spatial data infrastructure concepts. GSDI promotes the informed and responsible use of geographic information and spatial technologies for the benefit of society.

We have defined the following goals to fulfil this mission.
- To promote and develop awareness and exchanges on infrastructure issues for all the   relevant levels from local to global
- Promote and facilitate standards-based data access/discovery through the internet
- Promote, encourage, support and conduct capacity building
- Promote and conduct SDI development research
- Collaborate with others to accomplish its Vision and Goals

The focal point to the GSDI Association activities is achieving optimized international data access and facilitating the usability of these data by training and capacity building on a global basis. We are supporting universal licensing and sharing arrangements, global registries, standards and operability. We are encouraging policies and legislation that promote the access to and use of geographic data and services on a global basis.

The successful realisation of these activities requires optimized engagement of government authorities, academia, industry and the GI users. Government plays a vital role in the promotion of our global mission through strategic public networks, in supporting of our mission in the provision of funding for the global spatial data infrastructure in the development of bilateral donor agreements for developing countries. The academia is vital in this process for the execution of policy research, reviewing international legislation on data policy, and the development of protocols for registration and training. The industry assists in building registries and organises the outreach to clients to engage their participation in the GSDI activities.

The GSDI Association is a non- profit organisation with a focus on active membership participation and democratic processes.

We distinguish full, associate and individual memberships, such as government organizations and agencies (from national to local), companies (of all sizes), academic institutions, non-profit organizations and individuals.

Our membership's dues are scaled upon approximate of the ability our members to pay. The full members of our organisation form a Council which is the ultimate authority for the organization and also elects the Board.

The Board of Directors consists of the President, President-elect and the Past President, sector representatives from the Government, Industry, Academia and Non-Profit, representatives from Africa, Asia/Pacific, Europe, North America and South America; the Permanent regional committees from Europe, Africa, Americas and the Asia Pacific region, such as the PCGIAP. And finally the International and global organizations are member of the Board of Directors, such as representatives of International Geographic-, GSDI Related Global Initiatives, and International Industry Organizations. .

This overview shows of the wide range of GSDI membership around the globe, such as the Abbis Ababa University (Ethiopia), the Atlantic Institute (US/Canada), CIESIN Columbia University (US), UN Committee on Development Information CODI –Geo, Delft University of Technology (Netherlands), Department of Science and Technology (India), EIS- Africa (South Africa), ESRI. Euro-Geographic's (Europe), European Umbrella Organization for Geographic Information (EUROGI), Federal Geographic Data Committee (US), GISPOL (Poland), HUNAGI (Hungary), Indian Space Research Organization Headquarters (India), Institute Cartografic de Catalunya (Spain), Intergraph, International Society on Digital Earth (China), ITC (Netherlands), Military Geographic Institute of Chili, Leica Geosystems, National Geographic Information Infrastructure Programme Survey Nepal, National Geospatia-Intelligence Agency (US), National Land Survey Finland, National Resources Canada, National Space Research and Development Agency Nigeria, the National Spatial Data Centre (Malawi), National University of Lesotho, Open Geospatial Consortium, Pan American Institute of Geography and History (PAIGH), Regional Centre for Training In Aerospace Surveys (Nigeria), Spatial networks (India), State Bureau of Surveying and Mapping of China, the University College of Lands and Architectural Studies in Tanzania, the University Consortium for Geographic Information Science (US) and the University of Zimbabwe.

In GSDI various committees play an active role in the global capacity building process.
The Technical Working Group, the Legal and Economic Working Group, the Communications Committee, the Membership's Working Group, Conference Planning Committee, and the GSDI Association Sponsored Projects Committee are actively working on the realization of the GSDI mission.

GSDI provides a news list (news@gsdi.org) with1600 subscribers and monthly Regional Newsletters for Africa, Latin America and Asia/Pacific in electronic form. We provide E mail Discussion Forums. The SDI- Asia & Pacific Newsletter is edited by Changsup Han.

GSDI is actively involved in global groups to stimulate the registration of data catalogues and data/service offerings. We are Geo participant in the global earth observation network, WISIS participant, ISO TC 211Class A Liaison, CEOS WGISS liaison, and we have relationships with OGC, the International Society for Digital Earth and ISPRS.

GSDI Capacity building

Organisation of International GSDI Conferences

Regional Spatial Data network organizations play a crucial role in the Capacity building process. The UN Economic Commission for Africa, Committee for Development: GEO (CODI-GEO), Pan American Institute for Geography and History and Permanent Committee for GIS information for the Americas (PCIDEA), Permanent Committee on GIS Infrastructure for Asia and the Pacific (PCGIAP), and the European Umbrella Organisation for Geographic Information (EUROGI) are leading in the communication and commitment building process. These organisations are crucial in the organisation of GSDI conferences as we did in the past and we are going to organize in the coming years.

In the year 1996 the GSDI was founded in Bad Godesberg Germany. The first conference was organized by Klaus Barwinski (former president of the Deutsche Dachverband für Geo Information), in close cooperation with Fritz Petersohn (former chairman of the Atlantic Institute USA) and the EUROGI, the European Umbrella Organisation for Geographic Information. The first conference was focused on the articulation of major SDI issues. In the second conference in the USA the need for leadership and a place on the political agenda for addressing the policy and organizational aspects of SDI's (1997) were the major topics. The need to balance the interests of developed countries with those of developing nations and the organizational framework were the central issues in the 1998 Canberra conference. In 2000 in South Africa, central themes were "engaging emerging economies" and "sharing knowledge". In 2001 in Colombia, activities were concentrated internal issues, such as on engaging expanded working groups in achieving objectives. In 2002, the GSDI conference was held in Budapest with the theme "from global to local". In 2004, the conference was held in Bangalore India with an emphasis on SDI developments related to a economic and ecologic sustainability. In 2005 GSDI celebrated its tenth anniversary in Cairo, Egypt in cooperation with FIG with more than 900attendees from 88 countries (http://www.fig.net/pub/cairo/tech_programme.htm).This year the GSDI conference will be held in Santiago, Chili from November 6th till November 10th with the theme "Spatial Information: Tool for reducing poverty"
(http://www.igm.cl/gsdi 9)

The organisation has been evaluated from a discussion platform to a global knowledge network in the fast changing global community and knowledge society. In the first years the activities of the organisation were focussed on insight of technological developments and the creation of awareness. Nowadays there is a growing interest in the sustainability of regional, national and continental infrastructures in relationship with the organisational, political and legal issues.

Grant Programs.

The GSDI Association Sponsored Projects Committee works on our Small Grants program. This program stimulates GSDI involvement on regional levels and it stimulates the initiation or the expanding of spatial data infrastructure activities. The grants are provided to a various organisations in the world. In 2005 15 grants of the 71 proposals were awarded in 2005. Nine received 2500 USD grants; three received 2500 USD plus approximately 2000 USD in

equivalent services from the GIS Corps of URISA and three received up to 2500 USD in services from the GIS Corps.

The Intergraph/GSDI Interoperability Grants stimulates successful corroboration around the globe. In 2002, Intergraph made available 100 Intergraph/ GSDI Interoperability Grants at over 5.5 Million USD. Recently programs in India, Indonesia, South Africa, Chile, the Philippines, Romania and Thailand are supported by the Intergraph/ GSDI Interoperability Grants Program. The Royal Thai Survey Department received a grant for the development of the RTSD's GIS Data Web Map Query System.

ESRI is supporting a grant program and working closely with Global Map and the GSDI Association to support the development of geographic data sharing in the context of GSDI. ESRI provides copies of the Arc GIS system, virtual trainings for free for learning Arc GIS 8 and Introduction to Visual Basic 6, special designed courses to make the process of creating and publishing Global Map data easy to understand and participation for the annual ESRI International User Conference in San Diego California. Grantees agree and develop the Global Map for their country. ESRI provided for the program 5 million USD.

Organisation of other projects

-The GSDI Cookbook version 2.0
The version 2.0 SDI Cookbook (Editor in Chief, Dough Nebert) is available at http://www.gsdi.org. It contains contributions from many nations. FGDC/GSDI will remain this document and make it available on the GSDI website. It is a living document. Previous editions have translations available in Spanish, Chinese and Polish
-The UDDI Registry:
A challenge of this project is connecting the numerous islands of interoperability.
The creation of hundreds of catalogues of data and services is inevitable but is difficult to navigate. For that reason the registry of all services at a global level is needed
The GSDI industry Advisory Group- Geographic Gateway starts with experimentations on global level in close cooperation with the regional GI community)
-Global Commons and Global Geographic Data project Marketplace.
This project provides technological and legal approaches towards the creation of incentives for sharing locally collected data and enabling sharing these data based on a new conceptual approach.
http://www.nap.edu/catalog/11079.html http://www.spatial.maine.edu/geocommons

The Legal and Economic Working Group

We stimulate the participation in the data policy issues discussion and the creation of awareness for fostering the spatial data infrastructures that support sustainable social, economic, and environmental systems integrated from local to global
We stimulate the academic community to conduct research to SDI development. We are maintaining an online SDI library of reference material, are implementing a small grant program in support of SDI research and we are facilitating networking of SDI researchers around the world. News about research being done on legal, economic, and policy aspects of SDI developments are included in the Committee web pages. The Committee invites every body to

submit abstracts and papers to be made available on the GSDI Legal and Economic page. See http://www.gsdi.org/lewg/GII_research.htm

The Committee invites everybody to offer news of courses. See http://www.gsdidocs.org/lewg/SDI_education.htm

The Committee supports a Legal and Economic Discussion List, which has been active since December 2004. See http://www.gsdi.org/pipermail/legal-econ/.

Challenges for the future

Expanding our membership, intensive use of the small grants programme and attracting partners to leverage resources and broaden the impact, promoting and conduction SDI development research and encouraging capacity building are the main challenges for the future.

In the future capacity building in the regions are becoming more and more important because of the social, cultural and political differences all over the world. The GSDI organisation can facilitate this capacity building in providing the network, expertise and experiences of the Legal and Economic Working group to support this capacity building process in the Asia Pacific region.

Capacity building in using SDI's for social, economic and environmental development in the Asia Pacific region.

One of the key missions of GSDI is to foster capacity building for using spatial data infrastructures that support sustainable social, economic and environmental development which are integrated from local to a global level.

The GSDI Legal and Economic Working Group plays an important role in fulfilling this mission.

Current tasks of the GSDI Legal and Economic Working Group

In 2000, the GSDI Legal and Economic Working Group was founded.

The primary purpose of the Working Group is to open communication channels and encourage dialogue regarding the legal and economic frameworks within which SDIs are being developed. The exchange of such information helps identify constraints and opportunities for cooperation among nations in sharing knowledge and pursuing GSDI concepts. One short-term objective of our working group is to invite knowledgeable individuals to prepare detailed descriptions of the legal and economic frameworks for their nations that relate to SDI developments. The legal and economic issues addressed by each report might include (a) rules and laws regarding access to government data, (b) copyright, database protection, and similar intellectual property protections, (c) liability and other legal means for ensuring the suitability of data, and (d) protections of personal information privacy. These legal issues should be addressed in the context of geospatial data, the Internet, and evolving communication technologies.

Practical discussions are needed of the legal and economic constraints imposed on those nations developing SDIs. Better knowledge of these constraints and differing perspectives can lead to opportunities for collaboration and sharing. Through the publication of initial sample reports, we believe the conditions for developing communication channels and understanding among nations will be facilitated. The members of the working group believe that development of a network of engaged individuals seriously addressing legal and economic issues relative to NSDIs is

probably more important than the actual written responses that might be received in accomplishing the tasks outlined above.

From 2002 the work of the Group is focussing more and more on:

- stimulating transparency of SDI initiatives and cooperation between different regions.
- making links between the current SDI initiatives (including MSc & PhD research)
- stimulate dialogue on research in our GSDI network
- Access to publications which working group members submit, their on line reference to the SDI search engine and through the GSDI discussion list.

Encouraging capacity building by the Legal Working Group

A successful example of the encouraging capacity building is the collection in the presentation of successful SDI initiatives and the key dynamics in Europe.

Our group started with the organisation of a workshop at the GSDI 6 Conference in Budapest Europe in 2002 and provided for many participants an overview of different initiatives at different SDI levels. We showed which major initiatives at European level had been taken in general and in which way the legal, economic and organizational settings spatial data infrastructures develop. Main focus of the workshop was highlighting the recent data policy trends in Europe. These data policy developments which we presented at the GSDI 6 workshop are described in the GSDI book "Spatial Data Infrastructures and policy development in Europe and the United States". This book had been handed out during the GSDI 7 Conference in Bangalore India in 2004 and can be ordered through http://www.library.tudelft.nl/dup/leaflets/2467.html

This book was inspired by the workshop " Spatial Data Infrastructure Legal and Policy Issues: Providing Services and Addressing Legal Barriers in the Virtual Era- Best Practices from Europe" at the GSDI 6 conference in Budapest based on the current data policy developments in Europe. This workshop showed which major initiatives at European level had been taken.

The book gives an insight in the INSPIRE initiative which the Environmental Agency of the European Commission had been taken in the beginning of this millennium. This initiative will lead to a European Spatial Data Infrastructure. The European Commission in close cooperation with the European Union Countries and the GI community in Europe have carried out this initiative.

In this preparatory phase the stakeholders in the GI sector identified problems such as gaps in spatial data, the lack of documentation, incompatibility of spatial datasets and of geographic information initiatives and barriers for sharing and reusing the spatial data. These problems need to be resolved and are the main triggers for setting up an Infrastructure for Spatial Information in Europe. Actions need to be set up for: coordinating structures in the EU countries and on European level, meta data and a linked electronic network, standards and services, a data policy framework and a framework for monitoring the European Infrastructure. INSPIRE covers spatial data that are relevant for the formulation, implementation, monitoring, and evaluation of the European Union. There are 60 spatial data components defined grouped together on 17 themes. These themes are related to the environment policy and cross- sectoral information, such as administrative boundaries, elevation, and transport networks, etc. These actions will be regulated in a Directive, which has been adopted by the European Commission mid 2004.

A second interesting project, which had been described, is the GINIE project. GINIE stands for the Geo Information Network in Europe. GINIE aims to establish and promote a European strategy for geographic information. This project explains that for the development of spatial data infrastructures political support at all levels (national, regional and local) is a critical condition for success. It describes also the European policy context, regarding telecommunication policy, public sector information policy, e-government and environmental policy and it defines recommendations for optimized access of GI and some rules and mechanisms for GI providers on European level.

A third interesting data policy initiative on European level is the EULIS project. This European Land Information Service initiative is a cooperative action between the Scandinavian countries, UK, Austria, Lithuania and the Netherlands. The project aims to link the requestor of information in one country to access to land information in another.

A fourth contribution in the book is the description of the new European Union Directive for the re-use of public sector information in the European Union. This Directive is the first step on European level for the improvement of the access policies that is being harmonised in the European Union.

Further, the major funding systems are described, such as at the one hand the open access model and at the other hand the cost recovery model. The open access approach assumes that government agencies, responsible for the collection and creation of government spatial data, are fully funded with public funds to accomplish their public tasks. The cost recovery model gains income from the sale of data. The agencies are forced to generate income from the sales of data or products or through the provision of services.

Moreover, the situation in the USA has been described. On federal level the characteristics of the federal data policy is being described and laid down in the Freedom of Information Act, and may be summarised as no government copyright or database right, limited fees and no restrictions on re-use.

Finally, the legal and economic issues in the USA are being compared with a best practice example in the Netherlands for copyright and database legislation, privacy, access to government information, commercialization of government data, the availability of geographic data sets and their limitations in use, mechanics of access and electronic government.

In conclusion, this book gives an overview of the recent European Data Policy initiatives on Pan European and EU member states level and gives a theoretical framework on pricing and legal and economic best practice examples of the situation in the Netherlands and the USA.

At this moment the European GI community has developed an extensive network in developing commitment for the development of the European INSPIRE regulations and the European Infrastructure. An action plan will be developed on how the different European Member states can exchange the data of their nation SDI's, the conditions of the legal framework describing the access policies of the different EU member states are formulated and the conditions for the establishment of EU portals in the different member states are being prepared. The key element in this approach is demonstrating the societal benefit in using the European Spatial Data Infrastructure. Main leading target for the European Commission for initiating this European regulation is the execution of the European Environmental policy, such as the access of Environmental information of the Aarhus Convention and the European Sustainable Development Strategy.

The GSDI Legal and Economic Working Group stimulate the dialogue between the main stakeholders in the global network through the discussion list and stimulate the presentation of these initiatives at the different GSDI conferences.

For our GSDI 8 conference in April 2005 in Cairo Egypt and the next GSDI 9 conference in Chili from November 6th until November 11th this year we organized various sessions. The sessions are based "SDI policy and legal issues", "Partnership issues" and "Regional SDI's" and "Evaluating SDI's".

GSDI challenges for Asia Pacific: Proposed work plan through the PCGIAP Committee, Board and Secretariat in cooperation with GSDI

Societal issues in the Asia Pacific with a regional, national and global impact are becoming more and more important. Examples are the disaster management problems and the global warming issue. This conference will be the first start of a joint approach for this region in tackling this hot pressing societal problem.

The GSDI knowledge network can provide the Asia Pacific Community tools for defining the conditions in using SDI's, data policy and legal frameworks, commitment building instruments and composing a communication and awareness strategy which important role SDI's can play in the disaster management and management in the solution of other pressing societal issues.

Demonstrating the key elements of successful SDI approaches in the Asia Pacific area are of major challenging importance in the future using these tools for the prediction and organisation of disaster management.

Various indicators have been developed which are conditional for the development and implementation of SDI's.

These indicators (vision, leadership, communication strategy, content of SDI's / product based SDI's and process based SDI's) play an important role in the refinement of effective SDI use in the Asia pacific area.

A proposed joint GSDI/ PCGIAP work plan:

This primarily work plan could be set up in the second half of this year by PCGIAP in cooperation with GSDI.

The work plan could contain the following elements:

-An inventory of the dynamics in the Asia Pacific region which are appropriate for using SDI's

Defining the top 5 priorities for the new GSDI book "SDI and policy developments in Asia and the Pacific" need to be directly related to important sustainability issues in economic, societal and environmental prospect. In other words: which pressing societal issues are important for SDI development, which regulations are in preparation and in which way the GI community will be involved in this process?

-An insight in the current SDI developments in the AP region (the why, how and when questions on national and regional levels).

Very important for the region is getting an overview of the way in which new SDI initiatives are supportive for the creation of early warning and other important systems for disaster management, which bottlenecks are addressed, which SDI's are developed (product based or

process based), how SDI can help in the improvement of the early warning systems, which organisational issues need to be addressed, which government initiatives are in preparation and how the communication is organized with the regions and nations in the Asia Pacific region.
- An insight in the different legal frameworks which are using in the AP region
- A description of the main differences in the legal and policy frameworks in the Asia and the Pacific areas
- An overview of recent interesting legal and policy framework initiatives by governments which have been taken and the way in which way the GI community is involved in the preparation and execution of these initiatives

Outreach of the results in the future

The Bangalore GSDI 7 Conference inspired me to start with a similar initiative in the Asia Pacific region as we did in Europe. For this reason a special PCGIAP/GSDI Taskforce should be composed to realise this target in the creation and the execution of the work plan. This work plan could be composed in special Task Force sessions.

The Work plan for the Asia Pacific could contain actions for:

Collecting case example of SDI's
Identifying the key dynamics of the current SDI's
Demonstrating the presentation of successful examples and initiatives
Providing on-site support
Conducting follow-up activities/incentives
Establishing a knowledge infrastructure for regions
Converging regional spatial data infrastructures in the Asia Pacific region to shared SDI

A workshop which shows successful SDI's and other Asia Pacific region initiatives could be organized in the first half of 2007. This workshop might lead to a GSDI publication on successful policy developments in using SDI's in the Asia Pacific Region. The results of the work plan can be presented at GSDI 10 Fuji Conference in the Asia Pacific in the beginning of 2008.

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