

# **GLOBAL SPATIAL DATA INFRASTRUCTURE (GSDI): ENCOURAGING SDI DEVELOPMENT INTERNATIONALLY**

**Alan R. STEVENS, USA**  
**Harlan J. ONSRUD, USA**  
**Mukund RAO, India**

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## **SUMMARY**

The use of common standards and interoperable systems and techniques for digital geospatial data and information collection, archive, integration, and open sharing on a national scope is taking root in more and more nations. Pundits with a global perspective recognized that these same benefits can be realized across international and intercontinental boundaries as well. **The Global Spatial Data Infrastructure (GSDI)** took first form in 1995 with the small gathering of government organizations, industry, and academic luminaries in Bonn, Germany to exchange ideas on how to evolve and promote the ideas of SDI on a regional and a global basis. The Eighth GSDI meeting was just held in Cairo, Egypt in collaboration with the FIG Working Week. Between 900 and 1000 attendees represented 88 nations. The association currently has over 25 organizational members and roughly as many individual members. The goal of the organisation is to encourage and promote SDI awareness and capacity building globally. This is done primarily by working with partners to seek and distribute resources to assist fledgling SDI development primarily (but not exclusively) in emerging nations. The five major goals include: continue to develop awareness and exchanges; promote standards-based data access/discovery/use through the internet; encourage capacity building; conduct SDI development research; and engage partners to leverage resources for all of the above.

One of the programs includes the development of three regional newsletters distributed electronically focusing on SDI and GIS conferences, workshops and training, and the URLs for organizations that are supporting SDI development. A “small grant” program was also instituted to help stimulate the building of SDI components within organizations in nations with emerging SDI programs. Major grants from ESRI and Intergraph are key to stimulating SDI development nationally. A portal has been made available for searching for data globally along with web services and roughly 288 clearinghouses are available and pinged hourly to determine which are operational or not and why. The GSDI also distributes the GSDI “Cookbook” providing instructions to policy level, management level and operational people responsible for building SDIs.

## **CONTACTS:**

Alan R. STEVENS  
International Program Manager  
US Federal Geographic Data Committee  
Global Spatial Data Infrastructure Secretariat

590 National Center  
Reston, Virginia 20191  
Tel. +703-648-5119  
Fax. +703-648-5755  
Email: [astevens@gsdi.org](mailto:astevens@gsdi.org)  
Web site: [www.gsdi.org](http://www.gsdi.org)

Harlan J. ONSRUD  
President, Global Spatial Data Infrastructure Association  
Department of Spatial Information and Management, University of Maine,  
5711 Boardman Hall, Rm 340  
Orano, Maine 04469-5711  
Tel. +207-581-2175  
Fax: +207-581-2206  
Email: [onsrud@spatial.maine.edu](mailto:onsrud@spatial.maine.edu)  
Web site: [www.spatial.maine.edu](http://www.spatial.maine.edu)

Mukund RAO  
Past President, Global Data Infrastructure Association  
Deputy Director, Indian Space Research Organization  
Antariksha Bhavan, New BEL Road  
Bangalore, India 560 094  
Tel. +91 - 80 - 2341 - 7359  
Fax: +91 - 80 - 2341 - 7455  
Email: [mukundr@blr.vsnl.net.in](mailto:mukundr@blr.vsnl.net.in)

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The Global Spatial Data Infrastructure (GSDI) began in 1996 as the dream of a small group of visionaries. In its early stages it was a forum for those concerned with global spatial data to get together and discuss topics of interest, and try to come to agreement on activities that would help achieve their common aims. Over the period from 1996 to 2002, six GSDI Conferences were held, growing from a small group of invitees to several hundred participants from more than fifty nations, gathering in an open forum. In August of 2002, the GSDI Association became incorporated. This milestone marks a growth, not only in the membership, but also in the mission of the GSDI. The Association can now establish a budget, hire permanent staff, conduct capacity building programs, and become an active participant and leader in global spatial data activities, in addition to its continuing role as the premiere global spatial data forum.

## **1. MISSION**

- Serve as a point of contact and effective voice for those in the global community involved in developing, implementing and advancing spatial data infrastructure concepts,
- Foster spatial data infrastructures that support sustainable social, economic, and environmental systems integrated from local to global scales, and
- Promote the informed and responsible use of geographic information and spatial technologies for the benefit of society.

## **2. DEFINITION**

The Global Spatial Data Infrastructure supports ready global access to geographic information. This is achieved through the coordinated actions of nations and organizations that promote awareness and implementation of complimentary policies, common standards and effective mechanisms for the development and availability of interoperable digital geographic data and technologies to support decision making at all scales - for multiple purposes. These actions encompass the policies, organizational remits, data, technologies, standards, delivery mechanisms, and financial and human resources necessary to ensure that those working at the global and regional scale are not impeded in meeting their objectives.

## **3. PURPOSE**

The Global Spatial Data Infrastructure Association is dedicated to international cooperation and collaboration in support of local, national and international spatial data infrastructure developments that would allow nations to better address social, economic, and environmental issues of pressing importance. Its purpose is to focus on communication, education, scientific, research, and partnership efforts to achieve these aims.

***VISION: Support all societal needs for access to and use of spatial data.***

The Global Spatial Data Infrastructure (GSDI) Association is dedicated to bringing about an infrastructure that will allow users globally to access spatial data at a variety of scales from multiple sources that ultimately will appear seamless to all users. The GSDI will support the work of organizations to develop their own National Spatial Data Infrastructures (NSDI), and will collaborate with local, national, and international organizations to ensure that the geospatial data, services, and metadata are accessible through interoperable standards-based services, systems, software, and products that operate in a web-enabled environment. The success of the GSDI depends on the quality of its partnerships with public, private, academic, and non-governmental organizations.

#### **4. GOALS**

The GSDI will work toward this vision through five main goals.

1. Continue to promote and develop awareness and exchanges on infrastructure issues for all relevant levels from local to global.
2. Promote and facilitate standards-based data access/discovery through the Internet.
3. Promote, encourage, support, and conduct capacity building.
4. Promote and conduct SDI development research.
5. Collaborate with others to accomplish its Vision and Goals.

#### **5. STRATEGIC and IMPLEMENTATION PLANS**

A **membership survey** structured around the recently adopted Strategic and Implementation Plans was distributed to the membership. The survey finds that the membership strongly supports:

- Continue hosting a global conference regularly.
- Expand the membership of the GSDI Association.
- Increase networking among GSDI members and others interested in spatial data infrastructure concepts.
- Establish and maintain an electronic repository for GSDI-produced reports and papers prepared for conferences, meetings, etc.
- Provide a voice for the global spatial data infrastructure community at international meetings and in international policy and technical forums.
- Solicit funding to accomplish projects and host workshops of benefit to the global spatial data infrastructure community.

- Fully engage members in planning through open communications and in accomplishing specific projects and tasks through the GSDI committee structure.
- Publish a brochure explaining the benefits of joining the GSDI Association.
- Foster discussions with international development agencies of spatial data infrastructure issues
- Pursue funding to allow personnel from developing nations to attend GSDI-sponsored workshops and conferences.

Six working groups and committees have been instituted:

- Technical Working Group (Chair: Doug Nebert)
- Legal and Economic Working group (Chair: Bas Kok)
- Communications Committee (Chair: Mark Reichardt)
- Membership (Chair: Allan Doyle)
- Projects (Chair: C.J. Cote)
- Conference Planning Committee (Chair: Alan Stevens)

## **6. Through the Working Groups and committees reports on accomplishments:**

Supporting the GSDI Goal #1 and collaborating with the International Federation of Surveyors (FIG), the **GSDI conducted its eighth international forum**. This six-day meeting in Cairo Egypt brought together between 900 and 1000 scientists, engineers, and practitioners from four widely dispersed scientific and technical organizations to discuss ways to protect citizens from hazards, improve human health, provide better governance and more effective business strategies. Other collaborators included the Egyptian Survey Authority within the Ministry of Water and Irrigation and the International Steering Committee for Global Map (ISCGM.)

The common thread of these apparently diverse organizations is that they deal with the collection, processing, storage, distribution, delivery, and use of geographic information by decision makers responsible for protecting society and improving business decision-making. Finding water, safeguarding people and business in floods, reducing famine, improving forestation and agriculture, and recovery and prevention of natural and man-made disasters are only some of the most obvious applications and impact of these geographic information tools that are used in day-to-day society as well as emergency situations.

The meeting featured over 400 technical papers in close to 60 technical sessions and workshops better than half focusing on Spatial Data Infrastructure (SDI): implementation, geo-data and metadata, legal and policy barriers, portal/clearinghouse design and implementation, standards and interoperability specifications, success stories, commercial solutions, applications and related subjects

Professor Harlan Onsrud of the University of Maine, USA, was installed as incoming President of the GSDI Association by outgoing President Mukund Rao, Deputy Director, Indian Space Research Organization, Bangalore, India. Jarmo Ratia, Director of the

Finnish Land Survey was inaugurated as President Elect. The GSDI also took time to honor and thank the US Federal Geographic Data Committee (FGDC), the ESRI Corporation, and Intergraph Corporation for providing critical human, financial, and emotional support to the GSDI Association in its formative stages.

For further information: [www.gsdi.org](http://www.gsdi.org) ..... [www.fig.net/cairo](http://www.fig.net/cairo)

The GSDI accepted the proposal from the **Institute for Geography Military (IGM) in Santiago, Chile to conduct the GSDI-9**. The meeting will be held in Santiago, Chile in 6-10 November 2006. The Association is seeking collaboration opportunities with other international and national bodies to partner in conducting GSDI- 10 in the Asia and Pacific Region and GSDI-11 in Europe.

Also supporting the goal of collaboration, the GSDI works through its **Permanent committees** to reach all corners of the globe. In 2004 the GSDI Board formally accepted the proposal from the UN Economic Committee for Africa (UN ECA) to become the Permanent Committee for Africa. An ECA Working Group will actually function as the Permanent Committee -- the Committee On Development Information (CODI). The regions currently represented by permanent committees now include:

- Permanent Committee for GIS Infrastructure for Asia and the Pacific (PCGIAP)
- Pan American Institute for Geography and History (PAIGH)
- European Umbrella Organization for Geographic Information (EUROGI)
- UN Economic Commission – Committee on Development Information (CODI)

In an effort to encourage SDI building, the GSDI put out a call for proposals in 2004 under its **Small Grants Program**. Sixty-eight applications were received and ten grant were awarded averaging \$2500 USD. This is not a lot of money, but to many emerging nations, it can go a long way toward developing some component(s) of a national or regional SDI. In 2005 a request for proposals will go out shortly with a base funding pool of \$30,000 USD. The Association is **looking for partners to help extend limited funds in an effort to be able to award grants to all worthy applicants.**

The Association has published **electronic newsletters** in conjunction with the permanent committees. The content highlights SDI and GIS activities of the region to include conferences, workshops, training, etc; the outcomes of those activities; and websites for donors who support SDI development in the region(s.) One can find the newsletters by going to [www.gsdi.org](http://www.gsdi.org) , click on ‘publications,’ and ‘newsletters:’

- Africa (the original newsletter)
- Asia and the Pacific
- Latin America

As above, here too, we are looking for collaborators to help fund ten newsletters per region per year.

The GSDI also supported the publication of the African SDI Development hand book containing SDI implementation success stories and business cases compiled by Kate Lance as well as the Compendium of Legal and Economic Papers generated from the

GSDI-7 workshop in Bangalore, India and compiled by Bas Kok and Bastiaan van Loenen.

Its premiere publication of the GSDI, however, is the **handbook on *Developing Spatial Data Infrastructures*** first published in May 2001 and referred to as the ***SDI Cookbook***. The Cookbook is a compendium produced by the many members of the GSDI Technical Working Group and the Editor in Chief is Douglas Nebert. Version 2.0 was published in January of 2004. Each chapter is devoted to a component of a spatial data infrastructure such as geo-data, metadata, clearinghouse, framework, partnerships, standards, and others along with chapters on terminology and case studies. Each chapter deals with increasing levels of detail. The beginning of each chapter deals with describing the component to a ministry official, the second level describes issues as though the reader is a manager/leader of a major component of SDI development, and the last part deals with the details related to actual hands-on implementation. It can be found on the GSDI site under “publications” .... [www.gsdi.org](http://www.gsdi.org) The Cook book is being translated into Spanish by the Mapping Organization of Mexico.

Under the heading of facilitating **standards-based data access/discovery through the internet** the GSDI has developed and hosting an innovative and imaginative GSDI Web-site/Portal, which is one-stop information about GSDI, on SDI technologies and applications. One can find resources such as information on GSDI Projects, links to other SDI resources allowing users to log onto electronic bulletin boards, e-conversation boards, join different GSDI-Discussion lists and groups of the SDI community around the world. The GSDI Portal also provides access to catalogs of data and online map services, SDI literature and SDI Web-links around the world. This gateway is being improved and adapted over time by the GSDI Technical Working Group all found at the GSDI site. Additionally, one can log into the FGDC Site and get access to the status and provides metadata on each site for all clearinghouses globally. This site pings these clearinghouses hourly and users earn which are up, timed-out, or down. [www.fgdc.gov](http://www.fgdc.gov)

Recently the GSDI has developed linkages with 3 other international bodies.

- **The World Summit of Information Society** - GSDI has been accredited for the WSIS meetings. The next action has to be for GSDI, through its Members, to focus on GI technologies and applications at national level and promulgate SDI onto the WSIS recommendations. In this way be able to bring “recognition and respect” to spatial information amongst the ICT and its use for society - focusing on geospatial data, information, and technologies in the WSIS reports/recommendations. Spatial information has a niche role and considerable focus is required for this in the national, regional and inter-governmental arena and is a critical linkage for GSDI.
- The Association has also linked with the international GEO Forum, a **Group on Earth Observation** that is working on bringing to position an international

Global Earth Observation System of Systems (GEOSS) – especially in the areas of disaster reduction; environmental monitoring and societal enabling. The GEO 10-year plan mentions the GSDI and the need for considerable cooperation. GEO can benefit from standardization, portals, search-engine, data access, application models, etc. Again, through its Members, the GSDI can fill this gap.

- The international **Committee on EO Systems (CEOS)** has a Working Group on Information System and Services (WGISS) dealing principally with satellite images and services. Past President, Mukund Rao, has personally been associated with WGISS and there is a lot both GSDI and WGISS can benefit by collaboration. The WGISS has set up a EO Portal, EO global datasets archive, International Data Network, and a WGISS search capability.

## 7. WHERE TO FROM HERE?

As stated earlier, the vision of the GSDI is *to be seen as the focal point for global spatial data infrastructure information and help*. As a fledgling formal organization the Association needs to pay attention to the things the membership sees as essential programs for the immediate and long-term future and carefully balance that with the need for financial sustainability and growth. With this in mind the Association considers the following as critical next steps:

The first order of business is to keep the original members and stimulate new members. Toward this the Association has hired Allan Doyle as a part time Business Director with a strong background the GI industry and business management. His role will be to focus on membership issues and in promoting partnerships with others who share similar goals to leverage scarce resources.

The Newsletter program needs to be sustained and grown with other contributing to its sustainability. Similarly the small grant program should be owned and operated by the GSDI Association, and other partners sought to enlarge both the financial base and the players in defining and promoting the program as well as selecting worthy grant winners.

The *GSDI Cookbook* is a living document and should be both updated regularly, and the Working Group should be seeking other contributions such as successful business case examples particularly in emerging nations with fledgling SDIs. The key to the selling the development of any NSDI is being able to convince Ministers and other policy level people that there is a good business rationale for such an investment and that it will lead to better governance (and reflect positively on them.)

It is also necessary to provide services like portal and web applications. Financing the existing and broadening the portal and related capabilities is critical to show members and others that the Association has unique opportunities to membership.

Provide and assist with SDI capacity building is another key component of the GSDI. There is a significant difference between training and building capacity. The critical element here is to ensure that the capacity for which we are training is sustainable, ie, that it stays in place even after the training. Suggested approaches include following up after the initial training with visits inquiring as to progress, successes, problems, and the like. Providing assistance with troubling issues, interfacing with managers and ministry level officials as to progress, recording success stories examples for others who may be building SDIs, are all a part of the follow up. Where possible, providing seed monies to help fund small grants encouraging organizations within the nation to build SDI components such as metadata, or a clearinghouses is also a mechanism to help sustainability. Additionally, providing funding to support some fraction of the salary for a national SDI advocate to be share with a Ministry or Ministries for one, two, or three years is another factor to help with sustainability.

## **8. CLOSURE**

Geographic Information Systems (GIS) have greatly expanded opportunities for data integration and analysis, modeling, and map production. As populations grow, as countries boost their economies, as landscapes change, governments have increasingly relied on geographic information for applications such as environmental planning, land registration, disaster response, public health programs, agricultural marketing, and biodiversity conservation. Ready access to digital geospatial data is a clear prerequisite to progressive development.

Government agencies in many developing countries are at a critical transition from producing paper maps to digital maps. Often, the work is being done in an uncoordinated way, without documentation, and without consistent standards. There is considerable duplication of effort, and different standards limit the possibilities for integrating and using the data properly. Data producers are also in a transition from 'guarding' their information to exploring mechanisms for disseminating it on-line

A number of noteworthy national initiatives are already underway in developing regions, but generally, most countries still lack a national framework to ensure that geographic information is consistent, available, and affordable. Capacity building will further the development of such frameworks. With these frameworks in place, people who need access to data will know where to go for it, what format it is in, its scale, how reliable it is, how much it will cost, and whether they can duplicate it.

The GSDI Association was instituted to encourage many of these fledgling SDI as well as those that have not started anything in this area to focus on common standards, interoperable systems and processes. It breeds better, more efficient and effective governance and better business practices. The GSDI is bringing awareness and in many cases pressure to bear on some of these issues, but it too is evolving. With the right people, the right partners, a bigger membership base, and improved financial underpinning, it can become a major influence on the SDI Development locally to globally.

## **BIOGRAPHICAL NOTES**

Dr. Stevens is the International Program Manager for the U.S. Federal Geographic Data Committee (FGDC) and the Global Spatial Data Infrastructure (GSDI) Secretariat. This includes helping to build the GSDI into a bona fide Association promoting the development of National Spatial Data Infrastructures (NSDI) throughout the world. Prior to his current position he held several responsible positions within the U.S. Geological Survey's National Mapping Division including the International Manager for the National Mapping Division and the Deputy Director, the CEO, and the Operations Manager for the National Mapping Division's Eastern Region. His first assignment with the USGS was the Chief of the entire Mapping Division's Information distribution offices. Before coming to the USGS, he managed the photogrammetry and remote sensing research activities for the Tennessee Valley Authority (TVA.) He received his Bachelors, Masters, and PhD in Civil and Environmental Engineering from the University of Wisconsin. Alan is a past president of the American Society for Photogrammetry and Remote Sensing (ASPRS). He and his wife, Professor Karen Stevens, live in Reston, Virginia, USA and have two children and two grand children. Alan and Karen volunteer to work with families of chemically dependant adolescents.

### **CONTACTS:**

Alan R. STEVENS

International Program Manager, US Federal Geographic Data Committee

590 National Center; Reston, Virginia 20191

Tel. +703-648-5119

Fax. +703-648-5755

Email: [astevens@gsdi.org](mailto:astevens@gsdi.org)

Web site: [www.gsdi.org](http://www.gsdi.org)

Harlan J. ONSRUD

President, Global Spatial Data Infrastructure Association

Department of Spatial Information and Management, University of Maine,

5711 Boardman Hall, Rm 340

Orano, Maine 04469-5711

Tel. +207-581-2175

Fax: +207-581-2206

Email: [onsrud@spatial.maine.edu](mailto:onsrud@spatial.maine.edu)

Web site: [www.spatial.maine.edu](http://www.spatial.maine.edu)

Mukund RAO

Past President, Global Data Infrastructure Association

Deputy Director, Indian Space Research Organization

Antariksha Bhavan, New BEL Road

Bangalore, India 560 094

Tel. +91 - 80 - 2341 - 7359

Fax: +91 - 80 - 2341 - 7455

Email: [mukundr@blr.vsnl.net.in](mailto:mukundr@blr.vsnl.net.in)