

Background Note on Use of GIS & Space Technologies in e-Governance Workshop

The merits of GIS applications should be passed on to the common citizen by incorporating it in the e-Governance domain. Various information related to government services can be offered in a better way by proper use of GIS technology in the e-Governance applications. The work done by various agencies present in the GIS domain such as NIC, MoES (Ministry of Earth Sciences), Ministry of Mines, Survey of India, Department of Science and Technology etc needs to be enhanced, integrated and leveraged.

There is a need to create a common GIS platform with well defined governance structure, clear cut responsibilities of different agencies in terms of data sharing & access, data standardization etc. Since there are multiple agencies involved in GIS data creation and usage, it is urgently needed to have a national level consultation workshop for facilitating the approach, implementation etc for creating this platform.

Work done by various government agencies

Many state departments, government agencies and government assisted organizations have done significant and considerable amount of work in GIS space. Following are a few examples of such efforts-

National Informatics Centre (NIC):

National GIS at NIC is a very large repository of spatial data which incorporates images from Foreign and Indian satellites with different spatial spectral resolution along with the Maps developed from Survey. The application incorporates All India Mosaic of IRS-P6 satellite panchromatic (Black/white) image with 5.80m ground resolution. This data has been integrated with extensive topology from Survey maps for administrative boundaries for states and districts, National Highways, Railway lines and over 10 lac points describing locations for villages, habitations, headquarters, major towns etc.

NICMAPS of NIC:

NIC has established “**National GIS Framework**” as “**Service Oriented Architecture**”. Some of the salient features of the program are as follows-

- National GIS Platform Services for E-governance & Planning with Seamless Country wide base maps, satellite images and hybrid Maps
- Pre-cached service at 12 levels (1:40 K to 1:18 K) & 23 feature layers
- Multi-Scale & Multi-Resolution unique Map service in the country up to 36,000 scale primarily derived from SOI data and further value added in terms of content from multiple sources.

- Terrain Base Map service, using DEM derived from 20m Contour derived from SOI data.
- Geo-code web services with (12 lakhs locations)
- Linkages with e-gov applications viz. Education, e- Panchyat, Telecom etc.
- State/district/Sub district/Block wise viewing and Village location & boundaries
- Integration with Indian Services such as Bhuvan (NRSC, DOS, NNRMS, SIS-DP), Map My India, Global Services such as ESRI and any other OGC Compliant services coming from any source.
- Application of The NIC framework for various government programmes such as telecom, environment, rural development, agriculture, soil, ground water, & utility mapping services etc.
- Establish common GIS platform for all the ministries to harmonize data and overlay their information both in spatial and non spatial formats.
- **Up-Scaling of Multi-Layer GIS Framework using NICMAPS** is on-going SFC Project of NIC, DietY to scale up GIS asset & services from 1:50 K to 1:10 K using High Resolution Satellite Data. This is being further equipped with cloud based data centre infrastructure with high speed connectivity using NKN/NICNET to server GIS services in e-Governance Space.

NIC GIS for e-Governance: The NIC GIS portal for “Remote Sensing and Geographic Information System” (<http://gis.nic.in/home.html>) has some offering for G2C services as mentioned below –

- a. Village Level Mapping of Demography and Amenities: It displays data on map at State, District and village level for amenities such as Education, Health, Post, Telegraph, Telephone, Banking Facility, Cultural Facility etc. The data is point data provided on the cadastral maps which are not satellite images.
- b. Sports Facilities in Delhi: This website allows one to search sports facilities anywhere in Delhi by a number of different ways. One can browse an interactive map of the Delhi, search for facilities in your local area, use name and address of a specific facility to find out more information.
- c. Rural Post Office Mapping: Shows all the Head Offices, Sub offices, Branch Offices till village level along with Post Office name with pin code.
- d. National Atlas: It shows a) Spatial Maps such as Towns, Forests, Soil, Roads, Railways, Airports, Basins, Catchments etc b) Demographic Maps such as number of households, population, sex ratios, literacy ratio etc. c) Sectoral Maps such as Education (Number of schools), Medical (number of hospitals), Banks, recreation, finance etc. All these data is available at state level only. Though there is a link to view the data at district level, the link is not working currently.
- e. Parliamentary and Assembly Constituency Maps: It shows assembly constituencies and Parliamentary Constituencies of a selected state in the map.
- f. National Agricultural Market Atlas: There are services such as “National Agricultural Market Atlas” under heading “GIS Projects” can be very useful in identifying existing markets in the vicinity of the rural people and farmers. Also, it provides reports such

as items available in the market, current price of different items etc which can be very useful to the common citizen.

Apart from the above mentioned G2C services, NIC has also developed various other GIS applications. Ground Water Information System is such a system which provides access to various thematic layers as well as the nationwide database on ground water level and water quality monitoring by Central Ground Water Board (CGWB). Only the stakeholders involved in ground water development and management get access and visualize the ground water condition in the country through framework Service Oriented Architecture over enterprise spatial data infrastructure around multi-layer GIS.

National Remote Sensing Centre (NRSC):

ISRO launched the beta version of its web-based GIS tool, Bhuvan, on August 12, 2009. NRSC played an important role in the development of this product. Bhuvan offers detailed imagery of Indian locations compared to other Virtual Globe software, with spatial resolutions ranging up to 1 metre. At present 177 cities High resolution datasets are available, while the other part of the country is covered by 2.5m resolution imagery. Locations will be viewable from different perspectives, and the software will also provide functionality for the measurement of distances and other geo-processing capabilities. The Bhuvan portal is designed to run on slow Internet connections. The images available do not include any military installations in India, due to security concerns.

The browser is specifically tailored to view India, offering the highest resolution in this region provided with local four languages. Apart from visualization Bhuvan provides timely Disaster support services (Domestic and international), Free satellite data and products download facility, Rich Thematic datasets. Bhuvan is using Crowdsourcing approach to enrich its maps and collecting Point of Interest data. It also acts as a platform for hosting Government Data (example - Karnataka Forest Department datasets).

Bhuvan-2D is developed using open-source software Geospatial solutions. 2D images are available on all mobile browsers. Bhuvan also provides facility to view satellite imagery in 3-Dimensional format. The Open-source tool provided by Bhuvan is platform independent and Plug-in free. Bhuvan also provides an android based application for field data collection.

Indian National GIS Organization (INGO):

National GIS Mission & Indian National GIS Organization (INGO) was initiated based on Programme & Vision Document (October, 2011) prepared by Task Force constituted by Planning Commission under the Chairmanship of Secretary, MOES. Based on the recommendation of this report, Committee of Secretaries (COS) recognized the role of DST/SOI, DOS, MOES and DeitY/NIC in Implementing the GIS in the country. Subsequently, EFC draft was prepared by MOES & NIC and submitted to COS in July-August, 2012. Thereafter, COS identified DST as nodal organization to finalize EFC and incubate NGIS Mission & INGO.

DST has finalized the EFC to implement National GIS with total outlay of 3000 Crore. Currently, EFC is approved and now it is to be put up for cabinet approval. Pending cabinet approval, DST may initiate the ground work for the mission with stake holders namely NIC/DietY, MoES& DOD using 10 % of total EFC budget from DST.

Open Data Platform:

Some geospatial datasets have been uploaded on open data platform <http://www.data.gov.in> in open data format for public consumption.

National Spatial Data Infrastructure (NSDI):

National Spatial Data Infrastructure launched India Geo-Portal launched on 22 December 2008. With launch of India Geo-Portal, NSDI has become the first govt. agency to host OGC compliant metadata on the web which will be helpful in planning for development activities of the nation. The Geo-Portal includes OGC compliant Web-services: WMS, WRS, CS-W. It facilitates nodal agencies to uplink their metadata, Product-catalogue and other services through an SSO 128 bit encryption based secured communication.

Bhaskaracharya Institute For Space Applications and Geo-Informatics (BISAG):

BISAG provides solutions based on Remote Sensing, using Multi-spectral data, for specific applications like agricultural crop monitoring, watershed management, forest fire mapping etc. BISAG also offers leading-edge Mapping - GIS solutions for disaster management and specialized needs of Public Safety agencies like police, fire and ambulance services. Additionally, a full complement of e-governance solutions is also offered, to address varying GIS and MIS needs of governments and municipal corporations.

BISAG also undertakes all services for the entire process of implementing an enterprise level GIS system. These services include GIS database design and development, map creation/updation and finishing, data migration/conversion and format translation, software development and customization, systems integration and technical consulting. BISAG also provides complete GIS solutions, which bundle hardware, and software with GIS systems development services.

Discussion Areas

Hence it is proposed to organize a National GIS stakeholder's workshop for their consultation. Focused group discussions can be carried out in the workshop. The focused group discussions can be arranged around the following topics –

1. Single Platform for GIS:

As there are many agencies which are involved in data creation, data tagging and data usage related to GIS in the government and private space, it is of the utmost need that there should be a single platform where data will be aggregated. The aggregated data can be modified by the various agencies and may be useful for other departments. This will require discussions around creating a National Level GIS platform which will enable the user to access the data which has been created by other departments/ministries and can also share the data which is being created by them.

2. GIS data standards and Issues in data creation, aggregation, dissemination, usage:

There should be uniform standards for GIS data capturing, protocols to share data with other agencies and storing data in standard format. The standards should be so notified that the data becomes universally accepted and usable not only in the country but internationally.

Data creators, data providers and data users may find various challenges in their respective areas. As there are so many standards worldwide for every aspect of data creation but implementing them is a challenge by the agency. The various challenges need to be identified and solutions for the same may be suggested.

The discussion will involve the issues of data interoperability and require deliberation on standards for data creation which is simple yet effective. This will also cover the discussions of diverse file formats for various kinds of data like Vector, Raster and 3D data (Stereo Satellite Data and LIDAR data). There should be an open data store that allows stakeholders or anyone interested to download and redistribute raw data for its use.

3. Policy related bottlenecks:

The key policies rolled out so far by GOI are as follows -

- National Map Policy -2005

The NMP-2005 is a result of intense discussion and debate in the country that emanated from the "urgent need" to have digital topographic maps. Discussions, which started from 1999 onwards and weaved through various government meetings, centered on one major issue of "addressing security and defense concerns"

- Remote Sensing Data Policy : 2001 and 2011

RSDP-2011 (for which DOS is the nodal agency) defines the regulations for acquisition, dissemination of satellite images through NRSC. ISRO/DOS had positioned a RSDP-2001, which governed how satellite images were acquired and distributed from 2001 onwards and the recent RSDP-2011 now allowed even 1m images to be dissemination to users. The RSDP-2001 and RSDP-2011 embeds the concept of a High Resolution Image Clearance Committee to address the need of various users for 1m images.

- CAR, 2010 for Aerial Survey

In the Aerial Survey CAR-2010, a single window clearance system has been promulgated through DGCA for all aerial survey tasks. This is a major departure for aerial surveys – earlier which meant multiple application process has now become one-application and once clearance covering all aspects. It is now the DGCA's responsibility to obtain internal approvals/clearances of various ministries and determine a “collective” clearance for the application.

- The Delhi Geographical Spatial Data Infrastructure (Management, Control, Administration, Security and Safety), Act, 2011.

This Delhi Geospatial Act, 2011 is a unique of its kind and the first to be promulgated in a state of the country – Delhi. Delhi state has created a state GI content that includes about 48 lakh buildings, 3 lakh manholes and nearly 17,000 kilometres, demographics of the capital and utilities like storm-water drains, sewer lines, infrastructure projects and urban planning details under a Delhi State Spatial Database

- National Data Sharing and Availability Policy (NDSAP), 2012

The NDSAP, 2012 is designed to promote data sharing and enable access to Government of India owned data for national planning and development. The Policy is to apply to all data and information created, generated, collected and archived using public funds provided by Government of India directly or through authorised agencies by various Ministries/Departments/Organisations/Agencies and Autonomous bodies.

The discussion will be held to identify policy related bottlenecks in implementation of GIS in India and necessary GoI policy interventions and improvements for GIS data sharing, data dissemination, data protection and data updation. It may also delve the adoption of New GIS policy required by Government of India in the changed world scenario where the existing policy on GIS will not hold good.

4. Use cases for application of GIS in e-Governance and capacity building

It should be easier to publish interactive maps that summarize and share the value of important data with the public. The application of GIS is vast and can be suitably applied in e-Governance. An application which is browser compliant and mobile ready enables aid workers to update their development activities or send data from the field quickly. It should also help in communicating emergency response strategy and awareness for a given disaster or situation.

Considering the implementation aspect of GIS at various levels of government (Last Mile- Gram Panchayats to Ministers Office) what could be the best possible areas of GIS usages in MMP's should be discussed.

Capacity building is a major concern in successful implementation of government policies. The same applies to GIS also. Being a niche area, proper training should be provided to the government employees for efficient management and use of GIS. How the central and state government should work towards capacity building should also be discussed.

5. Linkages of GIS with other core IT enabled systems and Analysis of GIS data

The linkages of GIS with BI can enable Discover data connections via visualization, Find connections between data in an easy and visual way. It helps to analyze, visualize, and understand insights hidden in their data. Economic, social, political, or environmental indicators can be facilitated using rich and comprehensive maps to the stakeholders. Open-source design also enables users to filter data and customize information for their own humanitarian initiatives.

This topic will discuss the need and challenges of integrating the GIS with core IT systems including ERP, CRM etc. GIS data layers can be recombined or manipulated and analyzed with other layers of information. So, proper analysis of GIS data to create an effective decision support system can also be an area of discussion. Use cases of how the integration has been achieved by various technology players, Case study if any available can be discussed.

6. Implementation methodology

A road map how GIS will be implemented in various departments should be prepared. The target departments, time of completion and source of funding should be mentioned. The Governance structure for GIS implementation and management should also be created. Also, as there are many agencies involved, to work in collaboration. So, SLA arrangements should be specified among various agencies. There should be a clearing house mechanism by government for integrating applications within and among states and reduce duplication of efforts.

The discussion should focus on implementation methodology, SLA management, Governance structure and reduction in duplication effort.

7. Business Model for self sustainability of GIS services

This will discuss the possibilities model of attracting non-government players in bringing partnership with Government for GIS implementation. Global practices and role models on how PPT models are working out in implementing and sustaining GIS.

8. Cloud Enablement

Cloud computing is rapidly emerging as a technology trend almost every industry that provides or consumes software, hardware, and infrastructure can leverage. Cloud computing provides opportunities for organizations to become more cost-effective, productive, and flexible in order to rapidly deliver new capabilities. It should find out what great possibilities are associated with having a cloud integrated solution of GIS, various models of deployment in cloud (PaaS, SaaS, IaaS) and associated risks.