'Use of geospatial technology has to be driven by e-gov programmes in India'

The National Informatics Centre, or NIC, as it is popularly known, has established spatial infrastructure and services as an essential component of systems and support for national e-governance and planning in India. In a freewheeling interview, Director General Dr Y.K. Sharma talks of the pioneering work done by NIC, challenges in the way and the way forward.

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NIC has spearheaded the e-governance drive in the country in the past three decades, building foundation for transparent governance. NIC is one of the pioneering agencies in the country in use of geospatial technology. How is NIC leveraging these significant strengths in fulfilling its mission and objectives?

NIC has leveraged information and communications technology (ICT) to provide a robust communication backbone and effective support for e-governance to the central government, state governments, UT administrations, districts and other government bodies. It offers a wide range of ICT services. This includes NICNET, a nationwide communication network with gateway nodes at various departments of the Government of India, State/UT secretariats and all district collectorates to service ICT applications. NICNET has played a pivotal role in decentralised planning, improvement in government services, wider transparency of national and local governments and improving their accountability to the people. NIC assists in implementing ICT projects, in close collaboration with Central and state governments and endeavors to ensure that state-of the-art technology is available to its users in all areas of ICT.

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NIC has established spatial infrastructure and services as an essential component of "systems and support" for national e-governance and planning. It played a pioneering role in the development of a common enterprise GIS framework around the 1:50,000-scale topographic data from the Survey of India (SoI). Handling data from SoI was a challenging task as the data provided was in sheets and not in GIS-ready format. The extensive processing of data at NIC enabled readability in a standard GIS product, creation of seamless mosaic for visualisation and publishing of the same through adoption of standards using Web technologies. The entire work thus has mobilised the data into the services which is the primary concept of information sharing. The platform thus has enabled sharing of this data. This facilitate collaboration of inter-sectoral data among various government agencies that include SoI, Department of Science and Technology (DST), Forest Survey of India (FSI), Central Ground Water Board (CGWB), Registrar General of India (RGI) and departments dealing with environment and forest, agriculture, education etc. Web-GIS applications are developed around this spatial framework for various user departments as e-governance service in G2G and G2C categories. The user departments have made use of the facility extensively in their e-governance objectives.

NIC is involved in several mission mode projects at the national level aimed at the socioeconomic development of the country. How is it effectively incorporating/encouraging the use of geospatial technology in these projects?

The NIC-GIS framework deployed by NIC has brought a paradigm shift in visualisation of geospatial data as it is a robust, interoperable, and scalable and standards-based dissemination framework. Some of the benchmark applications of NIC have demonstrated how GIS can be enabled in various sectors. Online generation of thematic maps at the state, district and

village-level from the Census 2001 village-level data at http://gis.nic.in is one such example. Many applications from various sectors followed this model for presentation of their data in the form of thematic maps. Some of these incorporate GIS development for drinking water, total sanitation campaign, ground water data etc.

NIC-GIS is the largest spatial data repository and being used in various ministries/departments like telecom, environment and forests, agriculture, ground water, education etc.

How can geospatial technology help in nation building and inclusive growth?

GIS technology has long been valued for enhancing communication and collaboration in decision-making, effectively managing resources and assets, enhancing the efficiency of workflows, and improving the accessibility of information. The inclusive growth for holistic national building is the process embedded with location intelligence and hence any government programme such as the Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA), public distribution system (PDS), public grievances, pension, financial services and such other programmes need to be mapped on geospatial technology platform.

One of the recent initiatives of NIC is NICMaps. What are the objectives of this initiative?

NICMaps is a unique achievement and the first of its kind in the country. The various data sets created by NIC at different scale, including data from the SoI, FSI, RGI etc. are launched as seamless countrywide maps from 40 m to 18,000 scale at an equal interval in 12 levels. This service renders data at a response comparable to the world services. These maps can also overlay accurately (mash-up) with the services rendered by Google, Bing or ESRI. NICMaps provides a uniform content at all the levels across the country and application developed with this service has demonstrated a richness of data content when compared with the global GIS web service providers, especially in rural sectors.

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This framework is being utilised for various government programmes such as telecom, environment, rural development, agriculture, soil, ground water, utility mapping services and others. The project has successfully been able to establish a common platform for all the ministries to harmonise data and overlay their information both in spatial and non spatial formats. The main objectives of the NIC GIS Framework (NICMAPS) are to:

- Build a seamless country-wide high-quality, high resolution geospatial data with several layers from different sectors of interest, adopt standards, enable harmonised data repository to be shared in multiple GIS applications.
- Develop and evolve a robust framework to promote data sharing and cooperation between government departments. Enable access for the public with suitable information within the GOI policy framework.

How has been the response to this G2G data portal?
At present, this data portal has been extensively used in telecom GIS application. In addition, specific base map services from multilayer NICmaps GIS platform are being used in various e-governance applications such as banking infrastructure for financial services, postal mapping, and various other government schemes and programmes. The response has been overwhelming as this is the first initiative in the country serving uniform base map with high cartographic quality, faster performance and reliable maps.

NICMaps has spatial data sourced out from a variety of sources, both public and private. How is it handling copyright and liability issues?

The NICmaps framework has been built using the data procured from geospatial data generating agencies like SoI, FSI, DST etc. This also includes data created in house using satellite images and location information captured using mobile based applications. The data and services are in full compliance with the National Map Policy as well as the respective data owners' policy. Physical sharing of data with the outside agencies is restricted.

Is NICMaps data available through the National Spatial Data Infrastructure (NSDI)?

NIC has sought the clearance from Ministry of Defence (MoD) and we are awaiting a response. Currently, there is no demand from NSDI to access this data probably because NSDI has a focus on metadata portal. However, the necessary details in this regard have been provided to the NSDI.

The recent initiative www.data.gov.in is a welcome change in the government policy to make data accessible and available to all government ministries and departments. Is geospatial data being made available through this initiative?

Attempts have been made to provide administrative boundary layers like state, district etc. and is being proposed to be consumed in the visualisation tool of data.gov.in for testing purposes.

Since NICMmaps hasn"t got the clearance from (MoD), the same cannot be made available in data.gov.in. However, initiatives are under-way for the availability of Web map services, a subset of NICmaps, for basic administrative layers.

The need today is to provide geo-enabled services and create awareness among the public to utilise the same. How is NIC working in this direction?

The GIS module is being promoted as part of the e-governance service delivery platform. In this direction, NIC is trying to provide data as services as per the demand from the users. These services may be used for developing GIS solutions along with application programming interfaces, which shall help non-GIS professionals to consume and build applications on their own. This concept is being promoted for deploying GIS solution in e-governance projects undertaken by various divisions in the NIC. Utilisation of services has to go a long way as it would need to address issues e.g adoption of standards, service-level agreements, Intellectual property rights etc. Based on the experiences and as per the GIS policy regulations, they may be extended to the public.

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To make its ICT services more user-oriented and user-friendly, NIC is actively working on creating apps for various applications. How is the response? Is NIC looking at creating geo-enabled/location-enabled apps as well?

NIC is developing a large number of apps as per the requirements from various sectors. A controlled central app was launched for capturing of data from BSNL decentralised locations. Additionally, an effort is underway to create a generic mobile GIS application to enable users to capture the assets and their attributes along with the photograph of the asset. A limited version of app created so far includes window OS; however, extensive efforts are needed to cater to various operating systems being used in mobile services and at a pace the concept is changing. This application may find immense utilisation in various sectors like capturing of school locations, asset mapping for MGNREGA, NHAI projects etc.

The service delivery platform also provides generic toll for the data capture using mobile software development kit (SDK).

NIC is an important stakeholder in NSDI. What proactive steps is NIC taking to make this initiative a successful reality?

NIC has been an active member of NSDI and providing necessary technical expertise as per the request from NSDI. NIC is participating and contributing in all working groups and committees to establish meta-data, content and services standards.

Do you see a need to bring all the spatial data-producing organisations in the country like the SoI, NRSC, FSI and the Geological Survey of India, which are currently under different departments/ministries, under one department/ministry so that there is greater emphasis on the effective utilisation of spatial data and thereby create spatial literacy in the country?

No, there is no such vision so far. Rather than bringing all the organisations under one organisation, the need of the hour is to collaborate and share the experiences and build a strong GIS platform. The National GIS (NGIS) Mission and Indian

National GIS Organisation (INGO) is an effort to bring all the geospatial data-generating agencies on a common platform and provide geospatial data services to the central/state governments and the public at large. NGIS is "service-oriented framework" to facilitate geospatial services for a larger benefit of the country.

As per the 11th Plan allocation for geospatial projects, power and space applications together had almost 50 per cent share while others made up for the rest. Is that ratio changing in the 12th Plan and are more sectors using geospatial technology?

Use of geospatial technology is to be driven by e-governance programmes and all ministries and departments at central as well as at state level have to play major role. In the Internet age, geospatial technology is part of the mainstream ICT-based ecosystem. Therefore, any workflow-based process of governance in various sectors, including land and agriculture has to make the best use of geospatial technology in total convergence with all other ICT tools such as databases, web services and networking. In this context, e-governance, geospatial governance (g-governance) and mobile-governance (m-governance) are all part of the same eco-system to facilitate good governance. Hence, defining percentage use of geospatial technology in terms of ratio is not important, as it is going to be totally embedded with the workflows and process of governance projects. In this context, every sector of governance such as education, health, industry, rural/urban development, environment, and infrastructure etc. has a lot of scope and promises in the use of geospatial technology.

What is NIC's expenditure in geospatial technology?

NIC's investment in geospatial technology is a part of the complete "systems and support" infrastructure established for e-governance in the country. NIC has so far invested around over INR 100 crore in establishing a multi-layer GIS platform with base map and satellite and location data services, which is being further strengthened with support from various e-governance projects.

What is the future of geospatial technology in India?

Spatial data are a valuable information asset that can be used to support daily tasks and business decisions. However, it is usually restricted to a handful of technical experts within GIS departments and is often duplicated between different offices and departments within the same organisation.

Handling of geospatial data has been challenging task. With the increasing demand of such data in various MIS-based applications as a value addition to the existing systems has triggered the process to organise and disseminate spatial information service through web-based applications.

With the new National Map Policy, the general public can procure open series maps for any part of the country. This has triggered users to integrate GIS in their applications. Also, the use of satellite images up to 1 m resolution and location-based services are getting prominence. The future of GIS seems to be very bright.