

# **A LOOK AT NATIONAL GEO SPATIAL DATA INFRA-STRUCTURE IN INDIA**

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## **1.0 INTRODUCTION**

We are living in the era of information revolution. The information is the key for decision-making and the development. Information should be up-to-date and be available in the proper format. From the user point of view, the information should not only exist but its availability, should be known to the user. The format of the information should be such that it can be easily integrated with other information dataset. But, this is not always the real time scenario!

Survey of India, the national mapping agency has completed the mapping of whole country, at 1:250,000 scale (about 385 sheets), 1:50,000 scale (more than 5000 sheets). More than 50% of the country has also been mapped at 1:25,000 scale. Even the digital topographical data of the whole country is available at 1:250,000 Scale. Is, it not a great achievement for a developing country? But the question is: Is the availability and suitability of this huge geo-spatial data, known to the user? Is this data available to the user as per his requirement? And, this is not the isolated case. It is true for almost all geo-spatial data generating agencies in the country.

So the concept of National Geo-Spatial Data Infrastructure (NGDI) has evolved to make this large amount of geo-spatial data available to the user domain as per the user need. It will provide a base or structure of relationship among data producers and users that will facilitate data sharing.

## **2.0 NEED OF NGDI**

To make the user aware of the geo-spatial data existence and its suitability through well documented metadata.

To make the data available to the user through one window.

Data Standardization that may help inter-operability and wider use.

- To bring the data into public domain for better accessibility, sharing and avoid duplication and, wastage of efforts.
- To establish a modern operational geo-spatial information infrastructure that will help to take better and faster decisions which in turn help in development of the country, improving the environment and make the quality of life of the people better.

### **3.0 ISSUES INVOLVED IN ESTABLISHMENT OF NGDI**

There are four main issues involved in establishing of the NGDI.

#### **(i) Data Dissemination**

At present, almost entire geo-referenced digital topographical data are classified. The classified data cannot be kept on the network for security reasons.

To start with Survey of India may provide on its node the metadata i.e. information about the availability of geo-spatial data. For a long time to come, most of the large-scale topographical data is likely to be disseminated off-line on CD or any other media. Some other derived products, which are in high-demand may also be provided through NGDI by National Mapping Agency. It may include the following:

Raster maps

Digital aerial photographs

Digital Elevation Model

Other Digital and Paper Product as per the users demand

## **(ii) Metadata Services**

The general problem faced by the users is the lack of information about the availability of geo-spatial data with different Government agencies and also the information regarding the relevance of this data to their needs. Development of metadata service should be given high priority in the initial stage. They can be developed relatively quickly and at low cost. Metadata services will be useful for both, data user as well as data producers. For example it can be easily found out from the metadata that how many topographical sheets are more than 20 years old and need revision survey.

Metadata can be completed within 1 year time after finalization of the standards for it. One example of the metadata for digital topographical sheet is given on the next to next page.

Following points should be taken care while developing metadata:

- All participating agencies should develop metadata catalogue giving complete information about availability of spatial data, its specification, tile size, format, scale, accuracy, contents, restriction of use, price, contact person, copyright etc.,.
- NGDI committee should decide common standards for metadata.
- Major information about all participating agencies should be available on NGDI server.
- This stage will not involve much expenditure and can be developed in short period of time after finalization of the metadata standards.

## **(iii) Machinery for Co-ordination**

Implementation of NGDI involves a large number of agencies that have developed their own data sets, data format and standards. The proper co-ordination and co-operation among these participating agencies is required for developing common standard, metadata, actual data format and data content etc.,.

There should be inter-operability among various data generating agencies including hardware, software and data so that, the on-line data from more than one agency can be used by the user in integrated way. The copyright of the data should be decided and honoured.

#### **(iv) Data Integration**

One of the ultimate aims of NGDI is to develop an integrated national geo-spatial database. It is extremely expensive task that will take place over a relatively long period of time for integration. Integration of geo-spatial data will also depend on the progress made in this field by State Governments. Fortunately, data integration requirement is coming at a time when advances in processing power and continual fall in information technology prices are bringing GIS capable infrastructure on the desktop. There is a growing awareness that GIS has a role to play in an incredibly diverse range of application throughout the society. A right balance between long term and short-term objectives should be established.

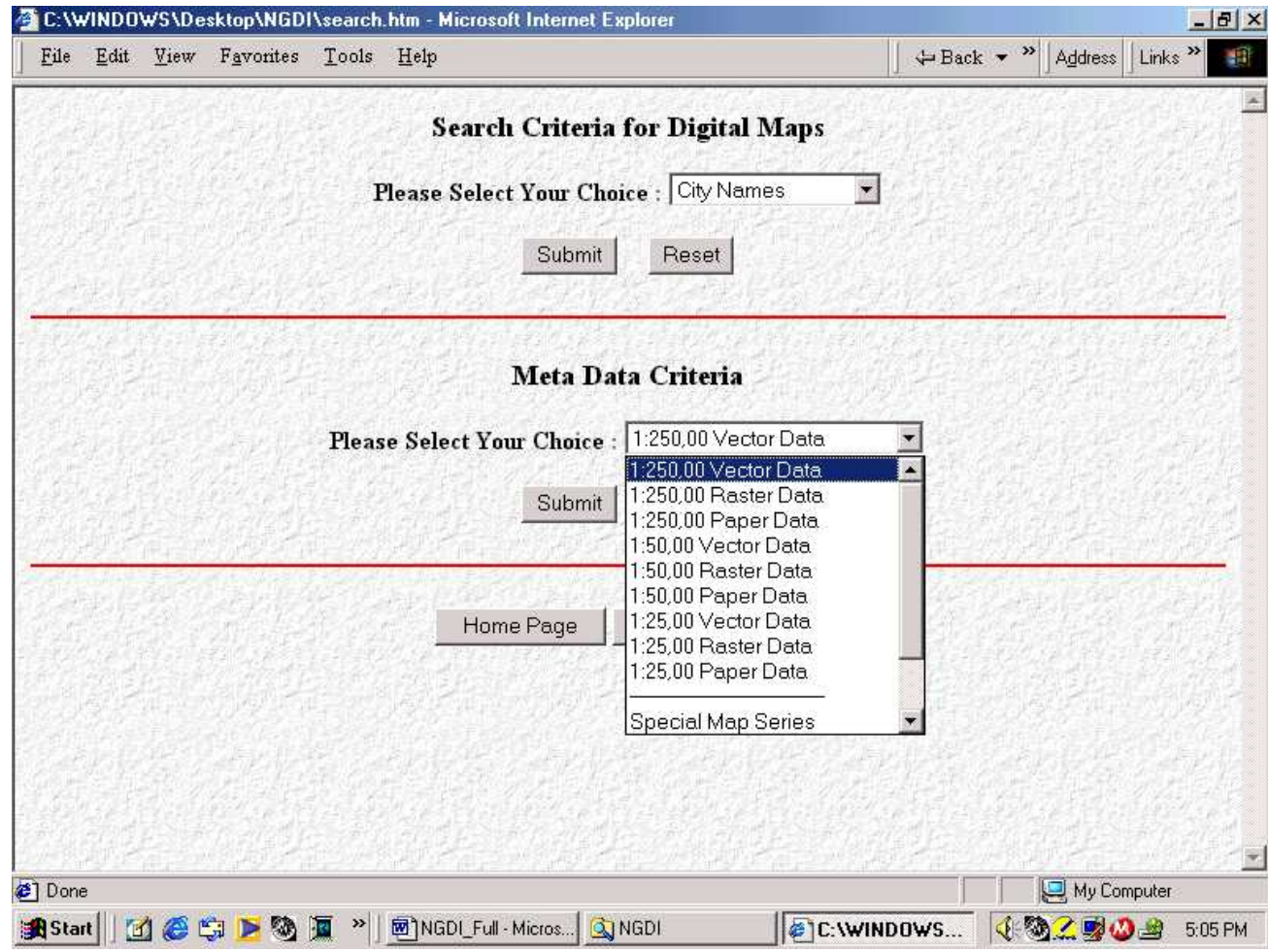
### **4.0 STAGES FOR DEVELOPMENT OF SURVEY OF INDIA NODE FOR NGDI**

#### **(i) Development of Metadata**

In present scenario it may not be possible to keep most of the spatial data available with SOI on-line. So in future Survey of India should give top priority to the development of metadata which will be available on-line.

Metadata should be developed separately for vector data, raster data and paper maps. The format for this may be decided by the standardization sub-group (one such sample metadata is given below). First one general metadata should be developed for all map series separately for vector, raster and paper map that may contain the common properties and search engine to search the metadata of component sheet, in a hierarchical way. Then metadata should be developed for each component sheet.

*An example of metadata for digital topographical data and its search engine is given below: -*



*Search Engine for Metadata*

**Meta Data of 1 : 250,000 scale Topographical Map**

<b>Specification</b>	1 : 250,000 Topographical Vector Data
<b>Availability</b>	Whole Country
<b>Tile Size</b>	1° × 1°
<b>Data Source</b>	Paper Map (Latest Edition)
<b>Data Structure</b>	Colour Separate wise
<b>Data Specification</b>	All Map Features
<b>Data Format</b>	DVD-1 and DGN
<b>Contour</b>	Tagged with height
<b>Security Classification</b>	Restricted
<b>Data Supply Terms</b>	Advance Payment
<b>Price Structure</b>	<a href="#">Digital Data Price</a>
<b>Storage Volume per tile</b>	3 MB to 10 MB (approx)
<b>Meta Data of Sheet No.</b>	<input type="text"/> <input type="button" value="Submit"/> <input type="button" value="Reset"/>
	( Please enter a 1:250,000 Sheet No. )
<b>Data use constraint</b>	Ministry of Defence clearance is required to obtain digital data of each sheet by the user.

*Metadata for 1:250,000 Scale digital topographical data*

Meta Data of Topo Sheet No. 53H - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Address Links

Data Type	Vector
Sheet No.	53H
Scale	1:250,000
Format	DGN or DVD-1
File Name	53H.DGN or 53H.DVD
File Size	DGN - 2.9 MB DVD - 3.6 MB
Data Source	Paper Map, 2 <sup>nd</sup> Edition 1980
Year of Survey	1975-76
Updation by	Nil
Updation Year	NA
Projection	Polyconic
Ellipsoid	Modified Everest
Height Reference	Above MSL
Extent	1" x 1"
Latitude & Longitude of SE Corner	28° , 77°
Latitude & Longitude of NW Corner	29° , 78°
Important Town	Delhi, Meerut, Palwal
Contour Interval	100 m.
Contact Person	Director, DMC Email: <a href="mailto:dmcsoi@ydb.vsnl.net.in">dmcsoi@ydb.vsnl.net.in</a>
Price	<a href="#">Digital Data Price</a>
Copyright	Govt. of India
Classification	Restricted
Meta Data of Sheet Number	53H/1 <input type="button" value="Submit"/> <input type="button" value="Reset"/>

Ministry of Defence clearance is required to obtain digital

My Computer

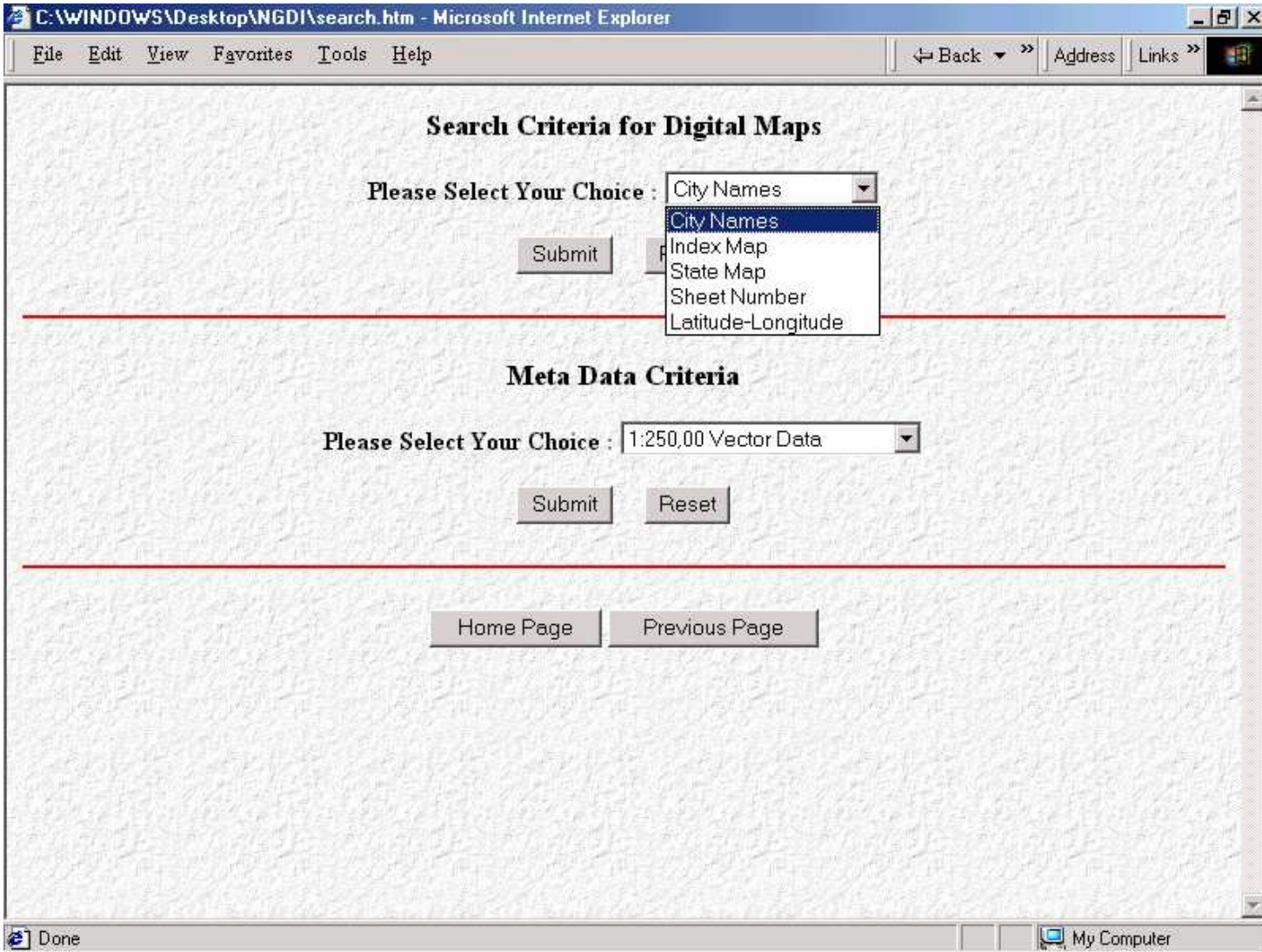
*Metadata for 1:250,000 Scale digital topographical data of Sheet No 53H*

**(i) Spatial Data Exchange on INTRANET / INTERNET**

Once the metadata standardization and its generation is completed, the next step may be putting the raster data on SOI node. This data is expected to generate lot of interest from the public. Only open category and small-scale map image will be kept on this site. Raster data can be created and put on the node in a short period of time.

The vector data will be put on the server and this data , can be accessed by the user through NGDI node. NGDI node and Participating Agencies nodes will be connected to Intranet/Internet with sufficient security controls. All requests for data will be processed at NGDI node and data will be either supplied by data producers to the user online or offline. This stage will require powerful servers, routers, leased lines etc., and should be planned when sufficient amount of vector data is available on desired projection/datum. Before putting any data on the server, the data content, standardization of format and accuracy should be completed. The on-line data should be unclassified.

The search criteria for searching the map data on this site may be developed as shown below: -



*Search Criteria For digital data*



Search will be done in a hierarchical order e.g. in Index map, it will be done from 1:250,000 to 1:50,000 to 1:25,000. Similarly, from state map respective DPMS may be searched.

**(iii) Internet / GIS**

This is the final stage when not only the digital geo-spatial data can be transferred on-line but the queries can also be made on existing geo-spatial database. There are various issues involved at this stage. First of all the Internet GIS is still in infancy. Secondly the GIS applications are based on some particular commercial software, but the common standards have to be developed which should be independent of any propriety software. Third issue to be resolved is that how the pricing will be done for querying the data- base. Will it be on hourly basis?

This stage can be started after completion of stage-one (metadata), and two (data exchange) which is, likely to take about several years. At this point of time, it appears that this stage may require some commercial Internet GIS software.

**(iv) Proposed Road Map for Establishment of SOI Node**

Survey of India should immediately establish a website node for NGDI. The generation of metadata for all 1:50,000 and smaller scale sheets can be completed within one year.

It is learnt that data for NGDI will be kept on new projection and datum like UTM/WGS84. In the next stage, the conversion of existing DTDB to new projection for all 250,000 scale sheets is expected to take about one more year after the transformation parametres between different datum are established. For 1:50,000 scale sheets, the same may be done in 4 to 5 years time. So the node establishment for data transfer through NGDI may be planned after two years from the time when the decision about the implementation of above road map is made so that sufficient data is available for online transfer.

## **5.0 CONCLUSION**

Users are clamoring for the availability of the geo-spatial data to further use and exploit it. The establishment of NGDI will be a right step in this direction. Many technical and organizational issues have to be dealt to successfully implement it. In the first stage, simple structure consisting metadata can be implemented while the complex structure including on-line data transfer may be implement in the further stages.

In to-days profit driven economy early results should be shown from an investment made in any infrastructure. This can be achieved by first developing the metadata services which can be developed relatively quickly and at low cost. Such metadata services will not only be useful to the users but also to the data producing agencies themselves.