भारतीय मानक
Indian Standard

IS 16554 : 2017

भू-स्थानिक सूचना के लिए डेटा के आदान-प्रदान हेतु मानक

Data Exchange Standard for Geospatial Information

ICS 35.240.70

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Geospatial Information Sectional Committee, LITD 22

FOREWORD

This Indian Standard was adopted by the Bureau of Indian Standards, after the draft finalized by the Geospatial Information Sectional Committee had been approved by the Electronics and Information Technology Division Council.

This standard provides a single window mechanism for providing access to the spatial data being generated and managed by various agencies in the country. The consensus amongst the data providers to share their datasets and making them accessible in a standard acceptable form necessitates a Data Exchange Standards for Digital Vector Data (DVD). While the individual domain servers could adopt the database design and implementation approaches based on their specific requirements of Software and Hardware tools, the exchange mechanism has to be open and neutral to specific platform. In this context it is very essential to evolve National Exchange Format. This standard takes into account DVD-1 format and built upon the same to suite the present need and which could, at a later date, port into an open Geographical Information System (GIS) platform. Such standards need continuous evalu-ation to meet the changes in the technologies and the user environment. It is hoped that this standard will pave the way for better utilization of geospatial data in this country and will help reduce the duplicity in spatial data generation.

The ultimate success of this standard will depend upon the ability of individual domain servers to serve the data to user community in a format, which is understood by one and all.

The composition of the Committee responsible for the formulation of this standard is given in Annex A.

Indian Standard

DATA EXCHANGE STANDARD FOR GEOSPATIAL INFORMATION

1 SCOPE

This standard specifies National Spatial Data Exchange (NSDE) format for catering the need of point, line and polygon topology and Digital Elevation Model (DEM) and coded raster data. This format also accommodates various types of thematic data sets along with the associated attribute data in tabular form. This Standard is to be supplemented by individual domain servers by development of to and fro data converters for supply of data to users and for accepting data from other domain servers describing relationships among spatial features. It has the provision to include digital images acquired by satellites

2 THE NATIONAL SPATIAL DATA EXCHANGE (NSDE) FORMAT

2.1 The data in NSDE Format will be supplied to users as a set of files as shown in Table 1. When supplying the data on media all the files would be copied unlabelled in the same sequence as shown in Table 1 with the End-Of-File (EOF) mark after each file and one extra EOF mark at the end of all files to indicate the end. In case the dataset cannot be accommodated in one media, the files will be copied sequentially into additional media which will be serially numbered and indicated in first file.

Table 1 Data Organisation Under NSDE
(*Clause* 2.1)

Sl No. (1)	File No. (2)	File Name (3)	Description (4)
i)	1	VOLDIR	Volume Directory Information
ii)	2	GENINFO	General Information
iii)	3	QUALINFO	Data Quality Information
iv)	4	TOPOINFO	Toposheet specific general information
v)	5	DATACAT	Data category records for basecategory/layer/spectral band number 1
vi)	6	DATAFIL	Data records for base category/layer/spectral band number 1
vii)	7	DATACAT	Data category records for basecategory/layer/spectral band number 2
viii)	8	DATAFIL	Data records for base category/layer/spectral bandnumber 2
ix)	4+2*p-1	DATACAT	Data category records for basecategory/layer/spectral band number p
x)	4+2*p	DATAFIL	Data records for base category/layer/spectral band number p

As shown in Table 1, there are totally 4+2*p files in general namely VOLDIR, GENINFO, QUALINFO, TOPOINFO, DATACAT and DATAFIL where p is number of base categories for SOI-DVD vector data or number of layers for Domain vector data or number of spectral bands for image/DEM/coded raster data. However, the file TOPOINFO is applicable only for SOI DVD data. VOLDIR file indicates whether these files exist or not. The DATACAT and DATAFIL repeat p times as shown in Table 1. All the files have fixed-length 72 bytes records. The first two records of all the files are identification and control records and are exactly identical in structure. The first record indicates the spatial context with reference to SOI toposheet numbering along with nature, type of data and generating agency. The second record contains file name as per Table 1, Volume code (which is unique for the dataset), serial number of media if applicable, total number of records in the data file and serial number of the base category/layer/multiple files, band number of raster images and the topological nature of the data. The description and format of these two records is given in Table 2.

The description and format of all the files from third record onwards are described below:

a) *File Voldir* — This file contains volume directory information. It indicates whether data are organized base category wise, layer wise or band wise. The description and serial number of all the base/layer category indicates whether data quality information (QUALINFO), topographic information (TOPOINFO) and attribute data exist or not. It also gives the serial number of the media containing the dataset. The detailed description and format of record number 3 onwards of this file is given in Table 3.

b) *File Geninfo* — This file contains general information like source agency, temporal and spatial framework, geographic incidence, projection information and co-ordinate system. It also describes data management environment at source agency. The detailed description and format of record number 3 onwards of this file is given in Table 4.

c) File Qualinfo — This file is the template for process citation and data accuracy information. The contents of this file will facilitate Quality audit and certification by NSDI. The detailed description and format of

record number 3 onwards of this file is given in Table 5.

The process citation will list all the distinct processes/ stages involved in data generation and for each stage the quality parameters have to be indicated by the domain servers. For example, for SOI Topographic data the processes could be control framework, Photogrammetric survey, field verification, fair mapping and digitization. The cumulative RMS accuracy value will be indicated in the Metadata of NSDI server.

This will be an index for the user regarding the quality and reliability of the data.

d) *File Topoinfo* — This file contains SOI specific information relating to toposheets namely, administrative index, compilation index, special footnotes etc. The detailed description and format of record number 3 onwards of this file is given in Table 6.

e) *File Datacat* — The main contents of this file are the listing of major categories of data along with category codes contained in the associated data that is RASTER/ NODE, LINE/ AREA/TEXT/ATTRIBUTE records. The information content of this file includes base category/layer/band serial number, number of major categories/layer categories, category code, number of nodes, lines, area features, no. of attribute tables and total number of rows and columns (for raster data), etc. The detailed description and format of record number 3 onwards of this file is given in Table 7.

f) *File Datafil* — This file contains the actual data categorized into raster, nodes, lines, areas, text and attributes depending upon the nature of the data. The details are given below:

   i) *Raster data records* — This section contains raster grid cell values as per the organization given in GENINFO and DATACAT. The detailed description and format of record number 3 onwards of this file is given in Table 8.

   ii) *Node data records* — This section contains information about nodes, which are intersection of lines or endpoints of lines. The information includes record type (NODE), element internal Id number, co-ordinates of node point and angle. The detailed description and format of record number 3 onwards is given in Table 9. There is one record per node.

   iii) *Line data records* — This section contains information about point and/or line features. A line that starts and ends at the same node and it has no vertices represents a point feature.

   The information regarding record type (LINE), element internal Id number, starting and ending node number, height, number of feature codes, object Id. etc. are given in the third record. The next set of records known as co-ordinate records contain X, Y values of vertices followed code records. For each line or point element, third record, co-ordinates record and code records are repeated. The detailed description and format of these records is given in Table 10.

   iv) Area data records (*Topologically structured*) — This section contains information about the polygon features. The third record contains details like record type (AREA), element internal Id number, co-ordinates of area point (polygon label), number of lines bounding the area, number of feature codes and object Id. Next set of records known as Line Id. records contain information about line Id. codes forming the polygon. After Line Id records, code records are written containing information about major and minor code list or layer category code list. The detailed description and format of these records is given in Table 11. For each area element, third record, Line Id. records and code records are written.

   v) *Area data records (Topologically non-structured)* — This section contains information about the area features defined by the vertices alongwith the feature code and feature name. The detailed description and format of these records is given in Table 12.

   vi) *Text data records* — This section contains information about text features. The third record of this file contains information about record type (TEXT), element internal Id., text size, justification, angle, X, Y co-ordinates of reference point, number of attribute codes and characters in the string and object Id. The fourth record contains the character string and the fifth record contains information about major and minor code list or layer category code list. The

detailed description and format of these records is given in Table 13.

vii) *Attribute data records* — This section contains information about attribute tables. The third record of this file contains information attribute tables like field definitions, number of records etc. The fourth record contains the actual attribute values. The detailed description and format of these records is given in Table 14. For each attribute table, third record and fourth record is repeated for as many number of tables as indicated in DATACAT file.

Table 2 Description and Format of First Two Records Common to All Files

(*Clause* 2.1)

Sl No.	Rec No.	Field	Contents	Type (Fortran)	Format	Starting Byte	End Byte	Description
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
i)	1	1	Map Sheet Code	CHARACTER	A40	1	50	Topo Sheet Number as per Scale for example 56G/12
ii)			Filler	—	—	51	52	2 Spaces
iii)		2	NSDE Version	CHARACTER	A6	53	58	Version of the exchange format in which data is organized. For example 1.0.1 organized e.g. 1.01
iv)			Filler	—	—	59	60	2 Spaces
v)		3	NSDI Layer	INTEGER*2	I4	61	64	NSDI Main Layer, for example Topography-001, Geology/Mining-002 etc
vi)		4	NSDI Sub-Layer	INTEGER*2	I4	65	68	Sub-layer Classification for example Coastal Geomorphology etc
vii)		5	Agency Code	INTEGER*2	I4	69	72	Unique Code of Data Generating Agency
viii)	2	1	File Name	CHARACTER	A7	1	7	7- Digit file name as per Table 1
ix)		2	Filler	—	—	8	9	2 Spaces
x)		3	Volume Code	INTEGER*4	16	10	15	6- Digit Code, Unique for Data Set. Provided for future use future use.
xi)		4	Data Type	INTEGER*2	I2	16	17	Indicates type of Spatial Data a) If data is base category wise (Vector Format) b) If data is Layer Wise (Vector Format) c) If raster multiband image (band wise) d) If Single band raster image values e) If Single band coded raster image
xii)			Filler	—	—	18	18	1 Space
xiii)		5	Serial Number of Media	INTEGER*2	I6	19	24	For data on Multiple Media only. Otherwise this value is zero
xiv)		6	Total Number of Records in the file	INTEGER*4	I12	25	36	—
xv)		7	Base Category / Layer serial No.	INTEGER*2	I6	37	42	Corresponds to field 1 of Record number 4 to 3+p of VOLDIR. Applicable only for files DATACAT and DATAFIL. FOR Other files this value is Zero.
xvi)			Filler	—	—	43	44	2 Spaces
xvii)		8	Data Classification	INTEGER*2	I2	45	46	0 Topologically Non-structured 1 Topologically Structured
xviii)			Filler	—	—	47	72	26 Spaces

Table 3 Volume Directory (VOLDIR) Records

[*Clause* 2. 1(a)]

Sl No.	Rec No.	Field	Contents	Type (Fortran)	Format	Starting Byte	End Byte	Description
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
i)	3	1	Availability of Data as One Single file or Multiple Files Or No. of layers Or No. of Bands (p)	INTEGER*2	I6	1	6	This value is zero for single file and non-zero (p) for multiple files, where p is the total number of base categories/ Layers mentioned in the volumes. Record no. 4 onwards will appear only if this value is non-zero. Also the next field of this record is meaningful only if this value is non-zero. In case of Raster data, each file will contain data for a particular band. In case of Layer data, the file will contain data pertaining to a layer.
ii)		2	Whether data is base category wise/layer wise/ Image band wise	I NTEGER*2	I6	7	12	This value is a) If data is base category wise (Vector Format). b) If data is Layer Wise (Vector Format) c) If raster multiband image (band wise) d) If Single band raster image values e) If Single band coded raster image
iii)		3	Whether File TOPOINFO exists	I NTEGER*2	I2	13	14	Relevant only for Topographic data 1 for yes 0 for no
iv)		4	Whether File QUALINFO exists	INTEGER*2	I2	15	16	Flag for existence of file containing Quality processes and parameters; 1 for yes 0 for no
v)			Filler	—	—	17	72	46 Spaces
vi)	4 to 3+p	1	Base Category/ Layer/Band Serial Number	INTEGER*2	I6	1	6	Order of listing of Base Categories, Layers, Bands
vii)		—	Filler	—	—	7	7	1 Space
viii)			Whether Attribute table Exist	INTEGER*2	I2	8	9	0 indicates no attribute data attached in DATAFIL, ELSE number of attribute tables associated
ix)		—	Filler	—	—	10	10	1 Space
x)		3	Description of	CHARACTER	A50	11	60	As per Section 3.
xi)			Base Categories/ Layers/Bands	—	—	—	—	Description of Base Categories, in case of vector topographic data Description of Layers, in case of user domain Layers in vector or raster format Description of Spectral Bands in case of multiple band image data (raster)
xii)		4	Whether Base Category/ Layer/Band included in the volume	INTEGER*2	I6	61	66	1, if includes Otherwise 0
xiii)		5	Serial Number of Media in which the Base Category/Layer/ Band is contained	INTEGER*2	I6	67	72	Applicable for data on Media only

Table 4 General Information (GENINFO) Records

Sl No. (1)	Rec No. (2)	Field (3)	Contents (4)	Type (Fortran) (5)	Format (6)	Starting Byte (7)	End Byte (8)	Description (9)
i)	3	1	Agency Acronym	CHARACTER	A10	1	10	Allotted by NSDI (ref NSDI metadata document 1.1.1.1)
ii)	4	2	Layer Name	CHARACTER	A30	11	40	Allotted by NSDI (ref NSDI metadata document 1.1.1.2)
iii)		3	Layer Type	CHARACTER	A20	41	60	Allotted by NSDI (ref NSDI metadata document 1.1.1.2)
iv)			Filler	—	—	61	61	1 Space
v)		2	Number of States/ UT = (m)	INTEGER*2	I2	62	63	As per Central Heading. Mostly applicable for SOI topographic data
vi)		3	Source Type	INTEGER*2	I9	64	65	0 — Original 1 — Compiled or Aggregated ..(Add new table)
vii)			Filler	—	—	66	72	7 Spaces
viii)		1	Scale	I NTEGER*4	I9	1	9	Scale of the map
ix)			Filler	—	—	10	11	2 Space
x)	5 to 5+m	2	Edition Number	INTEGER*2	I4	12	16	Edition of the source material
xi)			Filler	—	—	17	18	2 Space
xii)		3	Edition Year	INTEGER*2	I8	19	26	Edition year for example 2001
xiii)			Filler	—	—	27	72	46 Spaces
xiv)		1	State Name	CHARACTER	A68	1	64	One state per record (ref NSDI metadata document 1.1.1.4)
xv)	5+m to 5+m +n	2	Number of Districts (n)	INTEGER*2	I4	65	68	No. of Districts in the State
xvi)		3	Number of Location points (o)	INTEGER*2	I4	69	72	No. of unique reference locations
xvii)		1	Dist Name	CHARACTER	A72	1	72	Districts will be listed One District per record (ref NSDI metadata document 1.1.1.5)
xviii)	5+m +n to 5+m +n+ o	1	LocPt Name	CHARACTER	A72	1	72	One Location name per record (ref NSDI metadata document 1.1.1.6)
xix)	6+m +n+ o	1	Surveyed Year/Date of acquisition	CHARACTER	A60	1	60	Year(s) of Survey of the source material for example1968-69 Date of Acquisition in case of Satellite raster image
xx)			Filler	—	—	61	68	8 Spaces
xxi)		2	Security classification of dataset	INTEGER*2	I4	69	72	0 Not Classified 1 Classified
xxii)	7+m +n+ o	1	Data Type Code	INTEGER*2	I2	1	2	a) If data is base category wise (Topographic Vector). b) If data is Layer Wise (Vector Format) c) If raster multiband image (band wise) d) If Single band raster image values e) If Single band coded raster image
xxiii)		—	Filler	—	—	3	8	6 Spaces
xxiv)		2	Map Projection	CHARACTER	A4	9	12	POLY– Polyconic, UTM LAMB - Lambert Conical Orthomorphic SOM - Space Oblique Mercater Any Other
xxv)			Filler	—	—	13	14	2 Spaces

Sl No. (1)	Rec No. (2)	Field (3)	Contents (4)	Type (Fortran) (5)	Format (6)	Starting Byte (7)	End Byte (8)	Description (9)
xxvi)		3	Units	CHARACTER	A6	15	20	Units of measure for ground planimetric co-ordinates. Its Value is METERS
xxvii)			Filler	—	—	21	22	2 Spaces
xxviii)		4	Grid Size (Resolution)	REAL*4	F8.2	23	30	The true ground distance in meters
xxix)		5	Number of Control (Tick) Points (q)	INTEGER*2	I6	31	36	Usually 4 corners of the sheet for Topographic data. Could be more for User Domain data.
xxx)		—	Filler	—	—	37	72	36 Spaces
xxxi)	8+m +n+ o	1	Central Longitude	REAL*4	F12.5	1	12	Projection Parameters
xxxii)		2	Central Latitude	REAL*4	F12.5	13	24	Projection Parameters
xxxiii)		3	Standard Parallel 1	REAL*4	F12.5	25	36	Projection Parameters
xxxiv)		4	Standard Parallel 2	REAL *4	F12.5	37	48	Projection Parameters
xxxv)		5	Scale Factor	REAL*4	F6.4	49	54	Projection Parameters
xxxvi)			Filler	—	—	55	56	2 Spaces
xxxvii)		6	Spheroid	CHARACTER	A8	57	64	EVEREST, WGS84, WGS72 etc.
xxxviii)			Filler	—	—	65	72	8 Spaces
xxxix)	9+m +n+ o	1	Origin Latitude	REAL*4	F12.5	1	12	Projection Parameters
xl)		2	Origin Longitude	REAL*4	F12.5	13	24	Projection Parameters
xli)		3	Origin Easting	REAL*4	F12.2	25	36	Projection Parameters
xlii)		4	Origin Northing	REAL*4	F12.2	37	48	Projection Parameters
xliii)			Filler	—	—	49	72	24 Spaces
xliv)	10+ m+n +o to 10+ m+n +o +q	1	Control (Tick) point Label	INTEGER*2	I4	1	4	1 = SW/LL, 2 = SE/LR, 3 = NE/UR, 4 = NW/UL 999 = Reserved for Identifying the origin of Raster Image (For Raster data) 5 to 998 can be used for identifying other control(Tick) points within the sheet/ dataset
xlv)		2	Raster Image Orientation	CHARACTER	A2	5	6	Relevant for Control (Tick) Point Label = 999 (i.e. raster data) BL = Indicates raster image origin at Bottom left and rasterization is bottom up (row! scan lines)and Left-right (Columns/ Pixels) TL =Indicates raster image origin at Top left and rasterization is Top-down (row/ scan lines) and Left-right (Columns/ Pixels)
xlvi)		3	Latitude	REAL*4	F12.6	7	18	In Degrees nf Tick Points
xlvii)		4	Longitude	REAL*4	F12.6	19	30	In Degrees of Tick Points
xlviii)		—	Filler	—	—	31	36	6 Spaces
xlix)		5	X Co-ordinate	REAL*4	F12.6	37	48	Projected in ground terms in meters
l)		6	Y Co-ordinate	REAL*4	F12.6	49	60	Projected in ground terms in meters
li)		7	User TickLabel	CHARACTER	A10	61	70	User defined label for Tick point
lii)		—	Filler	—	—	71	72	2 Spaces
liii)	11+ m+n + o+q	1	O.S. Name	CHARACTER	Al8	1	18	Specifies name of source Operating System
liv)		2	GIS Package	CHARACTER	A18	19	36	Specifies name of source GIS Software
lv)		3	DBMS Name	CHARACTER	A18	37	54	Specifies name of source Database
lvi)		—	Filler	—	—	55	72	18 Spaces

Table 5 Quality Information (QUALINFO) Records
(*Clause* 2.1(c))

Sl No. (1)	Rec No (2)	Field (3)	Contents (4)	Type (Fortran) (5)	Format (6)	Starting Byte (7)	End Byte (8)	Description (9)
i)	3	1	Process Citation	CHARACTER	A69	1	69	General statement on data generation processes
ii)		2	No. of Process stages (m)	INTEGER*2	13	70	72	Number of distinct process stages
iii)	4 to 4+2*m	1	Process Description	CHARACTER	A62	1	62	Processes description
iv)			Filler	—	—	63	64	2 Spaces
v)		2	Process Year	INTEGER*4	18	65	72	Process/ Source Data Year
vi)		1	PAccHorX	REAL	F12.2	1	12	Positional accuracy in X direction
vii)		2	PAccHorY	REAL	F12.2	13	24	Positional accuracy in Y direction
viii)		3	PAccVer	REAL	F12.2	25	36	Positional accuracy in Z direction
ix)		4	TAcc	REAL	F12.2	37	48	Thematic accuracy in %
x)		5	TAccConf	REAL	F12.2	49	60	Confidence level for thematic accuracy
xi)		6	TAccArea	REAL	F12.2	61	72	Thematic Area accuracy in %
xii)	5 + 2 * m	1	PACCLayer* (horizontal)	REAL4	F12.2	1	12	Cumulative RMS Horizontal Positional accuracy (ref. NSDI metadata document 1.1.1.9)
xiii)		2	PACCLayer*(vertical)	REAL4	F12.2	13	24	Cumulative RMS vertical Positional accuracy (ref. NSDI metadata document 1.1.1.9)
xiv)		3	TACCLayer*	REAL4	F12.2	25	36	Final % thematic accuracy (ref. NSDI metadata document 1.1.1.9)
xv)		4	TACCLayer (area)	REAL4	F12.2	37	48	Final thematic area accuracy
xvi)			Filler	—	—	49	72	24 spaces

Table 6 General Topographic Information (TOPOINFO) Records
(*Clause* 2.1(d))

Sl No. (1)	Rec No (2)	Field (3)	Contents (4)	Type (Fortran) (5)	Format (6)	Starting Byte (7)	End Byte (8)	Description (9)
i)	3	1	Whether COMPIND Data Exists	INTEGER*2	I2	1	2	1 for yes, 0 for NO
ii)		2	Whether ADMIND Exists	INTEGER*2	I2	3	4	1 for yes, 0 for NO
iii)		3	Number of SPECIAL FOOTNOTES lines (m)	INTEGER*2	I2	5	6	—
iv)		4	Magnetic Variation Eor W of True North	CHARACTER	A2	7	8	E = East of True North W = West of True North
v)		5	Annual Change in Magnetic Variation with sign	INTEGER*2	I4	9	12	+ for increasing, - for decreasing

Sl No.	Rec No	Field	Contents	Type (Fortran)	Format	Starting Byte	End Byte	Description
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
vi)		—	Filler	—	—	13	14	2 Spaces
vii)		6	Year of Magnetic Variation	INTEGER*2	I6	15	20	—
viii)		7	Copyright	CHARACTER	A24	21	44	Example : Govt of India Copyright
ix)		8	Year of Copyright	INTEGER*2	I6	45	50	Example : 1975
x)		9	Contour Interval	INTEGER*2	I6	51	56	Contour interval in metres
xi)		8	Mean Grid North Alignment	INTEGER*2	2(I3)	57	62	In degrees and minutes. For un-gridded sheets this field and the next are blank
xii)		—	Filler	—	—	63	64	2 Spaces
xiii)		9	East and West of True North	CHARACTER	Al	65	65	E = East of True North W = West of True North
xiv)		—	Filler	—	—	66	67	2 Spaces
xv)		10	Name of Grid	CHARACTER	A5	68	72	User Defined
xvi)	4	1	Authority	CHARACTER	A64	1	64	Name of Authority under whose Direction the data is published/ generated
xvii)		2	Admn. Boundary Verification Remark	INTEGER*2	I2	65	66	1 = Adm. Boundaries are Verified 0 = Adm. Boundaries are not verified from appropriate Authority
xviii)		—	Filler	—	—	67	68	2 Spaces
xix)		3	Triangulated heights and contours adjusted with spirit-leveled heights	CHARACTER	Al	69	69	Y = Adjusted N = Not Adjusted
xx)		—	Filler	—	—	70	71	2 Spaces
xxi)		4	Territorial water upto 12 Nautical miles from the coastline	CHARACTER	Al	72	72	Y in case of data having coastline; N in case of data not having coastline.
xxii)	5 to 5+m	1	SPECIAL FOOTNOTES RECORDS	CHARACTER	A72	1	72	—

Table 7 Data Category (DATACAT) Records
(*Clause* 2.1(e))

Sl No.	Rec No	Field	Contents	Type (Fortran)	Format	Starting Byte	End Byte	Description
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
i)			Base Category Layer/ Band Serial Number	INTEGER*	I			Order of listing of Base Categories, Layers, Bands (Corresponds to field 1 of records 4 to 3+p ob Table 2)
ii)		2	Number of major categories / Layer Categories (m)	INTEGER*2	I6	7	12	a) Number of Base categories in case of Topographic data b) Number of Layer Categories in case of user Domain thematic data in vector or raster

Sl No. (1)	Rec No (2)	Field (3)	Contents (4)	Type (Fortran) (5)	Format (6)	Starting Byte (7)	End Byte (8)	Description (9)
								form c) Not relevant in case of Image data
iii)		3	Number of tables (nt)	1NTEGER*2	I6	13	18	a) Number of attribute tables attached to the Layer
iv)		—	Filler	—	—	19	72	54 Spaces
v)	4 to 3+m	1	Category Code	1NTEGER*2	I2	1	2	Major Category/ Layer Category Code
vi)		—	Filler	—	—	3	8	6 Spaces
vii)		2	Category Name	CHARACTER	A64	9	72	Full category name as per Appendix A Major Category/ Layer category Name/ Bandwidth
viii)	4+m	1	Number of Nodes (nn)	1NTEGER*4	I8	1	8	Set to Zero for Raster Data
ix)		2	No. of Lines (n1)	1NTEGER*4	I8	9	16	Set to Zero for Raster Data
x)		3	Number of Areas (na)	1NTEGER*4	I8	17	24	Set to Zero for Raster Data
xi)		4	No. of Texts (nx)	INTEGER*4	I8	25	32	Set to Zero for Raster Data
xii)		5	No. of Rows (nR)	INTEGER*4	I6	33	38	Set to Zero for Vector data
xiii)		6	No. of Columns (nC)	1NTEGER*4	I6	39	44	Set to Zero for Vector data
xiv)		7	No. of Pixel Bytes (nBytes)	INTEGER*2	I2	45	46	Set to Zero for Vector data, relevant to Image, Grid data 1- Single byte, binary for images 2- Two byte, binary for images/ coded grids 4- Four byte, binary for DEM
xv)		8	Byte Order (depending upon architecture)	CHARACTER	A2	47	48	Ill MM for more than one Byte data II indicates Intel, Big Endian architecture MM indicates Motorola, Little Endian Architecture
xvi)		9	Record Type	CHARACTER	A6	49	54	RASTER or VECTOR
xvii)		10	Format of Value Records	CHARACTER	A 10	55	64	Content would be LOGICAL*1 for Single byte, binary images INTEGER*2 for two byte, binary images/ coded grids REAL*4 for four byte, binary DEM data (as per the details in field 7 above)
xviii)		—	filler	—	—	65	72	8 spaces

Table 8 Raster (GRID) Data Records

(*Clause* 2.1(f)(i))

Sl No. (1)	Rec No (2)	Field (3)	Contents (4)	Type (Fortran) (5)	Format (6)	Starting Byte (7)	End Byte (8)	Description (9)
i)	Value Records 3 to (nR*nC * nBytes)/ 72+3	1	Raster Values • Reflectance Values for image data • Elevation Values for DEM • Coded Values for Coded Raster Layer	LOGICAL*1 or INTEGER*2 or REAL*4 (As per record 4+m, field 7 in table 6)	Binary	1	NR*Nc *nByte	Order of Grid cell locations for Values Row-1 :Col-1, col-2, ...col-nC Row-2…… Row-nr……..

Table 9 Node Records
(*Clause* 2.1(f)(ii))

Sl No.	Rec No	Field	Contents	Type (Fortran)	Format	Starting Byte	End Byte	Description
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
i)	3	1	Record Type	CHARACTER	A4	1	4	NODE
ii)		2	Element Internal Id No.	INTEGER*4	I8	5	12	This is Unique value for each Node
iii)		3	Co-ordinates of Node Point	REAL*4	2F12.2	13	36	X,Y co-ordinate in ground meters
iv)		4	Angle	REAL*4	F12.4	37	48	Orientation of point feature with X-axis in degrees(Relevant for Topographic Data)
v)		—	Filler	—	—	49	72	24 Space

Table 10 Line Records
(*Clause* 2.1(f)(iii))

Sl No.	Rec No	Field	Contents	Type (Fortran)	Forma	Starting Byte	End Byte	Description
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
i)	3	1	Record Type	CHARACTER	A4	1	4	LINE
ii)		2	Element Internal Id	INTEGER*4	I8	5	12	This is Unique value for each Line
iii)		3	Starting Node	INTEGER*4	I8	13	20	Internal ID Number. This refers to data element 2 of the Node records
iv)		4	Ending Node	INTEGER*4	I8	21	28	- do-
v)		5	Number of points in the line (p)	INTEGER*4	I8	29	36	Number of x-y Co-ordinate pairs (excluding the endpoints)
vi)		6	Height	REAL*4	F8.2	37	44	Height in Meters
vii)		7	Number of Feature Codes or Levels (q)	INTEGER*2	I4	45	48	—
viii)		8	Object ID	INTEGER*4	I8	49	56	—
ix)		—	Filler	—	—	57	72	16 Spaces
x)	Co-ordinate records	1 to 2p	x,y co-ordinate string	REAL*4	3(2F12.2)	1		Ending byte number is as per the number of points in the line
xi)	Code records	1 to 2q	Major& Minor CodeList or	INTEGER*4	6(2I6)	1	....	a) Major and Minor Codes for topographic data b) Will extend to next line as per the number offeature codes
xii)			Layer Category Code List	INTEGER*4	2(I36)	1		a) Layer category Codes for User Domain Thematic data b) Will extend to next line as per the number of feature codes

NOTE: All **POINT** features included in LINE type records. A POINT feature is distinguished from a LINE feature as follows:

1 **A POINT** feature has the same start and end node ID (Data elements 3 and 4) and

2 The number of points (Data element 5) for a POINT feature is zero (0)

The key for linking with the text in the file can also be used for linking with non-graphic data outside the file.

Table 11 Area Records (Topologically Structured)
(*Clause* 2.1(f)(iv))

Sl No. (1)	Rec No (2)	Field (3)	Contents (4)	Type (Fortran) (5)	Format (6)	Starting Byte (7)	End Byte (8)	Description (9)
i)	3	1	Record Type	CHARACTER	A4	1	4	AREA
ii)		2	Element Internal Id No.	INTEGER*4	I8	5	12	This is Unique value within all areas (polygons)
iii)		3	Co-ordinates of Area Point	REAL*4	2F(12.2)	13	36	The area point (polygon label) is always within the polyg on it represents
iv)		5	Number of lines bounding the area (b)	INTEGER*2	I4	37	40	Number of x-y Co-ordinate pairs
v)		6	Number of Feature Codes (r)	INTEGER*2	I4	41	44	—
vi)		7	Object ID	INTEGER*4	I8	45	52	The key for linking with the text in the file, can also be used for linking with non-graphic data outside the file
vii)			Filler	—	—	53	72	20 Spaces
viii)	Line ID records	1 to b	List of Line ID's	INTEGER*4	9(I8)	1		Internal ID number of lines bounding the area. Ending byte number is as per the number of lines in the area (polygon)
ix)	Code records	1to 2r	Major & Minor Code List	INTEGER*4	2I6	1	12	a) Major and Minor Codes in pairs for topographic data b) Will extend to next line as per the number of feature codes
x)			Filler	—	—	13	18	6 spaces
xi)			Feature Name	Character	A54	19	72	—
xii)			OR	—				
xiii)			Layer category Code List	INTEGER*4	2(I36)	1	—	a) Layer category Codes for User Domain Thematic data b) Will extend to next line as per the number of feature codes

Table 12 Area Records (Topologically Non- Structured)
(*Clause* 2.1(f)(v))

Sl No. (1)	Rec No (2)	Field (3)	Contents (4)	Type (Fortran) (5)	Format (6)	Starting Byte (7)	End Byte (8)	Description (9)
i)	3	1	Record Type	CHARACTER	A4	1	4	AREA
ii)		2	Major Code	1NTEGER*4	I6	5	10	Major Code of the Feature
iii)		3	Minor Code	INTEGER*4	I6	11	16	Minor Code of the Feature
iv)		6	Feature Type	CHARACTER	A52	17	68	—

v)		5	Number of vertices(p) excluding end points	1NTEGER*4	I4	69	72	Number of vertices
vi)	Co-ordinate records	1 to 2p	x,y coordinates of Area Points	REAL*4	3(F12.2)	1	—	Ending byte as per the number of vertices in the area feature

Table 13 Text Records
(*Clause* 2.1(f)(vi))

Sl No. (1)	Rec, No (2)	Field (3)	Contents (4)	Type (Fortran) (5)	Format (6)	Starting Byte (7)	End Byte (8)	Description (9)
i)	3	1	Record Type	CHARACTER	A4	1	4	TEXT
ii)		2	Element Internal Id	INTEGER*4	I8	5	12	This is Unique value for all text records
iii)		3	Text Size	INTEGER*2	I4	13	16	In one hundredth of an inch
iv)		4	Text Justification	INTEGER*2	I4	17	20	0 for left, 1 for right, 2 for centre justification
v)		5	Angle	REAL*4	F12.4	21	32	Angle of Text in Degrees
vi)		6	x,y Co-ordinates of reference Point	REAL*4	2F(12.2)	33	56	—
vii)		7	Number(r) of attribute codes	INTEGER*2	I4	57	60	Number of x-y Co-ordinate pairs
viii)		8	Number Text Character strings	INTEGER*2	I4	61	64	—
ix)		9	Object ID	INTEGER*4	I8	65	72	The key for linking with the object in the LINE or Area Records
x)		—	Filler	—	—	53	72	20 Spaces
xi)	Second	1	Text Characters	CHARACTER	A72	1	72	This record contains the text data describing Object ID
xii)	Third	1-2r	Major& Minor Code List	INTEGER*4	2I6	1	12	a) Major and Minor Codes for topographic data b) Will extend to next line as per the number of feature codes
xiii)			Filler	—	—	13	18	6 spaces
xiv)			Feature Name	Character	A54	19	72	—
xv)			OR	—				
xvi)			Layer category Code List	INTEGER*4	2(I36)	1	—	a) Layer category Codes for User Domain Thematic data b) Will extend to next line as per the number of feature codes

Table 14 Attribute Records
(*Clause* 2.1(f)(vii))

SL No. (1)	Rec. No. (2)	Field (3)	Contents (4)	Type (Fortran) (5)	Format (6)	Starting Byte (7)	End Byte (8)	Description (9)
i)	3	1	Type	CHARACTER	A4	1	4	Indicates attribute table type (ATTR)
ii)		2	Attribute Table Id.	Integer	I6	5	10	Attribute table Id.
iii)		3	Name of Attribute	CHARACTER	A12	1	24	Indicates name of the attribute table as per source specification.

SL No. (1)	Rec. No. (2)	Field (3)	Contents (4)	Type (Fortran) (5)	Format (6)	Starting Byte (7)	End Byte (8)	Description (9)
			Table					specification.
iv)		4	No. of fields (af)	INTEGER	I6	11	16	Indicates number of columns in attribute table
v)		5	No. of records Car)	INTEGER	I6	17	22	Indicates number of records in attribute table
vi)		—	Filler	—	—	23	72	50 Spaces
vii)	4 to 4+af	1	Field name	CHARACTER	A12	1	12	Represents Field Item name
viii)		2	Field type 1	CHARACTER	A12	13	24	Definition of Field giving Width, Output, Type, number of decimal places separated by comma.
ix)		3	Field type 2	CHARACTER	A8	25	32	Represents ANSI standard format
x)		4	Key-Field	CHARACTER	I2	33	34	Indicates 1 if the field is Key-indexed, ELSE 0
xi)		—	—	—	—	35	36	2 Spaces
xii)		5	Remarks	CHARACTER	A36	37	72	Description/Remarks of the Field
xiii)	Data\ Records 5+af to 5+af+ar	1-af	List of field values	CHARACTER	2(A36)	1	....	a) List of field data values b) Will extend to next line as per the number of filed values in attribute records
xiv)	Records numbered 3 onwards ... will be repeated as many times as the number of attribute tables indicated by number not in data cat file.							

ANNEX A

(*Foreword*)

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