

GIS Technologies and Applications

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Examples of Applied GIS

- **Urban Planning, Management & Policy**
 - Zoning, subdivision planning
 - Land acquisition
 - Economic development
 - Code enforcement
 - Housing renovation programs
 - Emergency response
 - Crime analysis
 - Tax assessment
- **Environmental Sciences**
 - Monitoring environmental risk
 - Modeling storm water runoff
 - Management of watersheds, floodplains, wetlands, forests, aquifers
 - Environmental Impact Analysis
 - Hazardous or toxic facility siting
 - Groundwater modeling and contamination tracking
- **Political Science**
 - Redistricting
 - Analysis of election results
 - Predictive modeling
- **Civil Engineering/Utility**
 - Locating underground facilities
 - Designing alignment for freeways, transit
 - Coordination of infrastructure maintenance
- **Business**
 - Demographic Analysis
 - Market Penetration/ Share Analysis
 - Site Selection
- **Education Administration**
 - Attendance Area Maintenance
 - Enrollment Projections
 - School Bus Routing
- **Real Estate**
 - Neighborhood land prices
 - Traffic Impact Analysis
- **Health Care**
 - Epidemiology
 - Needs Analysis
 - Service Inventory

What GIS Applications Do:

manage, analyze, communicate

- make possible the **automation** of activities involving geographic data
 - map production
 - calculation of areas, distances, route lengths
 - measurement of slope, aspect, volumes
 - logistics: route planning, vehicle tracking, traffic management
- allow for the **integration** of data hitherto confined to independent domains (e.g property maps and air photos).
- by tying data to maps, permits the succinct **communication of complex spatial patterns** (e.g environmental sensitivity).
- provides answers to **spatial queries** (how many elderly in Richardson live further than 10 minutes at rush hour from ambulance service?)
- perform complex **spatial modelling** (*what if* scenarios for transportation planning, disaster planning, resource management, utility design)

The major areas of GIS application

- Local Government
 - Public works/infrastructure management (roads, water, sewer)
 - Planning and environmental management
 - property records and appraisal
- Real Estate and Marketing
 - Retail site selection, site evaluation
- Public safety and defense
 - Crime analysis, fire prevention, emergency management, military/defense
- Natural resource exploration/extraction
 - Petroleum, minerals, quarrying
- Transportation
 - Airline route planning, transportation planning/modeling
- Public health and epidemiology
- The Geospatial Industry
 - Data development, application development, programming

Transportation and GIS

- Spread over a large geographic area.
- Mapping or geospatial data plays a key role in planning
- Transportation Planning needs Technical/Engineering as well as socio economic data and it's integration.
- GIS technology provides best software platform for integration, manipulation and utilization of this data.

Transportation Planning

- Estimation of demand
 - Need and demand for travel, Infrastructure needed.
- Locational importance various features and facilities.
- Designing Transportation systems like network, facilities.

Basic Requirements for Transportation Planning

- Geospatial data of appropriate scale.
- Socio economic data that necessitates travel.
- Infrastructure and management needed to meet the demand.
- Scope for scaling upwards based on increased demand.
- Regular updation of data and operations to improve functionality.

What does GIS provide

- Geospatial data of Engineering quality.
 - a. For geometric design of the road.
 - b. Complete geographical data of the area for network planning.
 - c. Complete spatial and non spatial data for planning location of facilities like bridges, terminals etc.
 - d. Complete spatial and non spatial data for management exercises.

Contd..

- Integration of spatial and nonspatial data to facilitate interaction between various components of the system and thereby provide a scientific decision support system.
- An integrated control system of the complete project.
- Ease in editing, adding new data and data manipulation. Specially suitable for planning, designing and managing large public transport systems.

CONCLUSION

- GIS technology can yield a comprehensive, cost effective and scientifically designed and run system with built in scope for editing, manipulating and upgrading the project.



DELHI STATE SPATIAL DATA INFRASTRUCTURE

A trend setter in urban management

Govt. of National Capital Territory of DELHI

दिल्ली सरकार



PHASES OF DSSDI PROJECT

GPS Control
5 cm accuracy

Aero Triangulation
12.5 cm accuracy

Phase A

Frame Work

**Digital Elevation
Model**
25 cm accuracy

Ortho Photo
20 cm accuracy

Database schema

Delhi Geo Portal

Phase B

System Design/
Integration

14 Monitoring Centers
2 Control Centers

Capacity Building

3D Mapping

Property Survey

Phase C

Primary Data Capture

Utility Survey

UIS & LIS

3D Topology

Texturing

Phase D

3D GIS

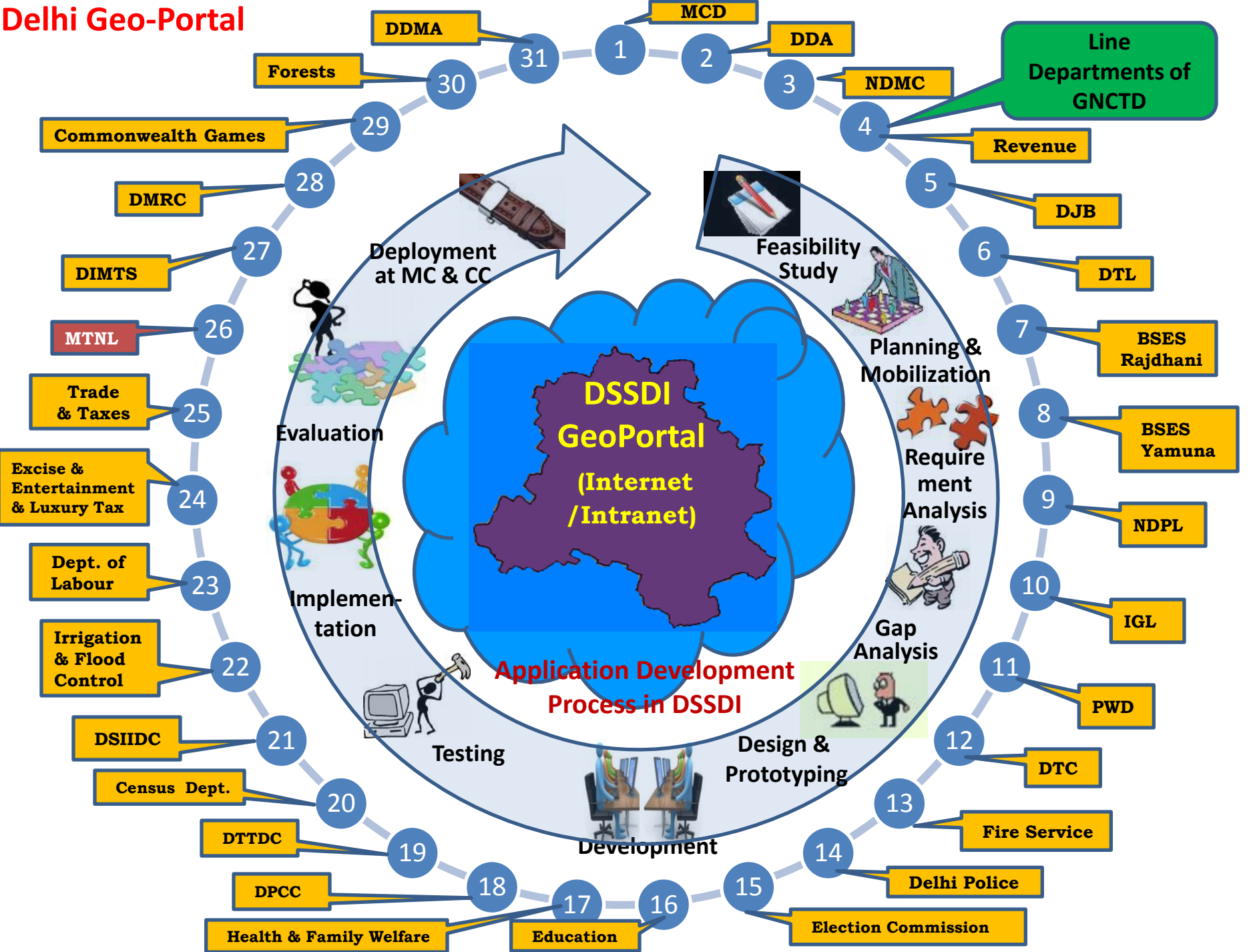
3D Visualisation

3D Rendering

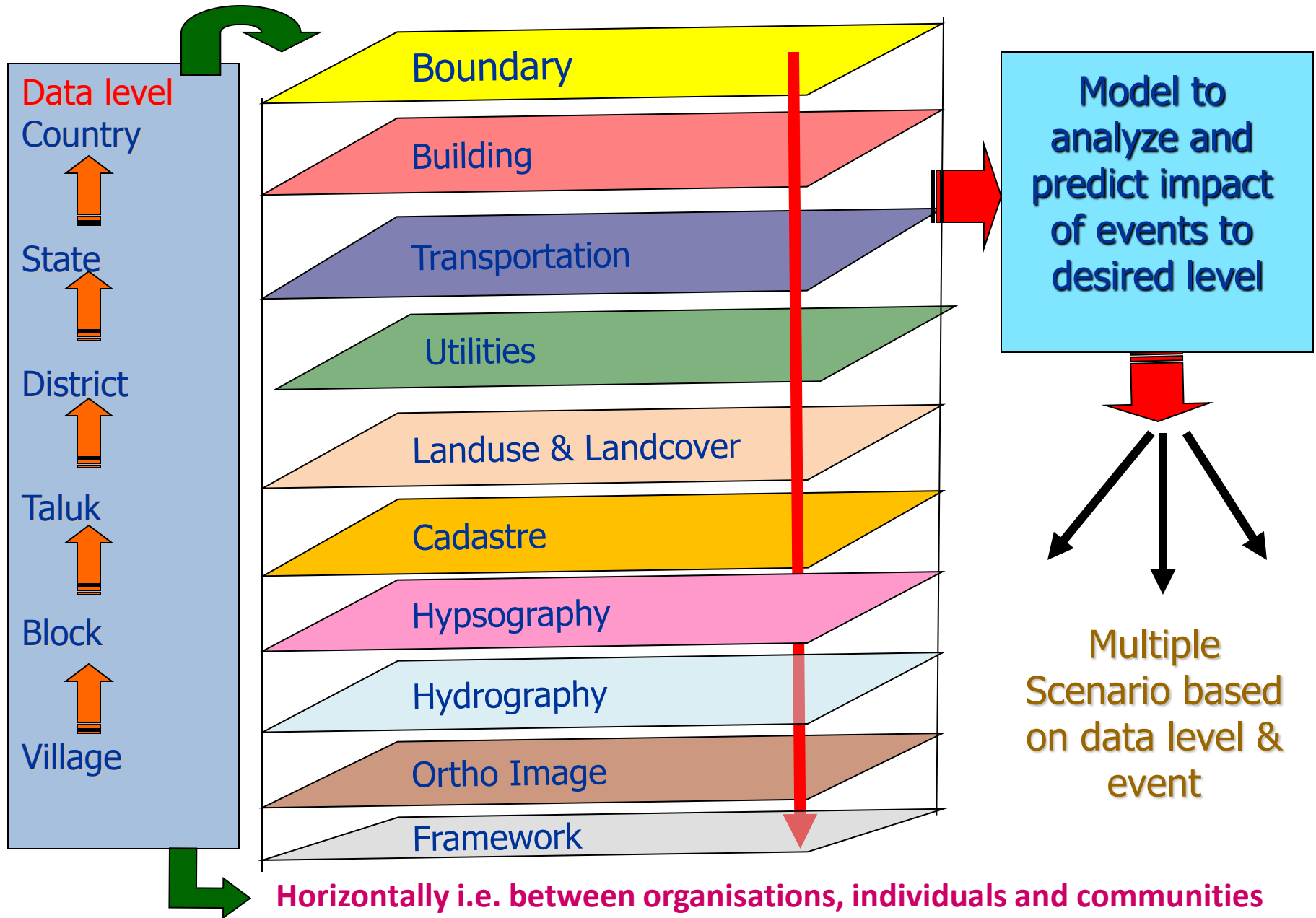
PROJECT AT A GLANCE

- DSSDI Project, will **set new benchmarks in urban management** in India
- The project will **facilitate high-resolution, three-dimensional virtual walkthroughs of the NCT of Delhi**
- **Urban Information System** -of the entire range of overland and underground public utilities of the city
- **Land Information System (LIS)** that maintains land records, spatial and attribute details up to the level of an individual building unit
- Wireless monitoring of the city by installing wireless IP cameras.
- Development of **Geo-Portal** to function as a single window through to access information and decision support systems using Enterprise GIS
- The project will **support the highest standards of g-governance** will enable:
 - Integrated management & Timely maintenance of the city's public utilities
 - Optimal utilisation of physical, financial and human resources ie Significant cost savings
 - Efficient revenue realisation and Land use monitoring
 - Tight policing and security arrangements
 - **Disaster management**
 - Seamless coordination between the line departments & **Integrated planning**
 - A calibrated, comprehensive mapping of the overland and underground utilities.

Delhi Geo-Portal



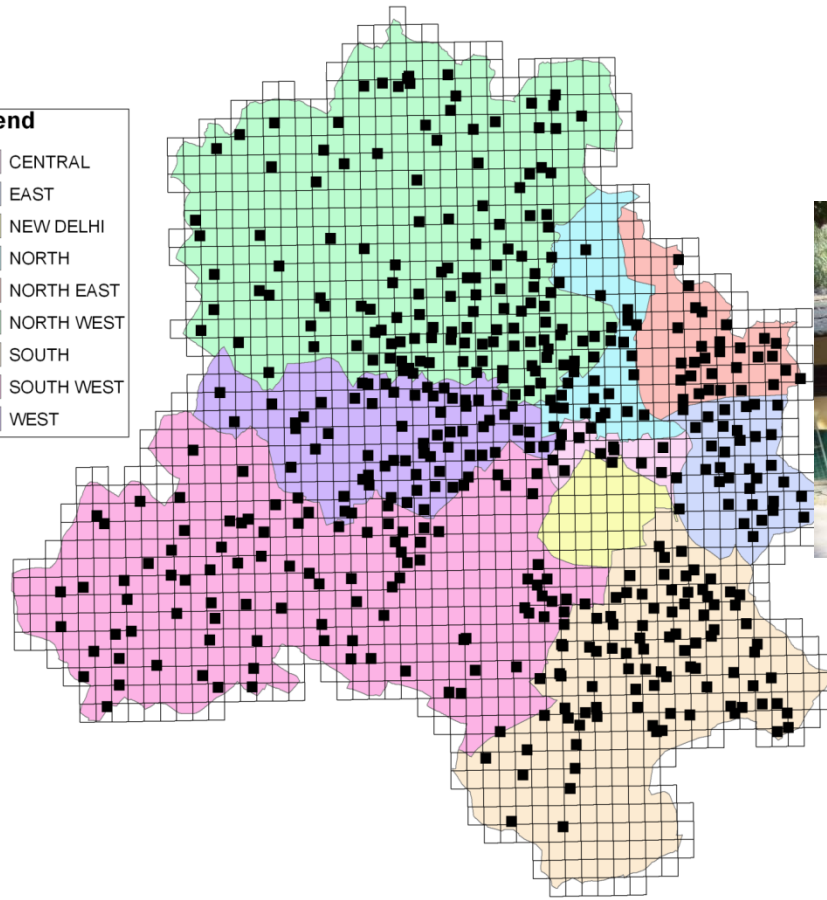
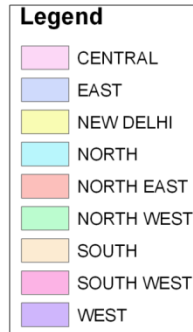
Multi-layered Geo-spatial Database



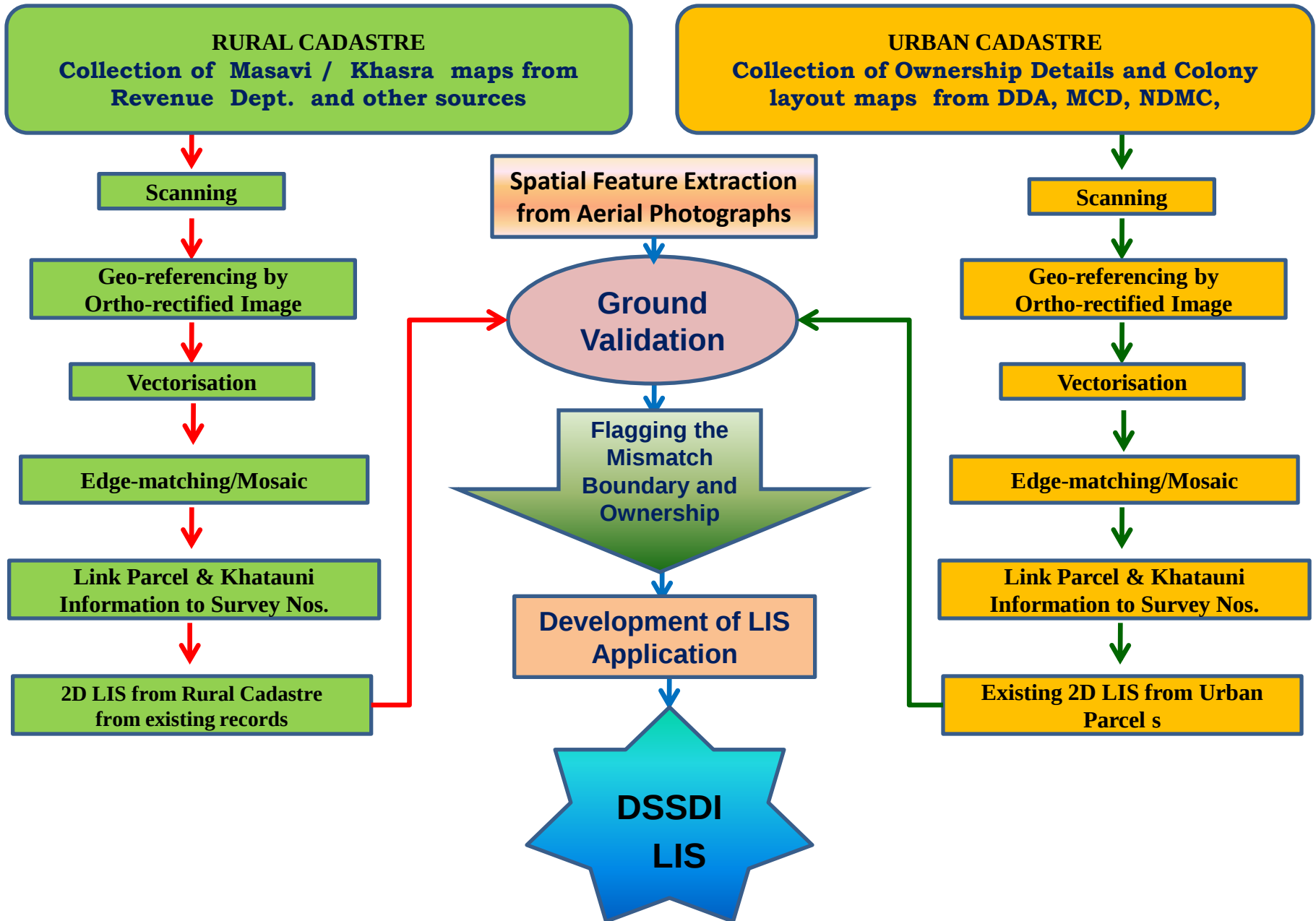
Monumentation



SIDE VIEW
30cm*30cm*50cm



Land Information System



Attributes for Property Survey

1. Index and Linkage to Spatial Data:

2. Address and Attributes of Property –

- ❖ District, Urban Locality, Type of Settlement -

3. Plot / Parcel

- ❖ Plot No., Usage of non-built-up plot : In use / Vacant, Revenue Parcel No.

4. Building and Property Identification Details :

- ❖ Building Name, Building Type, Year of Construction, Floor / level Details –

5. Building Unit details :

- ❖ Building Sl. No, Building Unit Sl. No. -

- ❖ Building Unit classification,

- ✓ Residential / Business / Educational / Health / Institution / Utility Center / Religious
- ✓ Government Office / Historical Monument, Heritage Building, Court, Others.

- ❖ Property Owner Details:

- ✓ Covered Area (as per document), Plot area (as per document)

- ❖ Property Occupant and Occupancy details (in case the occupant is not the owner):

- ❖ Electricity and Water Connection - Electricity connection no (K No.), Water connection no.

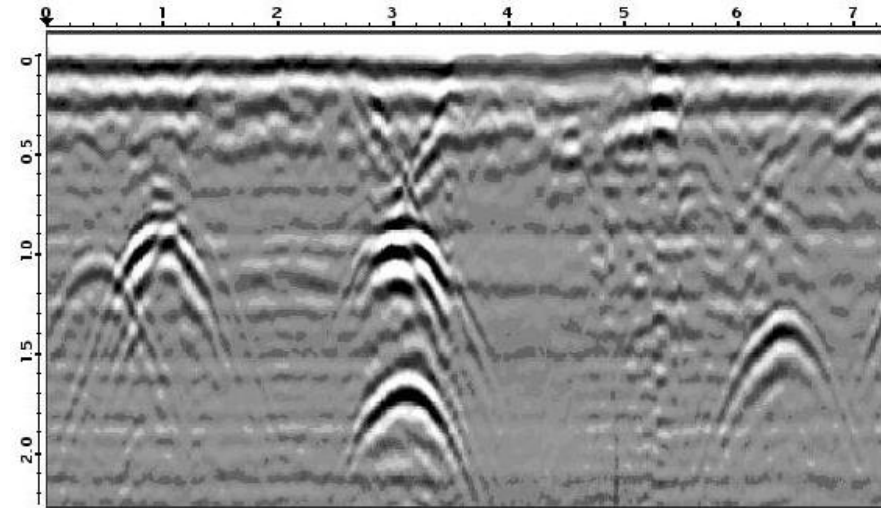
Underground Utilities - Water, sewer, gas and all type of cabling

Single channel Ground Probing Radar

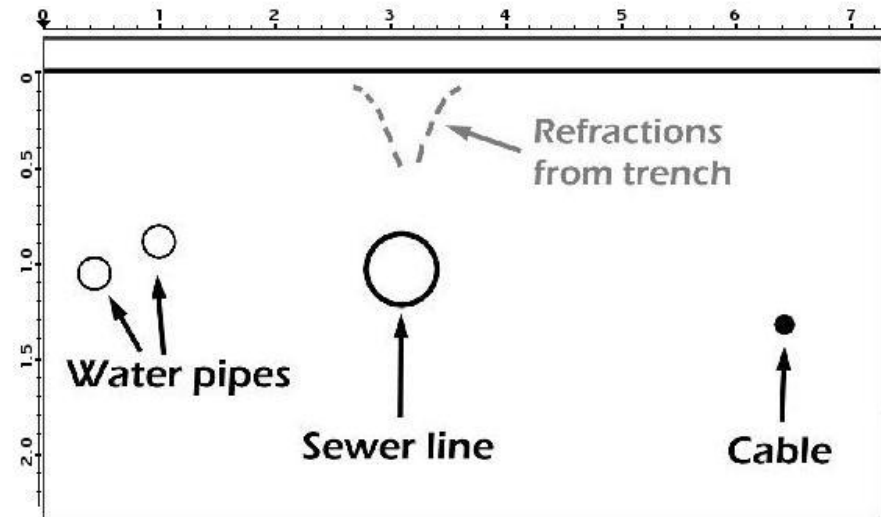


6 Feet wide coverage
Scan grid geometry
5 inch x 1inch

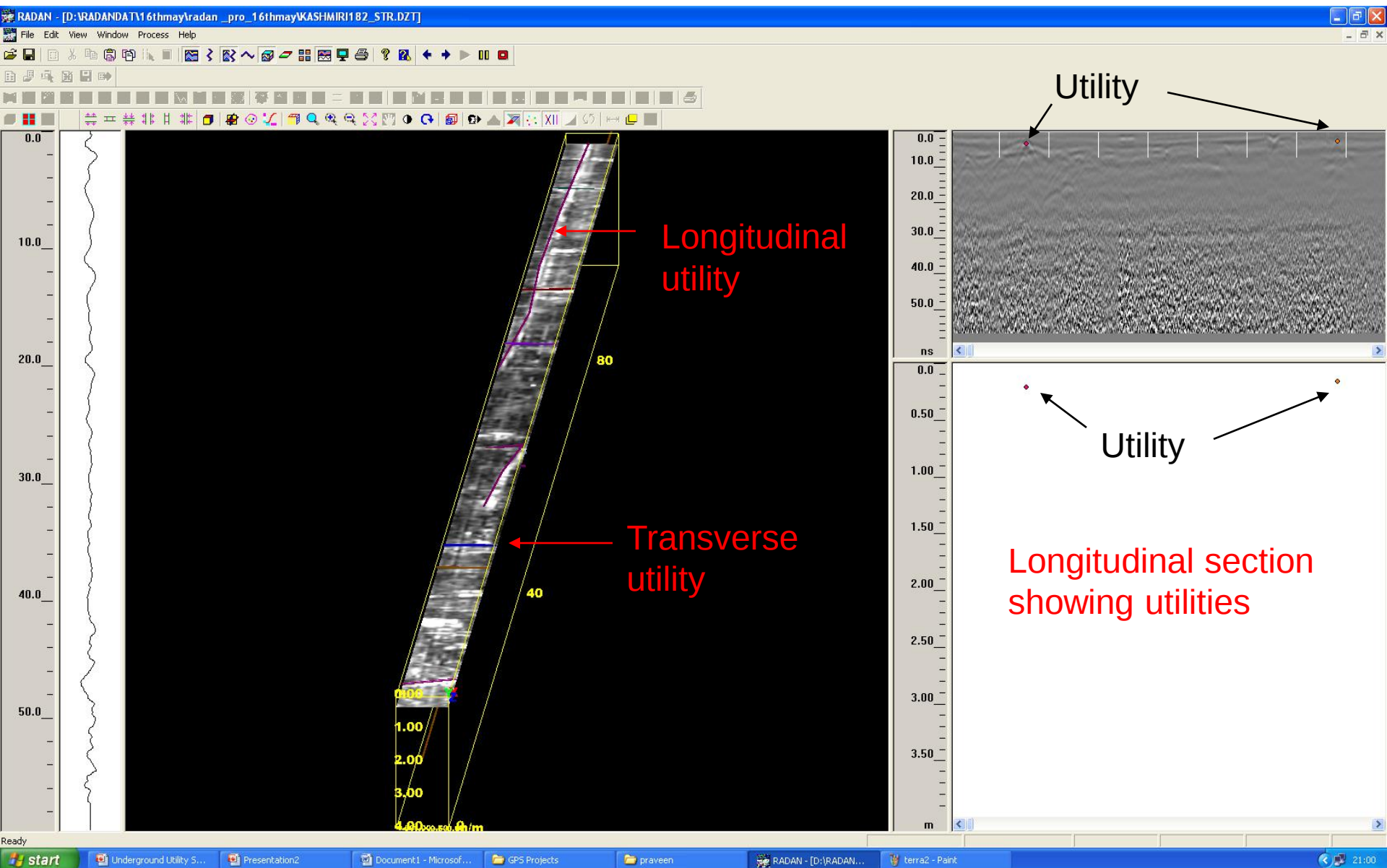
Parabolas indicating underground utilities



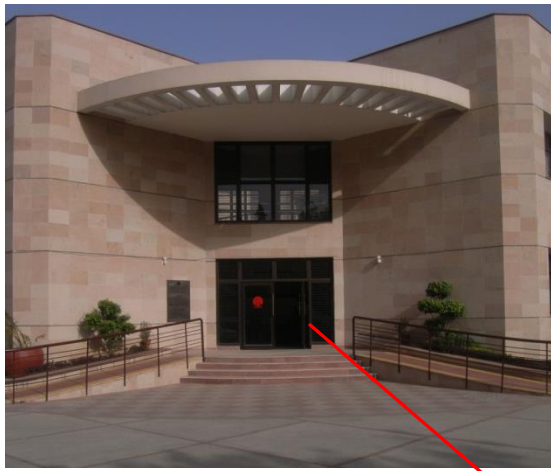
Multichannel cart radar system-Terra-Vision



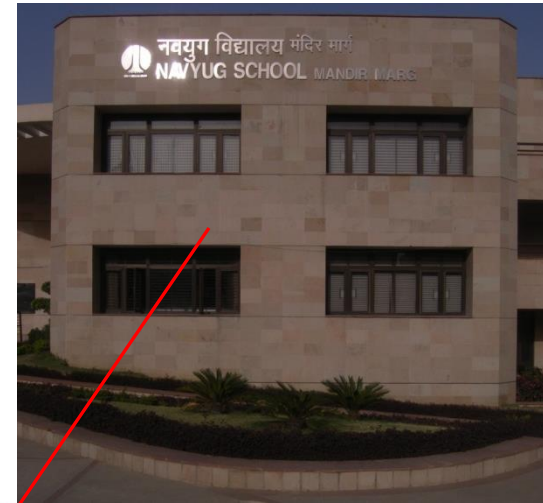
3-Dimensional block model showing utilities



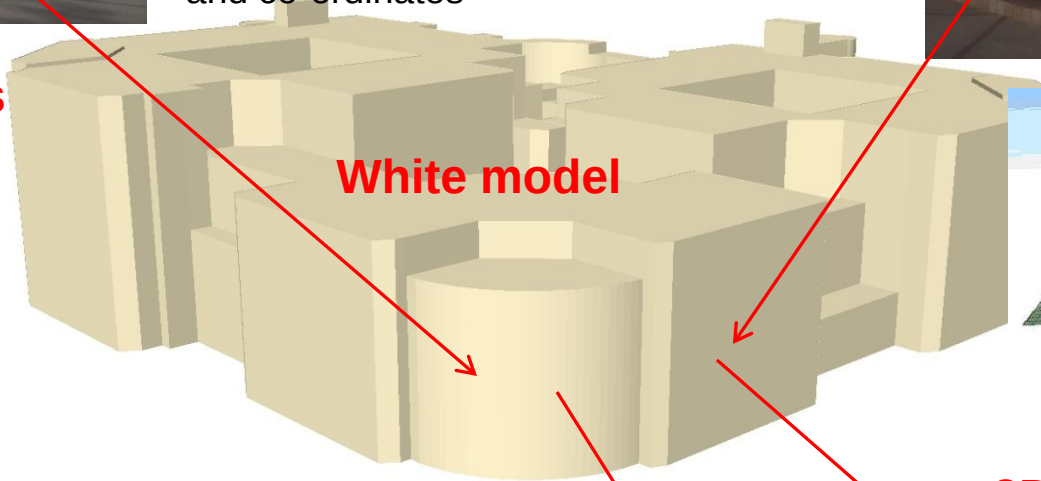
3D Texturing & Visualisation



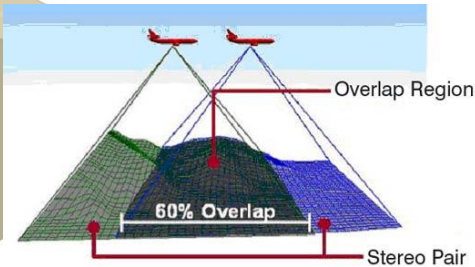
camera integrated with GPS records time and co-ordinates



Field Photographs



White model

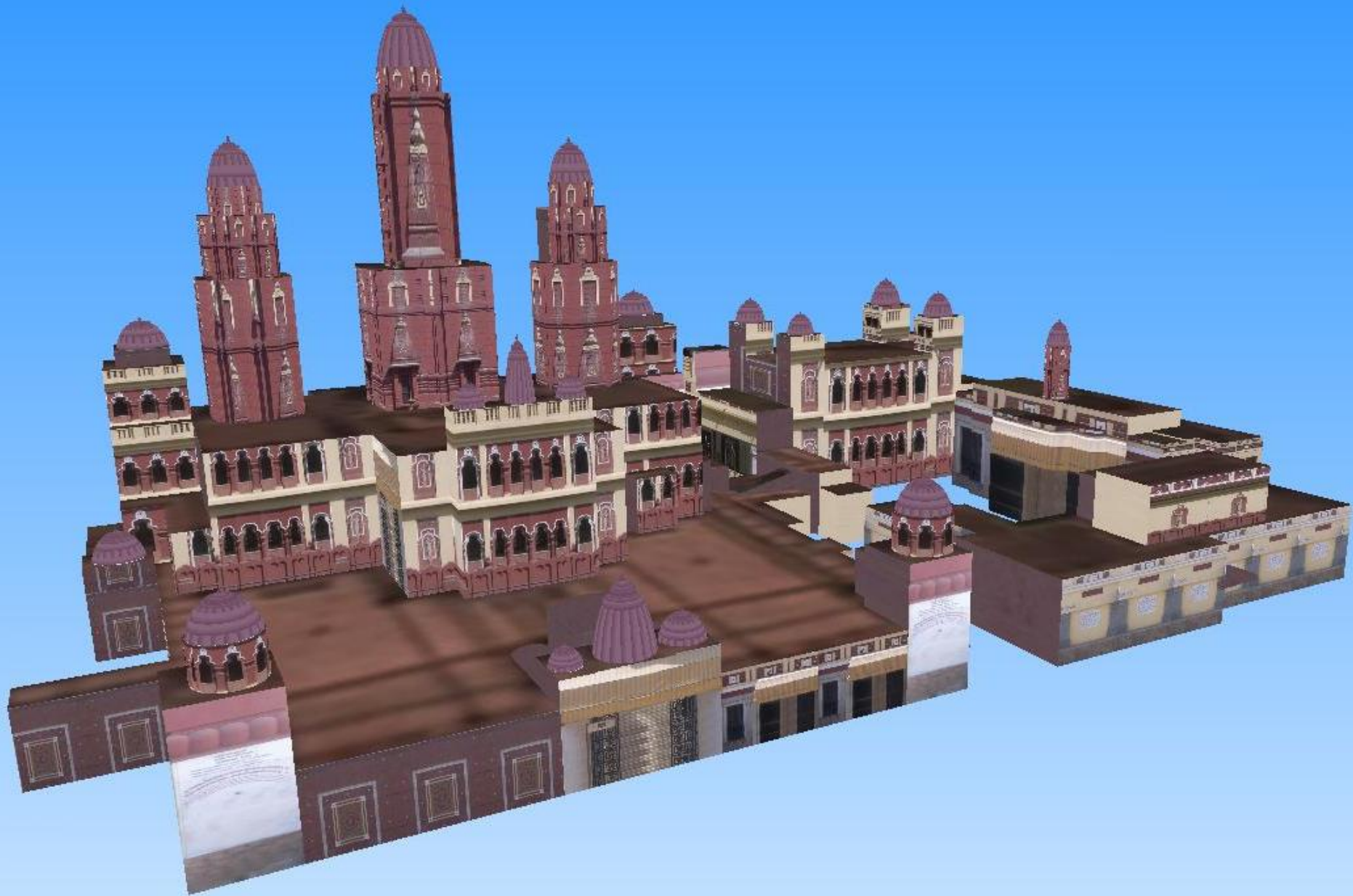


3D Texturing



- Creation of highly precise geometric building models from DEM, and stereo captured vector data
- Texture data for building by :
 - Digital picture capture
 - Top-texture from satellite images

Birla Mandir



Gurudwara



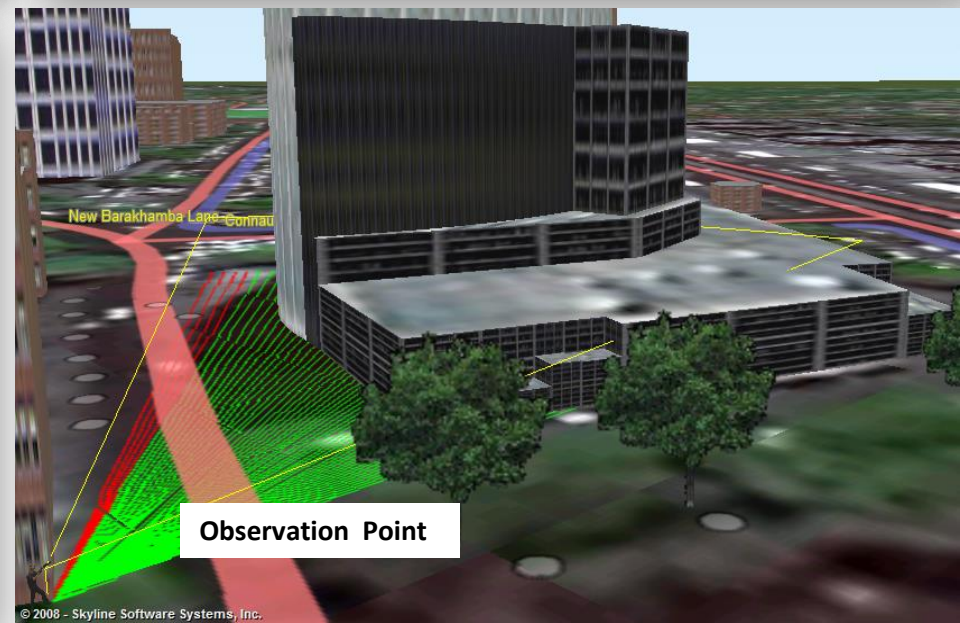
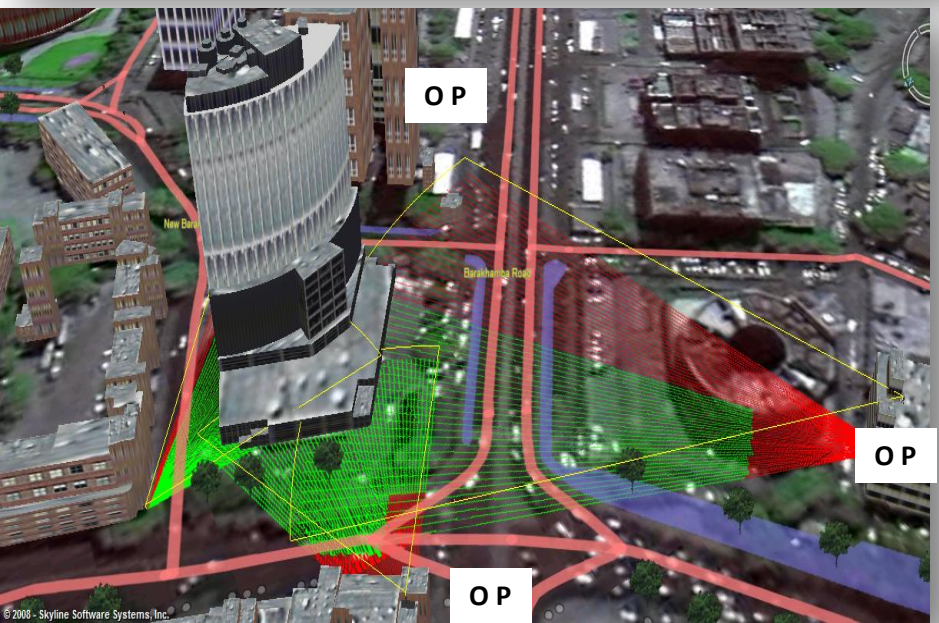
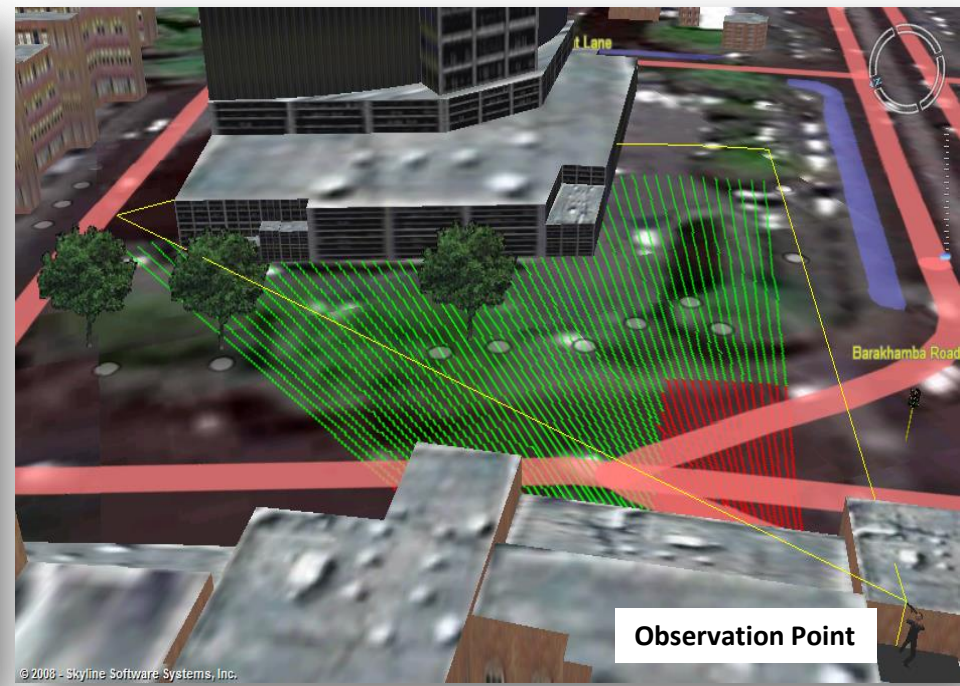
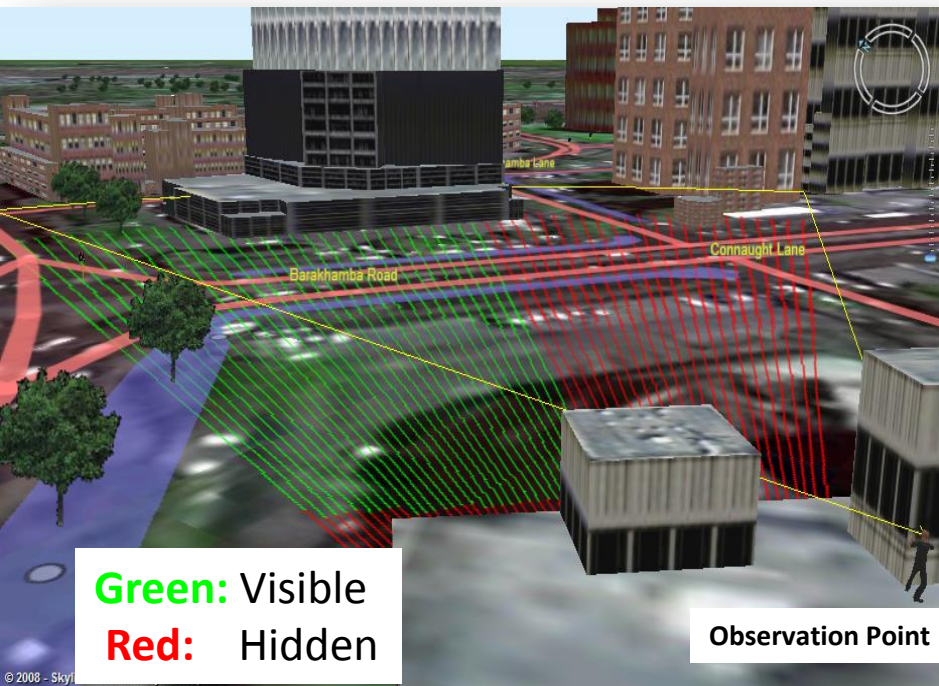
MODELING DISASTER GAS PIPE LINE LEAKAGE



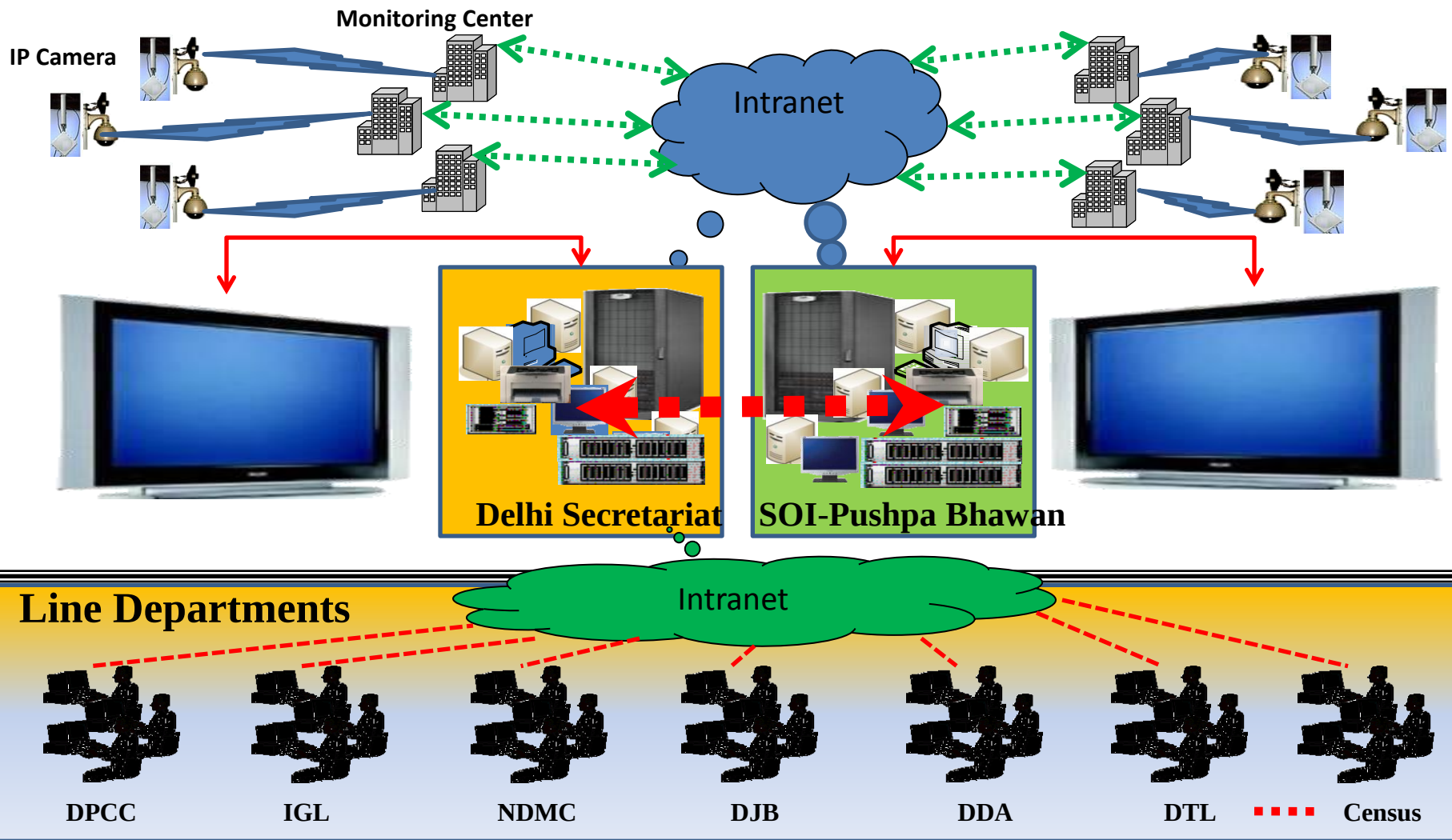
BUFFER ZONE

- High Risk Area
- Medium Risk Area
- Low Risk Area

VIEWSHED ANALYSIS



Delhi Geo-Portal - Architecture



- **System Integration, Implementation, Maintenance of the DSSDI solution for 5 years.**
- A one-stop geospatial “access” for metadata, data and applications for Line Depts. i.e. Preview, Access: download images, video, maps & Textual Data.
- **Capacity Building for Line Depts. (Training – Senior Management Staff & Technical Staff)**

Sheet Layout

G 43 (1:1MILLION)

72°						78°
28°	A	B	C	D	E	28°
	G	H	I	J	K	
	M	N	O	P	Q	
24°	S	T	U	V	W	24°
72°						78°

G 43S (1:250,000)

	72°				73°
25°	01	05	09	13	25°
	02	06	10	14	
	03	07	11	15	
24°	04	08	12	16	24°
	72°				73°

A square divided into four quadrants labeled NW, NE, SW, and SE. The top-left quadrant (NW) is white, the top-right (NE) is white, the bottom-left (SW) is light blue, and the bottom-right (SE) is light blue. The square is bounded by coordinates: top-left is 72° 24' 15", top-right is 72° 15' 24' 15", bottom-left is 72° 24' 15", and bottom-right is 72° 15' 24' 15". A red arrow points down from the top center.

72°				72° 15'		
24°15'	A	B	C	D	E	24°15'
	F	G	H	I	J	
	K	L	M	N	O	
	P	Q	R	S	T	
24°	U	V	W	X	Y	24°
72°					72° 15'	

72° G 43S04U (1:10,000) 72° 03'

24° 03'

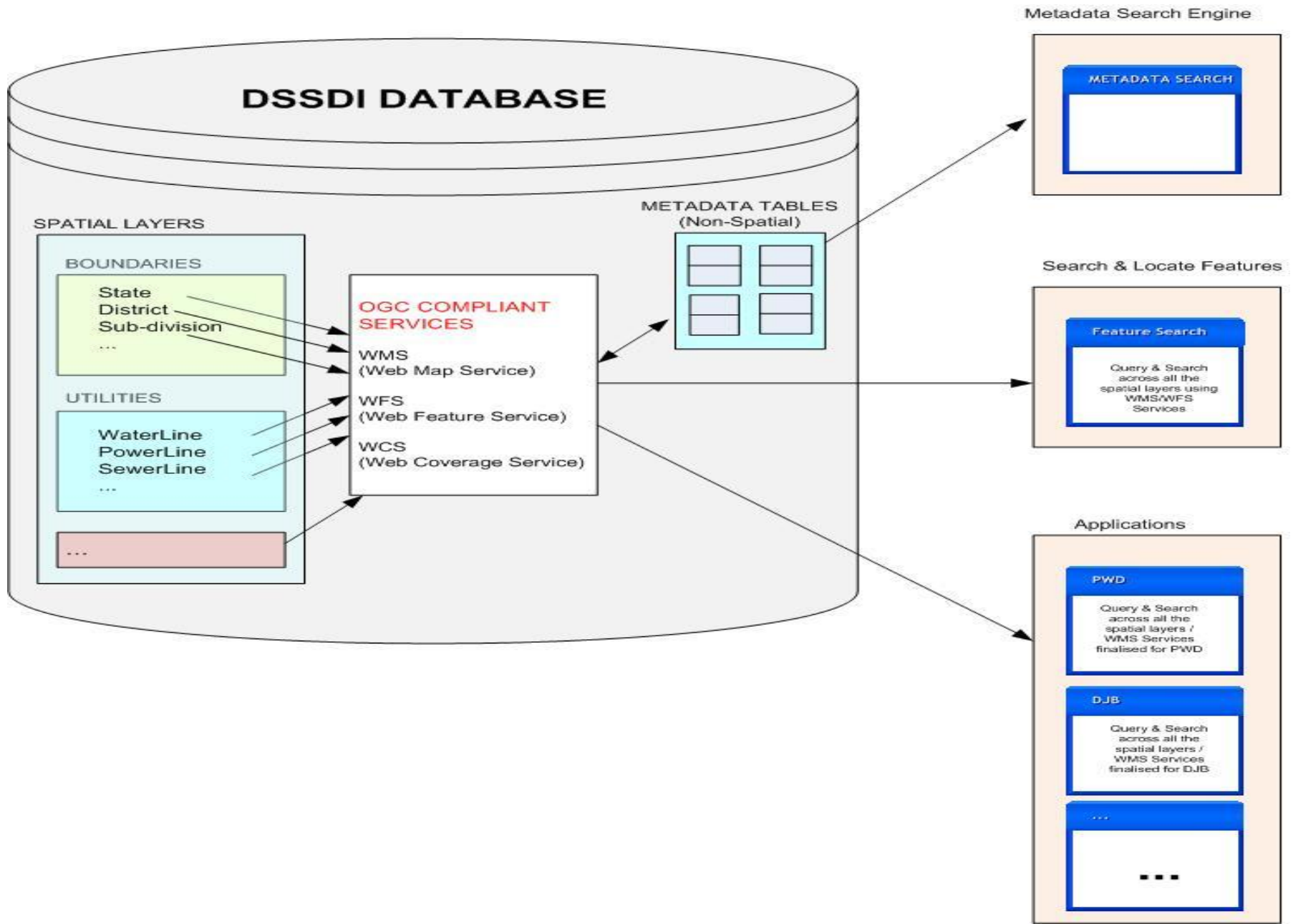
01	06	11	16	21
02	07	12	17	22
03	08	13	18	23
04	09	14	19	24
05	10	15	20	25

24°

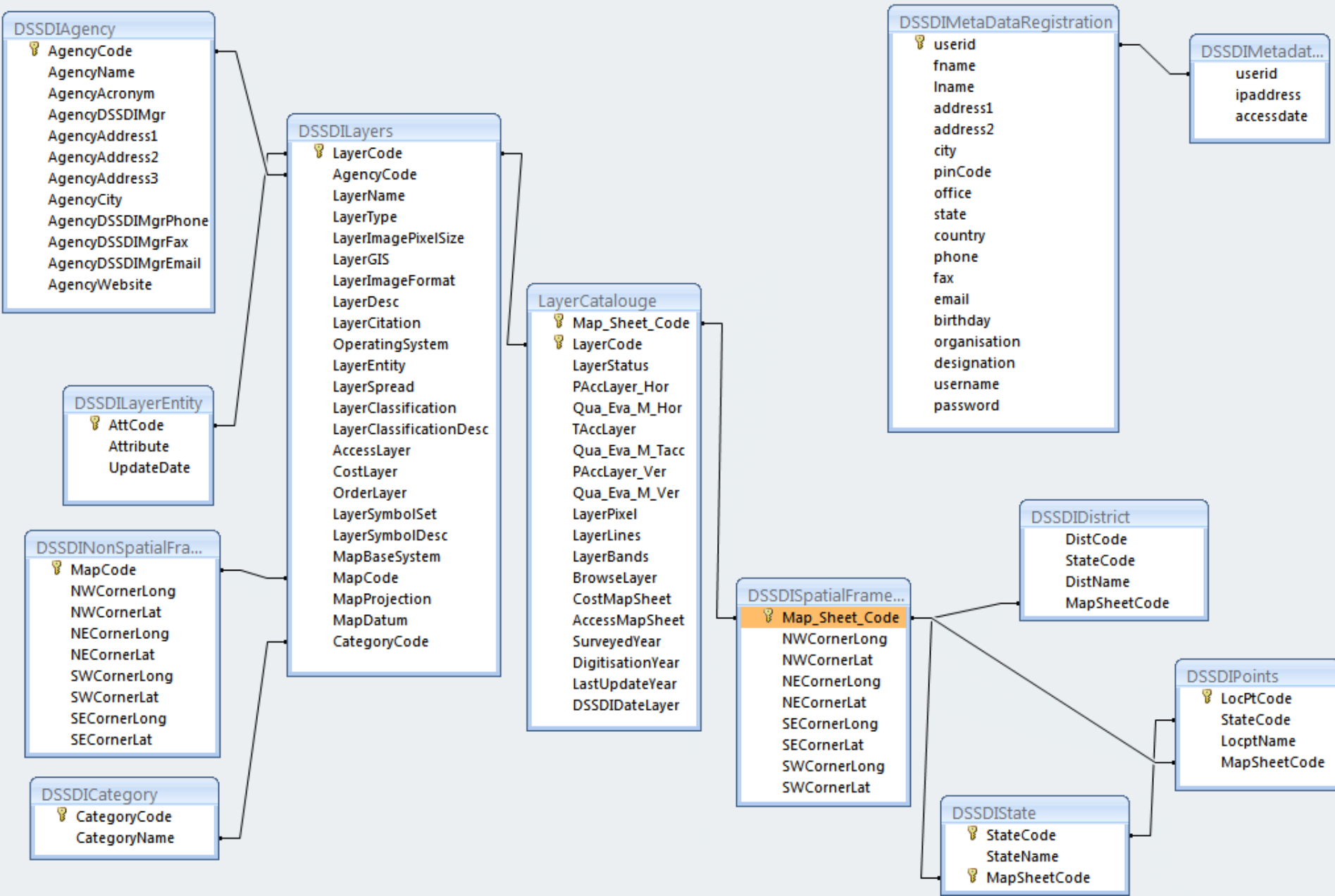
72° 72° 03'

G43S04U05 (1:2,000)

DSSDI – Database View



Metadata Tables – NSDI Standards



DSSDI - Metadata Search Engine

DSSDI - Metadata Search Engine

Where

District

Select District

Ward

Select Ward

Place

Enter Place

☐ Use envelope



What

Select Theme(s)

☐ Boundaries☐ Buildings☐ Transportation☐ Utilities☐ Land Use & Land Cover

When

Surveyed Year

Enter Surveyed Year

Published Year

Enter Published Year

Other Criteria

Sheet No.

Enter Sheet No.

Any Keyword

Enter Keywords

Submit Query

Search Results

Map Viewer





NORTH WEST
NORTH EAST
NORTH
WEST
CENTRAL
EAST
NEW DELHI
NAZUL LAND
SOUTH WEST
SOUTH

Layer / Legend Information

Status bar

DSSDI - Metadata Search Engine

DSSDI - Metadata Search Engine

Where

DistrictSouth West

WardSelect Ward

PlaceEnter Place

Use envelope

What

Select Theme(s)

☒ Boundaries

☐ Buildings

☐ Transportation

☒ Utilities

☐ Land Use & Land Cover

When

Surveyed Year

Enter Surveyed Year

Published Year

Enter Published Year

Other Criteria

Sheet No.

Enter Sheet No.

Any Keyword

Enter Keywords

Submit Query

Search Results

Map Viewer

3 Records found in matching criteria

Layer Name :

Layer Description :

Detail Metadata

View on Map

Download

Layer Name :

Layer Description :

Detail Metadata

View on Map

Download

Layer Name :

Layer Description :

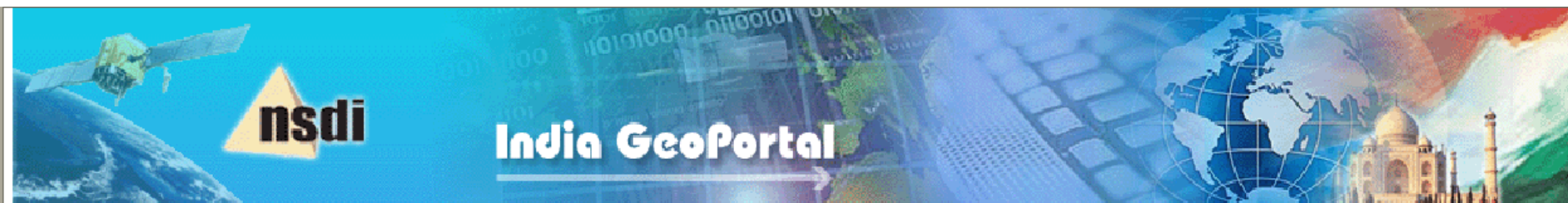
Detail Metadata

View on Map

Download

Status bar

INDIA GEOPORTAL



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1. National Infrastructure for the availability and access to organised spatial data.
2. Use of the infrastructure at Community, Local, State, Regional and National Levels for sustained economic growth.

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1. Training to trainers on GML was conducted from 8th April 2008 to 11th April 2008.
2. NSDI Nodal-officers meeting was conducted on 23rd May 2008.
3. Training to Nodal-officers on NSDI Geo-Portal was conducted from 10th November 2008 to 5th December 2008

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 DST	 Sol	 ISRO	 CGWB	 nrsc	 MoES
 GSI	 FSI	 MoEF	 Col	 IMD	 NBSSLUP
 DOD	 NATMO	 NIC	 NRDMS	 CWC	 Planning Commission

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Delhi GeoPortal

Survey of India (SOI) on behalf of Delhi Government is intended to create and maintain an integrated geospatial information system including 3D database of Delhi (DSSDI).

The work includes generation of base map and creating land / property information, generation of 3D pictorial data base, creation of DSSDI portal and applications for various stakeholders of Government of Delhi with maintenance for a period of 5 years.

The data will be used for City planning, Urban development, Utility Management, Traffic Management, Property tax collection, Pollution and Environment Monitoring, Security Management, Hazards and Disaster Management, Change Detection Analysis of building construction, Planning for future commonwealth games at Delhi.

This project is being full-fledged operational from the Office of The Project Director, DSSDI, Survey of India, Delhi with full assistance from Navayuga Spatial Technologies, Navayuga Infotech, and Navayuga Engineering Company Limited.

Login Here

Map viewer

User Name

Password

Don't have a GeoPortal ID ?

Signing up is easy. Signup...

News & Events

- 1

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This site is best viewed in 1024 X 768

Use IE 6.0/7.0 , Mozilla Firefox 2.0/3.0



Delhi GeoPortal



Welcome To Delhi GeoPortal

|| One Stop Entry For
Line Departments
in Delhi ||

Login

Select Department *

Password : *

Login



Survey of India

Powered by: NAVAYUGA





Delhi GeoPortal



Welcome To Delhi GeoPortal

|| One Stop Entry For
Line Departments
in Delhi ||



Login

Revenue Department

BSES Rajdhani Power Ltd

BSES Yamuna Power Limited

Census India

Commonwealth Games Delhi 2010

Delhi Development Authority

Delhi Fire Services

Delhi Integrated MMTS Ltd

Delhi Jal Board

Delhi Metro Rail Corporation Ltd

Delhi Police

Delhi Pollution Control Committee

Delhi State Ind. & Infra. Dev. Corp.

Delhi Tourism & Transport Development

Delhi Transco Ltd

Delhi Transport Corporation

Department of Forests

Department of Trade and Taxes

Dept of Irrigation & Flood Control

Directorate of Education

Directorate of Health Services

Excise Entertainment & Luxury Tax De

Indraprastha Gas Limited

Mahanagar Telephone Nigam Ltd

Municipal Corporation of Delhi

New Delhi Municipal Council

North Delhi Power Limited

Office of the Labour Commissioner

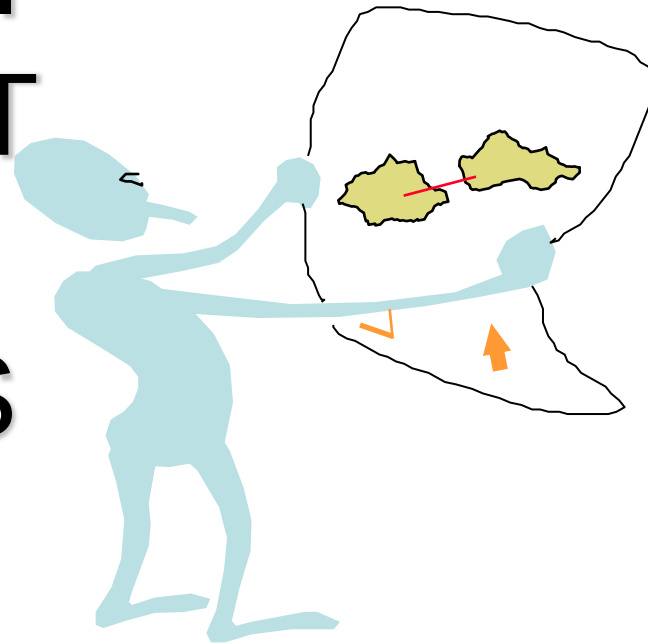
Office of the Chief Electoral officer, De

Public Works Department

Revenue Department

Survey of India

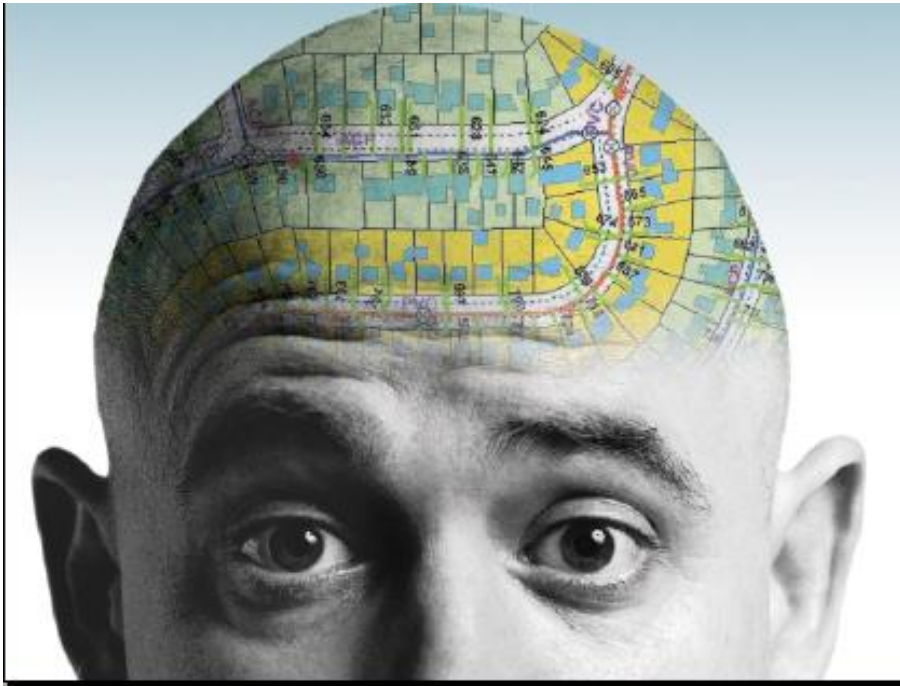
AT DSSDI
PROJECT
WE
ALWAYS
THINK
OF
THE



User

But

2 Dimensional



Think ? 3 Dimensional





THANK YOU VERY MUCH

A Geospatial
Decision Support System
for effective management
of the
Commonwealth Games
&
g - governance