Indian Urban Scenario
- Geospatial Solutions

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Urban India: Challenges

Pace of Urbanisation and Population size

- Growing urban populations: 377 M (2011) to ~600 M (2030)
- Rising levels of urbanization: 31% (2011) to ~50% (2040)
- Development concentrated in & around Metros (53 Metros account for > 42% of urban population) – Mumbai 18.4 M
- Increasing number of urban settlements

Graph showing population in million from 1951 to 2011, with urban and rural populations indicated.
Space Technology Applications & Accrued Benefits

1992
- Urban Mapping Scheme
- Large scale maps at the scale of 1:25000 using aerial photography for 53 towns.

2001
- NCR Plan
- Space-based geospatial technology used for preparation of NCR Regional Plan

2006
- NUIS
- GIS Data Base at 1:10000 & 1:2000 scale for 152 cities

2010
- Initiatives by States
- More than 200 cities in Maharashtra, Gujarat, Karnataka, Rajasthan, Orissa, Andhra Pradesh prepared and now use GIS based planning tools at the ULB level.

2015
- AMRUT
- Formulation of GIS based Master Plans for 500 AMRUT Cities
NCR comprises of NCT Delhi and Three Sub Regions of Haryana, Uttar Pradesh, and Rajasthan covering an area of ~55,000 Sq. km.

NRSC has prepared Regional Landuse database on 1:50,000 scale in 1999 which was the input for preparing the Regional Plan - 2021 for NCR

Regional Land Use was updated in 2012 for revision of Regional Plan 2021

During the period 1999-2012, built-up area has increased by 2.81% (95803.97 ha.) from 8.1% to 10.91% of the total NCR area and at the expense of agricultural land, waste land, green areas, and water bodies.

Land Use was mapped for the newly included additional districts

The Revised Proposed Landuse of Regional Plan-2021 has been approved in the 33rd NCR Planning Board meeting held on 1st July, 2013, for inviting public objections.
**National Urban Information System (NUIS) Scheme**

**Scope**

Generation of Multi scale (10K, 2K & 1K) Hierarchical Urban Geospatial Database including Thematic data for various levels of Urban Planning, Infrastructure Development and e-governance using Satellite, Aerial and GPR techniques. Launched during the 10th FYP

**Objectives**

- Develop spatial and attribute database
- Use modern data sources
- Develop Standards
- Develop urban indices, and
- Build capacity at State & local body Level

**Outcome**

About 23 towns have generated Master Plans using NUIS database
The Ministry of Urban Development, GoI has formally recognized the need for geospatial techniques (RS&GIS) for Master Plan formulation through the release of URDIPF Guidelines-2014 in New Delhi on February 18, 2015.

- Trained 2,500 Town Planning personnel on Bhuvan-NUIS
- Hands-on training imparted to 13 states for preparation of Master Plans for the identified towns.
- TCPO/MoUD is coordinating ULBs for progress of Master Plan preparation.

**Existing Data**
- Town Specific databases
- Admin Boundaries
- Ancillary Data

**Web App. Features**
- Status Updation
- Data versioning
- Proper logging
- Feedback
- Citizen View
- Town specific View: Authentication
- State: Access to all towns
- National: Access, state wise

Nationwide Training & Capacity Building on Bhuvan-NUIS
Development of GIS based Smart Solution

Naya Raipur Infrastructure is SCADA (supervisory control and data acquisition) enabled. SCADA is a system for remote monitoring and control that operates with coded signals over communication channels.

Geospatial enabled City Planning and Management
1. Urban Planning & Monitoring
2. Land management
3. Environmental & recreational
4. Social economic development
5. Investment planning

ICT enabled Smart solutions - City Governance
1. Municipal TAX, civic services
2. Transport
3. Power
4. Social Infrastructure (school, hospitals ..)
5. Water Supply
6. Sewerage & Solid waste
GEOSPATIAL DATABASE FOR AMRUT CITIES

Very High Resolution Satellite Data (Part of Thrissur, Kerala)

1. Vadakkunnathan Temple
2. St. Mary’s College

Urban Geospatial Database Creation using High Resolution Satellite Data

BENEFITS
- Formulate a master plan for decision making.
- Effective land use management and utilization.
- Spatial growth management.
- Enable project planning.
- Urban management.

Buildings
- Industrial
- Transportation
- Public & Semi-public
- Recreational
- Religious
- State Govt. Property
- Central Govt. Property
- Commercial
- Educational
- Health Services
- Mixed
- Residential

Urban Land Use
- Commercial
- Educational
- Green Areas
- Health Services
- Industrial
- Mixed
- Public & Semi-public
- Railway Property
- Recreational
- Religious
- Residential
- Road
Management plans for Heritage Sites & Monuments

Objectives

• Geospatial Inventory of all notified 3658 heritage sites and monuments
• Preparation of site management plans using web enabled GIS tools
• Capacity Building in ASI and other stake holder institutions

Expected Benefits to ASI, Min of Culture

• National Atlas of Heritage sites of India - Cultural, Natural & Mixed
• Cultural Resources Management Plans of Heritage sites for development, conservation and monitoring
• Archaeological Research

Expected Benefits to local Planning Authorities

• Local authorities can provide standardised guidelines to property owners or investors seeking to develop commercial spaces near heritage sites
• Make informed decisions on how to partner with the community to preserve & protect tangible & intangible aspects of Heritage sites

Phase I Progress

• Inventory of heritage sites : 90 % complete
• Mng. Plans for Sites : 60 % complete
• Data up loaded on Bhuvan for Visualisation
• 1 National & 4 Regional workshops organised in Dec 15
• Officials from 29 ASI circles trained at ISRO
Inventory of Heritage Sites and Monuments of National Importance using Geospatial Technology

3600 National Monuments and Heritage Sites in 30 ASI Circles

Jodhpur Circle
Rajasthan State
Jaipur Circle

Dharwad Circle
Karnataka State
Hampi Mini Circle
Bengaluru Circle

Major Highlights
- Geodatabase available live on Bhuvan portal as part of Decision Support Services for G2G and G2C applications under e-governance
- National Monument Authority uses this information for online Building Plan approval process. Qualified as part of Govt. of India initiative of “Ease of Doing Business” under Ministry of Urban Development

Site Management Plan (SMP)
Integrated action plans for Conservation and Protection of Heritage Sites and Monuments

Tajmahal, Agra
Stupa, Leb
Purana Qila, Delhi
Elephant's Caves, Raniagad

Mobile Apps for G2G & G2C applications

Smarac Citizen
Smarac Citizen

3D Models

Online Citizen request processing
- NMA/NIC Portal
- User Services
- Application No:
- Name:
- Mobile No:
- Email Id:
- Verify
- Internet
- GPS
- Bhuwan Server
- Smart Phone App
- Option 1: Intersect with protected boundary
- Option 2: Intersect with 100 m Buffer
- Option 3: Intersect with 300 m Buffer
- Download App
- Submit form
- Send
- Image clip/pan/zoom
- RDMS Log
- Date Time Lat Long Buf Status approved
- auto geo processor GIS Analysis
- Qualification as part of Govt. of India initiative of “Ease of Doing Business” under Ministry of Urban Development

Two boxs

3D Models
- Unmanned Aerial Vehicle (UAV), popularly known as Drone, is an airborne system or an aircraft operated remotely by a human operator or autonomously by an onboard computer.

- Large-scale mapping, urban modelling, vegetation structure mapping and real-time assessment and monitoring activities of various applications.

- Can carry maximum payload up to 2.5 Kg of different sensors such as thermal, multispectral, optical, hyperspectral or LIDAR

**Challenges**

i) limitation in the size of the study area

ii) processing of large volume of data

iii) requirement of large storage space

iv) Feature extraction techniques
Property Mapping by Municipal Administration

- Mobile App for geotagging of properties for taxation in Telangana
- 72 Urban Local Bodies (ULBs) and Greater Hyderabad Municipal Corporation have been covered

>12 Lakh Properties are geotagged
Monitoring Encroachments & Enforcements

Ecosensitive Zone Monitoring System

New Buildings
Un-authorised?

New Layout
Un-authorised?
<table>
<thead>
<tr>
<th>Factor</th>
<th>Sub component</th>
<th>Data Source</th>
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<tbody>
<tr>
<td>Demographic</td>
<td>Population Density</td>
<td>Census and Local Municipality</td>
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<td>Village Ward wise</td>
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<tr>
<td>Socio-Economic</td>
<td>Land value Income Levels</td>
<td>Local Municipality</td>
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<tr>
<td>Infrastructure</td>
<td>Road network</td>
<td>Satellite data &amp; DTCP</td>
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<td></td>
<td>Rail network</td>
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<td>Natural Resource</td>
<td>Soil Ground Water</td>
<td>NUIS &amp; RGNDWWM</td>
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<td>Slope Aspect</td>
<td>Bhuvan</td>
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<tr>
<td>Zoning Regulations</td>
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<td>DTCP</td>
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Potential Building Rooftops for Solar power PVs

- 2D Building rooftops generated from VHRS data and height from Cartosat-1 Stereo data
- Building rooftops > 500 sqm are potential for Solar power - One of the AMRUT mission reforms
- A Service to users through BHUVAN

Potential of solar Energy in Rajkot City

THANK YOU