



भूमि संसाधन विभाग  
DEPARTMENT OF LAND RESOURCES  
MINISTRY OF RURAL DEVELOPMENT  
GOVERNMENT OF INDIA



# STANDARD OPERATING PROCEDURE (SOP)



NAtional geospatial KNowledge-based land Survey of urban HAbitations

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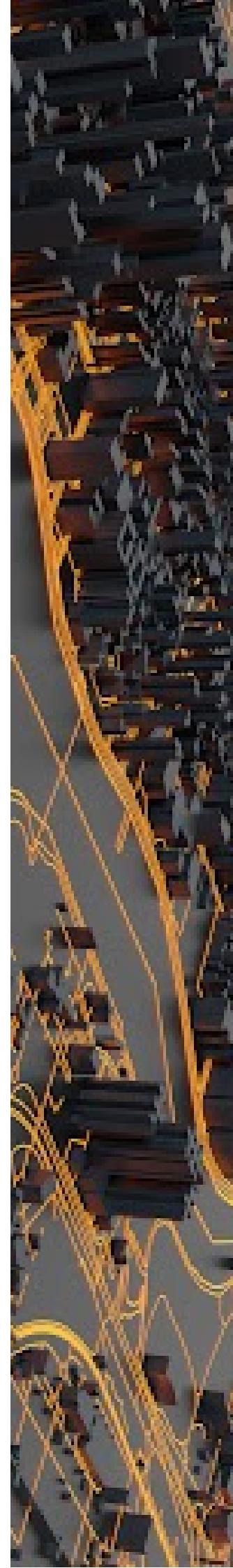
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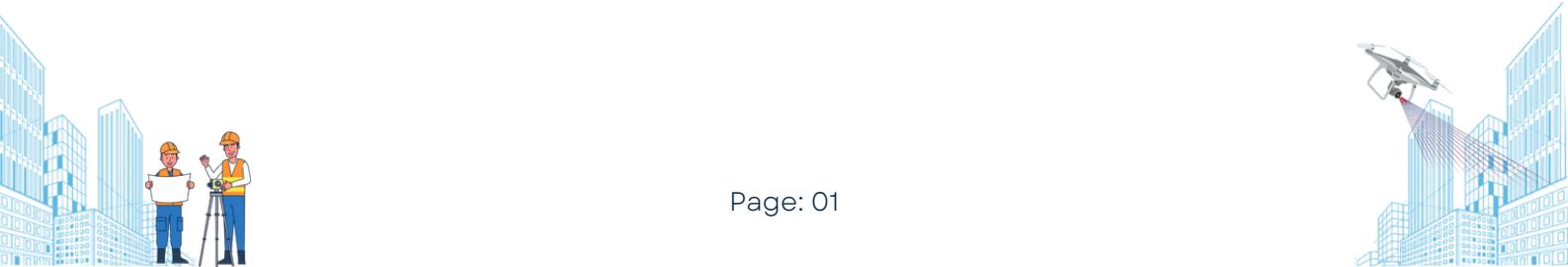
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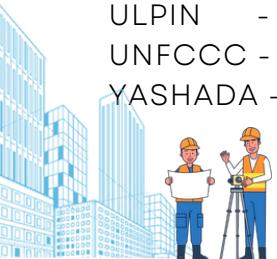
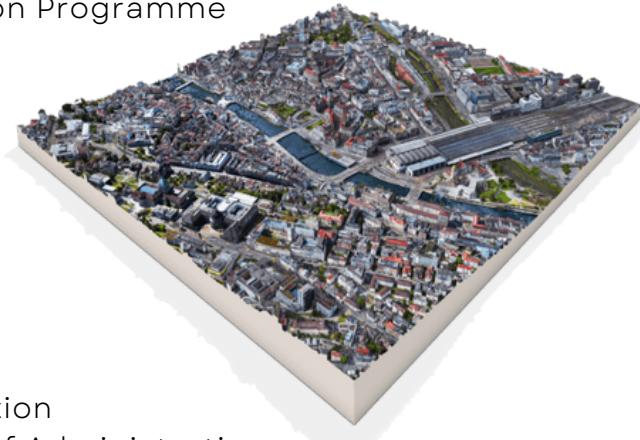
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# LIST OF ABBREVIATIONS

AMC	- Annual Maintenance Contract
AoI	- Area of Interest
API	- Application Programming Interface
CoE	- Centre of Excellence
CORS	- Continuously Operating Reference Stations
CRS	- Centre for Rural Studies
DEM	- Digital Elevation Model
DGPS	- Differential Global Positioning System
DILRMP	- Digital India Land Records Modernization Programme
DoLR	- Department of Land Resources
DSM	- Digital Surface Model
DTM	- Digital Terrain Model
EA	- Empanelled Agency
GCPs	- Ground Control Points
GIS	- Geographic Information System
GNSS	- Global Navigation Satellite System
GoI	- Government of India
GSD	- Ground Sample Distance
IEC	- Information Education and Communication
LBSNAA	- Lal Bahadur Shastri National Academy of Administration
MGSIPA	- Mahatma Gandhi State Institute of Public Administration
MoHUA	- Ministry of Housing and Urban Affairs
MoRD	- Ministry of Rural Development
MPSEDC	- Madhya Pradesh State Electronics Development Corporation
NAKSHA	- National geospatial Knowledge based land Survey of urban Habitations
NIC	- National Informatics Centre
NICSI	- National Informatics Centre Services Incorporated
NPMU	- National Programme Management Unit
NRTK	- Network Real Time Kinematic
NSSO	- National Sample Survey Office
OGC	- Open Geospatial Consortium
ORI	- Ortho Rectified Imagery
QA	- Quality Assurance
QC	- Quality Control
RFP	- Request For Proposal
RoRs	- Record of Rights
SDGs	- Sustainable Development Goals
SLC	- State Level committee
Sol	- Survey of India
SOP	- Standard Operating Procedure
SPMU	- State Programme Management Unit
SVAMITVA	- Survey of Villages Abadi and Mapping with Improvised Technology in Village Areas
UAV	- Unmanned Aerial Vehicle
ULB	- Urban Local Body
ULPIN	- Unique Land Parcel Identification Number
UNFCCC	- United Nations Framework Convention on Climate Change
YASHADA	- Yashwant Rao Chavan Academy for Development Administration



# 1. Introduction of the NAKSHA Programme:

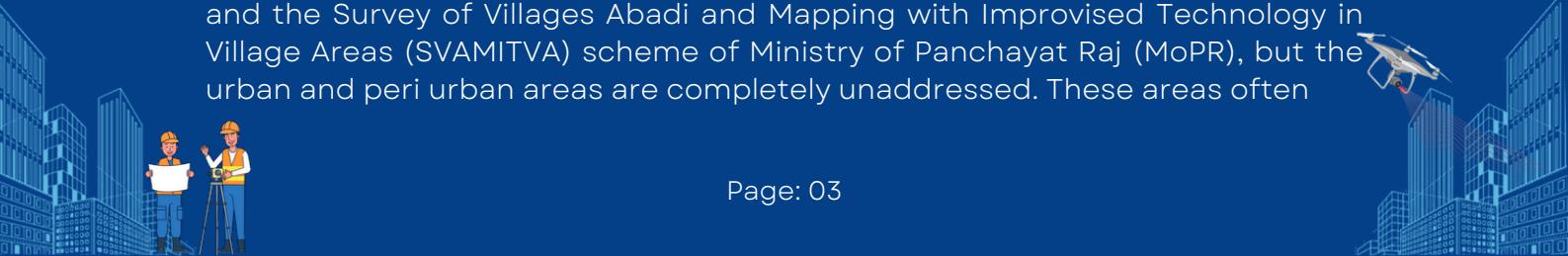


All India Debt and Investment Survey, 2019 (NSSO) highlights that 90% of assets of individuals in India are held as land and building. Various studies reveal that 2/3rd of the private disputes in subordinate courts in India relate to land and building. Lack of updated land records and maps are one of the main reasons for this. According to a McKinsey study (2001), land market distortions cost India about 1.3% in GDP growth. Another [McKinsey report \(2020\)](#) highlights that informal settlements and unregistered land could be formalized by speeding up the digitization of land records, cadastral maps, and surveys, deploying modern technologies including Differential Global Positioning System (DGPS) and aerial survey. These exercises would also significantly ease the process of land acquisition in urban and peri urban landscape.

The reforms in urban planning capacity in India report of 2021 by NITI Aayog has elaborated the need of spatial planning of urban areas. Further, cities play a decisive role in achieving India's commitments to global agendas, such as United Nations Sustainable Development Goals (SDGs) 2030: UN-Habitat's new urban agenda; and the Paris Agreement under the United Nations Framework Convention on Climate Change (UNFCCC). The SDGs specifically Goal 11 (making cities inclusive, safe, resilient, and sustainable) promote urban planning as one of the recommended methods for achieving sustainable development. They include a new focus on participatory and integrated planning for urban areas, peri-urban areas, and rural areas land resources.

One of the major components of urban planning are land records and property management which requires very precise survey, resurvey and creation & updation of the land records. This includes setting up ground control network and the process of cadastral revenue map (if any) overlaid on very high-resolution base map or GIS ready topographical layers generated using property tax database, layout plans etc. Hybrid method involves use of professional survey grade Unmanned Aerial Vehicle (UAV)/ Drone for large scale mapping and precise field measurements by DGPS or Global Navigation Satellite System (GNSS) Receivers (also known as GNSS Rovers). Since many Urban Local Bodies (ULBs) have multistorey structures, congested constructions narrow roads and streets, this calls for mapping the ULBs in 3D environment to accurately capture, visualize and interpret the ownership data and other categorization of property in spatial domain.

The digitization of urban land records is an essential step towards achieving transparency, efficiency, and accountability in land administration. While the Government of India (GoI) has made significant progress in digitizing rural land records through initiatives such as the Digital India Land Records Modernization Programme (DILRMP) of Department of Land Resources (DoLR) and the Survey of Villages Abadi and Mapping with Improvised Technology in Village Areas (SVAMITVA) scheme of Ministry of Panchayat Raj (MoPR), but the urban and peri urban areas are completely unaddressed. These areas often





lack clear update and accessible land records, including Record of Rights (RoRs), cadastral maps and their digital linkages which leads to uncertainties, prolonged legal disputes and numerous grievances.

Strengthening the urban and peri-urban land records system by creating, modernizing, updating, integrating records and maps is the need of the hour. Hon'ble Finance Minister of India in her July 2024-2025 Budget Speech emphasized that

*“Land-related reforms by state governments (para 98) – Land related reforms and actions, both in rural and urban areas, will cover (1) land administration, planning and management, and (2) urban planning, usage and building bylaws. These will be incentivized for completion within the next 3 years through appropriate fiscal support.*

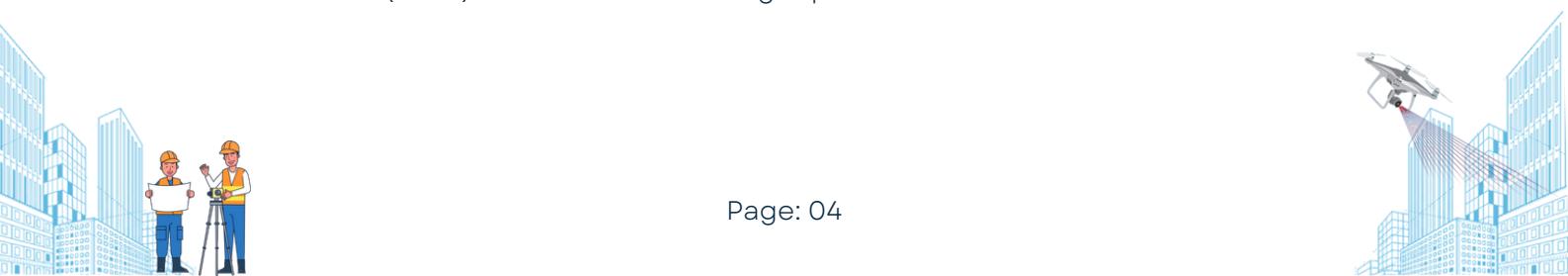
*Rural Land related actions (para 99) – Rural land related actions will include (1) assignment of Unique Land Parcel Identification Number (ULPIN) or Bhu-Aadhaar for all lands, (2) digitization of cadastral maps, (3) survey of map subdivisions as per current ownership, (4) establishment of land registry, and (5) linking to the farmers registry. These actions will also facilitate credit flow and other agricultural services. Urban Land related actions (para 100) – Land records in urban areas will be digitized with GIS mapping. An IT based system for property record administration, updating, and tax administration will be established. These will also facilitate improving the financial position of urban local bodies.”*

(Source: [www.indiabudget.gov.in/doc/budget\\_speech.pdf](http://www.indiabudget.gov.in/doc/budget_speech.pdf) - Government of India, Budget 2024-2025, Speech of Nirmala Sitharaman, Minister of Finance, July 23, 2024, page no. 18, para 98, 99 and 100)

To bridge this gap, NAational geospatial Knowledge-based land Survey of urban HAbitations (NAKSHA) Programme is sanctioned to create and digitize urban and peri-urban land records, offering an integrated solution that leverages modern surveying and mapping technologies, by Department of Land Resources, Government of India since September 2024.

Under this proposed programme the demarcation of government land, public land, various utilities like roads, railways, etc., inhabited land in urban and peri urban areas would be done using aerial surveying technology with the collaborative efforts of the Department of Land Resources (DoLR), Ministry of Rural Development (MoRD), Government of India; Ministry of Housing and Urban Affairs (MoHUA), Government of India; Survey of India (SoI), Dehradun; State Revenue & Urban Development Department/ Local Self Government, Madhya Pradesh State Electronics Development Corporation (MPSEDC), Bhopal, National Informatics Centre Services IncOR (NICSI).

“The NAKSHA Pilot Programme has been initiated by the Department of Land Resources in 152 ULBs/Local Self-Government across the country with Survey of India as Technical Partner which would cover the aerial survey and feature extraction part. The State/UT Governments would complete the field survey, ground truthing and final publication of urban and peri-urban land records. As of now 29 States/UTs are participating in the Pilot Programme with a variable number of Urban Local Bodies (ULBs) to a maximum of target per State/UT



## 2. Objectives of NAKSHA Programme

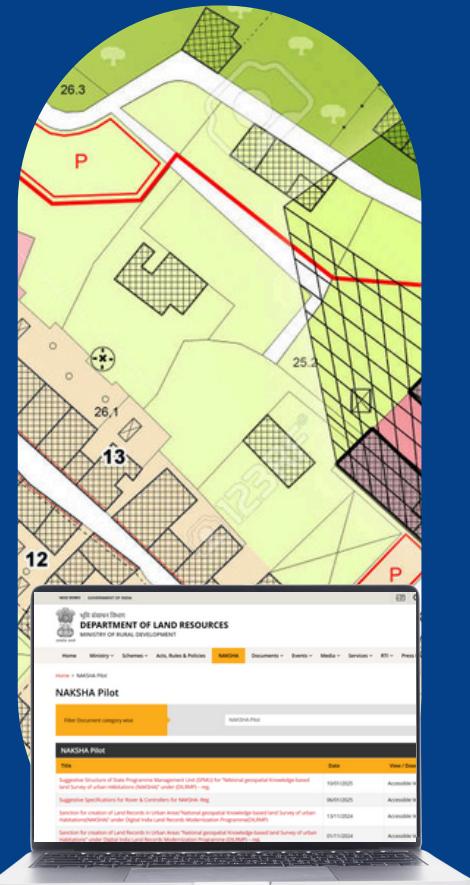


The NAKSHA Programme is designed to support urban, peri-urban and regional planning by generating and providing high-quality, geospatial data to the States/UTs. It is essential to prioritize the creation of land records in urban and peri-urban areas to enhance the ease of living for citizens, streamline the urban land records optimization and improve overall urban development outcomes, including better property tax collection, urban planning and redevelopment. It would also lead to ease of business by way of easier access to credits, precise geospatial decisions, and ownership clarity etc. A key step in this direction is the creation of the urban land record system which provides comprehensive and reliable information for all urban land parcels within ULBs and peri-urban areas in an easily accessible format.

Given the limitations of existing datasets, the most reliable approach to establishing such a system is to conduct a survey and create a database using the latest technology. This process should include robust safe guards by cross-referencing existing data bases and actively involving citizens through ground truthing and a transparent process for addressing objections. This approach ensures accuracy, reliability and public trust in the new urban land record system.

The primary objectives of the NAKSHA Programme are:

- a) Creation of urban land records:** To create spatial data enabled urban land records system as a comprehensive, digitized and accurate database in urban and peri-urban areas using latest technologies and to correlate the existing digitized town survey records wherever available
- b) Creation of Web GIS platform:** To develop a user-friendly end-to-end Web GIS platform that allows Government and citizens to access urban land records allowing interoperability of data across sectors.
- c) Empower Urban Citizens and improve ease of living:** Creation of urban land records resulting in reduction of disputes, simplification of access to urban utilities like electricity, water, telephone, etc and credit facilities.
- d) Better financial health of urban local bodies:** Scientific accurate and transparent property taxation regime would improve financial health of ULBs.  
Better Urban Planning: Provide geospatially accurate data to support scientific urban planning and disaster resilience.
- e) Better Urban Planning:** Provide geospatially accurate data to support scientific urban planning, redevelopment and disaster resilience & management.



# 3. Scope of Standard Operating Procedure (SOP)

This Standard Operating Procedure outlines the procedures for data collection, processing, analysis, and dissemination within the NAKSHA Programme. This SOP suggests the process for managing geospatial data and creating urban land records. However, variations as per regulatory frame work, data set availability and technological efficiency outcomes desirable to be captured in various State/UT and at ULBs level would be the core of the programme. The key steps and components include:



**a) Aerial Photogrammetric Data Collection and Ortho Rectified Imagery (ORI) Generation:**

Collecting geospatial data i.e. establishment of Ground Control network and generating Ortho-Rectified Imagery (ORI) using designated technologies.

**b) QA and QC:** Ensuring accuracy and consistency throughout the data acquisition and processing stages of Aerial survey and Feature extraction

**c) Data Processing and Analysis:** Processing and analyzing collected data schema to facilitate urban land records updation and data dissemination and as Map 1 sharing processed data with relevant stakeholders seamlessly for field survey and ground validation.

**d) Field Survey and Ground Truthing:** Conducting field surveys and ground-truthing for each land parcel under the jurisdiction of concerned Urban Local Bodies (ULBs) as required..

**e) Land Record Validation and System Update:** Validating existing land records if any, and generating updated maps, and uploading the data into the end to end WebGIS Application for Urban Land Record Management and publication of Map 2.

**f) Final Map Publication:** After acceptance or dispute /objections resolution, the final Map 3 publication of ULBs, containing details of ownership, area etc., of all the land parcels would be carried out.

# 4. Stakeholders, their Roles and Responsibilities

Table 4.1: Details of NAKSHA's component wise activity and responsibility

S. No	Component	Activity	Responsibility / Implementation by
1	<b>Aerial Survey</b>	Fixation of ULBs boundary for aerial survey with the help of satellite imagery and States/UTs ground support, establishment of Ground Control Points (GCPs), procuring of necessary clearances for aircraft/ drone flying, data acquisition, post processing generation of Mapping Ortho Rectified Imagery (ORI), Ortho mosaic, DEM (DSM & DTM), 3D textured model/3D reality model and QA/QC	Survey of India (SoI) through Third-Party private agencies for selected packages and by three different proposed technologies including QA/QC.
2	<b>Feature Extraction</b>	Generation of 2D/3D GIS dataset through feature extractions including all buildings and public utilities, etc., and generation of topographical layer including property markers and QA/QC as per standardized schema for the three methodologies.	Survey of India (SoI) through procurement of third-party private agencies
3	<b>Scanning, Digitization &amp; Integration of existing records</b>	Scanning, digitization of existing records & maps and integration of Record of Rights (RoRs) and other details details including property tax, layout plans, registration deeds etc. in attributes	States/UTs with assistance and guidance of Survey of India (As per DILRMP norms and conditions)
4	<b>Field Survey</b>	Field survey of all land parcels and ground truthing of the properties with two permanent staff (per team) from Revenue Department and Urban Development Department which would be provided by the States/UTs. Cost of three hired staff including a surveyor, helper and a driver with vehicle per team will be provided under this Programme.	States/UTs with their own staff or with help of private agencies by hiring or as a service. Hired staff (surveyor, helper and driver) and vehicles could be taken as a service from a third party or internally by the department concerned.
5	<b>Quality Assurance and Quality Control</b>	Generated Land Parcel/Property layer from Field Survey and Ground-truthing/ Ground Validated data of ownership data and publishing after inquiry & dispute resolution	States/UTs with technical assistance of Survey of India
6	<b>Cloud Space and Storage</b>	Cloud Infrastructure, Storage space, SSL, DR, Audit, etc., and misc. expenditure as required	NICSI through NIC DoLR

7	<b>IEC</b>	Standard Operating Procedure (SOP), Manual Publication, IEC and awareness of all stakeholders, equally urban committees	States/UTs with their own staffs or with help of third party agencies
8	<b>Training</b>	Training & Capacity Building, Travel, Exposure Visits, Conferences etc.	DoLR will provide training to senior officers and Master trainers with assistance of Sol, MPSEDC, COEs; and State/UTs will provide training to all concerned staff and ULBs based on prevailing legal provisions and methods at local ATIs/ State institutions.
9	<b>Documentation</b>	Documentation, Evaluation & Monitoring etc.	States/UTs through their Nodal Department
10	<b>Survey Equipment</b>	A) GNSS Rovers, Controllers, Hand Held Devices and Tablets (FDCs), rugged laptops, ETS GNSS etc.	States/UTs in consultation with Sol and DoLR. The Rover could be procured or taken as a service from third party agencies.
		B) Continuously Operating Reference Stations (CORS): Permanent OR temporary.	Sol in consultation with States/UTs and DoLR, and as required for successful implementation of this programme.
11	<b>Software Development</b>	Development of Web-GIS & Mobile Apps, with Portal & Dashboard; Integration of Record of Rights (RoRs); Cadastral Maps; ORIs; Property Taxes database; Development Authority Layout plans; Ground Truthing Database, Hosting, Maintenance, Updation and Integration of Data on Web, APIs and Software Development along with National/State level Cloud Storage	DoLR, States/UTs through MPSEDC would develop end end WebGIS platform and applications. The software services via Cloud infrastructure & storage space will be provided by NICSI.
12	<b>National Level IEC, Training, Documentation</b>		DoLR
13	<b>National Programme Management Unit (NPMU) &amp; Office Establishment</b>		DoLR
14	<b>State Programme Management Unit (SPMU) &amp; Office Establishment for Large &amp; Small States</b>		States/UTs as per norms
15	<b>Miscellaneous / Incidental Charges</b>		DoLR

## 4.1 Department of Land Resources (DoLR), MoRD Govt. of India

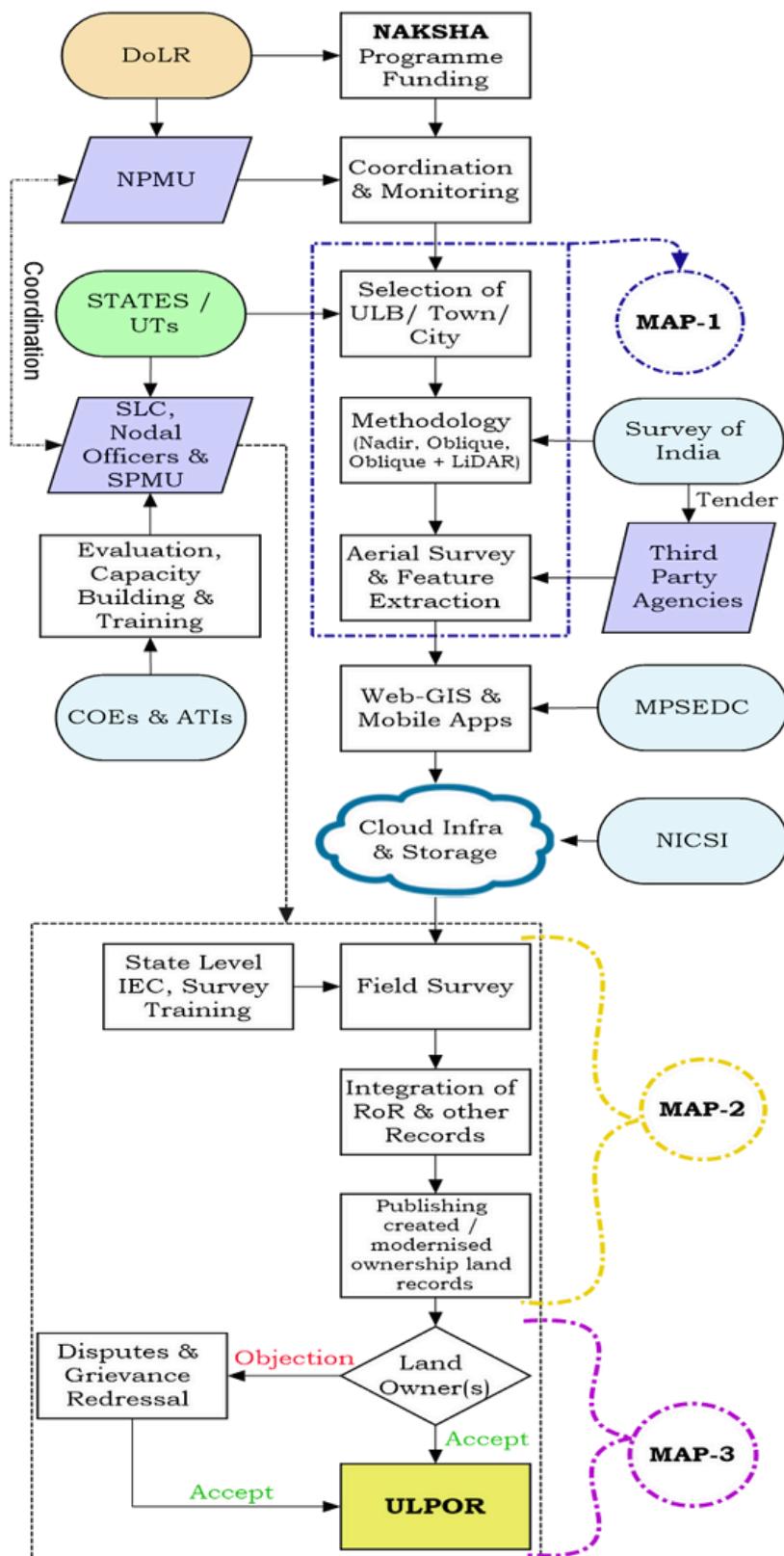


Figure 4.1: Stakeholder mapping for implementation of NAKSHA Programme

## **4.1 Department of Land Resources (DoLR), MoRD Govt. of India**



- a. Provide strategic direction for the integration of land resources data with NAKSHA.
- b. Release of funds to Sol, States/UTs, MPSEDC, NICSI and COEs/ATIs for undertaking activities under various components of NAKSHA.
- c. Establishment of National Programme Management Unit (NPMU) for effective coordination, monitoring, implementation of the NAKSHA Programme.
- d. Coordination with Sol for completion of Aerial survey, Feature Extraction, QA/QC and creation of MAP-1.
- e. Developing Web-GIS and Mobile application software for monitoring and data visualization of field survey activities with support of Madhya Pradesh Electronics Development Corporation (MPSEDC), Government of Madhya Pradesh.
- f. Coordinating with National Informatics Centre Services Inc. (NICSI) a company under National Informatics Centre, Ministry of Electronics & Information Technology, Government of India for providing and procuring IT solutions for NAKSHA's Cloud Infrastructure and Storage Space.
- g. Capacity building of stakeholders involved by developing training modules in consultation with Sol, MPSEDC, COEs/ATIs and Nodal department of States/UTs.
- h. Conducting National IEC involves providing information, education to increase knowledge and awareness, and communication to disseminate messages through various channels such as newspaper, broadcasting through television, radio, organizing awareness camp, social media engagement campaigning etc., and documentation
- i. Organizing workshops, symposiums and conferences at the International / National / Regional level for sensitizing stakeholders from time to time.

## **4.2 States/Union Territories (UTs) Nodal Department**

- a) Selection of Nodal Department for implementing NAKSHA Programme (Revenue/ Urban Development/ Local Self Government).
- b) Nomination of Nodal officer for day-to-day coordination with DoLR, Sol, ULBs and third-party agencies.
- c) Formation of State Level committee (SLC) under the chairmanship of the Chief Secretary for overall monitoring, evaluation, release of funds, coordination with Urban Local Bodies (ULBs) with support from Nodal department for implementation of NAKSHA Programme.
  - Representatives from the Board of Revenue, Principal Secretary/Secretary of the Departments of Revenue, Registration, Urban Development, Local Self Government, Finance, Planning and IT, Survey & Settlement Commissioner/ Director of Land Records, any other expert/ Institution as decided by the States/ UTs should be its members.



- State Nodal officer would be the convener of the SLC.
- It is recommended to conduct at least four meetings to monitor and review the NAKSHA Programme in a year.

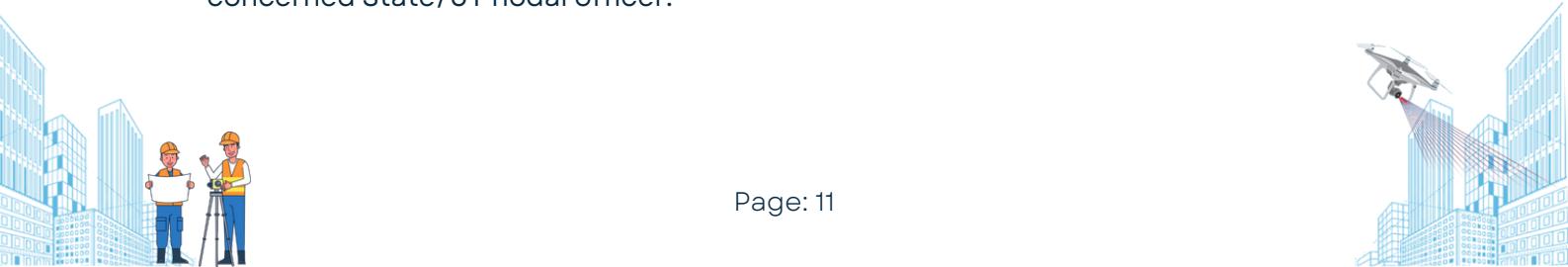
**d) Constitute State Programme Management Unit (SPMU)**

- SPMU to be headed by a Senior Govt. officials/as nominated by respective State/UT.
- Hiring experts/consultants including Project Manager and sufficient number of GIS experts, as per requirement of the States/UTs within the maximum sanctioned budget as indicated in the table below (eight experts/consultants for large States and four experts/consultants for smaller States)
- One time cost for office establishment including procurement of computers/ laptops, printers, office chair, table, accessories, internet connectivity etc. and monthly cost for Manpower support is as per table below:

Category	States/UTs	Human Resource Recruitment Cost (Monthly)	One time office Establishment Cost
A (Large States)	Andhra Pradesh, Assam, Bihar, Chhattisgarh, Gujarat, Haryana, Jharkhand, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Odisha, Punjab, Rajasthan, Tamil Nadu, Telangana, Uttar Pradesh, West Bengal (18 States)	Rs. 9.5 Lakh (Nine lakh fifty thousand)	Rs. 8.0 Lakh (Eight Lakhs)
B (Small States)	Arunachal Pradesh, Goa, Himachal Pradesh, Manipur, Meghalaya, Mizoram, Nagaland, Sikkim, Tripura, Uttarakhand, Andaman and Nicobar Islands, Chandigarh, Dadra and Nagar Haveli and Daman and Diu, Lakshadweep, Delhi, Puducherry, Jammu and Kashmir, Ladakh (18 States)	Rs. 6.0 Lakh (Six Lakhs)	Rs. 5.0 Lakh (Five Lakhs)

**e) Role of SPMU:**

- SPMU would assist in formulating strategies, IEC plans, training and capacity building, and overall documentation of the NAKSHA Programme under the supervision of concerned State/UT nodal officer.



- The SPMU team shall be the focal point for the NPMU and other stakeholders for implementation of the NAKSHA Programme.
- SPMU would assist the Nodal Department in troubleshooting technical issues during the implementation phase in consultation with Sol, Third Party Agencies, NICSI, MPSEDC or any other agencies as and when required.
- SPMU will be participating in all the review meetings scheduled by DoLR along with nodal officers. SPMU team members will be responsible for drafting the presentations on the progress made by the concerned ULB and share challenges, if any, in consultation with the nodal department of the State.
- SPMU will be responsible for day-to-day coordination with the field teams of the concerned ULBs, survey agencies, DoLR and other stakeholders involved in the implementation of NAKSHA Programme.
- Declare or notify Area of Interest (Aoi) of ULBs and assist in obtaining of required clearance.

**f)** Handover existing digitized data on record of rights, property tax, cadastral maps, layout plans etc. in specified format for integration. State nodal department or SPMU shall carry out the integration with assistance of State/UTs.

**g)** Collection of ORI and extracted features from the third-party agency of Sol.

**h)** a. Conduct Quality assurance and Quality check (QA/QC) for verification and report to Sol with any discrepancy.

**i)** Constitution and coordinating of adequate number of teams for time bound completion of field survey including hiring/procuring of outsourced staff and vehicle and providing necessary training.

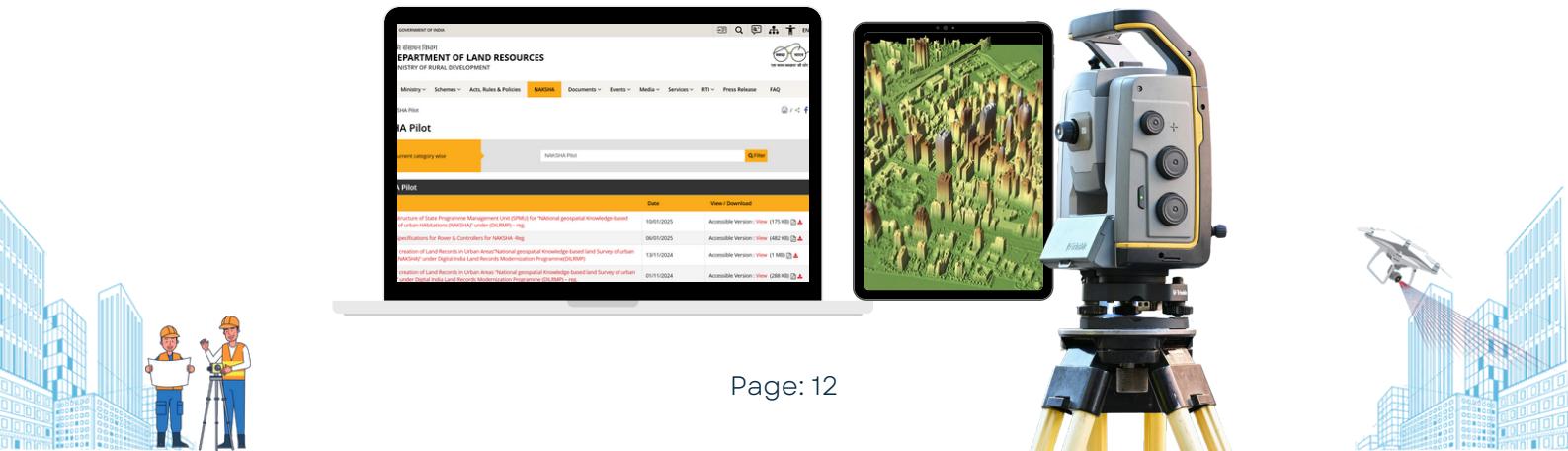
**j)** Procurement of survey instruments includes Rovers, Tablets/Mobiles, power back up and required software as per technical specification including RoR warranty, AMC cost etc. as per Govt. norms and procedures.

**k)** Report generation and final certification of every land parcel/ building/ plot shall be done by the designated officer of the State/UT at ULBs or SPMU level.

**l)** The State/UT nodal department would utilize the web GIS application developed by Madhya Pradesh Electronics Development Corporation (MPSEDC), Government of Madhya Pradesh for field survey and ground verification.

**m)** The State/UT would document the process followed and challenges faced in field survey activity, Web GIS application and ORIs data etc. and submit it to DoLR regularly for urgent resolution.

**n)** State should constitute a Supervisory Team at all the ULBs. The team may include District Commissioner or his representative, Municipal commissioner or his representative, District land records officer, and/or other officers as determined by State Level Committee (SLC)



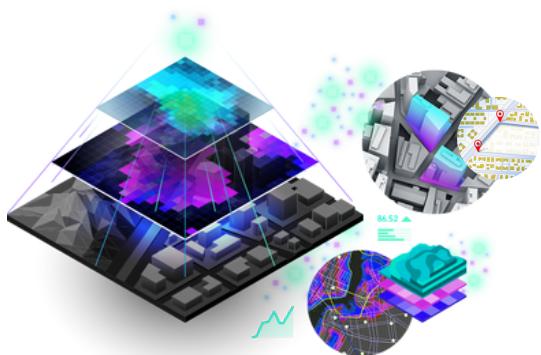
## **4.3 Survey of India and Third-party agencies**

- a)** The Survey of India (Sol) will hire the third-party agencies for the aerial survey and feature extraction, generation of Ortho Rectified Imagery (ORI) using three technologies i.e., 2D Nadir, 3D Oblique, 3D obliques + LiDAR and creation of 2D/ 3D virtual and reality model.
- b)** The Area of Interest (AoI) for aerial survey shall be jointly fixed by States/UTs Nodal Department, ULBs and the SPMU. Sol will assist technically in fixing the boundary of Towns/ULBs.
- c)** The Survey of India (Sol) through their Regional Offices and Geospatial Directorates will also ensure and certify the quality of ORIs, features extracted and GIS database delivered by third party agencies. The certified data would be handed over to the State/UT Nodal department, SPMU for field survey.
- d)** The delivered data by Sol may also be verified by the States/UTs Nodal department and SPMU level and if there is any mismatch or degradation of quality of data, the same shall be rectified by Sol through third-party agencies and resubmit the rectified data to concerned State/UT/SPMU.
- e)** Sol shall design the training and capacity building modules, videos, tutorials for field survey activities and use of aerial survey data for States/UTs.
- g)** Sol shall hand hold the third-party agencies, State /UT Nodal department, SPMU, MPSEDC in any technical challenge faced during aerial and field survey activities.

## **4.4 Madhya Pradesh State Electronic Development Corporation (MPSEDC)**

MPSEDC Ltd., is a Government of MP Undertaking. The MPSEDC shall develop a Web and Mobile GIS (Geographic Information System) application combining GIS data with modern web and mobile technologies. This application will provide users with tools to visualize, analyze, and interact with spatial information captured during the aerial and field survey on Web and mobile based platform with following responsibilities:

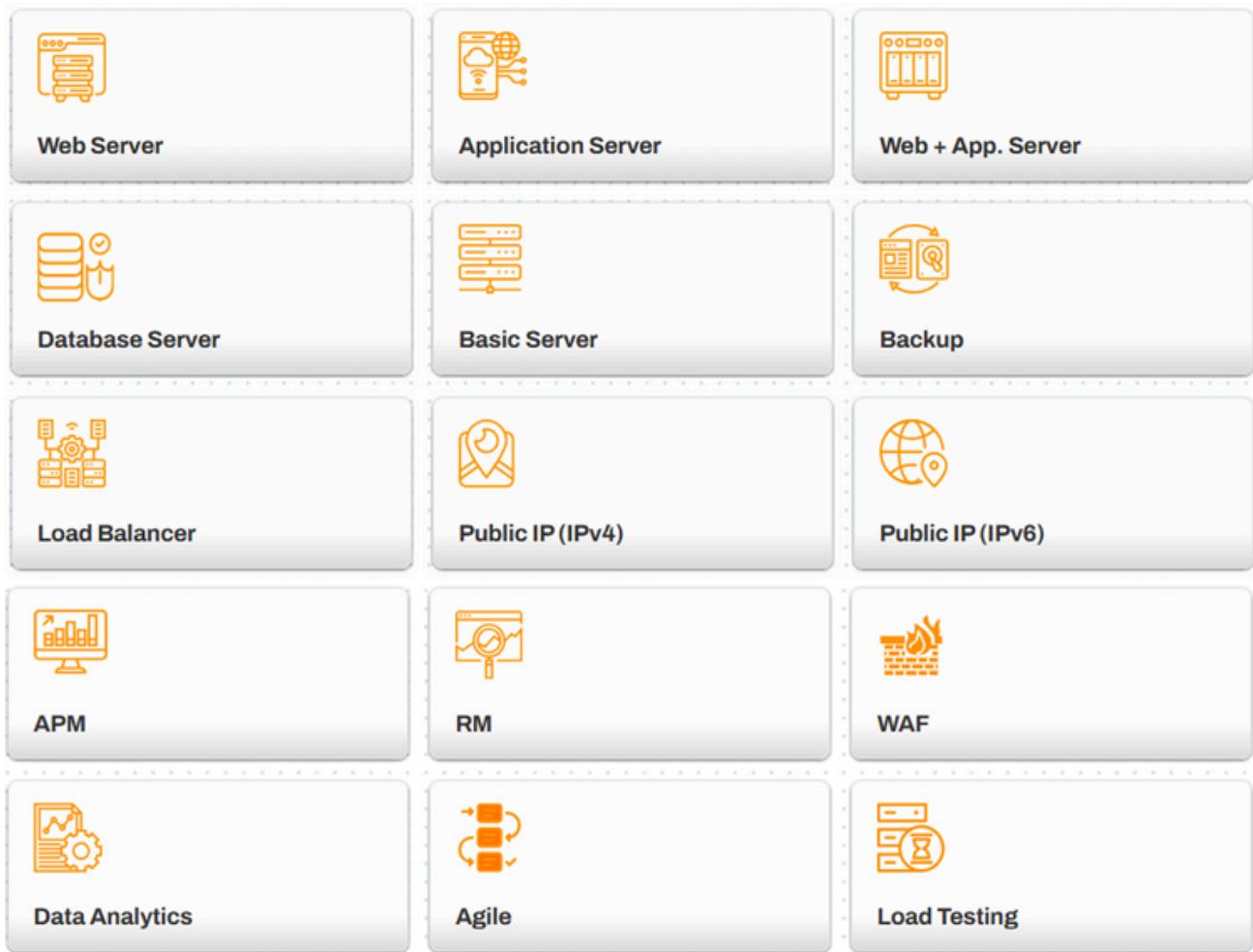
- a)** Customizing the Web-GIS application as per the existing system / requirement of all the State/UTs.
- b)** On-boarding the users into the Web-GIS system and User Role Management Integration (Web)
- c)** Assisting Survey of India (Sol) in uploading the ORI, feature extracted data base over the Web-GIS platform.
- d)** Upload data utility (Desktop)
- e)** Download and Data Sync Module (Mobile & Web)
- f)** Ground Truthing and Data Verification Module (Mobile & Web)
- g)** Merge/Split Module (Mobile & Web)
- h)** Record of Rights (RoR) Module (Mobile & Web)
- i)** Survey Data Publication Module (Web)
- j)** Final Publication and Record Update module
- k)** Dashboard for status monitoring
- l)** Imparting training to State agencies on use of NAKSHA GIS portal and operational manual onsite and offsite
- m)** Creation of user Manual and Videos
- n)** Hand Holding and post implementation support



## 4.5 National Informatic Centre Services Inc (NICSI)

National Informatics Centre Services Inc. (NICSI) was established as a company under National Informatics Centre, Ministry of Electronics & Information Technology, Government of India for providing and procuring IT solutions for multiple e-governance projects.

For NAKSHA, the NICSI is providing the cloud-based architecture, data storage, security and set up for maintaining and hosting the Web-GIS platform.



## 4.6 Centre of Excellence (CoE) & Administrative Training Institute (ATI)

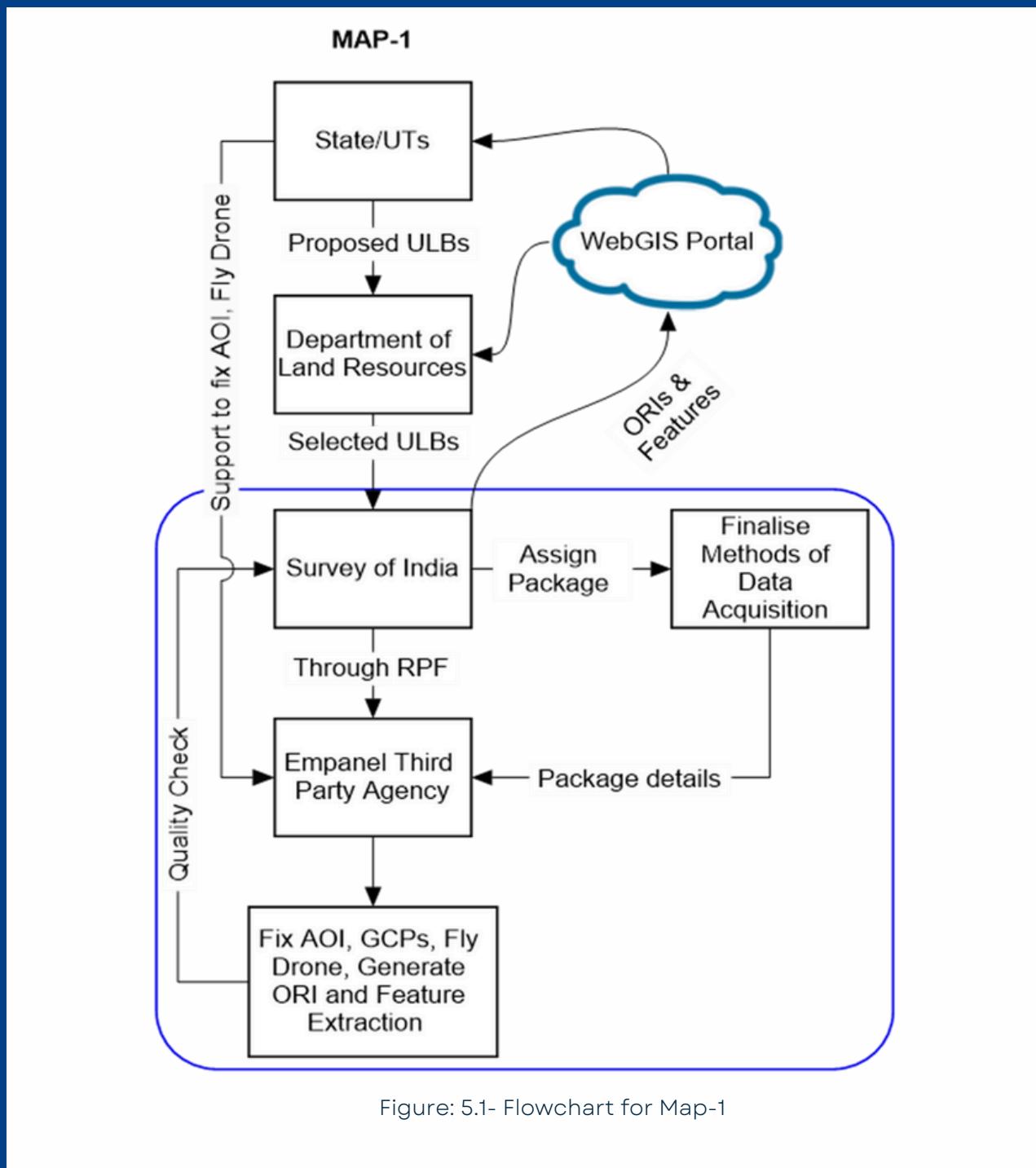
a) a. Providing necessary training and support to respective State/UTs for NAKSHA Programme and also for DILRMP programme, five Centre of Excellence (CoE) have been established. The list of COEs is as follows:

1. Centre for Rural Studies, Lal Bahadur Shastri National Academy of Administration (CRS-LBSNAA), Mussoorie,
2. Mahatma Gandhi State Institute of Public Administration (MGSIPA), Chandigarh,
3. Administrative Training Institute, Mysore,
4. Assam Survey and Settlement Training Institute, Guwahati, and
5. Yashwant Rao Chavan Academy for Development Administration (YASHADA) Pune

# 5. Activities involved in NAKSHA Programme



## 5.1 MAP-1 – Survey and Mapping including Feature Extraction



The one-year Pilot Programme NAKSHA would be implemented in 152 cities across the country with Survey of India (SoI) as a Technical Partner under Digital India Land Records Modernization Programme (DILRMP). It is also proposed that based on the learnings and outcomes of the pilot, a larger Programme covering all the cities and towns would be implemented across the country in a phase wise manner.

The cities where the pilot Programme NAKSHA would be carried out have been selected by the DoLR based on the proposals submitted by the States and UTs. From 26 States and 3 UTs for more than 220 ULBs were proposed for the pilot. After detailed consultation with concerned States/UTs, the DoLR shortlisted 152 ULBs for the pilot phase. Out of 152 ULBs, 128 ULBs have been sanctioned for Aerial Survey under NAKSHA Project and for others the ORIs are available with the State/UTs. The ULBs received from the States/UTs are based on the categories (a) A typical old city expanding horizontally, (b) A newly developed planned city with Peri-Urban areas, and (c) A city growing vertically at a rapid pace. Then selected ULBs details are shared to SoI.

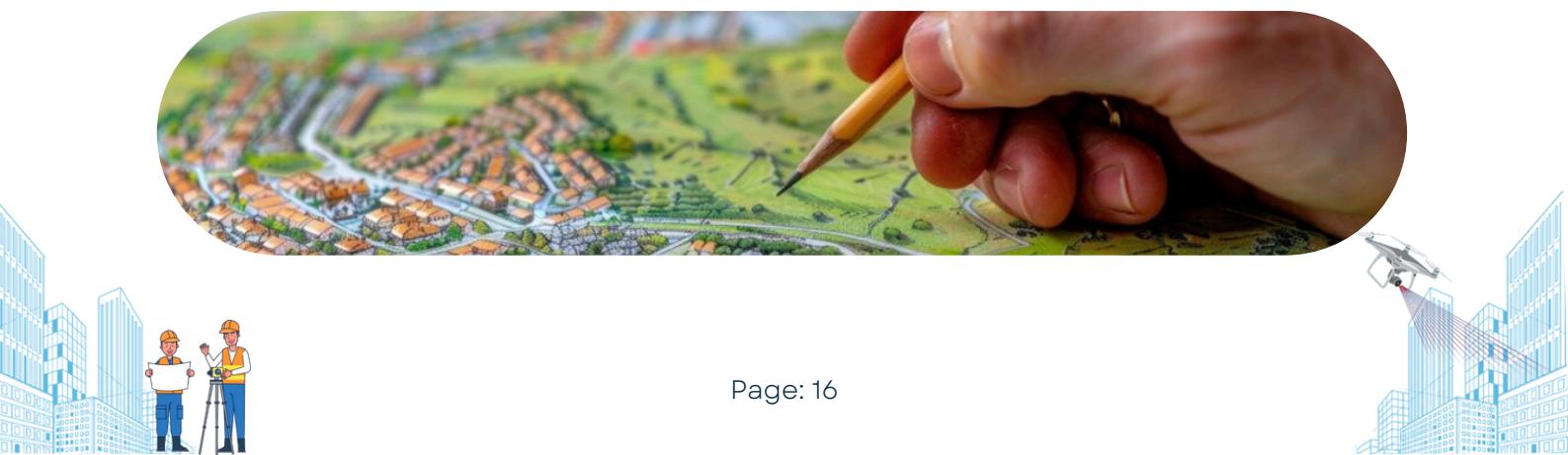
## 5.2 Survey of India (SoI)

The SoI is responsible for acquisition of high-resolution imagery, generation of Ortho Rectified Imagery (ORI) with the 5cm Ground Sample Distance (GSD), Digital Elevation Model (DEM) with both DSM and DTM, 3D reality Model, 2D/3D GIS dataset. The SoI is also responsible for the standardization of the process of data acquisition across the country by aircraft/drone survey with all three methods and sensors adopted for NAKSHA, image processing techniques and other salient features etc.

Based on three technologies being adopted, Survey of India has categorized the 128 ULBs into 17 packages. The Survey of India through RFP and bidding would select the third-party agencies to conduct the aerial survey followed by feature extraction based on technical, administrative and financial evaluation and the schema.

## 5.3 Third-Party Agency

- a)** Conducting aerial surveys using aerial platforms (manned/unmanned) with three technologies for data acquisition: Nadir Sensor, Oblique Angle Camera Sensor (1 Nadir + 4 Oblique Cameras) and Oblique Angle Camera + LiDAR Sensor as per the package awarded by SoI.
- b)** Processing and delivering accurate geospatial data such as orthorectified images, elevation models, 3D reality Model, 2D/3D GIS dataset and other visible topographical features.
- c)** Ensuring adherence to defined technical standards as fixed by Survey of India (SOI) and project timelines.



## 5.4 Methodologies adopted for Aerial Data Acquisition

### 5.4.1 Nadir (Vertically Oriented) Imaging:

Nadir imaging refers to capturing images directly downward sensors, perpendicular to the ground. The camera's optical axis is aligned vertically with respect to the earth's surface.

#### Characteristics:

- Provides a "top-down" view of the ground.
- Ensures minimal perspective distortion, making it ideal for orthoimage generation.
- Best suited for mapping flat terrain and capturing large areas efficiently.



#### Applications:

- Orthoimage generation for accurate mapping.
- Urban planning and cadastral surveys.
- Land use classification and land use change monitoring.

**Figure 5.2: Nadir Camera**

(Source: [www.phaseone.com](http://www.phaseone.com))

### 5.4.2 Oblique (Angled) Imaging:

Oblique imaging involves capturing images at an angle (typically between 30° to 60° from vertical) rather than straight down. These images provide a perspective view of features, including the sides of buildings and other vertical structures.

#### Characteristics:

- Provides a "top-down" view of the ground.
- Ensures minimal perspective distortion, making it ideal for orthoimage generation.
- Best suited for mapping flat terrain and capturing large areas efficiently.

#### Applications:

- Orthoimage generation for accurate mapping.
- Urban planning and cadastral surveys.
- Land use classification and land use change monitoring.



**Figure 5.3: oblique-camera**

(Source: [www.mavdrones.com](http://www.mavdrones.com))

## 5.4.3 Combined Oblique + LiDAR Systems:

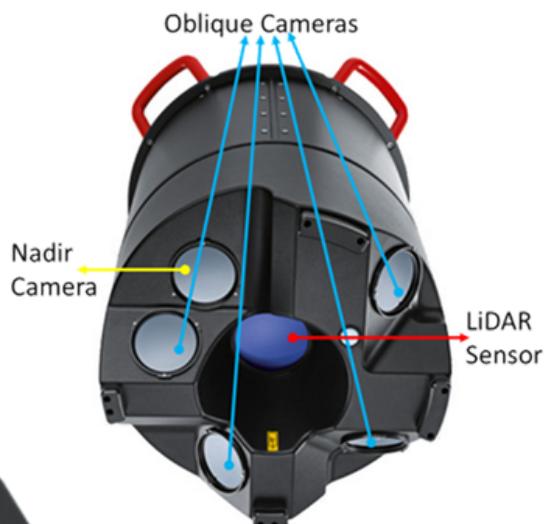
This system integrates oblique cameras with LiDAR (Light Detection and Ranging) sensors to capture both visual imagery and precise elevation data. LiDAR uses laser pulses to measure distances and generate high-resolution 3D point clouds.

### Characteristics:

- Provides both textural detail (from oblique imagery) and accurate elevation data (from LiDAR).
- Highly effective for mapping dense vegetation or rugged terrains where photographic imagery alone may not be sufficient.
- Enables the generation of Digital Surface Models (DSMs) and 3D models with enhanced accuracy.

### Applications:

- Detailed 3D city modelling and infrastructure planning.
- Disaster management, including landslide risk assessment and flood modelling.



**Figure 5.5: Combined Oblique + LiDAR Systems**

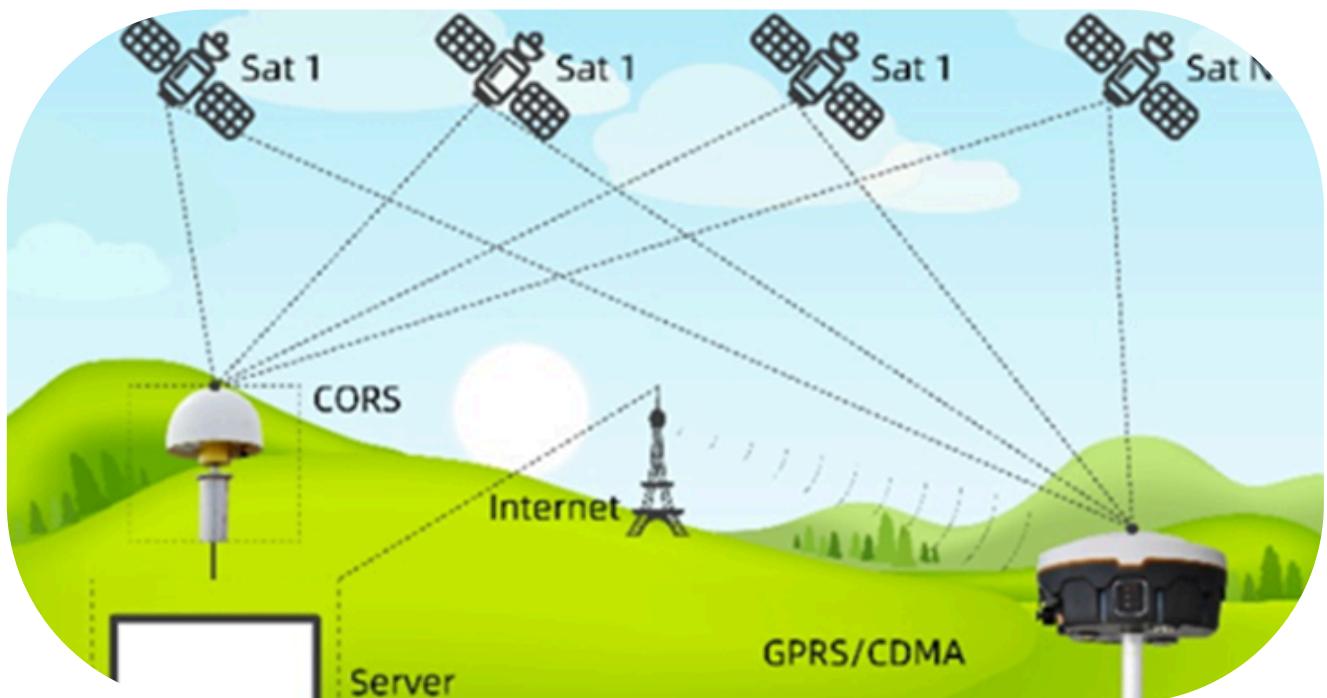
(Source: Leica CityMapper Airborne Hybrid Sensor)

Feature	Nadir Imaging	Oblique Imaging	Oblique + LiDAR Systems
<b>Orientation</b>	Vertical	Angled	Angled + Laser Scanning
<b>Coverage</b>	Top-down view	Side and angled views	Comprehensive (texture + elevation)
<b>Data Type</b>	2D imagery	2D imagery	2D imagery + 3D elevation (LiDAR)
<b>Applications</b>	Mapping, agriculture	3D modelling, visualization	Advanced 3D mapping, terrain analysis

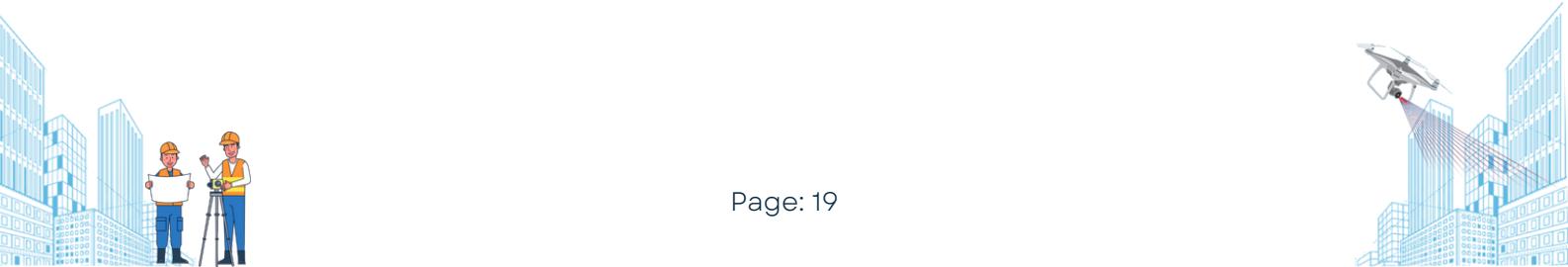


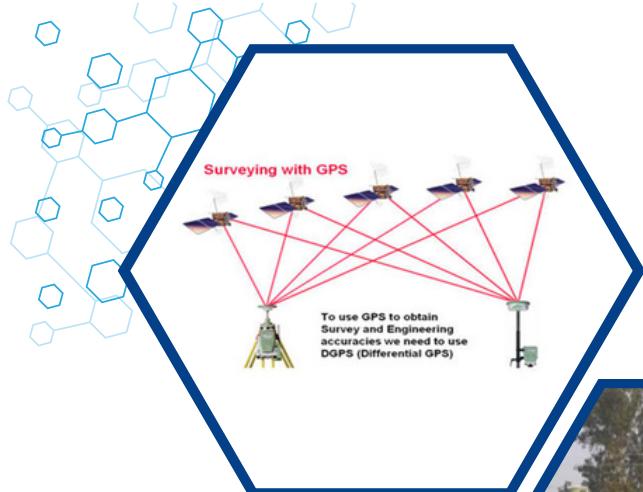
## 5.5 Fixing Area of Interest (AOI)

1. Initial shape file of the Area of Interest (AOI) shall be provided by the States/UTs to Sol and the same shall be shared with the third-party agencies
2. The Third-party agencies shall approach the States/UTs to fix the AOI
3. The Urban Local Bodies (ULBs) & State Project Management Units (SPMU) shall provide localized insights to refine the AOI, considering ground-level realities such as infrastructure, boundaries, or restricted zones and ensure AOI reflects the accurate on-ground conditions.
4. Use advanced geospatial tools and techniques (DGPS, GNSS Receivers, Continuously Operating Reference Stations (CORS, and GIS software) to define and refine the AOI.
5. Validate the AOI's feasibility based on survey technology and operational requirements. This collaborative approach ensures the AOI is accurate, practical, and fit for aerial surveying purposes.
6. The detailed work plan of aerial survey shall be submitted to Sol and States/UTs for approval by the third party agencies.
7. 25% of the peri-urban areas depending upon the built-up by the ULBs beyond the ULB shapefile may also be decided before aerial flying.



**Figure 5.6: Continuously Operating Reference Stations (CORS)**  
[Source: [en.harxon.com/about/news\\_detail/1222](http://en.harxon.com/about/news_detail/1222)]





**Figure 5.7: DGPS base / RTK Survey for Ground Control Points (GCP's)**  
 [Source: [prashantsurveys.com/dgps-base-rtk-survey-for-ground-control-points.php](http://prashantsurveys.com/dgps-base-rtk-survey-for-ground-control-points.php)]

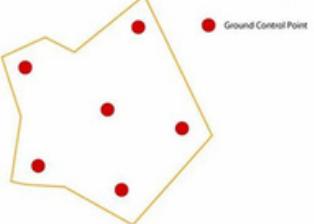
**Figure-5.8: DGPS Survey**  
 (Source: S.K Land Surveyors, Haryana)



**Figure-5.9: Marking GCP**  
 (Source: [dronitech.com](http://dronitech.com))



**Figure-5.10: A sample of DGPS GCPs in AOI**  
**DGPS Ground Control Point Survey Service**



**Figure-5.11: Final Area of Interest (AoI)**  
 (Source: DoLR – Arunachal Pradesh)



## 5.6 Fixing Flight Plan

The flight plan shall be prepared by the Sol's third party agency as per the following

- 1. Define Survey Parameters:** Set the Area of Interest (AOI) boundaries and altitude based on project requirements and terrain. Specify image resolution (e.g., 5 cm GSD) and overlaps (e.g., 70% - 80% forward, 60% - 70% side).
- 2. Assess Airspace Restrictions:** Verify legal compliance, restricted zones, and permissions from the Directorate General of Civil Aviation (DGCA).
- 3. Drone/Flight Path:** Use geospatial tools to create efficient flight paths with minimized gaps. Optimize coverage for data acquisition.
- 4. Validation:** Approve the plan through Sol, State/UTs, and local authorities. Account for weather and field conditions.

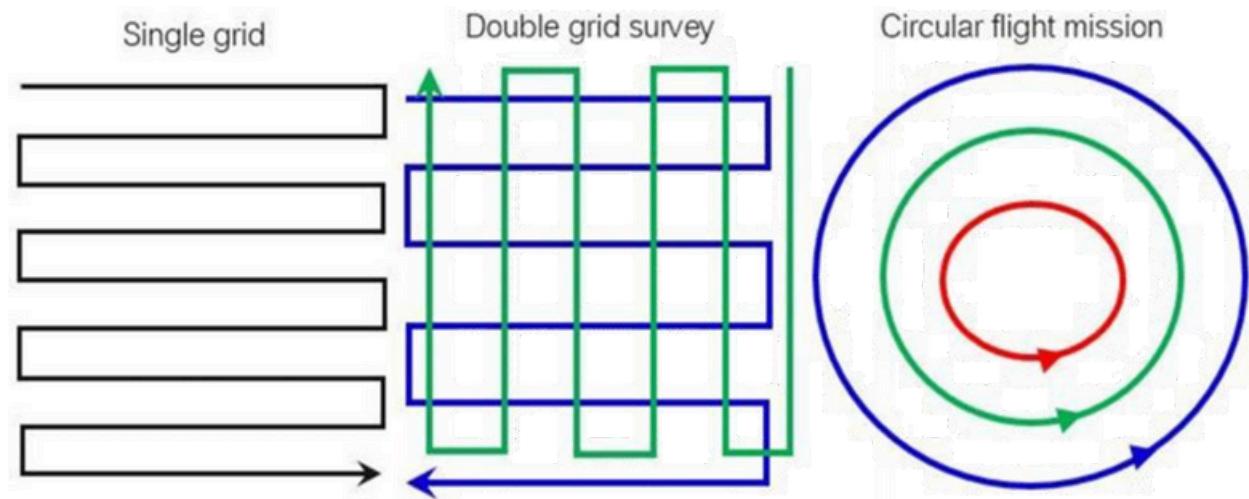
**Table 5.2: Task and Responsibility for flight plan**

Task	Responsibility
Prepare flight plan	Sol and third-party Agency
Initial approval	Survey of India (SOI)
Aviation clearance	Direktorate General of Civil Aviation (DGCA)
On-field approval	States/UTs & ULBs/District Administration

**Table 5.3: Sample overlaps for methodology during flight plan**

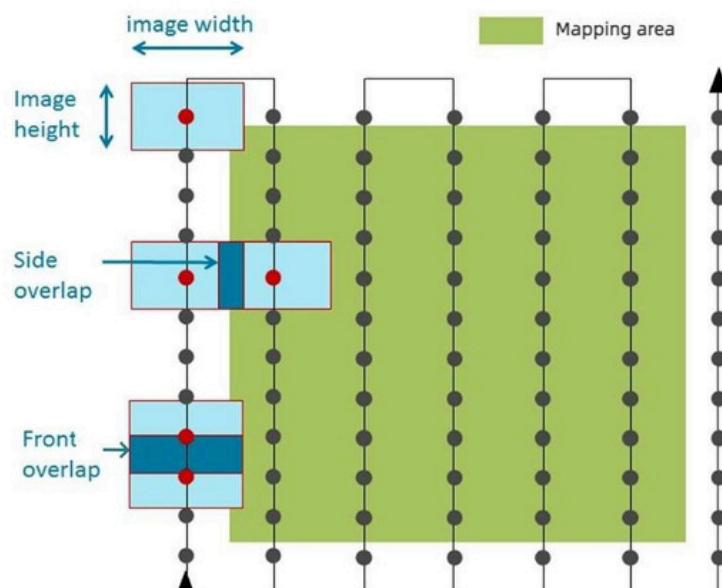
Methodology	Forward Overlap	Side Overlap	Key Parameter	Flying Pattern
Nadir Camera	70–90%	60–70%	High overlap, fixed altitude	Cross Grid
Oblique Cameras (4 + 1)	85–90%	70–80%	Multiple angles, higher altitude	Longitudinal (Single Grid)
Oblique + LiDAR	80–85%	60–70%	Dense point cloud, multi-pass for shadows	Longitudinal (Single Grid)





**Figure-5.12: Sample of Single, double and circular surveys designed flight paths in data acquisition.**

(Source: [www.researchgate.net](http://www.researchgate.net))



**Figure-5.13: Sample flight plan to understand side & front overlap to get Nadir images**

(Source: [www.jouav.com](http://www.jouav.com))

## 5.6.1 Rationale in flight plan:

- High overlap ensures the generation of distortion-free ortho-rectified imagery.
- Balance altitude based on GSD requirements (e.g., 5cm GSD).
- However, based on terrain condition, tall building, trees, power lines or windmills, the above conditions of overlaps, flights patterns may change



## 5.7 Ortho Rectified Imagery (ORI)

- a. Ortho Rectified Imagery is a geo-referenced image of the Earth's surface from top view.
- b. Raw aerial imagery cannot be used in GIS until processed by Photogrammetry technique to generate accurate georeferenced images, referred to as orthorectified images or orthoimages.
- c. Raw photos are from an inclined angle. ORIs are generated from Raw photos to build Images from the Top View.
- d. Any object's true shape and location can only be determined from ORI.

**RAW IMAGERY**

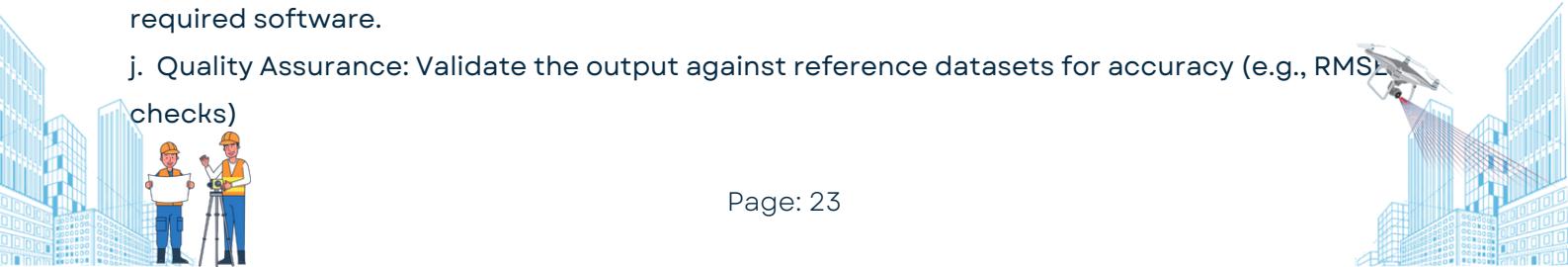


**ORI IMAGERY**



**Figure 5.14: Difference between raw image and orthorectified image (ORI)**

- e. ORI creation involves transforming raw aerial imagery into a geometrically corrected format that accurately represents the Earth's surface. This process removes distortions caused by camera tilt, terrain elevation, and sensor irregularities.
- f. ORI enables to have details of shadow area and corrects the distortion for correction of geo-location and measurements as in the raw images.
- g. Georeferencing: Involves Aligning imageries with geographic coordinates using GPS and Ground Control Points (GCPs).
- h. Digital Elevation Model (DEM) Integration: To adjust for terrain-induced distortions.
- i. Orthorectification Process involves application of mathematical models to correct image distortions by using specialized software like ERDAS IMAGINE, ArcGIS, or QGIS or any other required software.
- j. Quality Assurance: Validate the output against reference datasets for accuracy (e.g., RMS checks)



## **5.8 Quality Check**

Survey of India (Sol) to do quality check to ensure that their empaneled agency provide the ORIs/DEM<sub>s</sub>/3D Models as per the standards mentioned in the Request For Proposal.

### **5.8.1 Checking Quality of ORI**

- a. Checking the quality of orthorectified imagery is crucial to ensure its accuracy and usability for mapping, analysis, and other geospatial applications. Steps to evaluate the quality systematically:
  - b. Verify that the features (e.g., roads, buildings, rivers) align correctly with a trusted reference map or other high-accuracy datasets.
  - c. Look for visible seam lines, distortions, or artifacts that may indicate poor stitching or processing of ORI.
  - d. Check for uniformity in image brightness, contrast, and color balance across the entire dataset.
  - e. Compare control points from the imagery with ground control points (GCPs) from a reliable source, such as survey data or GPS measurements.
  - f. Measure the Root Mean Square Error (RMSE) to quantify positional accuracy. Ideally, the RMSE should be within the acceptable tolerance i.e. 2 cm (as per RFP)
  - g. Overlay the imagery on a known base layer (e.g., cadastral maps, GIS layers) and validate the alignment of features (buildings, roads) with the base layer.
  - h. Check if the Ground Sampling Distance (GSD) matches the project requirements i.e. 5 cm.
  - i. Verify details about the satellite or sensor that captured the imagery.
  - j. Evaluate the clarity of edges and features (e.g., roads, buildings) using zoomed-in views.
  - k. Test the imagery against scale-specific benchmarks to ensure the imagery meets required map scales for its intended use.
  - l. For tiled imagery, ensure seamless integration without misalignment or mismatched features at tile boundaries
  - m. Cross-check features on the imagery against field observations using check points (preferably pre-pointed) given by using Sol's CORS in Network Real Time Kinematic (NRTK) positioning mode for drone data validation.

### **5.8.2 Checking Quality of extracted features**

Compare the spatial location of extracted features i.e. Road, Building, Land parcel, 3D files with high-accuracy reference dataset.

- a. Ensure extracted features align with ORI
- b. Verify that attribute data (e.g., name, type, classification) matches the real-world characteristics of the feature.
- c. Ensure no missing or incorrect attribute values and validate attributes against predefined standards or schemas.



- d. Ensure that all the visible features like land parcels, building footprints, roads, water bodies etc. within the area of interest are extracted.
- e. Use overlays to identify missing features when compared to reference datasets
- f. Confirm all mandatory attributes are populated for each feature.
- g. Check for overlapping polygons, duplicate features, or gaps between polygons.
- h. Validate connectivity for line features (e.g., road or river networks).
- i. Ensure polygons are closed, lines are not self-intersecting, and points are not duplicated.
- j. Compare 3D points (X, Y, Z coordinates) with ground control points (GCPs) or a trusted reference dataset.
- k. Validate the relative height of features (e.g., buildings on terrain) against a Digital Elevation Model (DEM).
- l. Test the file in the intended software environment (e.g., QGIS, Blender, AutoCAD) to confirm usability.
- m. Render the vector file in 3D visualization software to identify anomalies like misplaced features, distorted geometries, or gaps.
- n. Verify that the point density (e.g., points per square meter) meets project specifications.
- o. Ensure uniform distribution of points across the area of interest; detect gaps or clustering.
- p. Ensure all areas of the target region are covered without omissions.
- q. Assess the accuracy of classified points (e.g., ground, vegetation, buildings, water, noise).
- r. Compare classified layers against reference datasets or manually inspect sections of the point cloud
- s. Ensure features are consistently classified across the dataset, with no misclassification (e.g., buildings classified as vegetation).
- t. Verify flight parameters such as altitude, speed, scan angle, and overlap meet specifications
- u. Confirm that metadata includes processing details (e.g., filtering methods, classification algorithms).

## **5.9 Deliverables by Third-Party Agencies to Sol**

- a. Refined AOI and buffer area in vector file (GIS OSC support format)
- b. Detailed Flight plan with overlap details used during Data acquisition (All output deliverables with Projection & Datum-UTM & WGS-84.)
- c. Digital True Ortho-imagery (R, G, B) or ORI of 5cm GSD or better in. GEOTIFF format.
- d. Digital Stereo Pair Images (R, G, B) of 5cm GSD or better in. GEOTIFF format.
- e. Horizontal Accuracy of Ground Control Points is to be 5cm RMSE or better and Check Points (duly processed) provided/used for Data Acquisition & Processing with descriptions and sketches.



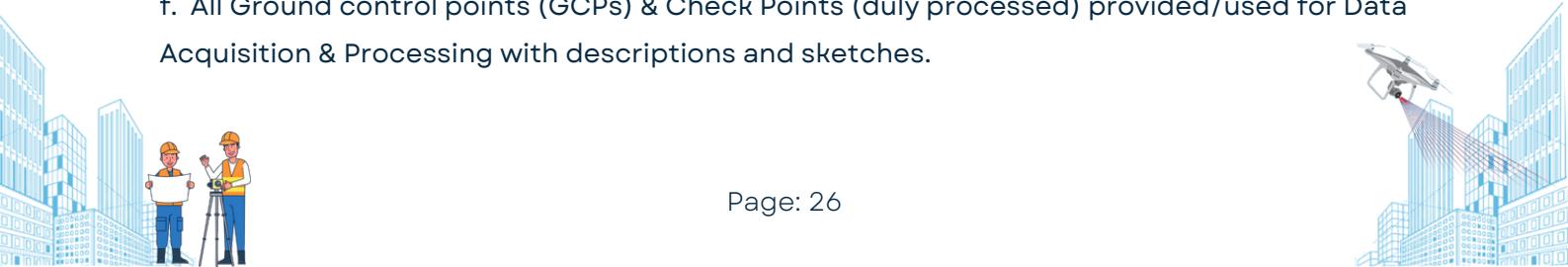
- f. DEM/DSM/DTM - Processed Digital Elevation data of 25cm vertical accuracy RMSE (for Indian vertical datum) at regular spacing of 0.50 meter in GEOTIFF and ASCII format.
- g. Raw data captured by various sensors and instruments including camera calibration certificate, .CAM files etc.
- h. All topographical 2D layers and vector layers including all buildings and public utilities, etc to generate 2D Property layer based on topographical markers in shape file format as well as in open format for geospatial information such as geo package etc.
- i. City/Town Level of Detail (LoD)-2 detailing is to be realized for creating 3D city mesh & 3D vector Model. For each building or structure, the geometrically simplified external structure should be depicted through horizontal or vertical outer surfaces with vertical distribution of space (i.e. floors), along with simplified roof structures and permanent rooftop structure, based on topographical markers. This shall apply to buildings and other structures such as Roads, Bridges, Flyover, Tunnels, Railways, Mono, Metro Street lights, Traffic signals, Water bodies, Trees, Landscapes, Open spaces, Airports, Gardens, Slum and all other features having height with reference to Aerial data complying with LoD-2 specifications. All topographical 3D vector layers including all buildings and public utilities, etc. to generate 3D Property layers based on topographical markers in open file formats such as City GML format etc.
- j. LiDAR data Processed DEM/DSM/DTM, 3D textured model/ 3D realty Model; and Generation of 3D GIS Dataset through feature extraction including all buildings and public utilities, etc. to generate 3D Property layer based on topographical markers. 3D urban data models should be delivered in LAS, LAZ, .OBJ, FBX, or .3DS format. All softcopy deliverables and raw data will be delivered to SOI.
- k. All salient reports generated including Survey report, Flight Plans, Photo-index, Aerial Flying Reports, AT (Aerial Triangulation) report, Block file, generation of 3D mesh model, QA/QC reports (QCRs), etc.

## **5.10 Deliverables by Survey of India to States/UTs**

### **5.10.1 TECHNOLOGY-1**

#### **Aerial (manned/ unmanned) Data Acquisition using Nadir Camera**

- a. Digital True Ortho-imagery (R, G, B) or ORI of 5cm GSD or better in GEOTIFF format.
- b. Digital Stereo Pair Images (R, G, B) of 5cm GSD or better in. GEOTIFF format.
- c. Horizontal Accuracy of all output deliverables is to be 10 cm RMSE or better.
- d. Horizontal Accuracy of Ground Control points is to be 5 cm RMSE or better.
- e. Processed Digital Elevation Model (Bare Earth) data of 25cm vertical accuracy
- f. All Ground control points (GCPs) & Check Points (duly processed) provided/used for Data Acquisition & Processing with descriptions and sketches.



- g. Processed Digital Surface Model (DSM).
- h. All topographical 2D (using a. ORI and b. digital stereo images) vector layers including all buildings and public utilities, etc. to generate 2D Property layer (using a. ORI and b. digital stereo images) based on topographical markers in shape file format as well as in open format for geospatial information such as geo package etc.

## 5.10.2 TECHNOLOGY-2

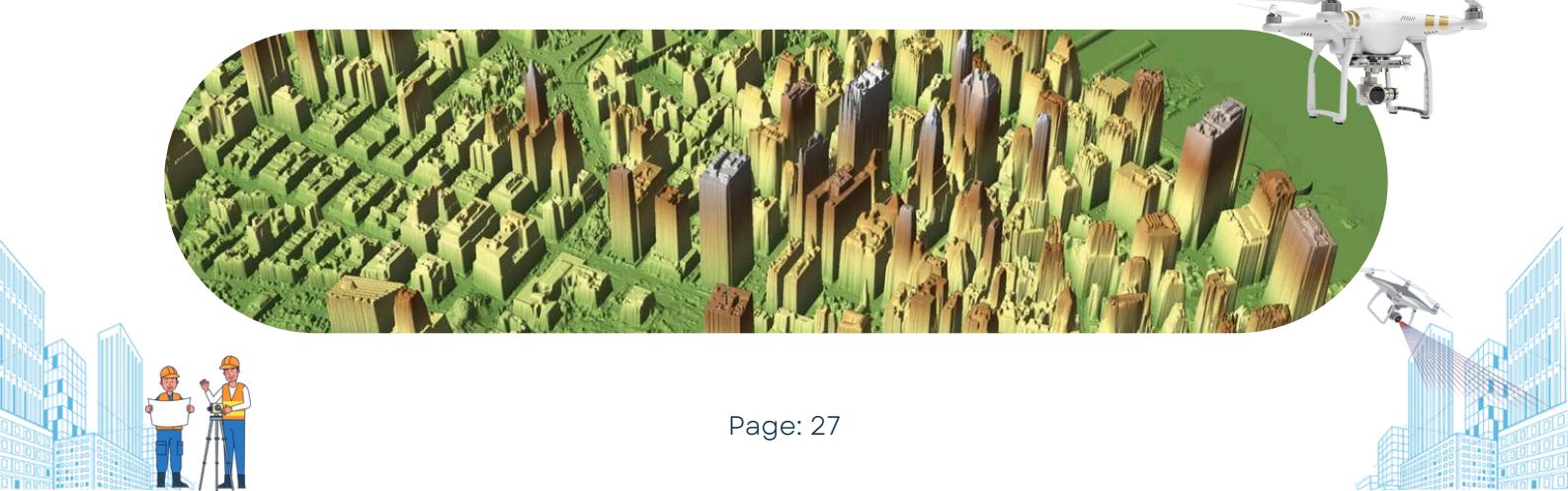
### **Aerial (manned/ unmanned) Data Acquisition using Oblique Angle (1 Nadir + 4 Oblique)**

- a. All deliverables mentioned in TECHNOLOGY-1 for Nadir (5.10.1. a to h)
- b. City/Town Level of Detail (LoD)-2 - For each building or structure, the geometrically simplified external structure should be depicted through horizontal or vertical outer surfaces with vertical distribution of space (i.e. floors), along with simplified roof structures and permanent rooftop structure, based on topographical markers. This shall apply to buildings and other structures such as Roads, Bridges, Flyover, Tunnels, Railways, Mono, Metro Street lights, Traffic signals, Water bodies, Trees, Landscapes, Open spaces, Airports, Gardens, Slum and all other features having height with reference to Aerial data complying with LoD-2 specifications.
- c. All topographical 3D vector layers including all buildings and public utilities, etc to generate 3D Property layers based on topographical markers in open file formats such as City GML format etc.

## 5.10.3 Technology-3

### **Aerial (manned/ unmanned) Data Acquisition using Oblique Angle (1 Nadir + 4 Oblique) Camera and LiDAR.**

- a. All deliverables mentioned in TECHNOLOGY-1 for Nadir (5.10.1 a to h) and TECHNOLOGY - 2 for Oblique (5.10.2. b to c)
- b. LiDAR Data Processed Digital Elevation data of 25 cm or 20 cm vertical accuracy RMSE (for Indian vertical datum) at regular spacing of 0.5 meter- called DEM in GEOTIFF and ASCII format.
- c. LiDAR data Processed Digital Elevation data (Bare Earth Model) of 25 cm or 20 cm vertical accuracy RMSE (for Indian vertical datum) at regular spacing of 0.5 meter- called DTM in GEOTIFF and ASCII format.



## **5.11 Training**

- a. The selected bidders will provide training to the State/ULB teams (on how to use and interpret the delivered data and models, along with a formal handover of all project materials)
- b. State/UT must ensure the participation of designated officers in the training to be provided by selected bidders.

### **5.11.1 Post-Delivery Support:**

- a. The selected bidders/service provider will provide technical hand holding support to the State/ City ground truthing team.
- b. If any issue is noticed in data quality, it must be communicated to SOI by the concerned State/ULB

### **5.11.2 Quality Assurance:**

The Sol shall review and certify the quality of all the processed data to ensure accuracy and consistency.

### **5.11.3 Data Sharing and dissemination:**

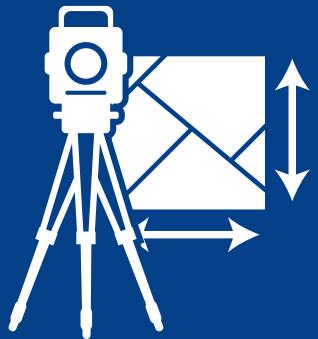
The Sol shall upload all the approved data (ORIs and extracted features) to the Web-GIS portal developed by MPSEDC. The same data shall be disseminated to relevant stakeholders including Revenue/Urban Development/Local Self Government Departments, ULBs, and other relevant departments of concerned States/UTs by providing login access at the WebGIS platform.

### **5.11.4 Validation:**

Validate findings with reference to ground truth data will be final and the same will be updated and approved.



# 6. MAP-2:Field Survey and Ground Truthing



## 6.1 Field Survey of Land Parcel

The field survey of land parcels/property boundary and cadastral information in urban and peri-urban areas is crucial for ensuring legal clarity, effective governance and sustainable development. It plays a key role in resolving ownership disputes and updating land records. In a country with outdated records, fragmented landholding and complex inheritance systems, field surveys provide the foundation for digital transformation, sustainable growth and efficient land use. Conducting a field survey of a land parcel involves systematic steps to gather accurate data about the land's location, size, shape, boundaries and features. The input for Map 2 i.e. Field Survey and Ground Truthing is an output of Map-1. In Map-1, Boundary layers are to be extracted based on topographical markers. Where aerial data acquisition is not being done under NAKSHA project, the already available data (ORIs) with respective states will act as input for Map -2. In Map -2, these layers will be ground validated and field survey will be conducted for ascertaining land parcel/property boundaries along with attribute data collection related to Cadastral information.

- a. In most cases the property parcel/boundary will follow a topographical feature like boundary wall, fences, common junctions of adjacent buildings, hedges, bunds, etc. Such features will be visible in the hard/ soft copy of Map/ORI generated as the output of MAP-1. The same can be confirmed on the ground by field survey team and traced as part of land parcel/property boundary layer.
- b. Some portion of the land-parcel/ property boundary will not be visible in the Map/ORI taken as input for Field Survey i.e. Map-2. These missing boundary vertices/portions will be surveyed on the ground using precise instruments like GNSS Receivers (also known as GNSS Rovers), Electronic Total Station integrated with GNSS, Laser Range Finder, etc. depending on the site conditions and availability of the instruments with States/UTs.
- c. All field survey activities can be carried out by using field devices like survey grade (i) GNSS Receivers (also known as GNSS Rovers) in NRTK/Static Mode integrated with/without field data collector connected to Central Database through an enterprise GIS Server in online/offline mode, (ii) ETS GNSS etc. depending on the terrain conditions and availability of the instruments with States/UTs.
- d. All field survey activities can be carried out by using GNSS Rovers, Real-Time Kinematic (RTK) positioning GPS, Electronic Total Station (ETS) etc. depending on the terrain conditions and availability of the instruments with States/UTs.



## **6.2 Global Navigation Satellite System (GNSS) Rovers**

a. GNSS Receivers (also known as GNSS Rovers) are devices that use the Global Navigation Satellite System (GNSS) to determine precise geographic locations on Earth. These are widely used in surveying & mapping, agriculture, construction, and other applications requiring high-accuracy positioning. GNSS rovers receive signals from multiple satellites in constellations like GPS (USA), GLONASS (Russia), Galileo (Europe), and BeiDou (China). These satellites transmit signals with information about their location and the time the signal was sent. By receiving signals from at least four satellites, the rover calculates its position using a process called triangulation. The distance to each satellite is measured based on the time it takes for receiving the signal to the rover.

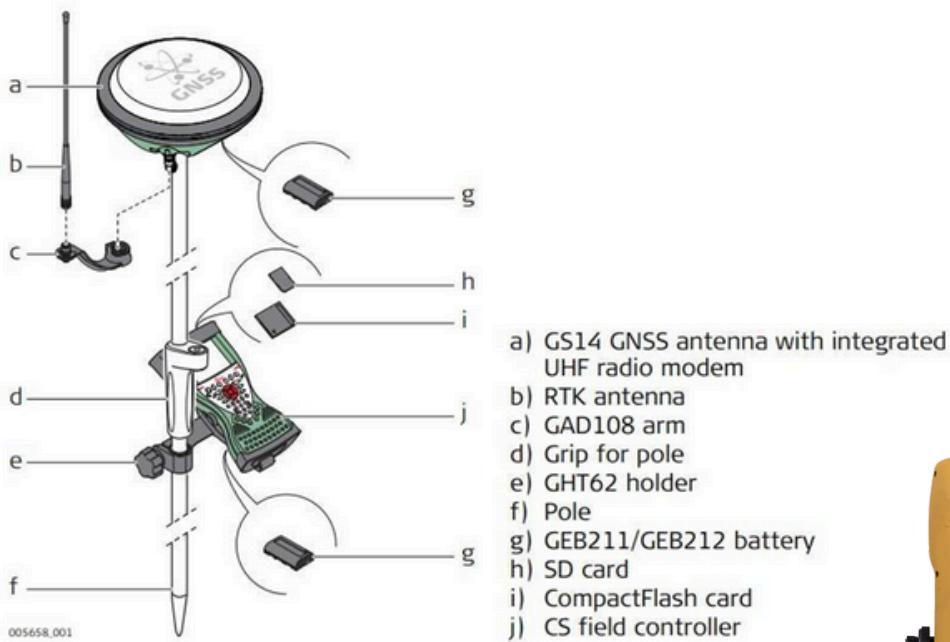
b. In standalone mode, the coordinates obtained from GNSS observations are burdened with many errors like Satellite Clock and orbit error, Ionospheric delay and Tropospheric delay, Receiver Noise, Multipath and Receiver Clock error. Due to the above errors the coordinates obtained are inaccurate and need to be corrected before use. To minimize the effect of these errors, the GNSS data of observation points needs to be processed with reference to some known reference stations whose coordinates are accurately known to us. The reference stations are of two types which includes CORS Network established by SOI (Active Network of Reference Stations) and SOI's GCPs (Passive Network of Reference Stations)

c. The positioning obtained from the GNSS receiver collects satellite signals and receives the correction data from the reference station in real-time through a communication link. By applying these corrections to its raw GNSS measurements, the rover achieves centimeter-level positional accuracy.

### **6.2.1 Key Component of GNSS Rovers**

At its core is the GNSS Receiver, which processes signals from multiple satellite constellations (e.g., GPS, GLONASS, Galileo, BeiDou) to determine the Receivers (also known as GNSS Rovers)'s location. This is paired with a high-performance antenna that ensures clear and reliable signal reception, even in challenging environments like urban areas or dense forests. A data collector acts as the interface, storing and processing positional information and often running software for real-time mapping and analysis. To achieve high accuracy, GNSS Receivers (also known as GNSS Rovers) also feature a communication module, which connects to CORS correction services via radio or cellular networks, enabling techniques like Network Real-Time Kinematic (NRTK) for centimeter-level precision. Additionally, these systems are ruggedized for durability, with weather-resistant casings and ergonomic designs for fieldwork. Together, these components enable GNSS Receivers (also known as GNSS Rovers) to deliver reliable, precise, and efficient solutions for a wide range of applications





**Figure 6.1: GNSS Rover and its components**

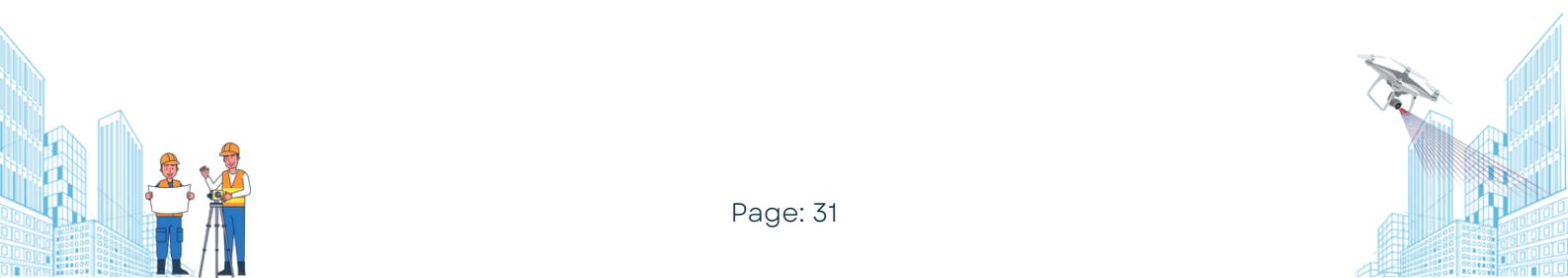


## 6.3 Real-Time Kinematic (RTK) positioning GPS

Real-Time Kinematic (RTK) GPS is a high-precision positioning system that enhances the accuracy of standard GPS signals by using carrier-phase measurements and corrections from a reference station. It consists of a reference station and a rover unit. In reference station, a stationary GPS receiver at a known location, continuously monitors satellite signals and calculates correction data by comparing its actual position to the satellite-provided position. The rover unit, which is a mobile GPS receiver, collects satellite signals and receives the correction data from the reference station in real-time through a communication link. By applying these corrections to its raw GPS measurements, the rover achieves centimeter-level positional accuracy.

## 6.4 Electronic Total Station (ETS) GNSS

Electronic Total Station (ETS) GNSS combines the functionalities of a traditional Electronic Total Station (ETS) and Global Navigation Satellite System (GNSS) to deliver enhanced precision and versatility in surveying and geospatial applications. An ETS measures angles (both horizontal and vertical) and distances using laser or infrared technology, while GNSS provides accurate positional data by receiving signals from satellites. Integrating these systems enables surveyors to conduct precise measurements over long distances, even in challenging terrains where one system alone might be insufficient.



## **6.5 Field Data Collector (FDC) with a Web GIS software for Field Survey**

A Field Data Collector refers to a device or system optimized for collecting and recording GIS data in the field, meaning outside of a laboratory or office setting. Typically, FDC is a rugged tablet that works with GNSS Receivers (also known as GNSS Rovers) / ETS, allowing surveyors to view and visualize ORIs and collect/extract features (including boundary points) in the field. Also, it can be linked with GNSS Receivers (also known as GNSS Rovers) for feature extraction and updation of land parcels. It also enables collection and linking of attribute data in the field. For end-to-end digital work flow, these field devices are connected to a central database through an enterprise GIS Server to enable transmission of field data to the central database server. In order to achieve field survey accuracies required for the NAKSHA Project through measurements, the FDCs should be integrated with CORS Network through a survey grade GNSS Receiver.

## **6.6 Distance-Distance measurement Laser Range Finder**

A Distance-Distance Measurement Laser Range Finder is a specialized tool used to measure the distance between two points using laser technology. In Land Surveys, it can be used to measure distances between various points, such as corners of a property, slopes, and terrain features. The measurement of a point which is not visible on ORI by occupying at least two well identifiable points that can be related between ORI and Ground and measuring the distance from these points to the missing vertex on the property boundary. The exact position of the above-mentioned vertex can be marked in the GIS environment using tools for distance-distance arc intersection.

## **6.7 Reference Stations**

The coordinates obtained from GPS/GNSS observations are burdened with many errors like Satellite Clock and orbit error, Ionospheric delay and Tropospheric delay, Receiver Noise, Multipath and Receiver Clock error. Due to the above errors the coordinates obtained are inaccurate and need to be corrected before use. To minimize the effect of these errors the GPS/GNSS data of observation points needs to be processed with reference to some known reference stations whose coordinates are accurately known to us. The reference stations are of two types which includes CORS Network established by SOI (Figure 6.1.2) GCPs (Passive Network of Reference Stations).

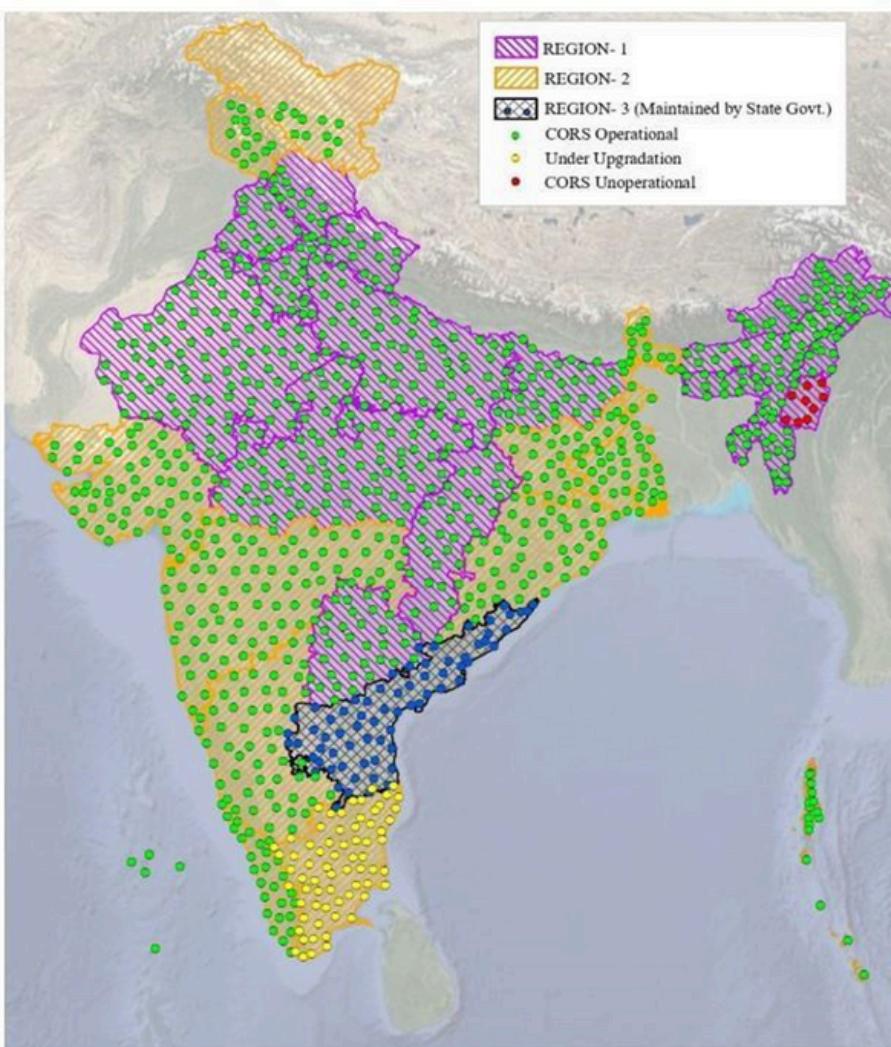


## 6.8 Continuously Operating Reference Stations (CORS)

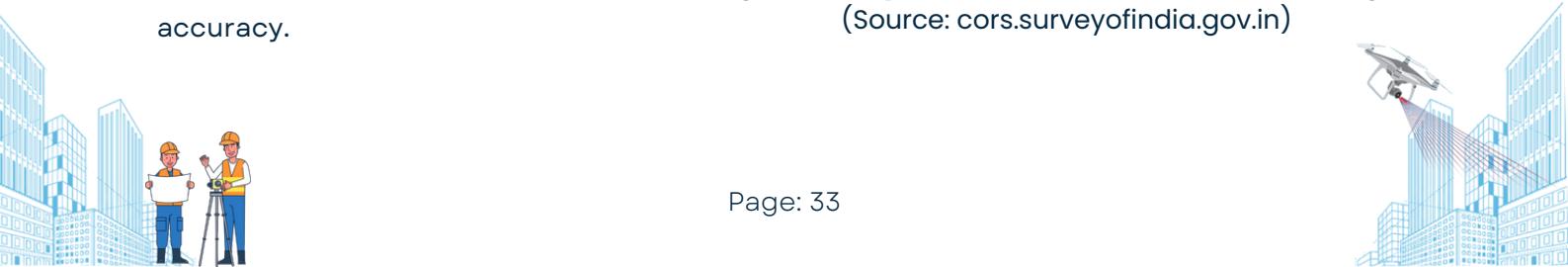


Survey of India has established Continuously Operating Reference System across India as a part of India's National Geodetic Reference Frame. In total, SOI has established 1047 permanent CORS reference stations and is under active consideration of densifying the same. Also, as per the requirement of CORS densification under NAKSHA, SOI is actively engaged with DoLR, GoI for densification of CORS network in (Temporary and Permanent stations) Towns/ULBs. CORS is a real time positioning service for accurate GNSS observations by general public. CORS services enables user to get the position data with 3-5 mins of observation with an accuracy of 2-3 cm. Earlier, to get an accurate position of a point, SOI's Ground control points were used and it took almost 2-3 days to get the precise location of a point. CORS is a system of interconnected, permanent GNSS (Global Navigation Satellite System) base stations that provide high-

precision positioning data to users in real-time or post-processed modes. Each reference station in the network is equipped with a high-precision GNSS receiver and antenna, continuously collecting satellite signals from constellations such as GPS, GLONASS, Galileo, or BeiDou. The data is processed to generate corrections that compensate for errors caused by atmospheric interference, satellite orbit inaccuracies, and clock deviations. The network computers and distributes correction data to rover units (GNSS Rovers) via the internet, radio, or cellular networks. Users connect to the network through specialized software or hardware and receive these corrections to enhance their positional accuracy.



**Figure-6.2: Spatial distribution of CORS network grid**  
(Source: [cors.surveyofindia.gov.in](http://cors.surveyofindia.gov.in))





**Figure-6.3: CORS station of Survey of India**  
(Source: cors.surveyofindia.gov.in)

## 6.9 Survey of India Ground Control Points

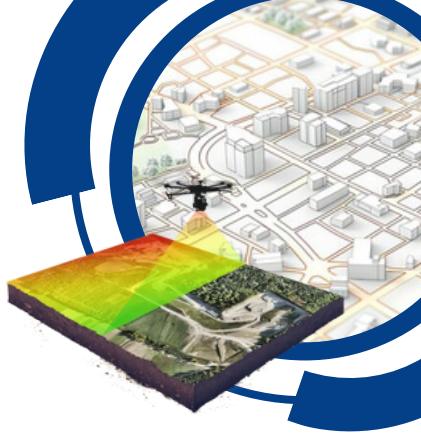
SOI GCPs also known as Passive Network of Reference Stations, are a network of established geodetic reference points used in India for high-precision surveys, mapping, and geospatial applications. These Ground Control Points (GCPs) are fixed physical locations with accurately determined coordinates (latitude, longitude, and elevation), typically obtained through precise geodetic measurements. These GCPs have cement concrete structure/Monumentation and can be located on the ground by their description which is available with SOI. The SOI has established a Ground Control Point (GCP) Library of about 2500 Ground Control Points in the entire country. These GCPs define the Horizontal datum of the country and can be used for various surveying, mapping and developmental activities.

## 6.10 Team constitution

The team constitution for a land parcel survey typically involves a combination of skilled professionals who work together to ensure accurate data collection, analysis, and reporting. The state can choose any number of team within the budget allocation for each ULB, but the core team members generally include the following:

1. One Permanent staff (equivalent to Patwari/Talati) from the State Revenue Department.
2. One Permanent staff (equivalent to Patwari/Talati/Inspector) from the State Urban Department.

3. One Department surveyor/hired surveyor for doing ETS survey
4. One helper to assist the surveyor
5. One vehicle with driver

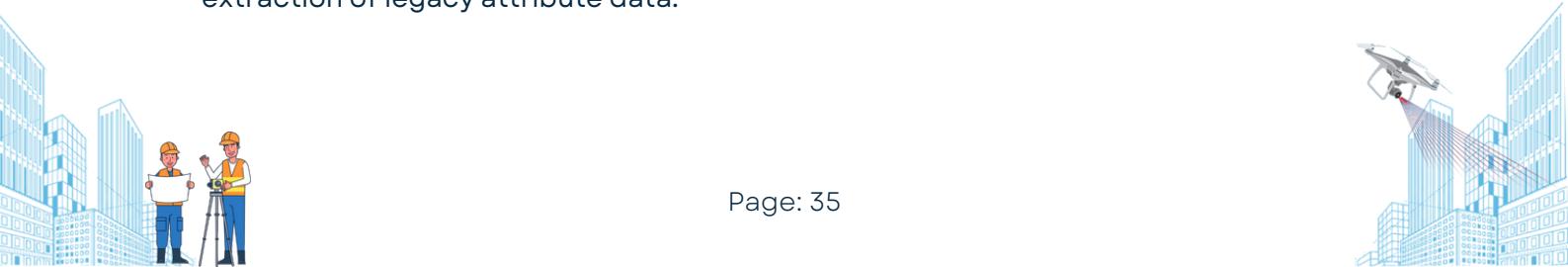


## 6.11 Public meeting

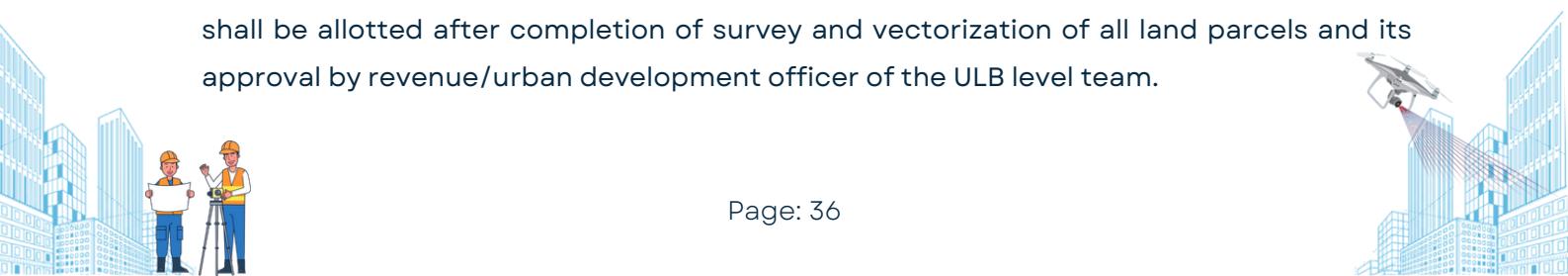
1. Public awareness during field survey is an essential step in the land surveying process, especially when the land parcel has implications for public interest, urban development, infrastructure, or land rights. Public meetings serve as a platform for stakeholders—such as landowners, government representatives, urban planners, and the general public—to discuss and review the proposed survey, boundaries, and any issues related to land use or ownership. The goal of a public meeting is to ensure transparency, gather feedback, address concerns, and align the survey process with legal and community requirements.
2. Public meetings should be advertised in advance through newspapers, community bulletins, official government websites, and direct communication with affected parties.
3. Notifications should include details such as the time, location, purpose, and agenda of the meeting.
4. During public meetings state level officer(s) must present an overview of the land survey project and its importance and survey methods.
5. Land holders should be requested at the meeting to clear the boundaries of their properties and place survey marks before reaching the surveyor for field demarcation work.
6. State level officer(s) must address any concerns raised by the attendees, offering clarifications or explanations about the survey and its impact.
7. Officer(s) must maintain official records of the meeting, including minutes, questions raised, and responses provided and notes any issues, suggestions, or concerns raised by the public for further consideration.
8. Ensure that the survey complies with local government policies and that all stakeholders are informed of the legal implications.

## 6.12 Field survey

- Before starting the field survey, the field survey team must collect the legal documents, existing maps, cadastral records, property tax details from the revenue/urban department of concerned ULBs. If state has online system (Web-GIS) for city survey, the API may be shared with Madhya Pradesh State Electronics Development Corporation (MPSEDC) GIS Platform [a](#)for its seamless integration.
- Wherever available, the cadastral plots, layout plans, etc., should be georeferenced for extraction of legacy attribute data.



- The team must carry the ORIs and extracted features received from SOI both in hard and soft copy, preferably in FDC with Web GIS Field Software enabled with NRTK receiver. In case it is not available, survey grade NRTK enabled GNSS Rovers along with rugged laptops with GIS software and internet connectivity may be used for plotting the position of surveyed boundary points and digitizing the property boundary in the field
- The survey team should use the Web GIS application of MPSEDC for field survey work.
- The Web GIS platform enables surveyors to view the a.ORIs and extracted features. It can also be linked with GNSS rovers for feature extraction and updation of land parcels.
- Survey team goes to the field with the sketch and marks the boundaries of existing holdings.
- Identify and document boundary markers or any physical landmarks on the ground.
- If the boundaries of any of the fields were not demarcated by the land holders, the boundaries of those fields must be demarcated by the surveyor and helper in the presence of the land owners.
- During demarcation of each holding, the surveyor will gather the name of registered holders of the plot, its classification, revenue number, etc. as per the latest revenue records and as per the present enjoyment, for writing up the land register and online.
- For each land parcel survey team needs to collect information mentioned in the Urban Property Card format given in para 7.5
- When there are bunds or hedges between holdings, the center of these will as a rule, be considered to be the true boundary, unless there is evidence to the contrary.
- Survey team need to take the front view photographs of the building/parcel using a fairly high-resolution camera and ensure that it is geotagged.
- Once all the boundaries of the land parcel are identified and confirmed by the land owner, the team can proceed for the GNSS Rover survey, as required.
- Wherever distinguishing features of a property/land parcel appears on ORI, shall be vectorized with reference to such features.
- Wherever property/land parcel boundaries are unable to be demarcated on the ORI, those shall be measured on ground with DGPS/CORS rovers.
- Wherever the satellite signal is poor and its not possible to collect the data with rover due to the dense structures, narrow roads, canopy areas, HT lines etc., the coordinate data shall be collected through ETS or measurements shall be taken up by tape and converted into coordinate data.
- The vectorization of land/property parcel boundaries shall be drawn with a combination of above said data in GIS software.
- During the Ground Truthing all land parcels including those belonging to the government shall be denoted with a temporary number. Property ID/City survey number shall be allotted after completion of survey and vectorization of all land parcels and its approval by revenue/urban development officer of the ULB level team.



## **6.13 Field Survey: Salient Instructions**

1. Survey team goes to the field with the ORI map and identifies as well as documents boundary markers or any physical landmarks on the ground and same should be correlated with ORI map.
2. Ground team to visit each plot or land parcel to verify urban land boundaries. Boundary points are to be noted by the ground truthing team using GNSS Rover, in presence of land owners, and neighbors. Field survey team to also ground validate the features extracted from the ORI such as utilities, buildings etc.
3. Collection of the plot details available with the survey team shall be tallied with the details contained in the attribute documents available with the land holders, which could include Record of Right, Sale Deed, Lease Deed, Gift Deed, Relinquishment Deed, Settlement Deed, Occupancy Certificate, Deed of Partition, Lay out Plan, Property Tax Receipt, Building Sanction Plan, Will, General Power of Attorney (GPA), Agreement to Sell (ATS), Utility Bills, Mutation Certificate, presented by the land holder in ownership possession of the plot/land parcel.

## **6.14 Field Survey Methodologies**

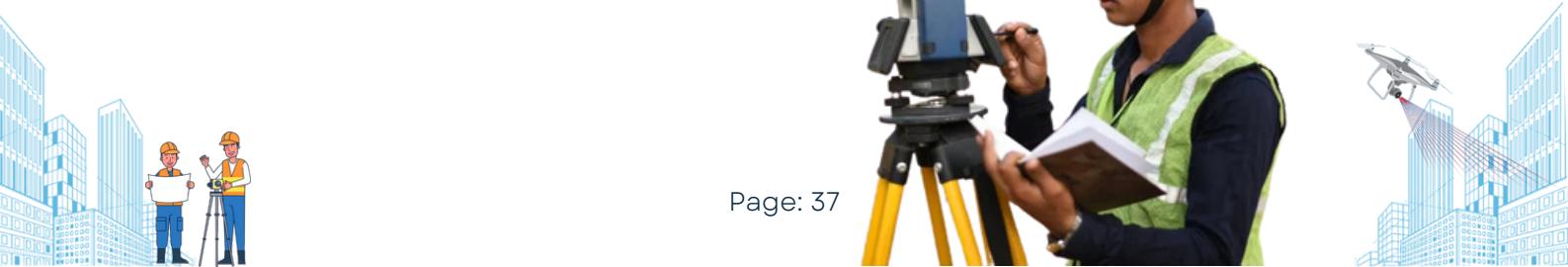
Following are the Methodologies for Property Boundary/Land Parcel Survey by State Authorities:

### **6.14.1 FDC integrated with CORS network through NRTK receiver:**

The property parcel boundaries can be demarcated on ground using a Network RTK (NRTK) enabled Rovers and Controller/Mobile application using the CORS network in the states where the CORS network is functional. The desired positional accuracy could be achieved using the CORS network in the states where the CORS network is functional. The desired positional accuracy could be achieved using the CORS correction streams. Further, extraction of property parcel boundary can be done simultaneously on the ground since the ORI/ Map 1 can be visualized in the FDC and shape file of property boundary can be created.

**Resources required:**

- i. CORS network
- ii. NRTK enabled GNSS Receivers (also known as GNSS Rovers) having tilt sensors
- iii. FDC integrated with CORS network NRTK rover.
- iv. Laser Range Finder
- v. Hardcopy of ORI with digitized features
- vi. Trained manpower



## **6.14.2 GNSS Receiver integrated with CORS Network**

The property parcel boundaries can be demarcated on ground using a Network RTK (NRTK) enabled Receivers (also known as GNSS Rovers) using the CORS network by taking observation of demarcated points (especially for missing vertices in ORI). The coordinates thus recorded in field can be parallelly plotted using rugged laptop with GIS Software to create the property boundary layer. This can be the alternate method of property demarcation in the States were the CORS network is functional.

Resources required:

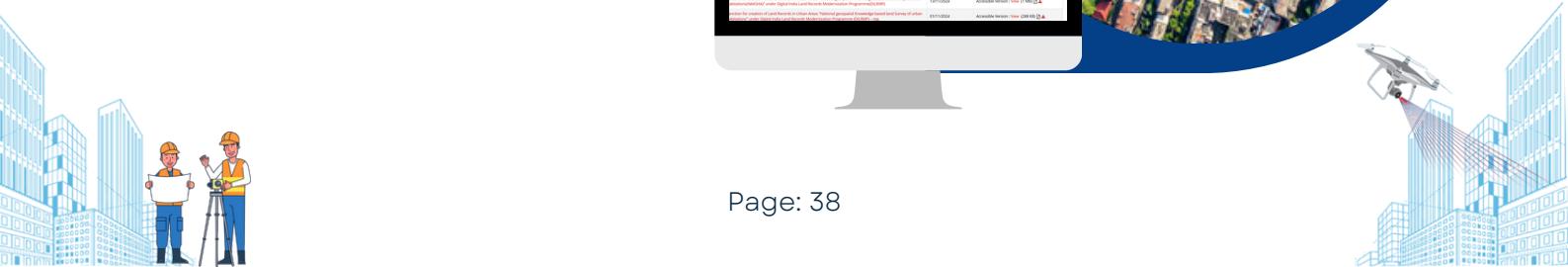
- i. CORS network
- ii. NRTK enable GNSS Receivers (also known as GNSS Rovers) having tilt sensors
- iii. Laser Range Finder
- iv. Rugged Laptop with GIS Software
- v. Hardcopy of Ortho plot
- vi. Trained manpower

## **6.14.3 Electronic Total Stations in combination with GNSS:**

The demarcation of property parcel boundaries on ground can be done using 3. Electronic Total Stations in combination with GNSS. In order to demarcate the property parcel boundaries, Control Points (at least 2 no. GCPs) are to be established in field survey area using GNSS Receivers (also known as GNSS Rovers). Using these two GCPs, total station can be aligned and further the coordinates of the vertices of property parcels can be picked up. The coordinates thus recorded in field can be parallelly plotted using rugged laptop with GIS Software to create the property boundary layer.

Resources required:

- i. GNSS instrument / CORS
- ii. Total Station
- iii. Rugged Laptop with GIS Software
- iv. Laser Range Finder
- v. Hardcopy of ORI with digitized features
- vi. Trained manpower



## 6.15 GNSS Rover Survey

The Observation of land parcels should be done using the GNSS Receiver/Robotic Total Station, based on the GNSS network. In the case of RTS surveys each day, surveys should be started and ended at known value stations. When selecting a GNSS receiver it should be ensured that it supports CORS (Continuously Operating Reference Station) networks and must have a tilt sensor.



## 6.16 Equipment Preparation

1. **GNSS Rover Setup:** Ensure the GNSS receiver is functional, charged, and updated with the latest firmware.
2. **Field Data Collector (FDC):** Install survey software (e.g., Trimble Access) and check Bluetooth and Wi-Fi functionality.
3. **Power Backup:** Carry spare batteries and portable chargers.
4. **Connectivity:** Confirm reliable internet access for the CORS network.

## 6.17 Define Survey Parameters

1. **Coordinate System:** Use WGS-84 or a geographical projection system
2. **Survey Style:** Configure GNSS receiver settings for RTK surveying:
3. **Signal Tracking:** Enable GNSS constellations (GPS, GLONASS, Galileo).
4. **Elevation Mask:** Set to 10–15 degrees to avoid low-angle satellites.
5. **PDOP Mask:** Set the threshold to <3 for high accuracy.
6. **Verify NTRIP** credentials (IP address, port, username, and password).



## 6.18 Survey Setup

1. Mount the GNSS receiver on a tripod or pole and position it vertically using the bubble level.
2. Power on the receiver and check for satellite lock (at least 5 satellites for a 3D fix).

## 6.19 Establish Connection to CORS

1. Primary ways to establish communication between the rover and CORS networks via internet Networked Transport of RTCM via Internet Protocol (NTRIP). This method allows the rover to connect to the CORS network through the internet.
2. Obtain NTRIP Access Information: Contact the CORS provider or use a public NTRIP service. You will need an NTRIP caster URL, a username, and password (if required), and the specific mount point of the CORS station.
3. Configure the Rover: In the rover's software or receiver settings, configure the NTRIP client by entering the caster URL, mountpoint, and login credentials.



4. Establish Connection: The rover will connect to the CORS network via the internet, receive RTK corrections, and apply them in real-time for improved accuracy.
5. Monitor the Connection: Ensure that the rover has an active connection to the CORS network and that it is receiving correction data

## 6.20 Pair the GNSS receiver with the Field Data Collector via Bluetooth

Open Bluetooth settings and pair with the GNSS receiver (default PIN: 0000). Connect to the CORS network:

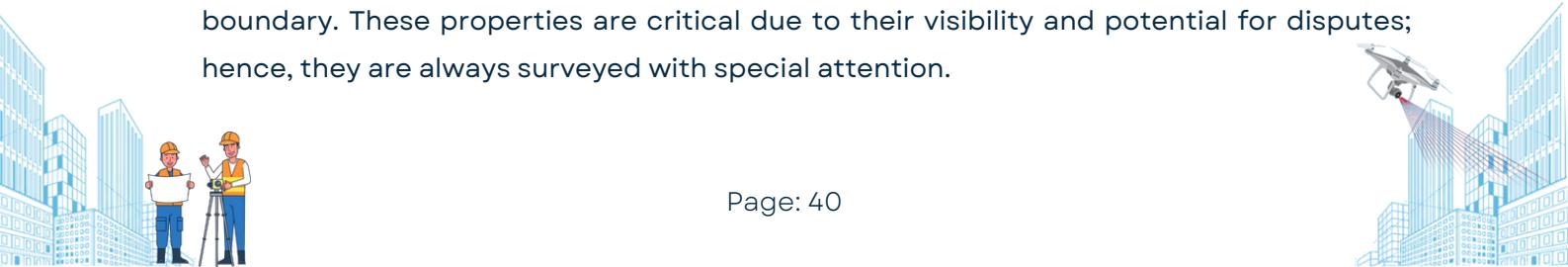
- i. Enter the IP address and port of the CORS server.
- ii. Input NTRIP credentials (username and password)
- iii. Verify real-time corrections are active.

## 6.21 Establish Base Point (if required)

- a. If a known control point is available, position the GNSS receiver over it.
- b. Measure the point using RTK corrections to establish the reference for the survey.

## 6.22 Land Parcel Survey Execution – Boundary Point Measurement

1. Navigate to the first boundary point of the parcel.
2. Position the GNSS Rover precisely over the point
3. Ensure the receiver is stable and vertical.
4. Always hold the survey pole vertically using the built-in bubble level. Misalignment can cause positioning errors due to an incorrect offset from the true ground position.
5. Ensure the rover's antenna is pointing directly upward to receive satellite signals without obstruction.
6. Check antenna height and input the value in the Field Data Collector.
7. Ensure line-of-sight to the sky for uninterrupted GNSS signals.
8. Start measurement and wait for the solution to show the value.
9. Person holding a rover must go to each corner of the land parcel according to the shape and record the point coordinates (latitude, longitude, elevation). The surveyor should carefully survey to see that the common points or boundary between two land parcels is measured but once only so that there may be no difference between the measurements recorded for such common points or boundaries.
10. Special considerations need to be given for corner properties which are located at the intersection of two roads, having at least one vertex (or more) common with the road boundary. These properties are critical due to their visibility and potential for disputes; hence, they are always surveyed with special attention.



11. All road-facing sides of corner properties must be measured during the survey.
12. If property boundaries overlap with building structures (as seen in ORI), the case must be reviewed, and corrections certified by the survey supervisor.
13. Locate the corner vertices where property boundaries intersect with roads and use the rover to precisely record these vertices with centimeter-level accuracy.
14. Measure boundaries shared with neighboring properties, ensuring no overlap.

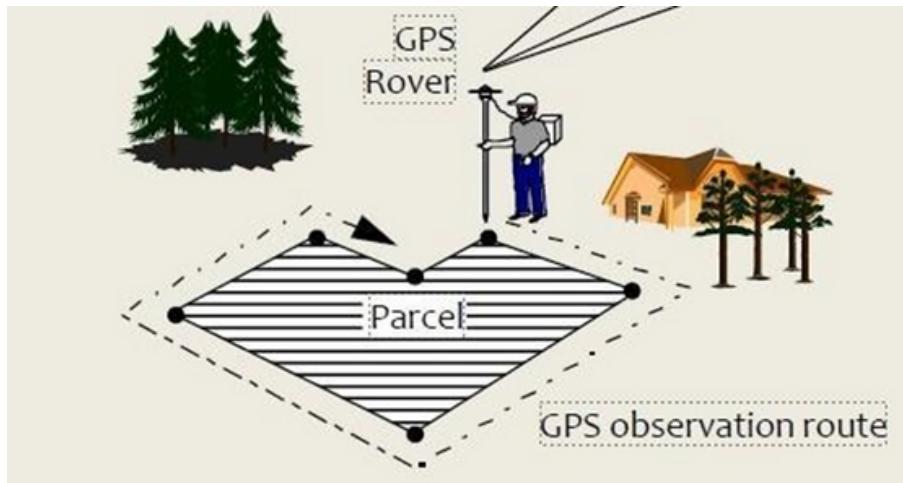
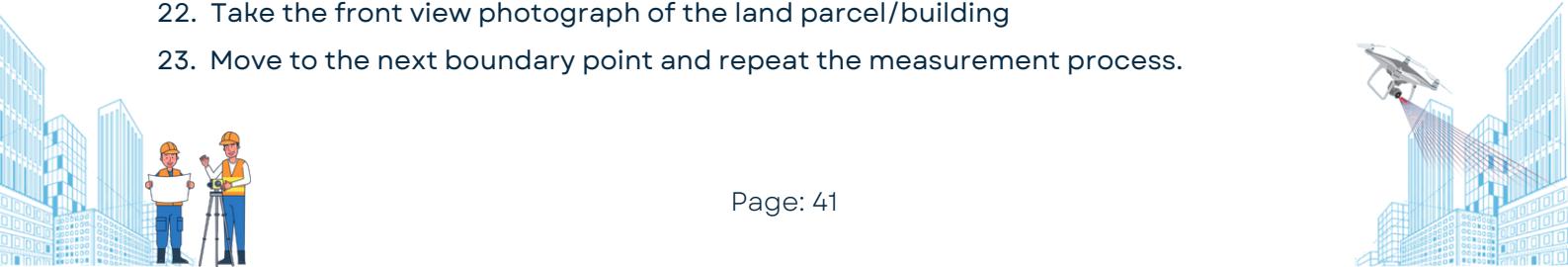


Figure-6.4: Illustration for land parcel survey

15. Compare GNSS measurements with existing maps or property sketches and if variations exceed 5 cm adjust the boundary polygon of existing maps or property sketches.
16. Any variation of length between the lengths measured on the ground and as written in the sketch which is less than 10 cm, need not be incorporated. For example if length in digital sketch is 9.1 m and on the ground it is measured to be 9.17 m then the said 7 cm variation need not be incorporated and 9.1 m shall remain unchanged. The variation in excess of 10 cm shall be duly incorporated by rounding off to a single decimal place of meters.
17. Extreme variation in length which is more than 50 cm as compared to ORI determined length should be re-measured by Survey Supervisor. Similarly, any change in lengths of the side or otherwise which leads to drawing of the property boundary line over the building in the ORI image, should be re-checked by Survey Supervisor and correction certified with time stamp.
18. Use offset measurement techniques for inaccessible points (e.g., behind obstructions).
19. Re-measure points if positional accuracy exceeds project thresholds.
20. The area of each land parcel should be computed by the Surveyor in the prescribed Software.
21. Add attribute information of each parcel (Survey No., Owner Name, Property tax details etc.).
22. Take the front view photograph of the land parcel/building
23. Move to the next boundary point and repeat the measurement process.



## **6.23 Post-Survey Tasks – Data Export**

1. Export the collected data from the Field Data Collector to the system
2. Format: CSV, DXF, or SHP (depending on project requirements).
3. Projection: UTM projection with datum WGS-84 or local coordinate system.
4. Save data securely in multiple locations (e.g., cloud storage, USB drives).

## **6.24 Surveyed Data Processing**

1. Import data into GIS or CAD software for analysis and mapping.
2. Process RTK and raw data in Trimble Business Center (TBC) or equivalent software:
3. Perform baseline processing and network adjustment.
4. Verify data consistency and accuracy.

## **6.25 Metadata Creation, Parcel Layout and Report Generation**

1. Prepare detailed maps showing parcel boundaries, coordinates and area of the land parcel metadata.
2. Include metadata:
3. Coordinate system and datum.
4. Measurement accuracy (horizontal and vertical).
5. CORS network details and reference points used.
6. Area of the land parcel

## **6.26 Best Practices**

1. Equipment Maintenance: Regularly calibrate GNSS receivers and ensure proper storage.
2. Signal Monitoring: Avoid surveying during high PDOP conditions or satellite outages.
3. Field Verification: Cross-check key points with existing boundary markers or legal records.
4. Safety Protocols: Follow safety guidelines in remote or hazardous survey areas.
5. Backup the data: Survey team must ensure that survey data is stored in proper devices



## **6.27 Government properties / land**

Government properties / land shall be surveyed first, before survey of private lands.

1. Vacant government plots.
2. Land allocated for public infrastructure projects.
3. Areas under municipal corporations or urban development authorities.
4. Government offices, administrative buildings, and educational institutions.
5. Land occupied by Public Sector Undertakings (PSU)
6. Land allotted for Special Economic Zones (SEZs).
7. Industrial estates managed by government agencies.
8. Roads, railways, and highways.
9. Airports and ports.
10. Public transportation hubs and utility corridors (electricity, water, gas etc.).
11. Public parks, green belts, and recreational spaces.
12. Land designated for afforestation or environmental preservation.
13. Government-owned land suspected to be encroached upon, especially in urban areas.
14. Government Land under litigation or dispute requiring clear boundaries.
15. Reserved/protected forests, wildlife sanctuaries, conservation zones, wetlands etc.
16. Land earmarked for biodiversity conservation and heritage sites.
17. Government-owned agricultural land leased or cultivated for public purposes.
18. Revenue land under the purview of district administration.
19. Land under defence establishments (to the extent permissible for civilian surveys).
20. Border and sensitive areas requiring specific permissions for surveying.
21. Land allocated for religious, cultural, or historical purposes.
22. Land under public healthcare facilities and community centers

## **6.28 Integration of property tax and RoR details with Land parcel data**

- a. Once all land parcel data are completed, it need to be integrated with property tax data sets or/and record of rights, if exists.
- b. For integration purpose, the states should use Web based application of MPSEDC.
- c. Web-GIS application will use API services for Property tax ownership data or other relevant information for RoR tagging etc. with respect to various State/UTs

### **a) Title confirmation guidelines and area mismatch guidelines**

Title confirmation guidelines and area mismatch guidelines for disposal of claims and objections:

State Government shall define title enquiry and area mismatch reconciliation guidelines, in respect of the procedure and the documents to be relied upon for determination of ownership and disposal of claims and objections on the field.



Guidelines formulated by some states which have already undertaken the urban surveys, have been provided at **Annexure-2**. States can adopt these guidelines with appropriate modifications or create their own Guidelines as required. Adherence to the applicable provisions under the relevant Revenue Acts /Municipal Acts shall have to be ensured when defining the Guidelines.

The documents to be relied upon for determination of ownership could be Record of Right, Sale Deed, Lease Deed, Gift Deed, Relinquishment Deed, Settlement Deed, Occupancy Certificate, Deed of Partition, lay out Plan, Property Tax Receipt, Building Sanction Plan, Will, General Power of Attorney (GPA), Agreement to Sell (ATS), Utility Bills, Mutation Certificate etc., or any other document as the state may decide, which shall be decided a case to case basis.

### **b) Updation of textual and spatial records**

Updation of textual and spatial records prior to commencement of the process of disposal of claims and objections

- a. In case of variations in the details in the two sets of the record (one available with the survey team and the other presented by the land holder in possession at the site), due to transfer of the land parcel/plot/property, by way of succession, sale, gift, relinquishment, mortgage, partition and subdivision etc, not followed by updation, the land holder shall be advised to submit an online application for updation of the ownership details. In case of disputes over the ownership/boundaries being raised before the survey team, also the parties shall be advised to submit online applications in support of their respective claims.
- b. Special efforts shall be made by the Revenue/Settlement/Municipal Authority concerned to update the ownership details, decide the disputes received through the survey teams, in accordance with the provisions of the applicable law, so as to limit the claims and objections at the later stage after publication of MAP-2.

### **c) Recording of commonly held land in housing societies**

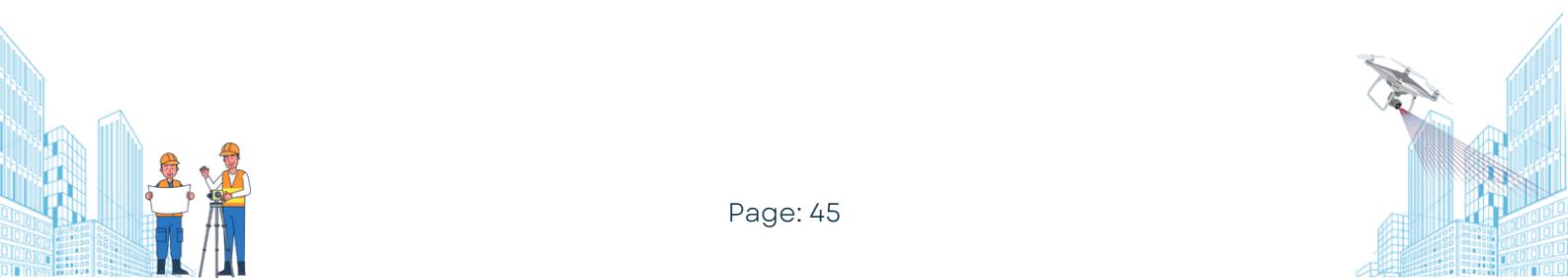
- Nodal departments of state/UTs would notify detailed Guidelines on how to record commonly held land in apartments complexes or colony/society land. If the state already has such Guidelines, the same may be used.
- If applicable, the nodal department also prescribes Guidelines on how to note individual ownership in different types of housing societies, including leasehold allotment, group housing societies, cooperative societies, apartment owners' association, and others.
- These should be in consultation with the Revenue and Urban development dept., and in conjunction with the new Urban Property Card format, prescribed in this SoP, to the extent possible.

## **d) Quality Check**

1. Supervisory Team at ULB level shall check the quality of records generated and resolution of claims to the prescribed percentage (to be decided by state Government). Not less than 5% of the properties surveyed and 10% of the resolved applications shall be verified.
2. State level teams/officers to undertake random checks on grounds in all the ULBs.
3. Upon verification, including random checks on ground, the draft urban property records shall be ready for publication.
4. The Urban Property Card (UrPro) of each land parcel must be assigned after the approval of Revenue/Urban officers not below the rank of Tahsildar, or as the case may be in various States/UTs.

## **e) Output Deliverables (MAP 2)**

1. Georeferenced map of the land parcel with attributes.
2. Property Parcel Maps with Geocode data, ULPIN and attribute data.
3. Accuracy report of surveyed points.
4. Linkage of property tax details and/or record of rights etc. with land parcel
5. Correlation statement w.r.t old survey record, if any.
6. Date and time of survey approvals.
7. Assign Urban Property Card (UrPro) property card, with name of the land owner.



# 7. MAP 3: Disposal of claims and objections and map finalization



## a) Documents for Determination of Land Ownership in India

In India, land ownership is determined through various government-issued and legal documents. The key documents include

### A. Title & Ownership Documents

1. Sale Deed – The most crucial document proving legal ownership. It must be registered with the Sub-Registrar of Assurances under the Registration Act, 1908.
2. Gift Deed – If the property is gifted, this document legally transfers ownership. Must be registered.
3. Partition Deed – Establishes division of ancestral property among legal heirs.
4. Conveyance Deed – Used in cases of land transfer, particularly in government land acquisitions.
5. Will & Probate – Proof of inheritance, especially when a legal heir acquires land/property.
6. Relinquishment Deed – Document where a co-owner surrenders their ownership rights.

### B. Government Land Records & Revenue Documents

1. Record of Rights (RoR) / Jamabandi / Khatian / Khatauni – Maintained by state revenue departments; shows land ownership and tenancy details.
2. Land Mutation Records – Updates ownership in revenue records after sale, inheritance, or gift.
3. Khasra & Khatauni – Village-level records containing land details, area, and ownership status.
4. Encumbrance Certificate (EC) – Confirms that the land is free from legal or financial liabilities. Essential for property transactions.
5. Survey & Settlement Records – Government records that verify land ownership, boundaries, and classification.
6. Patta M - Land assignment order - KL

### C. Tax & Utility Documents

1. Property Tax Receipts – Proof of land possession and municipal record linkage. Issued by local municipal bodies.

#### **D. Court & Legal Documents**

1. Registered Lease Agreement – Establishes rights of tenants and leaseholders.
2. Court Orders & Judgments – Ownership disputes settled through litigation.
3. Adverse Possession Proofs – If someone occupies land for 12+ years (private land) or 30+ years (government land), they may claim ownership under the Limitation Act, 1963.

#### **E. Government-Issued Approvals & Certificates**

1. Patta Certificate / Government Grant Orders – Proof of ownership for assigned land, issued by state governments.
2. No Objection Certificates (NOCs) – Clearance from government departments (e.g., urban development, municipal authorities).
3. Allotment Letter (for Government/Housing Schemes) – Proof of allocated land or property under government schemes.
4. Agricultural Land Conversion Certificate – If agricultural land is converted to residential/commercial use, this is mandatory.

#### **F. State-Specific Variations**

Since land is a state subject in India, the document names may vary from State to State. For example:-by state for example

- ❖ Maharashtra: 7/12 Extract (Satbara Utara) for land ownership.
- ❖ Karnataka: RTC (Record of Rights, Tenancy & Crops).
- ❖ Telangana/Andhra Pradesh: Pahani Document.
- ❖ West Bengal: Porcha.
- ❖ Uttar Pradesh/Bihar: Bhulekh/Khasra-Khatauni.
- ❖ Kerala: Pattayam - Land assignment order

Updation of textual and spatial records prior to commencement of the process of disposal of claims and objections

## **b) Action at Field Level**

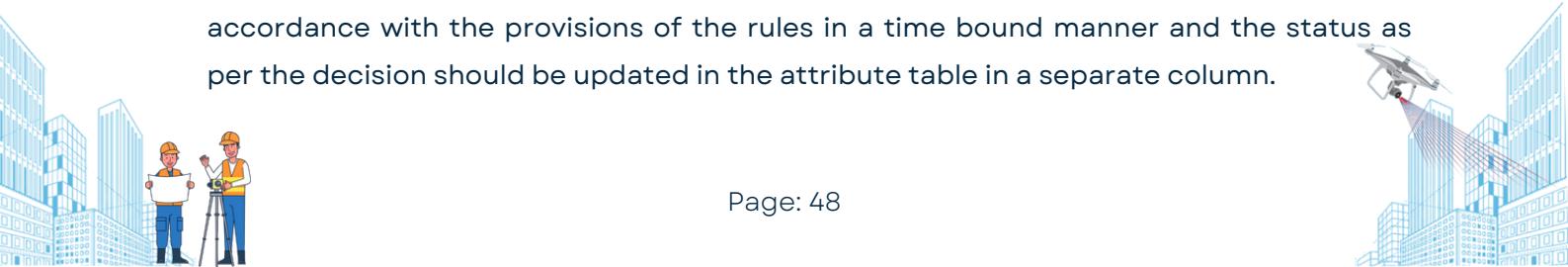
- A Special Team may be appointed constituting Revenue, Urban officers other than the initial survey Team for disposing of Claims & objections, if any or published Map 2.
- The land parcel/ plot level/building spatial data shall be carried to field through a mobile app / hard copy.
- The Survey team shall carry with them the plot wise information of ownership, as per revenue/municipal records, in respect of all the land parcels to be re-surveyed.
- The land parcel /property details available with the survey team shall be tallied with the details contained in the ownership documents, as mentioned in para 7.1 presented by the land holder in possession of the plot/land parcel.
- The survey team and the other presented by the land holder in possession at the site), due to transfer of the land parcel/plot/property, by way of succession, sale, gift,



- **relinquishment**, mortgage, partition and subdivision etc, not followed by updation, the land holder shall be advised to submit an application for updation of the ownership details. In case of disputes over the ownership/boundaries being raised before the survey team, also the parties shall be advised to submit applications in support of their respective claims.
- In case of variations in the details in the two sets of the record (one available with the survey team and the other presented by the land holder in possession at the site), due to transfer of the land parcel/plot/property, by way of succession, sale, gift, relinquishment, mortgage, partition and subdivision etc, not followed by updation, the land holder shall be advised to submit an application for updation of the ownership details. In case of disputes over the ownership/boundaries being raised before the survey team, also the parties shall be advised to submit applications in support of their respective claims. Or The Special Team shall conduct enquiry and issue speaking order regarding the claim/objection. If there arise any dispute between the parties, the special team shall decide the disputes in accordance with the provisions of the applicable law, so as to limit the claims and objections at the later stage after publication of map
- Special efforts shall be made by the Revenue/ Settlement/ Municipal Authority concerned to update the ownership details, decide the disputes received through the survey teams, in accordance with the provisions of the applicable law, so as to limit the claims and objections at the later stage after publication of MAP-2.

## c) Survey / Mutation Camps

- The States Revenue Departments and ULBs could consider holding special camps to facilitate alignment of the possession status with the status in the ownership records in all the clear / undisputed cases, by way of mutation/ updation of records for ownership change, partitions/ divisions and amalgamations of properties, property tax liability.
- Adequate publicity of the camp information as also the procedure, the documents required to be presented and the witnesses to be produced by the land holders at the camp shall have to be ensured.
- During the intervening period before the survey teams commence their work in the field, the State / UT Governments could consider inviting online/ physical applications/ claims for updation of records and dispose them off in a time bound manner so that the information to be taken by the survey teams to the field is as accurate as possible.
- For smooth passage of the survey process, the provisions which have worked well in the states of Andhra Pradesh, Kerala, Karnataka and Madhya Pradesh may mutatis mutandis, be adopted by other states through the appropriate process of amendment in the revenue / survey rules.
- The claims and objections should be disposed of by the competent Survey Authority in accordance with the provisions of the rules in a time bound manner and the status as per the decision should be updated in the attribute table in a separate column.



- Help desks and help lines for the guidance of the stakeholders in the process of updation shall be set up to operate under the supervision of the State PMU

## **d) Format of Property Card**

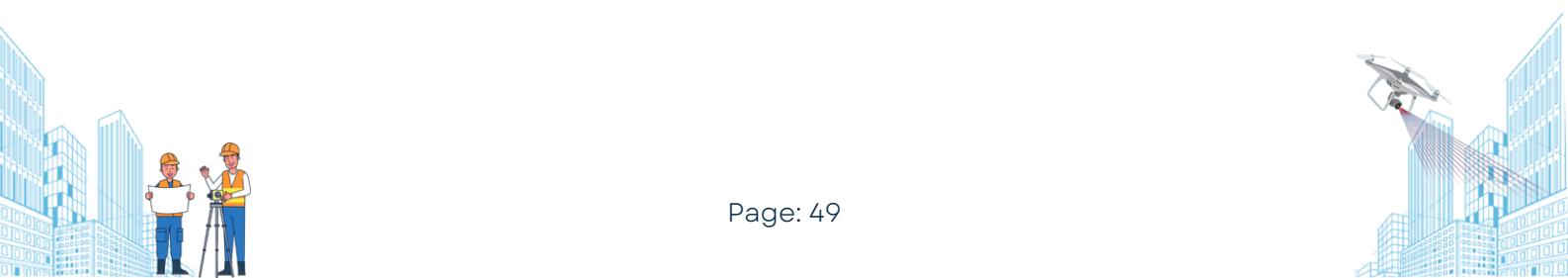
- A model format of the property card to include required attributes of land and building, including apartments in multi-ownership complexes, with the aim to suggest a provision for a comprehensive tool for transparency, accuracy and legal compliance, is given at Annexure-3. The State/UT may modify the format, if required, and notify it as part of their respective Revenue/Survey Rules and Manuals.

### **■ Integration of existing databases with UrPro**

- To ensure accuracy of the Land and Property Ownership data and its synchronization with property tax data, an automated mutation trigger mechanism is necessary. This mechanism will automatically update NAKSHA records including property tax data whenever there is a change in the land ownership, land-use categorization, or other property-related attributes.
- The integration of the data maintained by all the relevant departments like Revenue, Registration, Forest, Town Planning and Agriculture can be done through Web-based mechanisms. It will facilitate automatic updation of the changes made in one system to instantly reflect in the other, reducing/ obviating the need of manual intervention with ensured consistency between ownership and tax data. This facility will trigger auto-mutations in real-time providing accurate, up-to-date information on urban land transactions, ownership changes, and tax implications.
- In the cases where the data are still in physical form and real-time synchronization is not possible, the interim solutions, such as batch updates or scheduled uploads of offline records on WebGIS to ensure that the system remains up-to-date, should be considered. While automation of the mutation process is key to streamlining land administration, these temporary measures will help maintain data accuracy during the transition from offline to fully online systems.

## **e) Key Components of the UrPro**

- The Model Format is annexed (Annexure-3) contains details to facilitate Administrative Identification, Land Parcel/ Plot information including land ownership details, building/ structure details and building/ structure ownership details and property photograph.



- A sample guide to filling the details in various fields is given below

- Plot Details

- State/UT Name:

New Delhi

- District Name:

Delhi

- Town/City Name.:

Delhi

- City Survey No.:

478

- Ward Name & Number:

Kailashpuri-32

- Year of Commencement of Ownership:

2023

- Property Type (Private/Government):

Private

(In case of property type as Government then mention the property type cases such as Central Govt., State Govt., Local Body, or Govt. Undertaking whichever is applicable)

- ULPIN: 79PYQ GYZ30 XXXX

- Plot ID: ABCD12345

- Plot Area: 445.94 sq. m

- Plot Address with PIN code: Plot No. 87, Mira Road, Kailashpuri, New Delhi, Delhi 110011

- Plot Owner/s Name with Father/Guardian Name:

Mohal Lal Verma S/O Jetha Ji Verma

- Aadhar Number and Mobile Number of Owner: 7850 6983 XXXX; (+91) 98587 888XX

- Ownership/lease Hold/ Other rights: Owner (To be selected accordingly)

- Building details in respect of individual buildings in UrPro

- The details for individual building to be filled in the below format.

- i. Municipal ID: KA10EC1234

- ii. Property type (Private/Government):  
Private

- iii. Purpose of Usage (Residential, Commercial, Industrial, etc.): Residential (To be selected accordingly)

- iv. Name of the Building: Krishna Kunj

- v. Total Number of floors: 02

- i. Owner's floor number: 01

- ii. Name of the Owner: Rajeev Shukla

- iii. Super-Built-up Area: 445.94 sq. m

- iv. Parking Area: 12.5 sq. m

- v. Garage Area: 11.76 sq. m

- vi. Property Address: Krishna Kunj, M. G Road, New Enclave Colony, New Delhi, Delhi 110011

- Building details in respect of multi-ownership buildings in UrPro

- Municipal ID: To be mentioned

- Property type (Private/Government):  
Private  
(To be selected accordingly)

- Purpose of Usage (Residential, Commercial, Industrial, etc.): Residential  
(To be selected accordingly)

- Apartment Name/No.: Ashoka Apartments/D-01 (where 'D' indicate block and '01' indicates its sequencing)

- Floor No.: 03

- Flat No.: 021

- Name of the Owner: Mrs. Sunitha Gandhi

- Super-Built-up Area: 900.24 sq. m

- Parking Area: 12.5 sq. m

- Garage Area: 11.76 sq. m

- Property Address: Flat No. 21, 3rd Floor, Ashoka Apartments, Malviya Road, Amirpur Colony, New Delhi, Delhi 110011



- Owner details in respect of single/joint owners in individual buildings in UrPro**

The information regarding the owner details with percentage of ownership his/her communication address to be filled in the below format.

- |   |                                       |
|---|---------------------------------------|
| i. Name of Owner(s): Mr. Suresh Mittal      | v. Owners Communication Address: H    |
| ii. Guardian/Spouse Name: Mr. Ajit Mittal / | No. 21, Akbar Road, Lajpat Nagar, New |
| Mrs. Anita Mittal                           | Delhi, Delhi 110011                   |
| iii. Ownership Share: 100%                  | vi. Owner's Photograph: latest        |
| iv. Identity Document details: Aadhar/ PAN/ | Photograph of the owner               |
| Govt. ID Card Number                        | vii. Mutation Number and Date of      |
|   | Mutation: 356/2023 dated 15 October   |
|   | 2023                                  |

- Owner details in respect of single flat in multi ownership group housing in UrPro**

The information regarding the owner details with percentage of ownership his/her communication address to be filled in the below format

- |   |                                       |
|---|---------------------------------------|
| i. Title document number: Conveyance Deed No, dated   | i vi. Owners Communication Address: H |
| ii. Name of Owner(s): Mr. Suresh Mittal & Mr Harinam Mittal   | No. 21, Akbar Road, Lajpat Nagar, New |
| iii. Guardian/Spouse Name: (1)Mr. Ajit Mittal / Mrs. Anita Mittal (2) Mr. Vijay Mittal/Mrs. Priyanka Mittal | Delhi, Delhi 110011                   |
| iv. Ownership Share: 50%, 50%   | vii. Owner's Photograph: latest       |
| v. Identity Document details: Aadhar/ PAN/ Govt. ID Card Number of respective individual                    | Photograph of the owner/s             |
|   | viii. Mutation Number and Date of     |
|   | Mutation: 356/2023 dated 15 October   |
|   | 2023                                  |

- Encumbrance/ Mortgage/ Other rights and Remarks in UrPro**

- Records of any Encumbrance, Mortgage, Lease, Easement, or Other Rights associated with the property includes identifying and verifying information from reliable sources, defining and consistently using specific data fields, establishing clear data entry and verification procedures, outlining procedures for updating records, and specifying methods for secure storage and retrieval of property records. These procedures ensure accurate and complete records, facilitate smooth property transactions, minimize legal risks, and ensure compliance with legal requirements.

- Supporting Information in UrPro**

- Additional elements such as Location Map, Overview Map, Photograph of the Building and in case if it is a land then the photograph to be taken with neighboring structures and Digital Signature to authenticate. In similar way the required information can be incorporated in UrPro by States/UT's in given Annexure-3.



## **7.1 Ground truthing by Nodal Department Official**

1. Nodal department to notify guidelines on how to record commonly held land in apartments complexes or colony/society land. If the state already has such guidelines, the same may be used.
2. If applicable, the nodal department also prescribes guidelines on how to note individual ownership in different types of housing societies, including leasehold allotment, group housing societies, cooperative societies, apartment owners' association, and others.
3. These should be in consultation with urban development dept., and in conjunction with the new Urban Land Record format

## **7.2 Issuance of notice and notification**

### **7.2.1 Claim finalization and dispute resolution**

Claim finalization and dispute resolution of ownership, area, shape and boundary

- a. Claims and objections should be invited, through issues of notice and notification
- b. The claims and objections should be disposed of by the competent Survey Authority in accordance with the provisions of the rules in a time bound manner and the status as per the decision should be updated in the attribute table in a separate column
- c. For smooth passage of the survey process, the provisions which have worked well in the states of Andhra Pradesh, Kerala, Karnataka and Madhya Pradesh may mutatis mutandis, be adopted by other states through the appropriate process of amendment in the revenue / survey rules

### **7.2.2 Final MAP 3 publication with Property card and register**

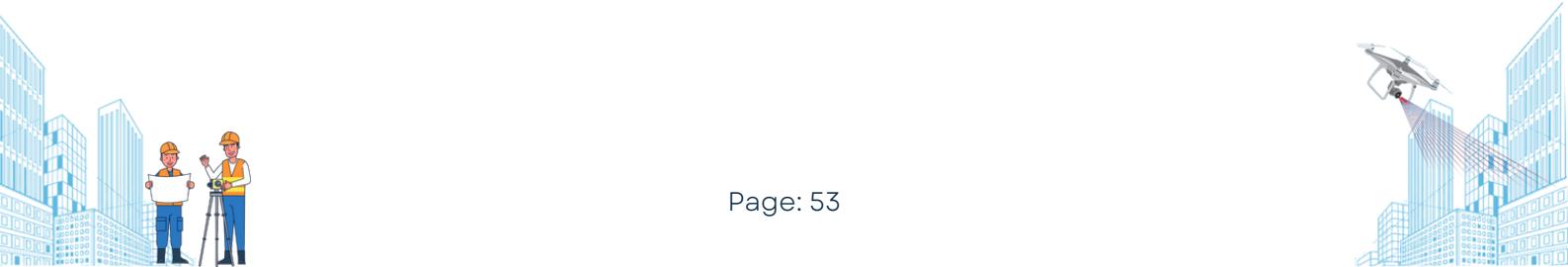
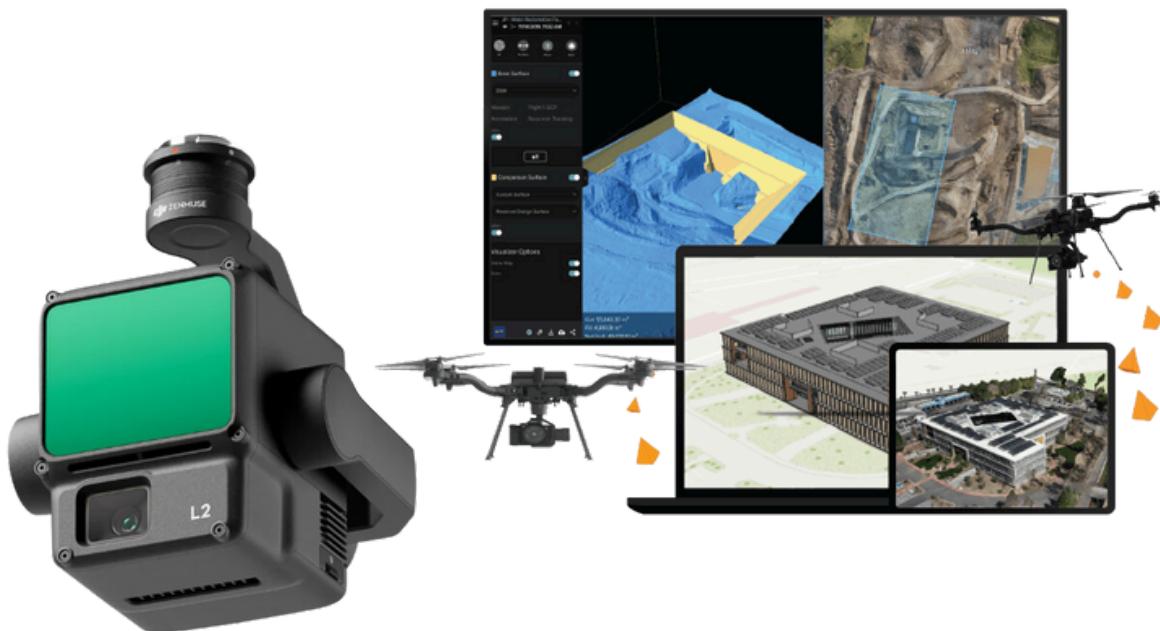
- Random checks on ground by the State Level Committee assigned Officer(s). For unresolved disputes, provide a pathway for escalation to civil courts, with a standardized timeframe (e.g., within 60 days after final publication or as per States/UTs norms)

## **7.3 Updation and maintenance of database**

- It is important to keep the database generated through NAKSHA up to date. On completion of the NAKSHA project, the state shall be responsible for maintenance of a web portal with finalized survey information at plot level. The state shall formulate processes for updation of the ownership data (on death or transfer of property) through offline or online means. Linking the NAKSHA data to registration software of states for automatic updates can be considered

## 7.4 Monitoring

1. States are encouraged to document the process, learnings and best practices, so that the documents may be utilized for a state-wide exercise undertaken on a later date and may benefit from these experiences. The documentation may be undertaken by the state government itself, or by third parties.
2. Such documentation shall include technological challenges (if any), public response, challenges faced at field level, institutional coordination mechanisms, effectiveness of title enquiry guidelines, and others as relevant. It may also make suggestions for improvements, and highlight innovative mechanisms and good practices.
3. For real time monitoring of the desired activities and recording the progress, SPMU is responsible for compiling the data from the concerned Urban Local bodies and feeding the data on the formats and portal prescribed by Department of Land Resources, Government of India.
4. SPMU along with Nodal officers of the respective State/UT will be participating in all the review meetings scheduled by DoLR.



# 8. Capacity Building and Knowledge Management

## 8.1 Training



The NAKSHA Capacity Building Programme is applicable to the following stakeholders:

1. Secretary/Commissioner/Director of 29 States/UTs (Revenue and Urban Development/ Local Self Government/Town & Country Planning Department) and the Nodal Officers of NAKSHA
2. Municipal Commissioner/Chief Municipal Officers/Executive Officers of 152 Selected ULBs
3. ULB Level Officials, State Programme Management Unit (SPMUs) Officials as Master Trainers from 29 States/UTs
4. Centre of Excellence (CoE) head as Master Trainers

Tentative Number of Resources to be Trained for NAKSHA at National Level

Level	Category	Number per State/UT or ULB	Total Number of Trainees	No. of Training Days
1	Senior Officials of Revenue and Urban Development/ Local Self Government/Town & Country Planning Department Departments	2 Officers x 29 States/UTs	58	1 Day
	NAKSHA Nodal Officers	1 Officer x 29 States/UTs	29	
Subtotal			87	
2	Middle-Level Officials of 152 ULBs	1 Officer x 152 ULBs	152	2 Days
	Centre of Excellence (CoE) Leadership	2 Officers x 5 CoEs	10	
	SPMU Officials	2 Officers x 29 States/UTs	58	
Subtotal			220	
3	Field Level Officials i.e. Master Trainers	4 Officers per State/UT x 29	116	7 Days
	State Programme Management Unit (SPMU) Officials	2 Officers x 29 States/UTs	58	
Subtotal			174	
4	All SPMUs Zonal Trainings	2 Officers x 29 States/UTs	58	2 Days
Total	All Levels Combined		539	



## A. National Level Implementation

To address the component of Training, Capacity Building, and Documentation, for implementation of NAKSHA, a tentative Course Curriculum of Capacity Building is devised for Senior Officers, Middle Level Officers and Field Level Officers who are responsible for ground implementation of the programme. The model Course Curricula for capacity building is as under:

- One day course for Senior Officials (Level 1) i.e. Secretary/Commissioners/Directors of Revenue and Urban Development/ Local Self Government/Town & Country Planning Department and Nodal Officers of NAKSHA of 29 States/UTs
- Two days course for Middle-level Officials (Level 2) i.e. Municipal Commissioners/Chief Municipal Officers of selected 152 ULBs, 2 Officers from all the 5 COEs and 2 Officials of SPMUs of 29 States/UTs
- Seven Days course for Field Level Officers and SPMUs Officials (Level 3) i.e. Master Trainers who will further train the other SPMU officials & ULB Level Teams
- Two Days Zonal Workshop of SPMU Officials (Level 4) at Regional Centres of Excellence

### (i) Training Overview

Level	Target Audience	Duration	Focus Area
Level 1	Senior Officers	1 Day	Strategic understanding of NAKSHA, geospatial technology applications, and urban planning.
Level 2	Middle-Level Officials and CoEs	2 Days	Operational workflows, GIS integration, aerial surveys, and Web GIS platforms.
Level 3	SPMU Officials & Field Level Officials	7 Days	Orientation of NAKSHA programme, Operational workflows, GIS integration, aerial surveys, and Web GIS platforms. Field-level geospatial tools, data validation, hands-on training, and preparation of urban land records.
Level 4	Zonal Workshop of SPMU Officials	2 Day	Regional review of NAKSHA programme in presence of concerned Nodal Officers

## **(ii) Level - Wise Course Content Details for Capacity Building Component of NAKSHA for “Creation of Urban Land Records” and Training details**

Level 1: One day course for Decision Makers i.e. Secretary/Commissioners/Directors of Revenue, Urban Development Departments and Nodal Officers of NAKSHA of 29 States/UTs

### **Tentative Number of Participants: 87**

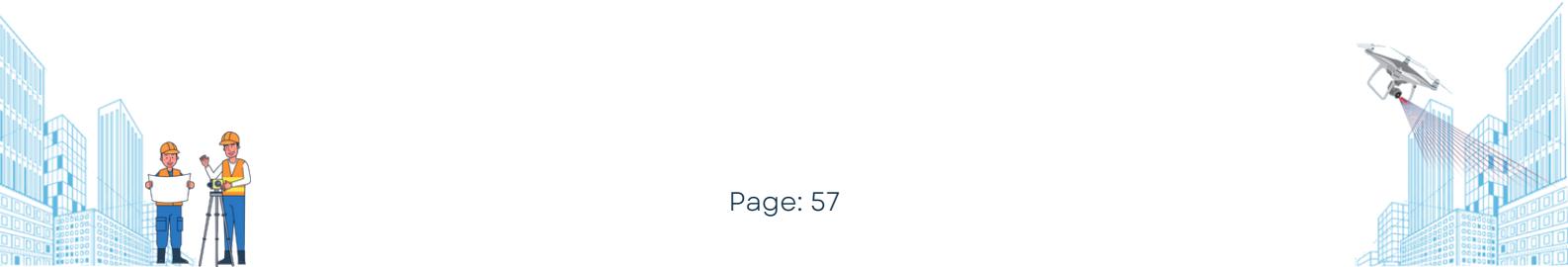
Organiser: Department of Land Resources, MoRD

Objective: Provide an understanding of NAKSHA’s implementation, geospatial technology, and decision-making framework.

Time	Topic	Resource
9:30 – 10:00 AM	Inaugural	
10:00–11:00 AM	Overview of NAKSHA and Role of Geospatial Technology	Representative of DoLR
11:00 – 11:30 AM	Overview of GIS: Concepts, Open Source GIS Tools, Cloud Space	Representative of NIGST
11:30–12:00 PM	Tea Break	
12:00–12:45 PM	Aerial Survey, QA/QC Practices, and Drone Policies	Representative of Survey of India
12:45 – 1:30 PM	Experience sharing of Aerial Survey by Andhra Pradesh, Odisha and Assam	Representatives Aerial Survey third party agencies, Government of Andhra Pradesh, Odisha, Assam
1:30–2:30 PM	Lunch Break	
2:30 – 3:15 PM	Use of Rovers for Survey Work and basics of DGPS surveying	Representative of Government of MP, Kerala, Maharashtra, Andhra Pradesh and Rover Provider companies
3:15 – 4:00 PM	Survey Demonstration Using Web GIS Platforms and grievance redressal	Representative of MPSEDC/NICSI
4:00–5:00 PM	Q&A Session and Open Discussion	
5:00–5:30 PM	Closing Remarks and Valedictory	DoLR

**Level 2: Two days course for Middle-level Officers (Level 2) i.e. Municipal Commissioners /Chief Municipal Officers of selected 152 ULBs, 2 Officers from all the 5 COEs and 2 Officials of SPMUs of 29 States/UTs**

S. No	Centre	Zone	States/UTs
1	Mahatma Gandhi State Institute of Public Administration (MGSIPA), Chandigarh	North	Punjab, Haryana, Himachal Pradesh, Jammu & Kashmir, Uttarakhand, Uttar Pradesh, Chandigarh
2	National Institute of Geoinformatics Science and Technology (NIGST), Survey of India, Hyderabad	South	Telangana, Tamil Nadu, Kerala, Karnataka, Andhra Pradesh, Telangana, Puducherry
3	Survey of India, Dehradun	East	Assam, Tripura, Bihar, Jharkhand, Odisha, Meghalaya, Mizoram, Nagaland, West Bengal, Sikkim
4	Yashwantrao Chavan Academy of Development Administration (YASHADA), Pune, Maharashtra	West	Chhattisgarh, Madhya Pradesh, Maharashtra, Goa, Rajasthan



Organiser: Department of Land Resources, MoRD in collaboration with Survey of India and Centres of Excellence

Objective: Equip Municipal Commissioners/Chief Municipal Officers of selected 152 ULBs, 2 persons from the State/UT PMUs and 2 persons from all the 5 COEs with overview of NAKSHA programme, operational knowledge, GIS integration skills, and aerial and field survey techniques. The SPMU members in tandem with CoEs would further train the Master Trainers in respective States/UTs

### **Day 1: Operational Training**

Time	Topic	Resource
9:30 – 10:00 AM	Inaugural	
10:00–11:00 AM	Overview of NAKSHA and Role of Geospatial Technology	Representative of DoLR
11:00 – 11:30 AM	Overview of GIS: Concepts, Open-Source GIS Tools	Representative of NIGST
11:30–12:00 PM	Tea Break	
12:00–12:45 PM	Aerial Survey, QA/QC Practices, and Drone Policies	Representative of Survey of India
12:45 – 2:00 PM	Experience sharing of Aerial Survey by Andhra Pradesh, Odisha and Assam	Representatives Aerial Survey third part agencies, Government of Andhra Pradesh, Odisha, Assam
2:00 – 3:00 PM	Lunch Break	
3:00 – 4:00 PM	Field Survey and Ground Truthing Experience Demonstration on Use of Rovers for Survey Work and basics of DGPS/ Rover based surveying	Representative of Government of MP, Kerala, Maharashtra, Andhra Pradesh and Rover Provider companies
4:00 – 4:30 PM	Tea Break	
4:30 – 5:00 PM	Survey Demonstration Using Web GIS Platforms and grievance redressal	Representative of MPSEDC
5:00 – 5:30 PM	Q&A Session and Open Discussion	

## Day 2: GIS and Web GIS Focus

Time	Topic	Resource
10:00 –11:00 AM	Data Integration on Web GIS Portal	Representatives of MPSEDC
11:00 – 11:30 AM	GIS Data Creation, Feature extraction using ORIs, Attribution	Representatives of MPSEDC/NIGST
11:30–12:00 PM	Tea Break	
12:00–12:45 PM	Overview and Demonstration of NAKSHA Web GIS Platform	Representative of MPSEDC
12:45 – 1:00 PM	Basics of Cloud Space, uses and requirements for NAKSHA	Representatives of Meghraj/NICSI
1:30–2:30 PM	Lunch Break	
2:30–4:00 PM	Map Preparation, Public Objection Handling, and Finalization	Representative of MPSEDC & Government of Andhra Pradesh, MP, Maharashtra
4:00–5:00 PM	Open Discussion, Feedback, and Evaluation	
5:00–5:30 PM	Valedictory Remarks and Certification	DoLR

**Level 3: Seven Days course for Field Level Officers and SPMUs Officials (Level 3) i.e.  
Master Trainers who will further train the other SPMU officials & ULB Level Teams**

Organiser: Department of Land Resources, MoRD

Objective: Develop detailed understanding of NAKSHA programme, technical expertise for hands-on implementation of geospatial surveys, WebGIS tools, and data validation for Master Trainers who would further provide the training to the field functionaries.

Day	Topics	Session Details
Day 1	Introduction to NAKSHA, GPS/CORS Basics, Aerial Survey Methods	Overview, field demonstrations, and initial hands-on training. GNSS Observation Methods & Introductions to Geoid (Theory) Exposure/training to GPS/CORS Instruments & Field practise (Field)
Day 2	CORS Network, Configuration, Data Downloading	CORS Website Registration & Data downloading and processing (Field) Demo and practice on Configuration of controller for using CORS & Hands on practice using CORS (NRTK/static) (Field) Hands-on practice with equipment and software.
Day 3	Creation of Ground Control Points and Map Georeferencing and Ground Verification	Creation of Ground Control points using CORS (static) & Data downloading and processing (Field) Field practice and data validation using CORS Practical exercises with QGIS/ArcGIS, focusing on Map 2 and Map 3 components.
Day 4	Web GIS Portal Overview and Cloud Services & Uses Integration of Documents and Property Tax Databases	Demonstration of modules, data uploads, and feature creation, Cloud Storage etc. Practical training on Web GIS modules for integration and analysis
Day 5	Live Demonstration and QA/QC Conflict Resolution and Public Engagement	Field exercises and quality assurance techniques for urban land records. Role-playing exercises and methods to handle objections and disputes.
Day 6	Map Finalization and Approval Processes	Steps for preparing and publishing finalized maps
Day 7	Assessment, Feedback, and Certification	Evaluation, feedback collection, and certificate distribution.

## **Level 4: One Day Orientation Programme of SPMU Staff and Overview of NAKSHA along with Technologies**

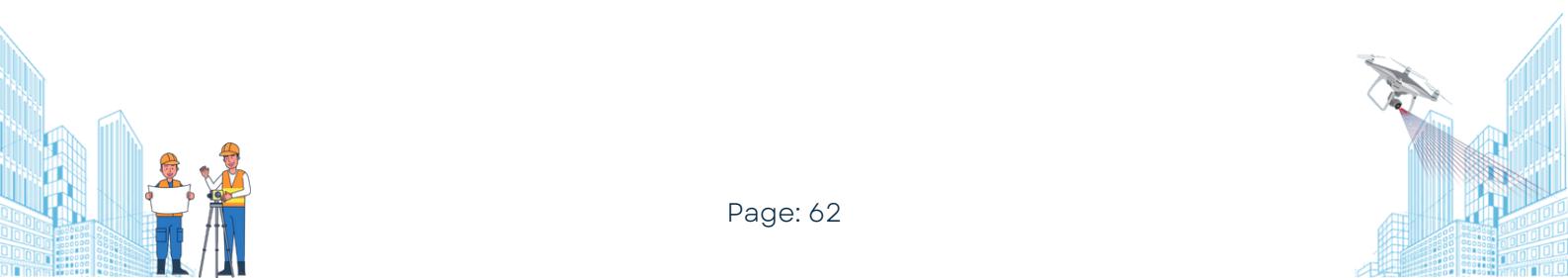
Tentative Number of Participants: 58

Organiser: Regional Centre of Excellence, DoLR

S. No.	Centre of Excellence	State / UT's
1	Lal Bahadur Shastri National Academy of Administration (LBSNAA), Mussoorie, Uttarakhand	Bihar, Jharkhand, Odisha, West Bengal, Uttar Pradesh, Uttarakhand
2	Yashwantrao Chavan Academy of Development Administration (YASHADA), Pune, Maharashtra	Chhattisgarh, Goa, Madhya Pradesh, Maharashtra
3	Northeast Region Centre of Excellence, Guwahati, Assam	Sikkim, Arunachal Pradesh, Assam, Meghalaya, Mizoram, Tripura
4	Mahatma Gandhi State Institute of Public Administration (MGSIPA), Chandigarh	Chandigarh, Haryana, Himachal Pradesh, Jammu & Kashmir, Punjab, Rajasthan
5	Administrative Training Institute (ATI), Mysuru, Karnataka	Andhra Pradesh, Karnataka, Kerala, Puducherry, Tamil Nadu, Telangana

**Objective: Orientation of SPMU Staff engaged for implementation of NAKSHA programme and their interaction with regional States/UTs for cross learnings along with the regional review of NAKSHA Programme**

Time	Topic	Resource
9:30 – 10:00 AM	Inaugural	
10:00–11:00 AM	Overview of NAKSHA and Role of Geospatial Technology	DoLR Representative (Virtual) and Head Regional CoE
11:00 – 11:30 AM	Overview of GIS: Concepts, Open-Source GIS Tools, Cloud Space	Master Trainer, Regional CoE
11:30–12:00 PM	Tea Break	
12:00–12:45 PM	Aerial Survey, QA/QC Practices, and Drone Policies	Master Trainer, Regional CoE
12:45 – 1:30 PM	Overview of Aerial Survey by Andhra Pradesh, Odisha and SVAMITVA	Master Trainer, Regional CoE
1:30–2:30 PM	Lunch Break	
2:30 – 3:15 PM	Demonstration on Use of Rovers for Survey Work and basics of DGPS surveying	Master Trainer, Regional CoE
3:15 - 4:00 PM	Survey Demonstration Using Web GIS Platforms and grievance redressal	Master Trainer, Regional CoE
4:00–5:00 PM	Q&A Session and Open Discussion	
5:00–5:30 PM	Closing Remarks and Valedictory	Head Regional CoE



## B. State/UT Level Implementation

To address the component of Training, Capacity Building, and Documentation, for implementation of NAKSHA programme at State/UT Level, a tentative Course Curriculum of Capacity Building is devised for ULB Level Officials who are responsible for ground implementation of the programme. The model Course Curricula for capacity building is as under:

### (i) Training Overview

Level	Target Audience	Duration	Focus Area	Venue
Level 5	ULB Level Staff	7 Day	Ground Truthing, Field Survey, Web GIS software handling, Dispute Resolution etc.	Administrative Training Institutes of 29 States/UTs

### (ii) Level - Wise Course Content Details for Capacity Building Component of NAKSHA for “Creation of Urban Land Records” and Training details at State/UT Level

Level	Category	Number per State/UT or ULB	Total Number of Trainees	No. of Training Days
5	ULB Level Officials	1754 Teams x 2 Officials	3,508	7 Days

#### Level 5: One Day Ground Truthing, Dispute Resolution and Web GIS Operation Training for ULB Level Officials

- Tentative Number of Participants: 3508
- Organiser: Administrative Training Institutes of 29 States/UTs participating in NAKSHA Programme
- Objective: Develop detailed understanding of NAKSHA programme, technical expertise for hands-on implementation of geospatial surveys, Web GIS tools, and data validation for ULB Level Officials who are responsible for ground level implementation

Time	Topic	Resource
9:30 – 10:00 AM	Inaugural	
10:00–11:00 AM	Overview of NAKSHA and Role of Geospatial Technology	Organiser, ATI and Master Trainers



## 8.2 IEC and Communications Plan

This outlines the Information, Education, and Communication (IEC) activities for the NAKSHA program per ULB in the local languages of the States/UTs.

Numbers listed under actionable items are a general indication of expectations, and aren't absolute

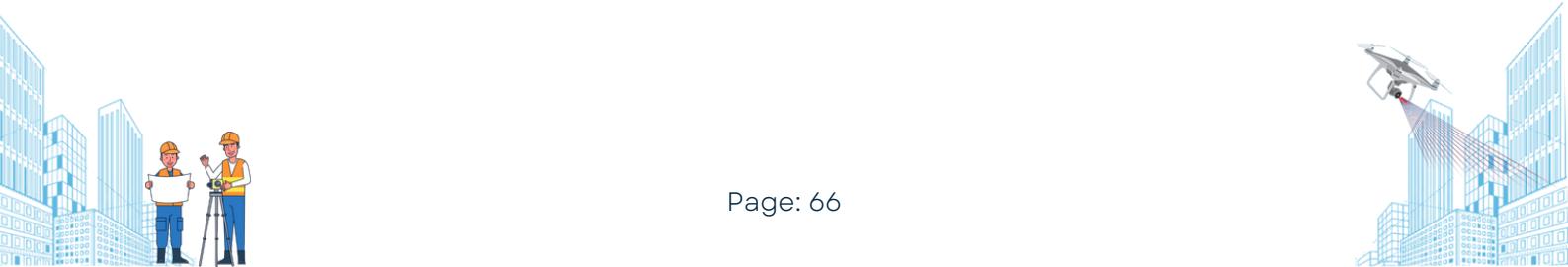
Activity	Description	Key Usage Locations	Actionable Items
<b>Development of IEC Materials</b>			
Posters and Banners	Visual communication tools to convey NAKSHA's benefits, steps to update land records, and the relevance of the program.	Key urban junctions (3 per ULB), high-traffic areas like main roads, markets, and public squares.	Urban banners at 3 high-traffic junction locations per ULB.
Standees and displays in Offices	Small, portable displays at land record offices, municipal corporations, and government buildings.	Land offices, municipal corporations, ward offices, local government buildings.	- Standees at all land and municipal offices in each ULB.
Wall Paintings and Murals	Large-scale artwork placed at key urban locations to reinforce NAKSHA's message of transparency, ownership, and security.	1 mural at a key urban location within each ULB (e.g., community centers, central market areas).	- 1 mural per ULB at a key urban location.
Rickshaws and Branded Autos for Audio Campaigns	Use rickshaws and branded autos equipped with sound systems to broadcast audio messages across neighbourhoods.	High footfall areas like markets, bus stations, parks, local streets, and migrant colonies.	Equip 30 rickshaws/autos per ULB with sound systems.

Community Engagement Strategies			
Interactive Workshops and Public Meetings	Workshops to explain the NAKSHA program and answer citizen queries.	Community centers, schools, local halls.	Hold 2 workshops per month.
		Residential colonies, gated communities.	
Feedback Forums	Platforms for citizens to share their feedback on NAKSHA and ask questions.	ULB offices, local government buildings.	1 feedback forum per person/meeting.
		Public events and festivals.	
Public Festivals and Roadshows	Fun, engaging outreach events with informational booths, live demos, and interactive displays.	Local fairs, cultural festivals, street markets.	Organize 2 roadshows/ festivals per year.
		High-traffic roadsides and shopping streets.	
Training and Capacity Building			
Behavior Change Communication (BCC) Training	Training for ULB staff and community leaders on BCC techniques to encourage participation in NAKSHA.	Local government offices, regional centers, and community halls.	Conduct 1 BCC training session per month.
Community Champions	Identify and train local community influencers to spread awareness and encourage participation.	Community events, door-to-door campaigns.	1 community champion per ward in the ULB.
Use of Media			
Local Media Outreach	Partner with local radio stations, TV, and newspapers to broadcast NAKSHA-related content.	Radio stations, local TV channels.	Partner with 3-5 media outlets.
		Local newspapers and community magazines.	
Social Media Campaigns	Utilize social media platforms to share updates, engage with citizens, and address concerns.	Facebook, Instagram, WhatsApp.	10-12 posts per week.
		Interactive posts, videos, live Q&A sessions.	Host 1 live Q&A per month through state handles.
Community Radio	Use local community radio to broadcast updates, interviews, and information in regional languages.	Community radio stations.	Broadcast 1 update per week on community radio.
		Regional dialects and cultural adaptations for broader reach.	

## 8.3 Documentation Plan at Ground Level for ULBs

This documentation plan outlines the procedures and requirements for Urban Local Bodies (ULBs) to effectively implement NAKSHA IEC activities at the ground level. The state government is responsible for overseeing the implementation, ensuring that documentation is thorough, consistent, and aligned with the overall program objectives. This plan will ensure that each ULB captures the necessary data and provides regular updates for monitoring and evaluation.

Activity	Description	Documentation Requirements	Responsibility
IEC Materials Development and Distribution	Development and distribution of posters, banners, standees, and other communication materials to inform citizens.	Material Inventory Records: Maintain detailed list of IEC materials (posters, banners, standees, leaflets, rickshaws) Distribution Tracking: Record distribution dates, areas covered, and number of materials distributed. Photo Documentation: Capture photographs of materials placed at different locations for visual evidence.	ULB IEC Coordinator Distribution Staff, Field Staff
Community Engagement and Public Awareness	Conducting workshops, meetings, and festivals to educate citizens about NAKSHA.	Workshop and Meeting Records: Document event title, date, location, number of participants, topics covered, key takeaways. Feedback Collection Forms: Collect structured feedback from participants after workshops and meetings. Rickshaw/Auto Campaign Logs: Track deployment, routes, number of audio messages delivered, areas covered.	ULB Event Coordinator, Workshop Facilitators, Feedback Collectors, Transport Coordinator



Media and Social Media Outreach	Broadcasting NAKSHA content through local media (radio, TV) and engaging citizens on social media platforms.	<p><b>Media Outreach</b>  Logs: Record media type (radio, TV, print), date of coverage, and audience reach.</p> <p><b>Social Media Analytics:</b> Track engagement metrics (likes, shares, comments, overall engagement).</p> <p><b>Radio and TV Broadcast Logs:</b> Document content aired, including date, time, and program name.</p>	ULB Media Relations Officer, Social Media Manager, Media Coordinator
Feedback, Surveys, and Continuous Improvement	Collecting feedback through surveys, focus groups, and community forums to improve IEC strategies.	<p><b>Survey Data Collection Forms:</b> Collect structured feedback from citizens via surveys or focus groups.</p> <p><b>Community Forum Records:</b> Document forum date, location, participants, and key discussions.</p>	ULB Survey Team, Field Staff, Event Coordinator
Performance Evaluation and Impact Assessment	Monitoring and evaluating the effectiveness of IEC activities and their impact on public engagement and awareness.	<p><b>Quarterly Monitoring Reports:</b> ULBs to submit quarterly progress reports summarizing activities, metrics, challenges, and adjustments.</p> <p><b>End-of-Program Impact Report:</b> Comprehensive evaluation of IEC activities' long-term impact on public awareness, engagement, and participation.</p>	ULB Program Monitoring Officer, Impact Evaluation Officer

# 9. Annexure

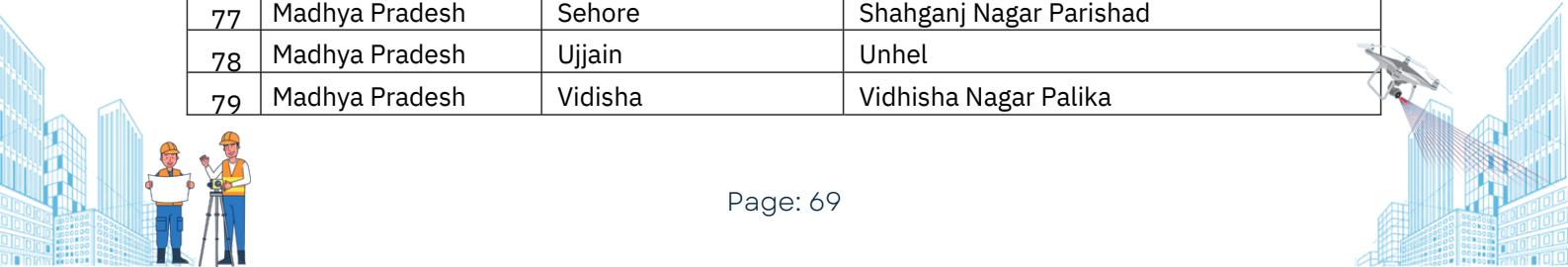
## 9.1 Annexure-1: List of 152 ULBs



#	State/ UTs	District	Name ULB/Town/ City
1	Andhra Pradesh	Ananthapur	Anantapuramu
2	Andhra Pradesh	Chittor	Kuppam
3	Andhra Pradesh	Eluru	Eluru
4	Andhra Pradesh	Guntur	Guntur
5	Andhra Pradesh	Guntur	Mangalagiri- Tadepalli
6	Andhra Pradesh	Kakinada	Kakinada
7	Andhra Pradesh	Kurnool	Kurnool
8	Andhra Pradesh	Prakasam	Ongole
9	Andhra Pradesh	SPSR Nellore	Nellore
10	Andhra Pradesh	Tirupati	Tirupati
11	Arunachal Pradesh	Namsai	Namsai
12	Assam	Barpeta	Barpeta Road
13	Assam	Bongaigaon	Abhayapuri
14	Assam	Bongaigaon	Bongaigaon
15	Assam	Darrang	Mangaldoi MB
16	Assam	Golaghat	Golaghat MB
17	Assam	Hojai	Hojai MB
18	Assam	Nagaon	Nagaon MB
19	Assam	Nalbari	Nalbari MB
20	Assam	Sivsagar	Sivsagar MB
21	Assam	Sonitpur	Dhekiajuli MB
22	Bihar	Banka	Banka Nagar Parishad
23	Bihar	Buxar	Buxar Nagar Parishad
24	Bihar	Munger	Tarapur Nagar Panchayat
25	Bihar	Nalanda	Rajgir Nagar Parishad
26	Bihar	Rohtas	Dehri Nagar Parishad
27	Bihar	Sonpur	Sonpur Nagar Parishad
28	Chandigarh	Chandigarh	Sarangpur, Burail, Kajheri, Palsora, Attawa
29	Chhattisgarh	Dhamtari	Nagar Palik Nigam Dhamtari
30	Chhattisgarh	Jagdalpur (Bastar)	Nagar Palik Nigam Jagdalpur (Bastar)
31	Chhattisgarh	Sarguja	Nagar Nigam Ambikapur
32	Goa	North Goa	Corporation of the City of Panaji
33	Goa	South Goa	CuncolimM.Cl
34	Goa	South Goa	MargaoM.Cl
35	Haryana	Gurugram	Manesar
36	Haryana	Narnaul	Narnaul
37	Haryana	Panchkula	Panchkula



#	State/ UTs	District	Name ULB/Town/ City
38	Himachal Pradesh	Hamirpur	Nadaun Nagar Panchayat
39	Himachal Pradesh	Kangra	Palampur MC
40	Himachal Pradesh	Mandi	Mandi MC
41	Himachal Pradesh	Solan	Solan MC
42	Jammu & Kashmir	Baramulla	Pattan
43	Jammu & Kashmir	Jammu	Bishnah
44	Jammu & Kashmir	Pulwama	Awantipora
45	Jammu & Kashmir	Reasi	Katra
46	Jharkhand	Lohardaga	Lohardaga Nagar
47	Jharkhand	Palamu	Vishrampur Nagar Parishad
48	Jharkhand	Ranchi	Ranchi MC
49	Jharkhand	Simdega	Simdega Nagar Parishad
50	Karnataka	Bagalkote	Bagalkote MC
51	Karnataka	Ballari	Bhagyanagara Town Panchayat (TP)
52	Karnataka	Ballari	Siraguppa MC
53	Karnataka	Belagavi	Boragav TP
54	Karnataka	Belagavi	Gokaka MC
55	Karnataka	Bidar	Basavakalyan MC
56	Karnataka	Chikkamagaluru	Chikkamagaluru MC
57	Karnataka	Kolar	Kolar Municipal Corporation (MC)
58	Karnataka	Mysuru	Bogadi TP
59	Karnataka	Shivamogga	Anavatti TP
60	Kerala	Alappuzha	Harippad
61	Kerala	Kannur	Thalassery
62	Kerala	Kasaragod	Kasaragod
63	Kerala	Kollam	Punalur
64	Kerala	Kottayam	Vaikom
65	Kerala	Kozhikode	Vadakara
66	Kerala	Malappuram	Perinthalmanna
67	Kerala	Malappuram	Ponnani
68	Kerala	Thiruvananthapuram	Attingal
69	Kerala	Thiruvananthapuram	Neyyattinkara
70	Madhya Pradesh	Alirajpur	Alirajpur Nagar Palika
71	Madhya Pradesh	Indore	Depalpur Nagar Palika
72	Madhya Pradesh	Indore	Dhar Kothi
73	Madhya Pradesh	Jhabua	Meghnagar
74	Madhya Pradesh	Khandwa	Channera (Naya Harsood) Nagar Parishad
75	Madhya Pradesh	Narmadapuram	Makhan Nagar (Babai)
76	Madhya Pradesh	Raisen	Sanchi
77	Madhya Pradesh	Sehore	Shahganj Nagar Parishad
78	Madhya Pradesh	Ujjain	Unhel
79	Madhya Pradesh	Vidisha	Vidhisha Nagar Palika



#	State/ UTs	District	Name ULB/Town/ City
80	Maharashtra	Ahmednagar	Shirdi (Tq. Rahata)
81	Maharashtra	Akola	Murtizapur
82	Maharashtra	Buldhana	Buldhana
83	Maharashtra	Chandrapur	Ghuggus (Tq. Chandrapur)
84	Maharashtra	Chh.Sambhajinagar	Kannad
85	Maharashtra	Jalgaon	Varanganv (Tq. Bhusaval)
86	Maharashtra	Pune	Baramati
87	Maharashtra	Raigad	Khopoli council
88	Maharashtra	Solapur	Pandhapur
89	Maharashtra	Thane East	Kulgaon Badalapur (Tq. Ambarnath)
90	Meghalaya	Khasi Hills	Shillong
91	Mizoram	Aizwal North	Aizwal MC 11-19
92	Nagaland	Dimapur	Dimapur
93	Odisha	Jharsuguda	Jharsuguda Municipality
94	Odisha	Khorda	Khorda Municipality
95	Odisha	Khordha	Jatni Municipality
96	Odisha	Mayurbhanj	Baripada Municipality
97	Puducherry	Murungapakkam	Murungapakkam
98	Punjab	Barnala	Barnala
99	Punjab	Ludhiana	Khanna
100	Punjab	Patiala	Rajpura
101	Punjab	SAS Nagar	Banur
102	Punjab	SAS Nagar	Derabassi
103	Punjab	SAS Nagar	SAS Nagar
104	Rajasthan	Ajmer	Kishangarh
105	Rajasthan	Ajmer	Pushkar
106	Rajasthan	Beawar	Beawar
107	Rajasthan	Jaipur Rural	Bagru
108	Rajasthan	Jaisalmer	Jaisalmer
109	Rajasthan	Khairthal Tijara	Bhiwadi
110	Rajasthan	Kotputali- Behror	Behror
111	Rajasthan	Rajsamand	Nathdwara
112	Rajasthan	Sawai Madhopur	Sawai Madhopur
113	Rajasthan	Sikar	Nawalgarh
114	Sikkim	Sikkim (East)	Gangtok Municipal Corporation
115	Tamil Nadu	Ariyalur	Ariyalur
116	Tamil Nadu	Chengalpattu	Maraimalai Nagar
117	Tamil Nadu	Coimbatore	Coimbatore (7 Wards)
118	Tamil Nadu	Dindigul	Dindigul
119	Tamil Nadu	Kanchipuram	Kanchipuram
120	Tamil Nadu	Sivagangai	Karaikudi
121	Tamil Nadu	Thanjavur	Thanjavur

#	State/ UTs	District	Name ULB/Town/ City
122	Tamil Nadu	Tiruvannamalai	Tiruvannamalai
123	Tamil Nadu	Tuticorin	Kovilpatti
124	Tamil Nadu	Virudhunagar	Virudhunagar
125	Telangana	Bhadradri Kothagudem	Manuguru
126	Telangana	Jagityal	Jagityal
127	Telangana	Mahabubabad	Mahabubabad
128	Telangana	Mahabubnagar	Jacherla
129	Telangana	Nalgonda	Miryalguda
130	Telangana	Rajanna Sircilla	Vemulawada
131	Telangana	Siddipet	Husnabad
132	Telangana	Vikarabad	Kodangal
133	Telangana	Warangal Rural	Wardhannapet
134	Telangana	Yadadri Bhuvanagiri	Yadagirigutta
135	Tripura	West	Agartala Municipal Corporation (MC)
136	Uttar Pradesh	Ambedkar Nagar	Tanda
137	Uttar Pradesh	Barabanki	Nawabganj
138	Uttar Pradesh	Bulandshar	Anupshahr
139	Uttar Pradesh	Chitrakoot	Chitrakoot Dham
140	Uttar Pradesh	Gorakhpur	Gorakhpur
141	Uttar Pradesh	Hardoi	Hardoi
142	Uttar Pradesh	Jhansi	Jhansi
143	Uttar Pradesh	Mirzapur	Chunar
144	Uttar Pradesh	Pilibhit	Puranpur
145	Uttar Pradesh	Shajanpur	Tilhar
146	Uttarakhand	Almora	Nagar Palika Almora
147	Uttarakhand	Haridwar	Nagar Palika Bhagwanpur
148	Uttarakhand	Tehri Garhwal	Nagar Palika Narendra Nagar
149	Uttarakhand	Udham Singh Nagar	Nagar Palika Kitcha
150	West Bengal	Hooghly	Chandannagar Municipal Corporation
151	West Bengal	North 24 Parganas	Ashokenagar Kalyangarh Municipality
152	West Bengal	North 24 Parganas	New Town Kolkata Development Authority (NKDA)

## **9.2 Annexure-2: Guidelines Formulated by Some States for Urban Surveys**

### **9.2.1 SOP on Survey of Government Land (Andhra Pradesh)**

a. Notice/ intimation to be issued to the Departments and neighbouring Private Property Owners.

- Notice shall be issued regarding intimation about identification and demarcation of the Government Land/Institutional Land/Properties to the Departments concerned and neighbouring Private Property Owners. And shall obtain acknowledgement from the authorized person from the concern department and neighbouring private property owners.
- Public notice shall be issued for survey of the Government/Institutional / ULB/ Municipal land/properties in the notice boards of the respective Government offices and notice boards of the ULB and other prominent places like Ward Secretariats, Post Offices, and Banks, MRO/RDO offices, etc.,

b. ULB/District level team(s) shall address all the departments concerned to nominate one nodal officer duly authorizing him to attend for re-survey with relevant documents and also finalizing the demarcation of the Government / Municipal / Endowments Lands/Properties of the outcome of the Survey.

c. In order to fix the boundaries both ULB as well as Government/Institutional /Municipal properties have to keep ready for the functioning of CORS network and GNSS Rover synchronizing to AP CORS by the Ward Planning & Regulation Secretary (WP&RS) and Operators.

d. All Government/Institutional/Municipal properties/lands shall be identified and boundary demarcation shall be done in presence of respective department's authorized personnel and neighbouring private property owners by planting the stones (wherever required).

e. In cases of encroachment on government land, or unauthorised construction by private parties, the state rules regarding the same shall apply, for recording of ownership and boundaries.

### **9.2.2 Title Enquiry Guidelines for Government Land (Karnataka)**

Title Enquiry Guidelines for Government Land in case of land grants/ allotment or layout development (Karnataka)



A. In case the property on "government land" was issued in the name of a private person(s) in the Revenue records, and the private person (or their successors) are in possession of the said land, then such revenue records shall be accepted and accordingly the owner therein or his legal successors through registered deed or inheritance/succession, shall be accepted as the owner. The revenue records shall override the municipal records in case there is a conflict between the two.

B. In general, in absence of Revenue Records, for the properties on "government land" the document of grant of the said government land or revenue survey number to the private person is mandatory. Thereupon the flow of ownership of the granted land, or a piece thereof, from the grantee to the present claimant of property should be there to accept the present claimant and record him as owner leading to issuance of Urban Land Record. Provided that in case there is a proper document of grant of government land to a private person but subsequent documents a.creating a clear chain of flow of ownership is missing, then the municipal ownership records can be relied on to issue the Urban Land Record.

C. For the properties on the layouts of government agencies on the government land, the allotment letter of the agency develops the layout, registered deed from such an agency to a person is the primary document of ownership. In case such a document is given by a citizen or otherwise available, the same shall be the basis of recording the property owner. Provided that in case of subsequent transfer of property or inheritance or succession of such property by the original owner, the latest owner shall be recorded. The municipal ownership records in such layouts shall be given due value in accepting the present owner of the property.

D. In absence of a government land grant or recording of property as private property in any revenue record, and the property is not part of the layout of a government agency, then the Urban Land Record shall not be issued to private persons on government land. Provided the Urban Land Records to Government Agencies and departments can be issued.

E. In case the government land grant document for the concerned land in favour of a private person is available or the grant is proved as per Government procedure, then apart from chain of documents proving flow of ownership of present claimant from the original grantee of land; the ownership/title as per municipal records shall also be accepted. The Urban Land Record may be accordingly issued.

F. In accepting and recording the ownership of any property on a granted Government land where the land grant document is available or layout on government is done by a government agency, any documents or records that are received /obtained from the citizen or any other authority should be duly considered as per their legal value. In this regard, the following broad principles shall be adopted –

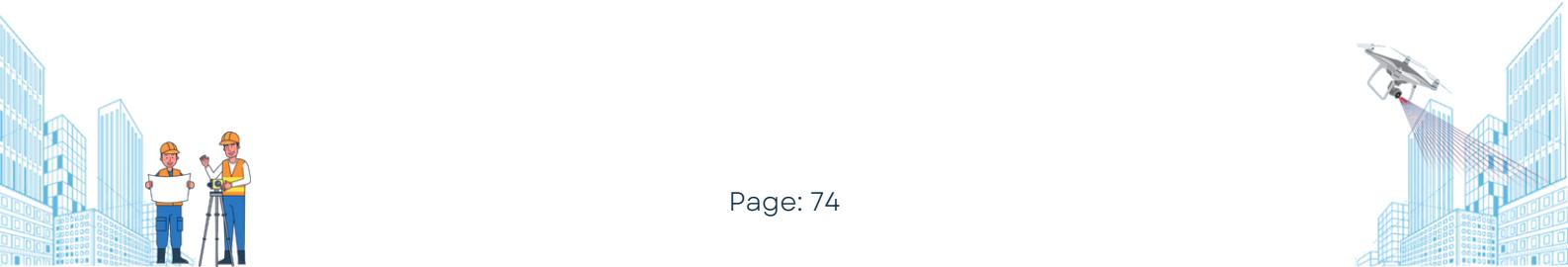
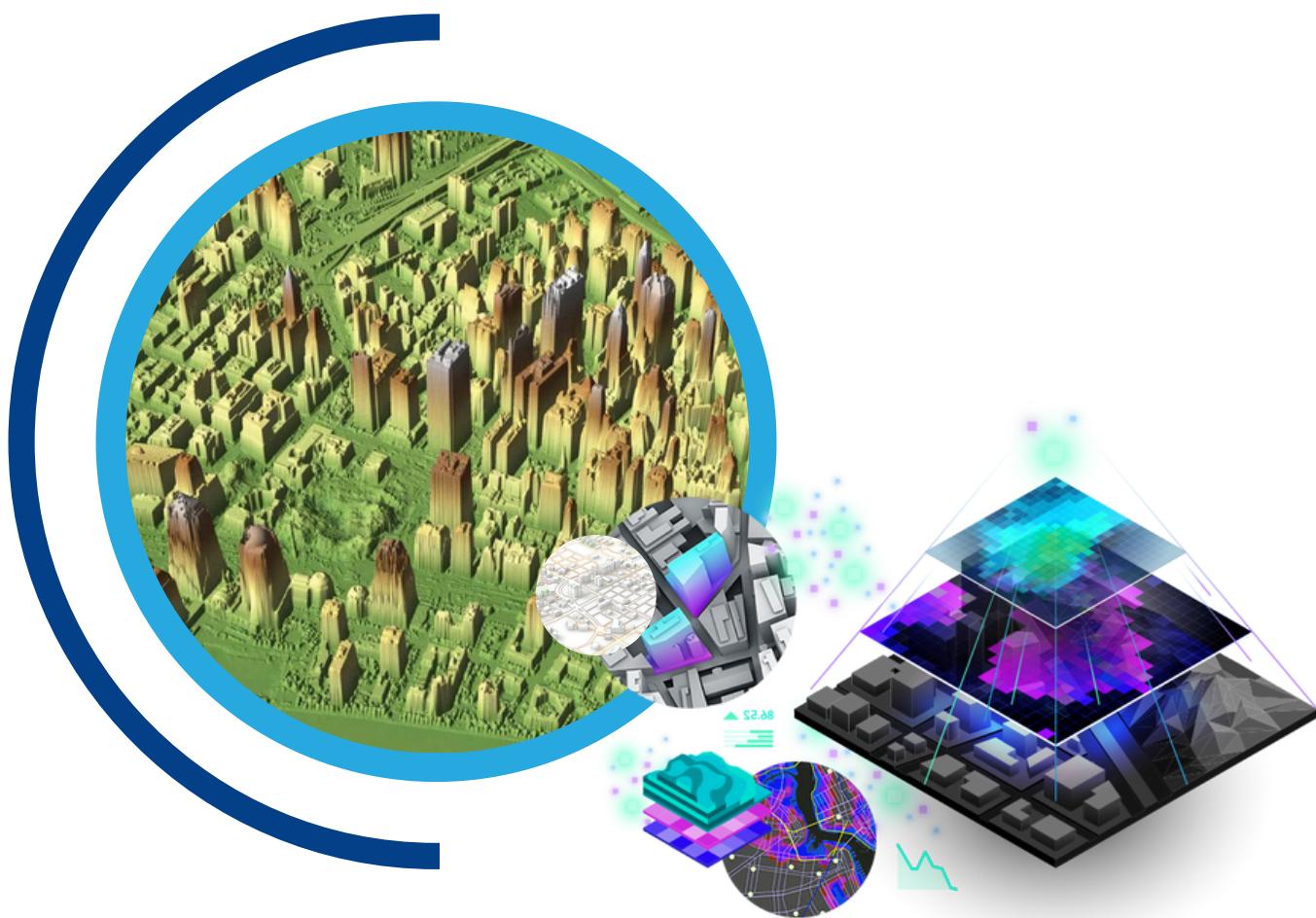
- a.The revenue records are primary and shall override municipal records in case of contradiction.
- b.The allotment letter or registered deeds from government agencies that developed layout on the government land are also primary documents and shall override municipal records in case of contradiction.

## 9.2.3 Good Practice on Simplified and Standardized Forms

The Andhra Pradesh SOP for urban resurvey specifies forms for all stages of the survey process. This enables efficient scaling up of the survey across the state, brings in standardization in operations, and transparency and convenience for both officers and citizens.

Some of the key forms used in the state for the purpose of resolving disputes regarding the boundary inaccuracies have been presented. Specific forms are utilized at different stages of the survey, during ground truthing and appeals. These forms serve as official documentation for addressing the objections, verifying and correcting the discrepancies.

Similar forms may be adapted by states for their own purposes. The forms regarding various stages of the urban survey process in Andhra Pradesh can be retrieved from the SOP document of the state.



## 9.3 Annexure-3: A model format of Urban Property Card



State Govt.  
logo

Dept.  
logo

Revenue/UD/LSG Department

Urban Property (UrPro) Card Number.....

(Issued under the rule of \_\_\_\_\_ of \_\_\_\_\_ Rules 19\*\*)

FORM NO \_\_\_\_\_

Date: \_\_\_\_\_

remove  
red colour

Owner/s Name: \_\_\_\_\_

1. Plot Details			
State/UT Name		ULPIN	
District Name		Plot ID.	
Town/City Name		Plot Area (sq. m)	
City Survey No.		Plot Address with PIN Code	
Ward Name & No.		Plot Owner/s Name with Father/Guardian Name	
Year of Commencement of Ownership		Aadhaar No. and Mobile No. of the owner/s	
Property Type (Private/ Government)		Ownership/ Lease Hold/ Other Rights	
a. Central Govt. b. State Govt. c. Local body d. Govt. Undertaking			

2. (a) Building Details in respect of individual buildings				
Municipal ID	Property Type (Private/Government)	Purpose of Usage (Commercial/Residential/Industrial/Institutional/Mixed)		
		Name of the Building	Total No. of Floors	Owner's Floor No.
Name of the Owner	Super Built-up Area (sq. m)	Parking Area (sq. m)	Garage Area (sq. m)	Property Address

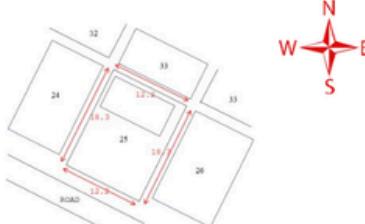
2. (b) Building Details in respect of multi-ownership buildings				
Municipal ID	Property Type (Private/Government)	Purpose of Usage (Commercial/Residential/Industrial/Institutional/Mixed)		
		Apartment Name/No.	Floor No.	Flat No.
Name of the Owner	Super Built-up Area (sq. m)	Parking Area (sq. m)	Garage Area (sq. m)	Property Address

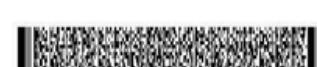


3. (a) Owner details in respect of single/joint owners in individual buildings						
Title document No.						
Sl.	Name of the Owner	Guardian/Spouse's Name	Ownership Share	Owner's identity document	Owner's Communication Address	Owner's Photograph

3. (b) Owner details in respect of single flat in multi-ownership Group Housing Society						
Title document No.						
Sl.	Name of the Owner	Guardian/Spouse's Name	Ownership Share	Owner's identity document	Owner's Communication Address	Owner's Photograph

4. Mutation No. with Date of Mutation	5. Encumbrances/Mortgage/ Other rights	6. Remarks

7. Location Map	8. Overview Map
 <b>OLC: 7J4VXFHH+2V</b> <p>To the scale (all the dimensions are in meters), Land Record Area = _____ sq. m or _____ sq. feet</p>	 <b>Not to the Scale</b>

9. Photo of the Building /If Land then with Neighbouring Structures	10. Digital Signature
	 <b>Enquiry Officer</b> <b>City/District/State</b> Generated on date: 22.11.2024
<b>Note:</b> This is a digitally signed document does not require physical signature.	

This proforma is indicate of minimum fields to be filled up which may me amended by the State/UTs depending upon regulatory framework/field requirements.



# **Notes for the Survey Department:**

1. Plot No: In case of planned colonies, Plot Nos are assigned by the Development Bodies/Authorities concerned. Plot IDs are not in practice and should be assigned by the said bodies/authorities. Property IDs are assigned by the Property Tax Authorities.
2. City Survey No: This is urban equivalent of the Rural land Survey No/Khasra No.
3. Details of the plot of a land are to be filled in the part 1 of the Property Card.
4. In case of lease hold property, date on which lease ends should be filled in the relevant field in part 1.
5. Either Part 1 & 2(a) or Part 1 & 2(b) will be applicable in case of individual buildings and or multi-ownership buildings respectively.
6. In case of a standalone / independent plot, the details of the plot are to be included in the Part 1 whereas the details of the building are to be filled in the Part 2(a).
7. In case of a multi-ownership buildings, the details of the plot are to be filled in the Part 1 and the details of the building to be filled in the Part 2(b).
8. Details of the owner and his/her communication address in respect of single/joint ownership in individual buildings are to be filled in 3(a).
9. Details of the owner and his/her communication address in respect of flat in multi-ownership group housing society are to be filled in 3(a).
10. The photograph of the property (Part 9) is proposed to be captured at the time of field survey. A sketch of the Tower with its details, with a highlight on the flat No described in the property card should be given in this part.
11. Ownership data should be compiled and maintained in excel sheets, for reference and for generation of the property card.
12. An example for compiling (in case of group Housing multi-story Apartments/flats Societies is given below:
  - i. Name of the Society: Shramjeevi Co operative Group Housing Society Ltd., Dwarka sector-5, New Delhi-110075.
  - ii. No of Towers: 5
  - iii. Tower wise No of flats:  
(1) Tower A: 15, (2) Tower B: 20, (3) Tower C: 20, (4) Tower D: 15, (5) Tower E: 15

Flat Layout plan of Tower A:

51	52	53
41	42	43
31	32	33
21	22	23
11	12	13

**Names of owners (As available in property tax data): Tower A:**

Flat No	Name of the owner
11	AAA
12	BBB
13	CCC
21	DDD
22	EEE
23	FFF
31	GGG
32	HHH
33	III
41	JJJ
42	KKK
43	LLL
44	MMM
51	NNN
52	OOO
53	PPP

13. Real time updated data by Integration and synchronization of data across all the stakeholder departments:

- (i) It is helpful to seed mobile and Aadhar number in the data base and integrate the data maintained by all the relevant departments like Revenue, Registration, Forest, Town Planning and Agriculture through web-based mechanisms so as to facilitate real time updation for ensuring consistency between ownership and tax data.
- (ii) The States/UTs where the records are in physical form or real-time synchronization is not possible, batch updates or scheduled uploads of offline records on property data Web-GIS platform should be carried out to maintain the data up to date.





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